

UNITED STATES GOVERNMENT

Memorandum

TO : Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch, ML

DATE: August 17, 1964

FROM : Charles D. Luke, Chief
Criticality Branch, ML

SUBJECT: THE MARTIN COMPANY, DOCKET NO. 70-58, APPLICATION DATED AUGUST 4, 1964

SYMBOL: ML:TGM

We have reviewed the subject application for amendment of Special Nuclear Material License No. SNM-53 to authorize the fabrication of a nuclear core employing U(5%)O₂ pellets. This application supersedes earlier applications dated April 1 and 9, 1964. We have the following comments:

- "1. You have not demonstrated that the H/X ratio for an individual unit can not exceed 20 which is a requirement for the use of Table IV, TID-7016, Rev. 1, in that your storage box exceeds 3.6 liters in volume. In order that we may confirm the safety of your storage, you should either:
 - "a. Confirm that the walls and ceiling of the storage area are fabricated of noncombustible materials and are of sufficient structural integrity to insure in the event of fire that hydrogenous materials will not enter the storage area as a result of sprinklers or other fire fighting means. Demonstrate that the water lines within the room can not produce a situation wherein the H/X ratio of individual units can exceed 20, or disconnect drain and cap off these lines outside of the storage area; or
 - "b. Provide a nuclear safety analysis involving calculation of k_{eff} for an individual box with the fuel rods optimally spaced and moderated and demonstrate that this storage arrangement satisfies the solid angle criterion.
- "2. Description of procedures and nuclear safety analysis for the handling and storage of uranium-bearing scrap materials generated during your proposed operations.
- "3. We recognize that your hydrogen fluoride prohibition will assure the absence of uranium from the solution while cleaning sound tubes. However, we require your description of

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procedures to be followed in the event that a faulty tube is discovered after cleaning, and of procedures to assure that there will not be a gradual buildup of uranium in solution as a result of unnoticed faulty tubes.

- "4. It is noted on the process flow chart, Fig. 1, that the criticality control for work area tube storage was stated to be 9.2" safe diameter. By your analysis (p. 6), 9.2" is shown to be the minimum critical value. The minimum critical dimensions should be reduced by .85 in order to obtain the "safe" diameter. In the storage area described on p. 5, the proposed 23.8 kg of uranium per individual container exceeds the safe value (minimum critical mass x $\frac{1}{23}$) and therefore, k_{eff} may not be assumed to equal 0.65. We can, however, concur in the safety of this proposed storage arrangement based on the safety of the 4" diameter and a k_{eff} not exceeding 0.58 for the unreflected 4" container."