

COMBUSTION ENGINEERING

0700 0036 - Docket

License SNM - 33

release

June 6, 1988

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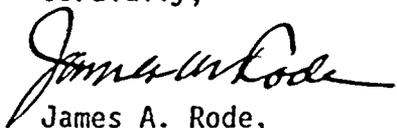
George Bidinger,
Uranium Fuel Section
Division of Fuel Cycle, Medical
Academic, and Commercial Use Safety
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Bidinger:

Enclosed are revised pages to the application for amendment of License SNM-33 to increase the U^{235} enrichment limit to 5.0%. Revisions have been made pursuant to your discussions with members of our staff. Substantial changes from the previous submission are denoted by an asterisk (*) in the right page margin. A listing of pages comprising this application is also enclosed.

Again, we certainly appreciate your efforts to expedite processing of this amendment.

Cordially,



James A. Rode,
Plant Manager

JAR/ead
JAR/88/15082

Enclosures

H-62
JUN 9 1988

**SNM-33 AMENDMENT APPLICATION
LIST OF PAGE REVISIONS**

<u>Page #</u>	<u>Revision #</u>	<u>Date Revised</u>
I.4-6	3	06/06/88
I.4-6a	2	06/06/88
II.8-1	1	06/06/88
II.8-3	1	06/06/88
II.9-33	X	*DELETED

4.2.3 Safety Margins for Individual Units (continued)

- j)
 - 4. NO_x Scrubber
 - 5. Centrifuge Supernate Recycle
 - 6. UO₄ Precipitate Overflow Vessel
- k) The hydrometer on the air inlet to the Dry Blender will be set to alarm at no more than 5% water and checked on a six month period.
- l) The water content will be verified to be less than 0.05 w/o in storage cans on the conveyor storage area on a production lot basis (contents of two dry blenders).

4.2.4 Limits for Safe Individual Units (SIUs)

Table 4.2.4

Safe Individual Unit Limits for $\leq 5.0\%$ enriched UO₂ at optimum moderation. All Mass and Volume limits have been adjusted to provide constant spacing areas for the enrichment shown. Heterogeneous limits have been developed with optimum rod sizes taken to allow for pellet chips, etc.

Nominal Enrichment/ Mass (Kg UO ₂)	<u>HOMOGENEOUS</u>		<u>HETEROGENEOUS</u>	
	Limit	f*	Limit	f*
- 2.5% U ²³⁵	54	.19	50	.26
>2.4 - 3.0% "	41	.23	38	.29
>3.0 - 3.2% "	36	.23	36	.29
>3.2 - 3.4% "	35	.25	33	.29
>3.4 - 3.6% "	32	.26	30	.30
>3.6 - 3.8% "	28	.26	27	.29
>3.8 - 4.1% "	24	.25	24	.27
>4.1 - 4.3% "	22	.26	22	.27
>4.3 - 4.5% "	20	.27	20	.27
>4.5 - 4.7% "	18	.26	18	.27
>4.7 - 5.0% "	16	.27	16	.27

4.2.4 Limits for Safe Individual Units (SIUs) (continued)

<u>Nominal Enrichment/ Volume (liters)</u>	<u>HOMOGENEOUS</u>		<u>HETEROGENEOUS</u>		*
	Limit	f*	Limit	f*	
- 3.5% U ²³⁵	31	.39	22	.40	
>3.5 - 4.1	25	.38	18	.38	*
>4.1 - 5.0	22	.22	9	.38	*
<u>Cylinder Diameter (inches)</u>					
- 3.5%	10.7	.34	9.5	.36	
>3.5 - 4.1	9.8	.33	8.9	.34	*
>4.1 - 5.0	9.2	.34	8.4	.35	*
<u>Slab Thickness (inches)</u>					
- 3.5%	5.1	.36	4.4	.22	
>3.5 - 4.1	4.6	.32	3.9	.20	*
>4.1 - 4.3	4.5	.31	3.7	.20	*
>4.3 - 5.0	4.0	.29	3.5	.20	*

*Fraction of the equivalent unreflected critical spherical volume or mass.

4.2.5 Surface Density Method

The surface density method may be used to evaluate arrays of SIUs where each mass limit has a fraction critical of 0.3, and volume and cylinder limits have a fraction critical of 0.4. Spacing for mass limited Safe Individual Units is such that the contained UO₂ and

8.0 PROCESS DESCRIPTION AND SAFETY ANALYSIS

This section contains detailed descriptions of all manufacturing operations in the Hematite facility. Sufficient detail is provided to permit an independent verification of the adequacy of controls for the purpose of assuring safe operations.

Nuclear criticality limits are taken from Chapter I.4.0. However, the intricacies of the equipment in certain operations require further analysis, which is provided in Chapter II.9.0. Details of specific calculations used to support various aspects of this analysis are also provided in Chapter II.9.0.

Present arrangements of equipment are shown in the drawings provided in Chapter II.10.0. These arrangements may be changed in accordance with the procedures of Part I. Therefore, this is considered to be a typical analysis for operations conducted within the scope of this license.

8.1 UF₆ to UO₂ Conversion

This system is designed to convert uranium hexafluoride to UO₂ powder suitable for pressing into fuel pellets. The equipment is designed to handle a maximum enrichment of 5.0% U²³⁵. The operation is depicted schematically in Figure II.8.1. *

8.1.1 Receive and Store UF₆

UF₆ is received in standard 2-1/2 ton cylinders in approved shipping packages. Upon receipt, the cylinders are placed in the UF₆ cylinder storage area which holds up to 54 cylinders. Eighteen additional cylinders may be located adjacent to the vaporizers near the cylinder scale, or in shipping packages

8.1.1 Receive and Store UF₆ (continued)

on the Oxide Building dock.

As required, a UF₆ cylinder is removed from its shipping package or storage and connected to the conversion equipment.

The UF₆ storage area is separated from the dock by more than 12 feet.

The individual UF₆ cylinders filled with 5.0 wt % U²³⁵ are a safe internally moderated controlled subcrit. On the storage pad they are spaced one foot apart in a planar array. This assures a nuclearly safe storage. *

8.1.2 UF₆ Conversion Process

Vaporization of the UF₆ by heating the UF₆ cylinder in a steam chamber is the first step of this process. There are two chambers but only one cylinder is on line at a time. When one cylinder is almost empty, the second cylinder starts on line. Valving arrangement prevents the two cylinders from being interconnected.

A condensate line drains the steam chambers through an air gap to take steam condensate to the drain. The drain line contains a conductivity cell and an automatic shut-off valve.