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COMBUSTION ENGINEERING 07000036-Docket
Licensee SNM-33

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

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SNM-33 AMENDMENT APPLICATION
LIST OF PAGE REVISIONS

Page #	Revision #	Date Revised
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. UO_4 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 ≤ 5.0% enriched UO_2 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)	HOMOGENEOUS		HETEROGENEOUS		
	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)

Nominal Enrichment/ Volume (liters)	HOMOGENEOUS Limit	f*	HETEROGENEOUS 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	*
Cylinder Diameter (inches)					
- 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	*
Slab Thickness (inches)					
- 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 UO_2 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 UF_6 to UO_2 Conversion

This system is designed to convert uranium hexafluoride to UO_2 powder suitable for pressing into fuel pellets. The equipment is designed to handle a maximum enrichment of 5.0% U^{235}. The operation is depicted schematically in Figure II.8.1. *

8.1.1 Receive and Store UF_6

UF_6 is received in standard 2-/2 ton cylinders in approved shipping packages. Upon receipt, the cylinders are placed in the UF_6 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 UF_6 (continued)

on the Oxide Building dock.

As required, a UF_6 cylinder is removed from it's shipping package or storage and connected to the conversion equipment.

The UF_6 storage area is separated from the dock by more than 12 feet.

The individual UF_6 cylinders filled with 5.0 wt % U^{235} 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 UF_6 Conversion Process

Vaporization of the UF_6 by heating the UF_6 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.