

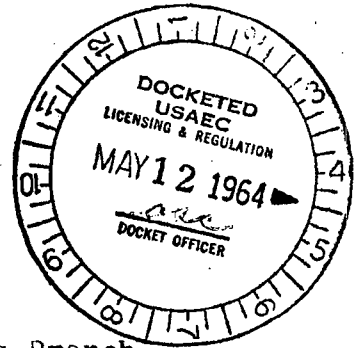
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NUCLEAR
DIVISION
Baltimore,
Maryland
21203

MARTIN COMPANY

Refer to:
ACC-287

May 11, 1964



U. S. Atomic Energy Commission
Source and Special Nuclear Materials Branch
Washington, D. C.

Attention: Mr. Donald A. Nussbaumer, Chief
Source and Special Nuclear Materials Branch

Subject: Information for Shipment of Uranium bearing
solutions.

Reference: Shipment of Uranium Bearing Excess Material
from Martin Marietta Corporation (Proposed
Amendment No. 20 to SNM-53)

Gentlemen:

In our letter of February 14, 1964, we transmitted the reference document which, in general, described the Martin plans for shipment of excess uranium bearing material to a recovery site. Since that time an approved shipment of uranium bearing air filters has been accomplished. We are now submitting detailed shipping information for uranium bearing solutions. Shipment will be made to Erwin, Tennessee via the following route:

- U.S. Route 40 to Frederick, Maryland
- U.S. Route 340 to U.S. Route 11
- U.S. Route 11 to Erwin, Tennessee (Destination)

General Discussion -

The solution, which results from fabrication activity including pickling and cleaning operations, approximates 20,000 liters and is contained in polyethylene lined 55 gallon drums. Inventory of solution on hand as of May 1, 1964 is shown in the following table:

<u>No. of 55 Gallon Drums</u>	<u>Type of Solution</u>	<u>Percent Acid Content</u>	<u>Grams of Uranium in solution</u>
9	Water	none	1939
4	Perchloric Acid and Water	16%	680
43	Nitric Acid and Water	14%	8285
37	Sulfuric Acid and Water	18%	3395

Compliance *K.R.*
PDR

B/S

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Minor additional quantities will be generated during the completion of the program.

Containers.-

The detail of the polyethylene lined 55 gallon drum shipping container consists of a specification 2S polyethylene liner in an 18 gauge 55 gallon drum as shown in the attached drawing. Although all containers are considered in sound condition, a thorough inspection of each individual drum will be performed by Martin Nuclear Materials Management to further insure drum integrity prior to shipment.

Method of Shipment.-

Each filled container which weighs approximately 500-600 pounds will be banded to an individual pallet and placed within the shipping van as depicted in the attached drawing. Tie down of the entire shipment within the van is also shown. Stacking of drums will not be permitted and shipment of the solution previously indicated on inventory will be made by exclusive use of a van. Two such shipments are anticipated. Smaller residual quantities resulting during the completion of the program which will not constitute a van load will be included with other type material in order that exclusive use of a van may be economically employed. Shipment of all solutions is expected within a six month period.

Hazard Evaluation.-

(1) Criticality

The uranium content of each drum has been established by chemical analysis and no individual drum contains more than 350 gms of U-235. U-235 content in the drums ranges from 2-350 grams distributed as follows:

2-100 gms U-235	<u>34</u>
100-200 "	<u>27</u>
200-300 "	<u>20</u>
300-350 "	<u>12</u>

Since each 55 gallon drum contains no more than 350 gms U-235 in solution the moderator to fuel atom ratio has been calculated to be 17,900.

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Referencing Figure 1 of TID-7016, Rev. 1, "Nuclear Safety Guide" shows that moderator to fuel ratios greater than 2,000 cannot achieve criticality. Therefore, these solutions are approximately a factor of 9 overmoderated.

In addition the overall uranium concentration in the approximate 20,000 liters is less than 1 gram U-235 per liter of solution an always safe condition. Also a severe rupture of several drums by some unpredicted accident during transport would only spread the solution over the truck bed in a slab array too thin to support a nuclear chain reaction.

(2) Chemical Hazard

Recent inspection of polyethylene liners which have been used for storage of similar acid solutions over a period of two years has shown compatibility of the solution with the polyethylene liner. Acid solution inspected after storage has been clear and no settling of uranium sludge has been evident. A recent shipment of similar solution in this type container was approved and made without incident at the direction of the AEC.

We have submitted similar information to the Bureau of Explosives and would appreciate receiving approval in order that shipment may be made during the week of May 25, 1964.

Very truly yours,

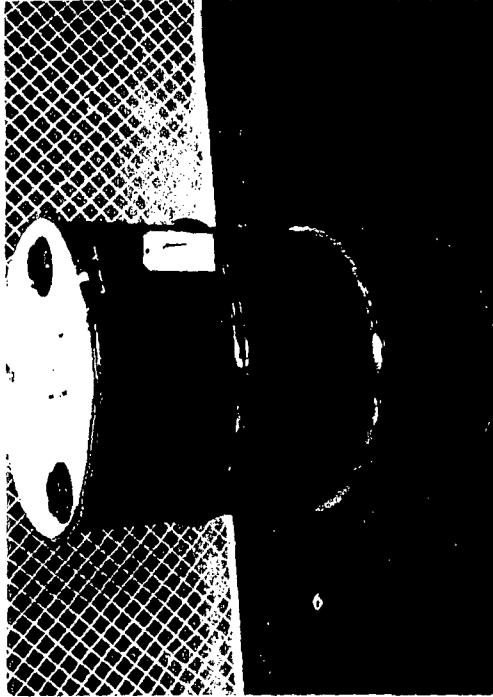
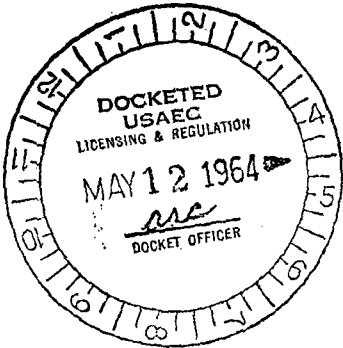


C. W. Keller
Nuclear Accountability &
Licensing Representative

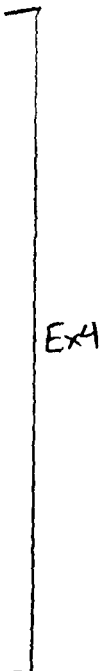
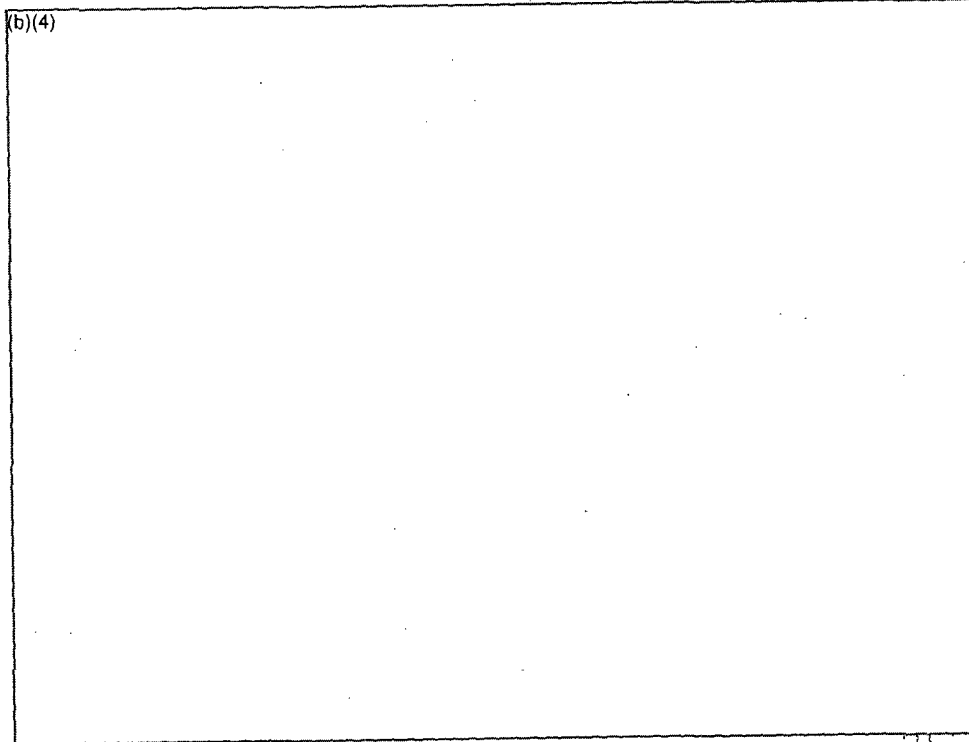
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STORAGE CONTAINERS



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