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UNITED STATES GOVERNMENT

Memorandum

TO : Donald A. Nussbaumer, Chief, Source and Special Nuclear Materials Branch, DML

DATE: October 18, 1965

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

SUBJECT: MARTIN COMPANY, DOCKET NO. 70-58, APPLICATION DATED SEPTEMBER 30, 1965

DML:CB:TGM

In response to your letter dated July 13, 1965, the application revises or supplements nuclear safety analyses of operations described in the Martin renewal application dated January 28, 1965.

In answer to Item #13: Martin Company has revised U-235 mass limit for process steps in fuel preparation powder and in uranium oxide-metal oxide component fabrication. The safety of the established mass limits is based on an H/X ratio of 20 or less. For those operations where a "considerable" amount of water is intentionally present the U-235 mass limit is reduced to the always safe mass limit of 350 g. We note, however, that the established mass limits for normally dry operations exceed the minimum critical mass should accidental flooding occur. We, therefore, request that Martin either reduce the established mass (or geometry) to an acceptable value for the flooded condition, or provide a description of the controls to assure against flooding.

Martin Company has established for the majority of the operations involved in the fabrication of low enriched-tubular fuel elements coincident mass and geometry limits to assure nuclear safety. Only for one operation, Process K-acid cleaning, is additional information required. We agree that the proposed acid cleaning procedures will be safe from accidental criticality provided no uranium goes into solution. However, we require additional information concerning the applicant's procedure to assure safety if uranium does go into solution. If it is possible that a batch would be completely dissolved then the tank should be safe as a unit and, in proximity to the other tanks, and the acid should be drawn off to safe solution storage. If it is determined through inspection that there has been a penetration of the cladding then the standard operating procedures should call for a uranium analysis of the acid and specify uranium contents which would require discarding the acid before subsequent use.

In answer to Items 15 and 16: Solid angle calculations have been included to demonstrate the safety from neutron interaction between individual storage boxes of a storage rack, between racks within the operating area and between racks in process storage area. While we do not agree that the selected reference unit represents the most

reactive unit for 12 rows of storage racks within a large array, the very conservative assumption that each unit may be represented by a cylinder of diameter equal to the diagonal of the storage unit is sufficient to compensate for the selection of the reference unit.

In regard to the calculated k_{eff} value for an individual storage box, the parameters established are not sufficient to assure that this value will not be exceeded. The analysis considers an over-moderated system whereas the most effective degree of moderation must be assumed, unless positive controls will insure other than optimal moderation in the event of flooding. Also, the most reactive fuel materials should be considered. Therefore, we request that Martin Company revise their k_{eff} analysis considering these comments.

In addition to the information requested, Martin Company has provided a new section entitled, "Shipping Criteria". It has been noted that the shipping arrangements specified will not assure against commingling of special nuclear materials for shipments involving intermediate loading, unloading or transshipment at a terminal. It is, therefore, requested that Martin Company provide a delineation of the arrangements to be made prior to such shipments with all carriers involved and with terminal authorities to assure that their shipment will not be placed closer than twenty feet from all other special nuclear material at any time during loading, unloading, transshipment and delivery.