331

(13)

RECEIVED
OCT 10 1968
U.S. ATOMIC ENERGY COMMISSION
Regulatory Mail Section

UNITED NUCLEAR
CORPORATION

P. O. BOX 1883
365 WINCHESTER AVENUE
NEW HAVEN, CONN. 06508
777-5361

October 8, 1968

R

In Reply Refer To: NIS-CP-REK-17

Mr. Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch
Division of Materials Licensing
U.S. Atomic Energy Commission
4915 St. Elmo Place
Bethesda, Maryland 20014

Regulatory Suppl File Cy.

DOCKETED
USAEC
OCT 10 1968
REGULATORY
MAIL SECTION
DOCKET CLERK

Subject: Fabrication of ~~Uranium~~-Aluminum Ceramic Cores - SNM-777, Docket 70-820, Section 6A

Reference: (1) NIS-CP-REK-3 dated 6/24/68

Dear Mr. Nussbaumer:

United Nuclear Corporation, Commercial Products Division, requests approval to fabricate uranium-aluminum ceramic cores at its Fuel Fabrication Operation in New Haven, Connecticut, under license SNM-777, Docket 70-820. This application supersedes our previous application, submitted as Reference (1) and subsequently withdrawn.

Enclosed are eight (8) copies of this application, which include pages for insertion in the existing license, sketches and layout drawings.

w/holding granted per our 11-22-68 letter

It is requested that Layout Drawing B-304236 and the sketch marked as proprietory be withheld from Public Documentation, and treated as proprietory to United Nuclear Corporation. We make this request since layout of manufacturing facilities indicate our own methods for controlling the flow of work as well as the specific items and numbers of various types of equipment used in this fabrication. It is our feeling that the disclosure of this information within the public domain would permit our competitors or other concerns interested in competing to duplicate our equipment layouts and flow of work, without the investment of budget funds that were required for United Nuclear Corporation to arrive at this point in its manufacturing facility. The drawing and sketch referred to are submitted primarily for background information, and do not materially affect the safety evaluation. That information which is disclosed and would be released to the Public Document Room, together with the information already on file, would enable an interested member of the public to assure himself of the safety of the operations.

SEE SEPARATE FOLDER FOR MATERIAL WITHHELD IN ACCORDANCE WITH SECTION 2.790 of PART 2
Information in this record was deleted in accordance with the Freedom of Information Act, exemptions 4
FOIA-2004-0234

PDR w/o Proprietary Drawing and Sketch
10/11/68
RRR
Crit. Br. 10/11/68 - RRR

ACKNOWLEDGED

4547 V-8

Your early review is respectfully requested.

Very truly yours,

L J Swallow

Louis J. Swallow
Nuclear & Industrial Safety Manager
Commercial Products Division

REK:gd
Attach.

Regulatory Suppl File Cy.

Section 6A: U-Al Fabrication Procedures and Limits - Alternate Process Steps for Fabrication of U-Al Ceramic Cores

I. GENERAL

This subsection covers the fabrication of UAL_X ceramic cores. UAL_X is a fine mesh uranium-aluminum powder with a bulk density of 2.6 grams per cubic centimeter and a U-235 weight fraction up to and including .70. Compacts contain UAL_X, aluminum and sometimes nuclear poisons such as B_4C powders, with a theoretical density of 6.03 grams per cubic centimeter and a U-235 weight fraction up to and including .50. The process is shown on the attached flow diagram.

These operations will be performed in Building 19H. The processing locations and a general equipment layout are shown on Drawing B-2098. A more detailed layout of the UAL_X process area is shown on the attached sketch.

Except for the specific size containers described in II, all containers will have a capacity of 1 gallon or less.

II. PROCESS DESCRIPTION

Ex. 2

Ex. 4

Ex. 2

Ex. 4

III. SUPPORT OR AUXILIARY OPERATIONS

A. Process

Other work benches, tables or hoods may be used for support or auxiliary operations. Generally, these benches or tables will be used to place containers, blenders, tote boxes, etc. on them during transfers between normal process steps. No loose powder will be allowed out of containers.

B. Nuclear Safety

No more than 700 grams of U-235 will be allowed out of a container or as a group of small containers or pieces. This is the standard dry operation limit. Containers will have either a safe volume or safe cross section as described in the operations above.

IV. INTERACTION BETWEEN PROCESS OPERATIONS

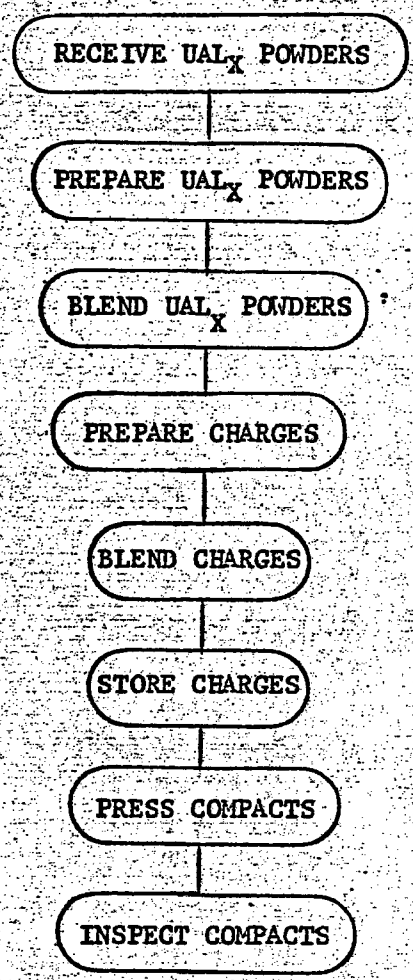
The interaction between process operations is not calculated. Each operation, as listed in II above, is shown on the attached layout sketch. Generally, process operations are separated by three feet, exclusive of ports or shelves in storage devices. This process area has a floor area of approximately 819 square feet (21' x 39"). Using a safe surface density of 175 gm U-235 per sq. ft., a process area limit of 143 kgs of U-235 will be established.

$$\text{Process Area Limit} = 819\ ft^2 \times 175\ gm\ U\text{-}235/ft^2 = 143\ kgs\ U\text{-}235$$

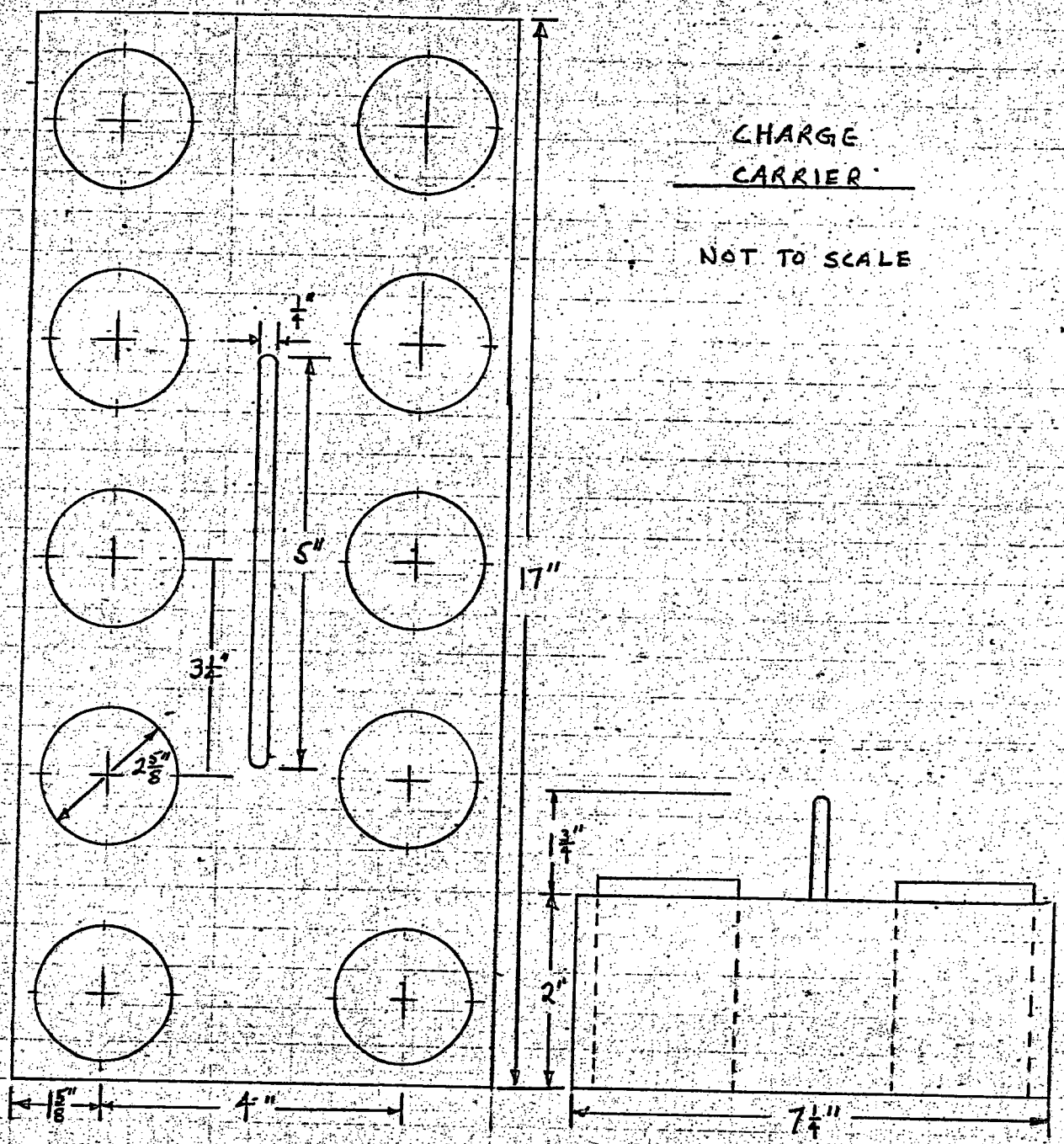
The safe surface density of 175 grams of U-235 per sq. ft. of floor area was obtained by replotting the data on Fig. 11, TID-7028, in terms of U-235 content per square foot of planar area versus U-235 density. It is noted that the curve has a minimum at about 350 grams of U-235 per square foot. A safety factor of 2 was applied to obtain the limiting value. This limit was then checked against the minimum critical, but bare, surface density to determine the fraction critical. The fraction critical is approximately 0.3. Therefore, this limit meets the criteria set forth in LA-3366.

V. HEALTH PHYSICS

The UAL_X operations will be performed in accordance with the existing health physics procedures. Operations involving UAL_X powder will be performed in glove boxes, or with local ventilation. Initial operations will be monitored by health physics to assure that the ventilation and contamination control procedures are adequate for processing UAL_X. Procedure and/or ventilation modifications, if required, will be implemented prior to routine operations.



LICENSE: SNM-777; DOCKET: 70-82
SECTION: 6A
UAL_X PROCESS FLOW
DIAGRAM

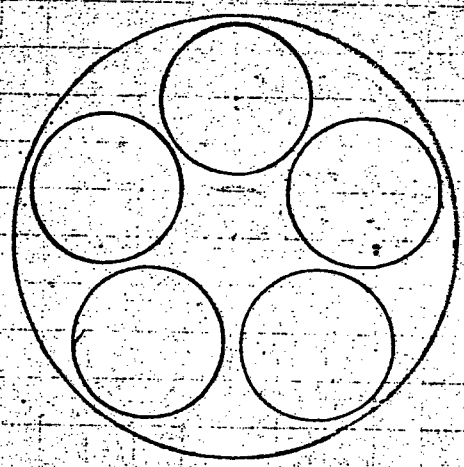


CHARGE CARRIER

NOT TO SCALE

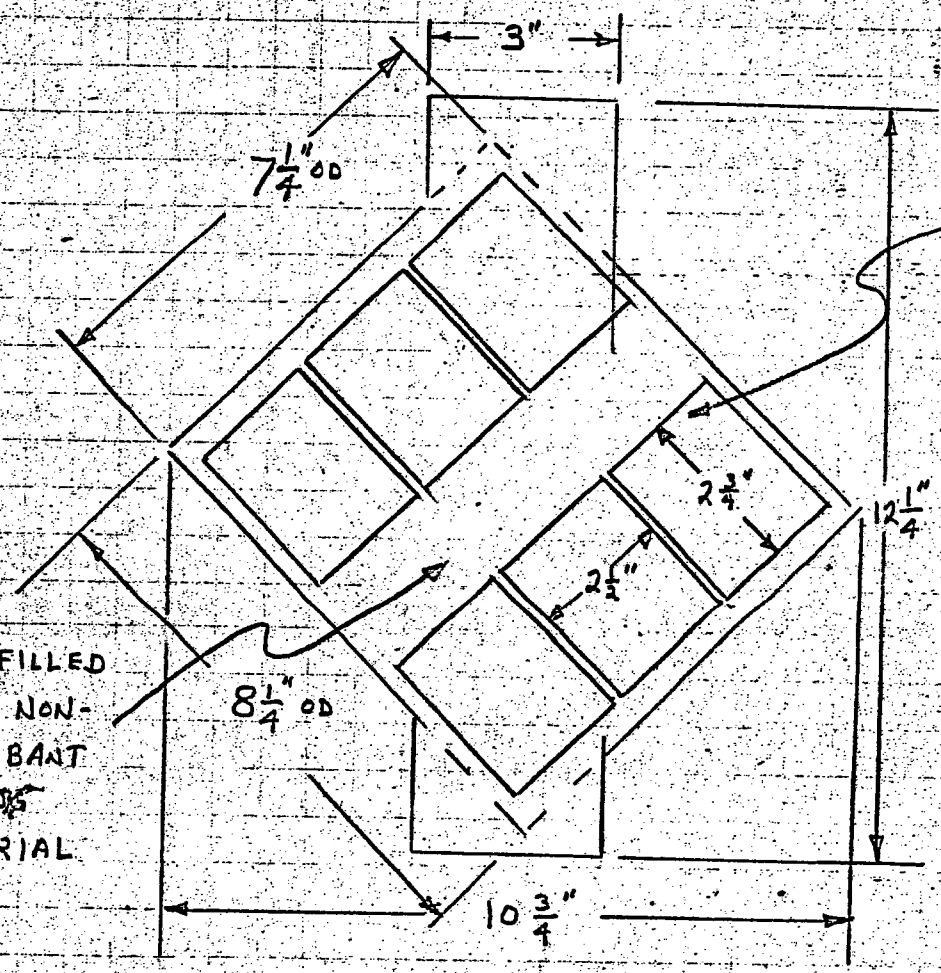
LICENSE: SNM-777
DOCKET: 70-820
SECTION: 6A

UALX-AL-B_4C POWDER BLENDING LAYOUT



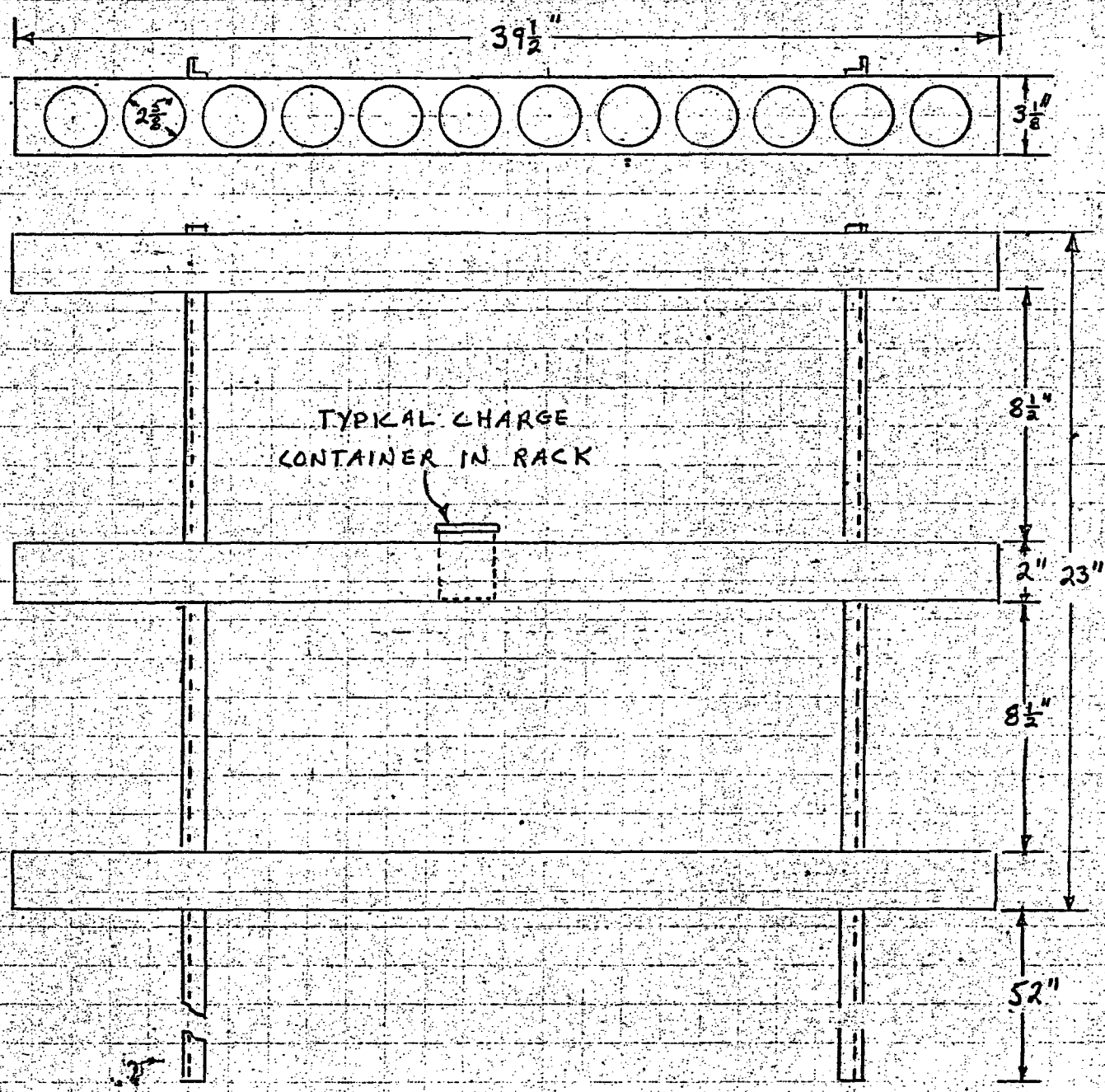
OBLIQUE CAN
VOLUME = 5.58 L

CHARGE CONTAINER
VOLUME = 0.118 L



LICENSE: SNM-777
DOCKET: 70-820
SECTION: 6A

CHARGE STORAGE RACK



LICENSE: SNM-777
DOCKET: 70-820
SECTION: 6A