DOCKET NO. 70-58
File Cy

THE MARTIN COMPANY

Baltimore 3, Maryland

Mail No. W-722
April 18, 1960

Refer to: NMC-113

Director, Division of Licensing & Regulations
U. S. Atomic Energy Commission
Washington 25, D. C.

Attn: Mr. Lyle Johnson, Chief
Licensing Branch

Gentlemen:

Reference is made to our special Nuclear Material License SNM-53 as amended. We desire to further amend this license in order that we can proceed to ship uranium-aluminum type fuel elements to the Universities of California and Washington. For your information we have enclosed a write-up describing our proposed shipping plan and have included drawings of the proposed shipping container.

I certify that the statements made in this letter and referenced enclosures are true, complete and correct to the best of my knowledge and belief and are made in good faith.

Very truly yours,

THE MARTIN COMPANY

J. V. Loppert
Licensing Officer
Nuclear Division

JVL:WWW:cg

DOCKETED USAEC Division of Licensing & Regulation APR 19 1960 Docket Officer

Cy of this request sent Inspection 4-20-60

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PROCEDURE FOR SHIPPING URANIUM-ALUMINUM FUEL ELEMENTS

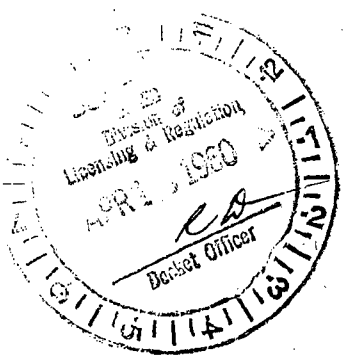
AMENDMENT TO MARTIN LICENSE SNM-53

The shipment to the Universities of California and Washington will consist of 24 each, 11 plate fuel assemblies. Each fuel plate, whether in the assembly or separate, will contain 13.2 ± 1.0 grams of U235 as 93+% enriched uranium metal in a uranium-aluminum alloy. Therefore, the 11 plate assemblies will each contain a maximum of 156 grams of U235.

Each shipment will consist of four 11 plate assemblies in the proposed container. The nominal U235 in each shipping container is 581 grams. Based on the tolerance the maximum would be 624 grams.

The shipping containers will be made from 55 gallon steel drums. The four contained fuel elements will be packed in a wooden box and located in the center of the drum by wooden separators as shown in the attached drawings. Each element measures 2.85 x 2.44 x 26 inches long. Each element will be completely enclosed by corrugated cardboard and the four elements will be packed in a central box which measures 6" x 7" 28" long allowing for ½" of insulation the fuel portions measure 5.4" x 6.25" x 24". The rigid plywood supports will maintain a 4" space between the fuel elements and the top and bottom of the shipping container. The space between the box and the side of the 55 gallon drum is 8" and 8½" respectively as shown on the attached drawings.

With the space that the shipping container maintains internally, and the quantity of fuel contained in the 4 elements, multiple containers can be placed against each other in any arrangement and will be sub-critical even under flooding conditions. Since each delivery is limited to 24 elements and the delivery dates are spaced by several months, the maximum number of containers that can be shipped at any one time is six. Since the shipping containers are constructed of steel they provide good resistance to fire and wreckage.



Pages 3 through 4 redacted for the following reasons:

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INTER-DEPARTMENT COMMUNICATION

April 18, 1960

To: W. Wachtl

From: E Scicchitano

Subject: ANF Storage Box Nuclear Calculations-Summary of Results

I. Multiplication Factor

A. 6.25" X 5.4" X 24" box containing 4-11 plate assemblies.

		K_{eff}
1)	Dry	.81
2)	Wet	.90
3)	Wet with ∞ water reflector	.94

B. 55 gal. drum

		K_{eff}
1)	Infinite array of homogeneous mixture	.93
2)	Infinite array of homogeneous with double loading (by mistake)	.96

Multiplication factor calculations were based on three group diffusion theory calculations. The distributions of the materials within the box and drum were assumed to be homogeneous.

II. Interaction Calculations*

		L (Steradians)
A.	3 X 2 array of 6.25" X 5.4" X 27" boxes in 55 gal. drums. (24 drums)	1.4

* Ref. I TID 7016-Guide to Shipment of U235 Enriched Uranium Material
Page 74 Appendix 4

Conclusions

As seen from results in I above, the shipping containers are safe under flooded conditions.

From results of interaction calculations (II above) and Appendix 5 in Ref. I, the shipping containers are still safe.

E. Scicchitano
E. Scicchitano