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**UNITED NUCLEAR**  
C O R P O R A T I O N

March 12, 1965

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

NLS-123

Mr. Donald A. Nussbaumer, Chief  
Source & Special Nuclear Materials Branch  
Division of Materials Licensing  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

Subject: Amendment to SNM 777

Dear Mr. Nussbaumer:

Please amend License SNM 777 to incorporate changes as indicated on  
the attached revised pages and drawings.

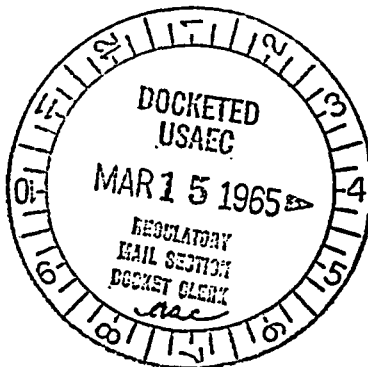
Very truly yours,

*D. F. Cronin*

DFC:tc

D. F. Cronin  
Director of Licensing

attachments



1. S. ATOMIC ENERGY COMM.  
REGULATORY  
MAIL SECTION

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ACKNOWLEDGED

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CORPORATION

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**SUBJECT: PROCESSING - FACILITIES AND EQUIPMENT**

**ISSUED March 10, 1965**

Head Ends Processing

**SUPERSEDES**

**302.8 Uranium Bearing Scrap Containing Combustible or Volatile Material**

**302.8.1 General Description Oxygen Burning Facility**

Uranium compounds with uranium density equal to or less than 3.2 gms/cc will be converted to uranium oxides, by discharging pulverized powder into a vertical tube together with oxygen rich gas, collected in portable containers, and dissolved in nitric and/or other acids to make uranium solutions which will be processed as described elsewhere in the license. The location of this equipment is shown in attached Drawing 602/3 as revised. Equipment is shown in Figure 3.

Coated uranium compounds will be weighed and loaded into one gallon containers in Glove Box 1-L-1 or in Hood 1-L-14 as described in Section 302.2.2 and 302.2.3. These containers will be transferred, one at a time, to the Tray Dissolver described in Section 302.3.1.2 for decoating, as described in Section 302.3.2 et seq. The filtrate will be analyzed for uranium content. If this solution contains uranium above the discard limits, it will be stored for future recovery; if below discard limits, solution will be transferred to the waste treatment tanks. (11 liter bottles will be used for the transfer). The de-coated scrap will be dried (1-H-8 or 1-H-4) and transferred to the Pulverizer, 2-K-1 in Glove Box 2-L-2 and/or Pulverizer (1-K-5) in 1-L-9B. (302.2.5)

Uncoated uranium compounds will be dried, if necessary in 1-H-7 or 1-H-4 before transferring to the Pulverizer (2-K-1) in Glove Box 2-L-2 and/or Pulverizer 1-K-1 in 1-L-9B.

The receiver, from Pulverizer 2-K-1, restricted to one gallon capacity, is normally a hopper container (2 X 1, 2, 3, 4, 5) which also serves as a transfer vessel, burner feed and collector hopper. This container is 5" ID X 12" long tapering to a 3" diam. neck (30° taper) with a mechanical valve closure. When Pulverizer 1-K-1 in Hood 1-L-9B is used, a one gallon plastic bottle, or a hopper container may be the receiver. Transfer from a bottle to the 2 X 1, 2, 3, 4, 5 containers will be in Glove Boxes 1-L-9A, 1-L-14, or 2-L-2.

The container holding dry pulverized material is inverted and attached to the feed hopper at the top of the Tower Reactor (2R-1). The materials fall vertically thru the heated oxygen rich atmosphere in the Tower and are collected at the base in a feed container (2 X 1, 2, 3, 4, or 5).

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**SUPERSEDES**

302.8.1 (continued)

Solids are collected at the bottom of the tower in one of the special feed hopper containers (2 X 1,2,3,4,5). Gases pass through a separator cyclone and a cross-over pipe (2-X-8) which is a 1-1/2" dia. Sch 40 pipe which intersects the 5" Sch 40 1'10" long pipe section at the bottom of the Reactor Tower. This cross over pipe terminates at the Filter Housing (2-F-2) which is a 3-1/2" Sch 40 pipe 8' long. This Filter Housing contains a filter insert which is also 8' long, a 1-1/2" dia. grilled pipe wrapped with 200 mesh wire cloth. The Reactor Tower and Filter Housing are separated by 60", as shown on the attached sketch.

At the bottom of the Filter Housing is another feeder hopper container which further collects any solids that may carry over from the Tower Reactor and also collects fines that do not pass the filter.

Gases pass out the filter through the wire mesh, a pressure control valve and through two 8" x 8" x 5-7/8" absolute filters (2-F-1A, 2-F-1B) and are discharged into a 1-1/2" dia. stack to the atmosphere. Ventilation boxes enclose the three attached hopper containers and are exhausted through a separate system of ducts through a 24 x 24 x 12" absolute filter (2-F-6). See attached drawing E-7533, Revision 1.

If further ignition is deemed necessary on inspection of the burned powder in Hood 1-L-1, the material may be taken to Hood 1-L-9A or 1-L-4 for transfer to the Calciner trays directly and calcined in 1-H-7 as described in Section 302.2.7 and/or transferred to Hood 2-L-2 or 1-L-9B for pulverizing if needed and re-burning or calcining. The reprocessed powder will be then dissolved as described earlier.

302.8.2 EQUIPMENT

302.8.2.1 Pulverizer 2-K-1

The Pulverizer 2-K-1 will be located in Hood 2-L-2. A total of one gallon will be permitted as a batch. The material is hand fed from one gallon containers into the Hopper at the top of the Pulverizer. The receiver vessel for the Pulverizer is a 5" diameter x 12 long container with 3" diameter neck which also serves as a transfer container for further processing of the powder. The same vessels are used as hopper containers and are designated as 2-X-1, 2, 3, 4, 5. As an alternative, a standard one-gallon container may be used.

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**SUPERSEDES**

302.8.2 (Equipment - continued)

302.8.2.2 Special Containers 2 X 1, 2, 3, 4, 5

These special containers are used interchangeably for transfer, feed hoppers, and collectors. Each container is a maximum of 5" ID x 12" long with a tapering neck from 5" to 3" (approx. 30° taper 4" long). Each container is fitted a mechanical valve at the end of the 3" section to insure contents are retained. Containers are fabricated from metal of all welded construction, generally of a stainless steel or monel.

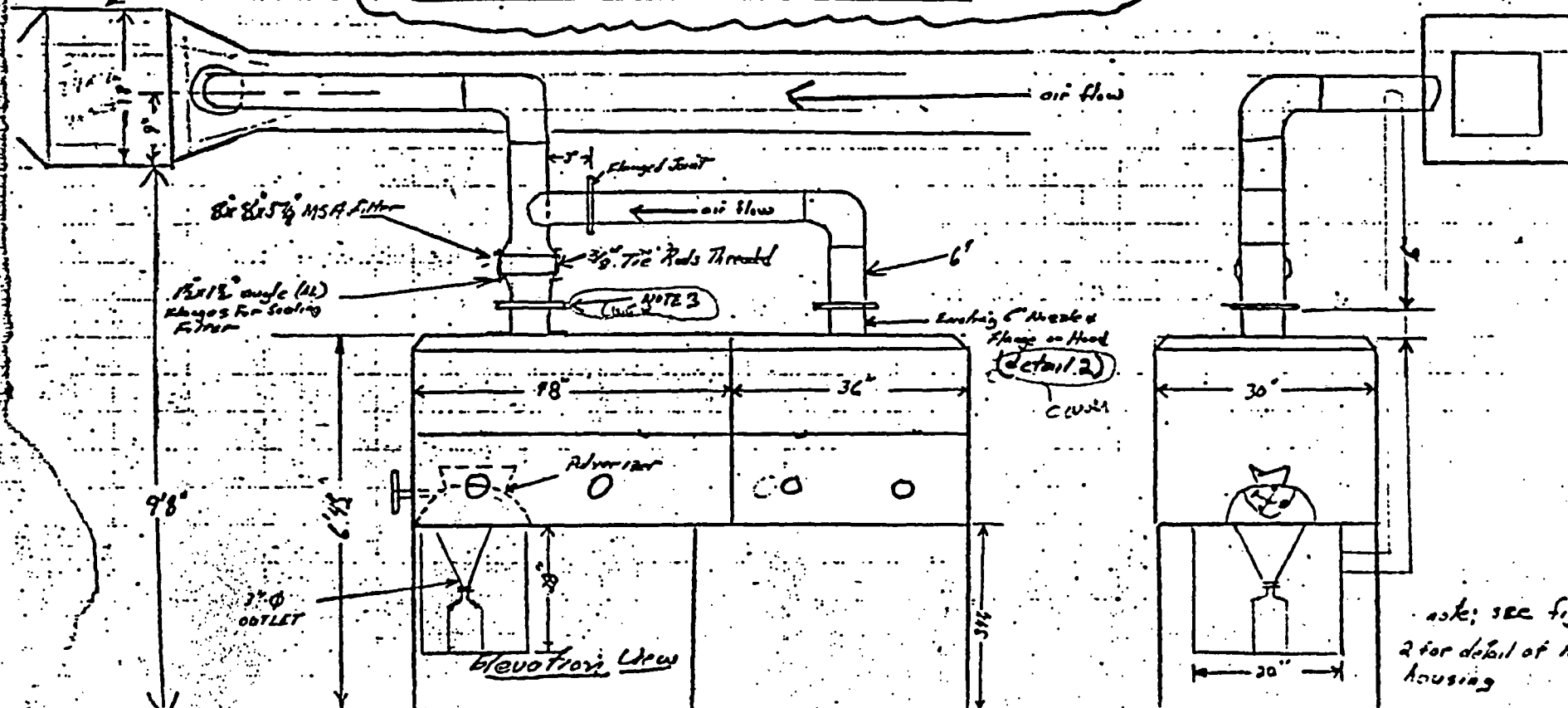
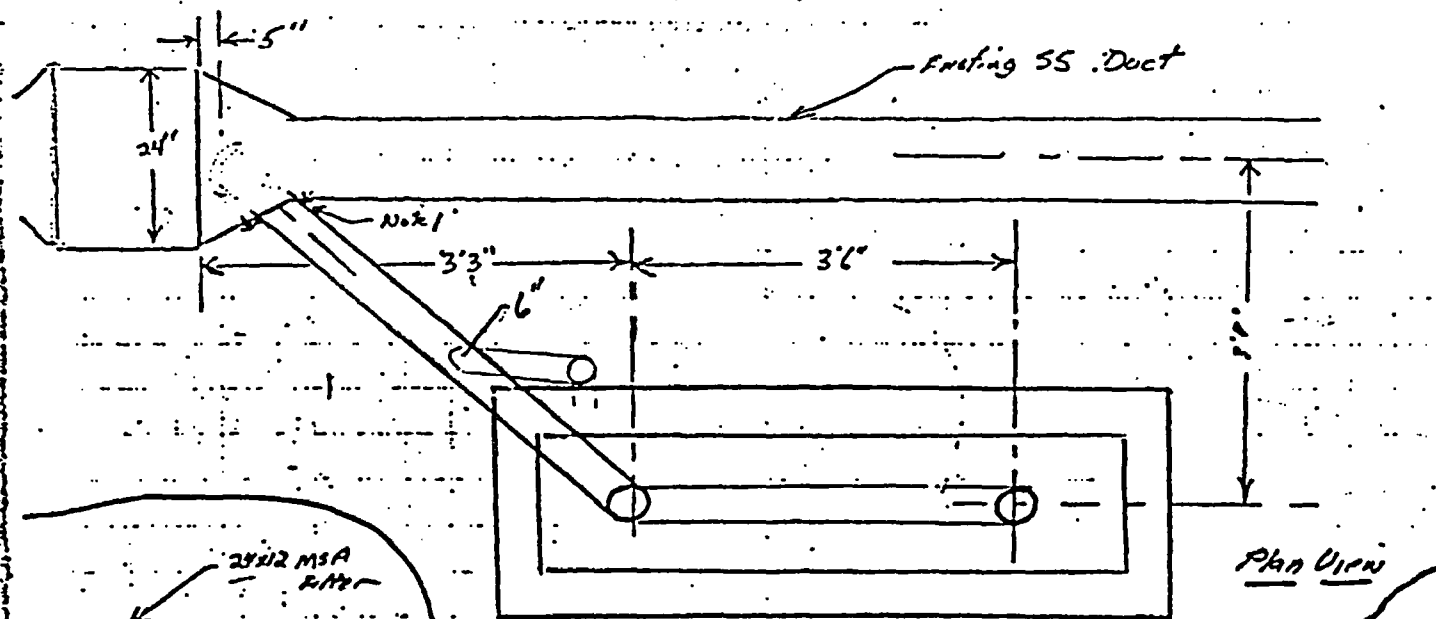
302.8.2.3 Hood 2-L-2

This Hood is 30" deep x 84" long x 42" high. The section housing the Pulverizer is 48" long and is connected to the adjacent chamber by a sliding vertical door. The drive motor for the Pulverizer is externally mounted. Ventilation to the Hood is provided by three ducts leading from each end of the Hood and the withdrawal chamber to an existing exhaust system. The air from the Pulverizer chamber is filtered through an 8 x 8 x 5-7/8 absolute filter before entering the present exhaust system which has additional filtering. The air from the entrance and withdrawal chamber passes into the present exhaust system before additional filtering. See Figure 1 and 2.

This Hood sets 3' off the floor and is located 4' north of 1-L-9 and 10' south of 1-D-41. The west end of the Hood is contiguous to Column 6E. Drawing A602/Rev is attached showing this location. The materials are collected in the 5 ID x 12 long hopper container (2-X-1, 2, 3, 4, 5) or 1 gallon bottles.

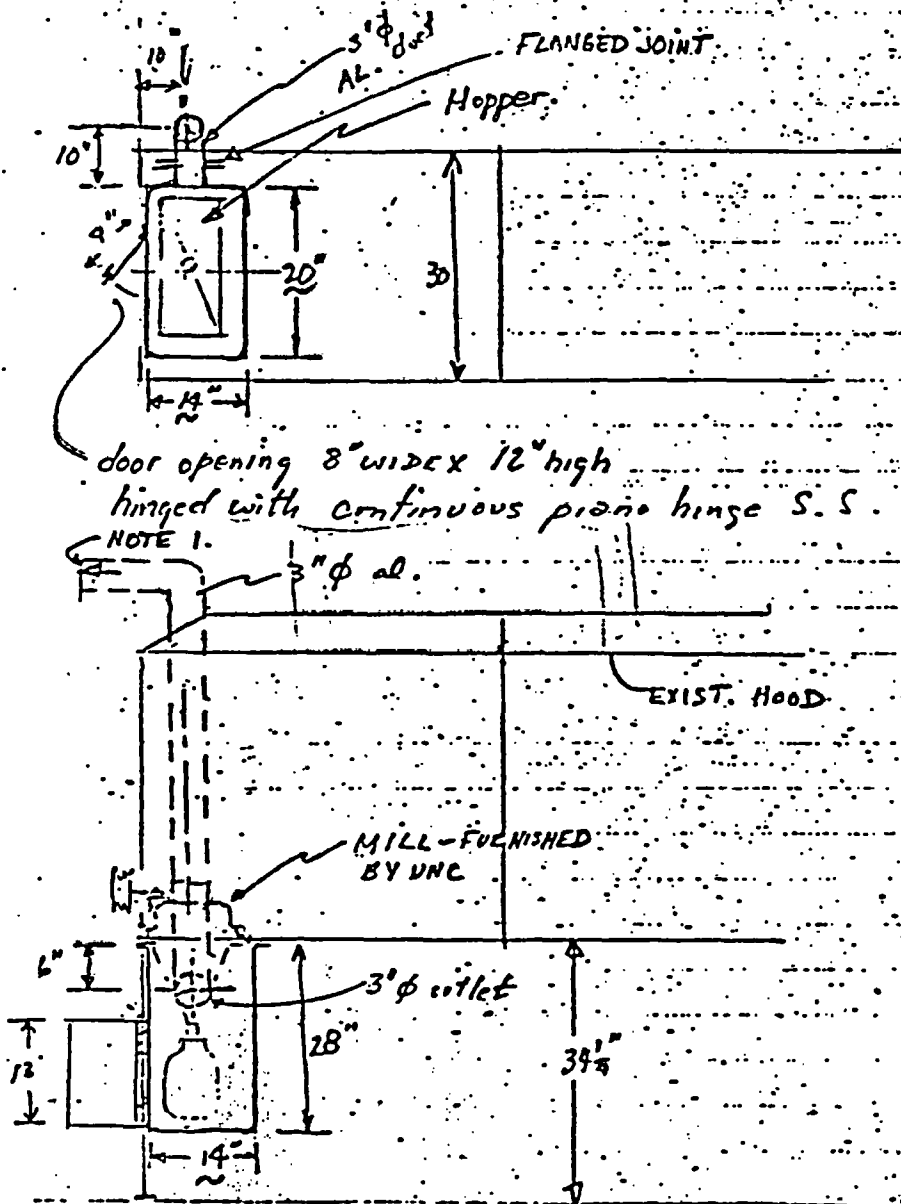
302.8.2.4 Tower Reactor 2-R-1

The Tower Reactor is a 4" ID x 8' long Sch 40 monel pipe with a 1'10" long 5" ID section at the bottom to which the hopper container (2-X-1,2,3,4,5) is attached to receive the uranium rich ash or fines. This Tower Reactor is insulated and electrically heated (1 Kw heater) at the top. The Tower is wrapped with 1/2" dia. tubing tack welded to the pipe for external cooling by passing either air, water or steam through the coils.



note: see figure 2 for detail of hopper housing

# DIAGRAM 2



## NOTES:

1. Connect, 3"  $\phi$  Al. duct to 6" duct as shown on RI 386 INQUIRY.

2. Material of const. 18-8 type S.S.

door opening 8" wide x 12" high hinged with continuous piano hinge S.S. and latched at top & bottom.

NOTE 1.

2/ 1/65  
Hopper Housing  
and exhaust duct  
VNC. RI

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SUPERSEDED

302.8.2 (Equipment - continued)

302.8.2.5 Crossover (2 x 8)

1-1/2" diameter schedule 40 pipe approximately 5 feet long connecting Tower Reactor 2-R1 with the Filter Housing 2-F2. This pipe intersects the 2-F2 and 2-R1 tangentially to form a modified cyclone separator.

302.8.2.6 Filter Housing 2-F2

This Filter Housing is a vertical 3-1/2" schedule 40 pipe 8' long. The filter insert is a 1-1/2" diameter drilled pipe wrapped with fine mesh wire cloth.

302.8.2.7 Nuclear Safety Considerations

Each individual unit is restricted to either 5" diameter cylinders or a total volume per container of one gallon. Interaction between units is negligible. The solid angle between the Tower Reactor (2-R1) considered as the most reactive unit, the overhead storage pipes and the adjacent 4" diam. filter (2-F1) is less than 2 steradians. (Between 2R1 and 2F1 conservatively assumed as both 5" ID and infinitely long  $\Omega$  is 0.162 steradians, between 2R1 and overhead pipes  $< 1$  steradian).

The intersections of the 1-1/2" diameter crossover pipe (2x8), conservatively evaluated as crosses following the method described on page 20, TID 7016, Revision 1, have an equivalent diameter of 3.71 inches each.

Health Physics

Ventilation and filtration of the exhaust air are provided as shown in the attached drawings Figures 1 and 2, and Dwg. E-7533, Rev. 1 and described earlier.

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MAIN FLOOR PLAN

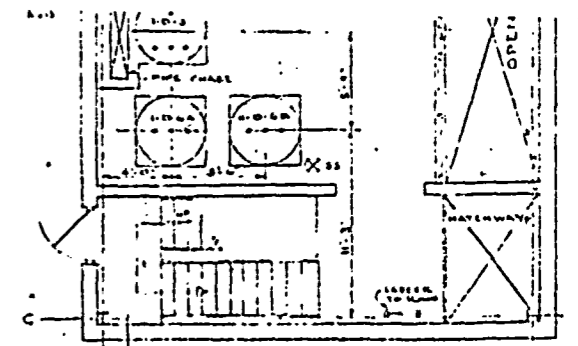
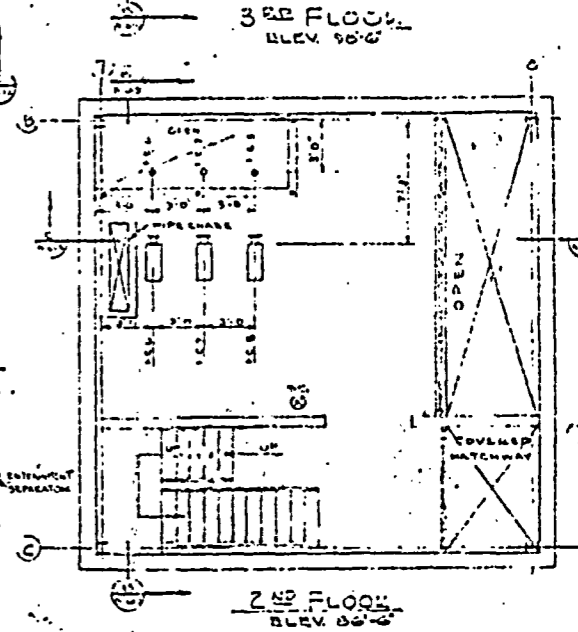
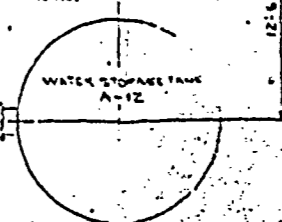
ELEV. 10'-0"

ROOF PLAN

UNITED NUCL  
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CHEMICAL DIVIS  
SCRAP RECOVERY FA  
EQUIPMENT LAYOUT PLANS



DESIGNED BY WATSON & WATSON	APPROVED BY WATSON & WATSON	DATE 11-1-60	PROJECT NO. 2296-C
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SCRAP RECOVERY FA  
EQUIPMENT LAYOUT PLANS  
11-1-60

