

UNITED STATES GOVERNMENT

Memorandum

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

DATE: February 28, 1964

FROM : Charles D. Luke, Chief
Criticality Evaluation Branch, DLR *CDL*

SUBJECT: THE MARTIN COMPANY, SHIPMENT OF URANIUM BEARING EXCESS MATERIAL
FROM MARTIN-MARIETTA CORPORATION, DOCKET NO. 70-58, AMENDMENT
NO. 20, DATED FEBRUARY 14, 1964

REFERENCES: (1) 2/17/64 Meeting, Bethesda, Charles Keller and DLR personnel
(2) 2/25/64 Telecon with Charles Keller and K. E. Lauterbach, DLR
(3) 2/26/64 Telecon with Charles Keller and K. E. Lauterbach, R. L. Stevenson and C. D. Luke

SYMBOL: DLR:RLS

Martin-Marietta proposes to ship air filters containing enriched uranium oxide to Davison Chemical at Erwin, Tennessee. The filters would be packaged in 55 gallon drums and wooden boxes and shipped with exclusive use of the van in a single shipment. (The proposed amendment described other waste materials and containers that have not been considered in this evaluation.)

Based upon our review of the application, we see no objection to that part of the shipment comprising 25 drums of small filters subject to the proviso that each 55-gallon drum containing 20 filters will contain no more than a total of 800 grams U-235. If the drum is to contain less than 20 filters then the 800 gram limit must be scaled down proportionately.

Martin Company proposed (Ref. 1) that the large filters be packaged in 110 gallon steel drums to which we had no objection. However, the large filters would not fit the 110 gallon drums and Martin (Ref. 2) proposed to package the large filters in wooden boxes. In order to permit our nuclear safety analysis of this modification, we request that Martin analyze the hazards, taking into consideration the effects of accidental impact, fire and wetting. The safety analysis should evaluate carefully any possible re-orientation of the uranium resulting from the series of accident conditions. If the large filters were packaged in steel drums, we would see no objection to shipment of these filters and can see no credible likelihood of hazards due to neutron interaction between 13 packages of the large filters and 25 packages of the small filters.

B/15

The medium size filters, packed one to a 55 gallon drum and each containing a maximum of 870 grams U-235, represent a serious problem and we are unable to agree with the applicant as to the safety of the eight packages. We do not agree with his assumed multiplication factor for a unit and we are convinced that further information is required on the structural integrity of the placement of these packages on the vehicle, inasmuch as nuclear safety of this part of the shipment is based on spacing being maintained between the eight packages. We request that the applicant include in his nuclear safety analysis the assumption that water would leak into each drum thoroughly wetting the filters, but that the accident would not necessarily involve complete flooding to the extent of isolating one unit from another. The applicant should compute by acceptable procedure the value of k_{eff} for the filter with all voids filled with water and assuming no reflector. He may use this k_{eff} to obtain the corresponding maximum solid angle, and space the eight packages so as not to exceed this solid angle. From the standpoint of neutron interaction with the other two types of packages on the vehicle, we would consider it acceptable if the medium filters were shored in one end of the vehicle, the large filters shored in the center and the small filters in the other end. Both this shoring and the fixment of the medium size filter packages should be designed to maintain separations in the event of credible accident. We feel that this would involve design taking into consideration a force of (b)(4) Ex4 Martin should be informed that we would be pleased to assist them in any way we can. I told Mr. Keller that Mr. Christian Beck would review the structural integrity and would be pleased to lend his assistance on this particular aspect of the problem.

Mr. Keller stated that one of his associates would telephone us next Monday afternoon, March 2, but I suggest that you refer the results of our present review, as outlined above, to Martin at the earliest opportunity.

cc: C. Beck, DLR