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NUCLEAR
DIVISION
Baltimore 3,
Maryland

MARTIN COMPANY

October 8, 1963

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

Attention: Mr. Robert Layfield

Subject: Proposed Amendment Number 19 to Special
Nuclear Material License No. 53

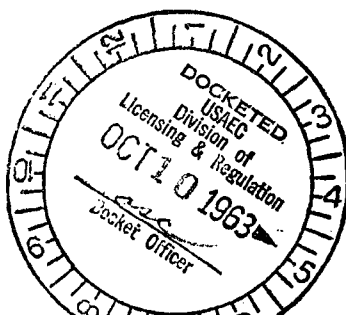
Reference: (a) Martin letter ACC-200 to Donald A. Nussbaumer,
Chief, Source and Special Nuclear Materials
Branch, dated June 25, 1963

In the reference letter we initiated our request for AEC approval for shipment of Pathfinder fuel assemblies from the Martin site in Baltimore to the Northern States Power Company facility in Sioux Falls, North Dakota. Shippage in the shipping schedule and determination of method of shipment have delayed submission of additional information to you.

We have now negotiated with the Tri State Motor Transit Company of Joplin, Missouri for exclusive use of van shipments. Enclosed is the routing which they will use.

We plan to ship no more than 10 shipping containers each containing 14 fuel assemblies, in any one shipment. Spacing in a 40 foot van will accommodate the ten containers on the floor of the van in a two wide by five long arrangement. Exclusive use of van shipments for less than ten containers may be made. Present planning calls for the initial shipment in mid-November, with another in December, and two in February - March 1964.

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MARIETTA

We have completed fabrication of twenty (20) shipping containers with pallets for use in shipping both finished product as well as reject tubular material for subsequent uranium recovery. Enclosed is the criticality evaluation for the most reactive array of seven containers with consideration of a 10% deformation criteria. Evaluation has also been made for a planar array of twenty-four (24) containers which is shown to be safe from a criticality standpoint. Since the proposed shipment will be made under controlled array conditions and will contain a maximum of ten (10) containers, nuclear safety is assured.

We regret the delay in supplying you additional information. We trust that your evaluation can now be completed and a timely approval granted for the proposed Amendment No. 19 to Special Nuclear Material license No. 53.

Very truly yours,



C. W. Keller, Manager
Nuclear Materials

CWK/mfp

Criticality Evaluation

Proposed Shipment of Pathfinder Fuel Assemblies

This submittal presents supplementary information for the proposed Amendment No. 19 to Special Nuclear Material License No. S3.

Interaction Calculations: ~

Two interaction calculations were performed, namely:

1. Evaluation of seven containers in the most reactive array.
2. Evaluation of a 24 container planar array.

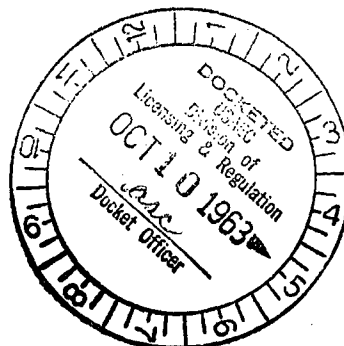
Figure 1 depicts the axial view of a planar array of the shipping container. The plot of the multiplication factor, k_{eff} , for a single container and the total fractional solid angle, Ω_f , is shown in Figure 2. The value of k_{eff} , 0.425, was determined in the original evaluation.

The following discussion outlines the methods used in the calculations utilizing the 10% deformation criteria.

Dimensions:

Underformed container diameter	= 22.5"
Central pipe diameter	= 5.0"
Separation diameter	= 17.5"
10% deformation	= 1.75"
Modified separation diameter	= 15.75"
Modified container diameter	= 20.75"

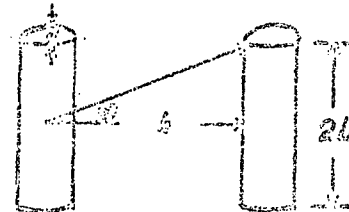
The separation distances shown in Figure 1 are based on the modified container diameter.



ATTACHMENT NO. 1 (Continued)

The fractional solid angle, Ω_f , was computed by means of the relationship

$$\Omega_f = \frac{dl}{2\pi h \sqrt{h^2 + l^2}}$$



where d = pipe diameter = 5 inches

l = half the length of the active fuel element = 36 inches

h = separation distance, inches.

Ω_f (Central 7 containers) = .3338

Ω_f (24 containers) = .3788

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1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific information required.

Sept. 27, 1950

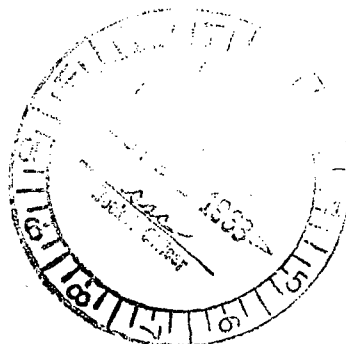
1. Mr. J. Edgar Hoover
 2. Director
 3. Federal Bureau of Investigation
 4. Washington, D. C.

Journal of Management Studies, 1986, 23(1), 7-10

Only using a small amount of the vote, we will use the
 100,000 votes to elect a Senator from Maryland to show
 that we can win a seat in the Senate.

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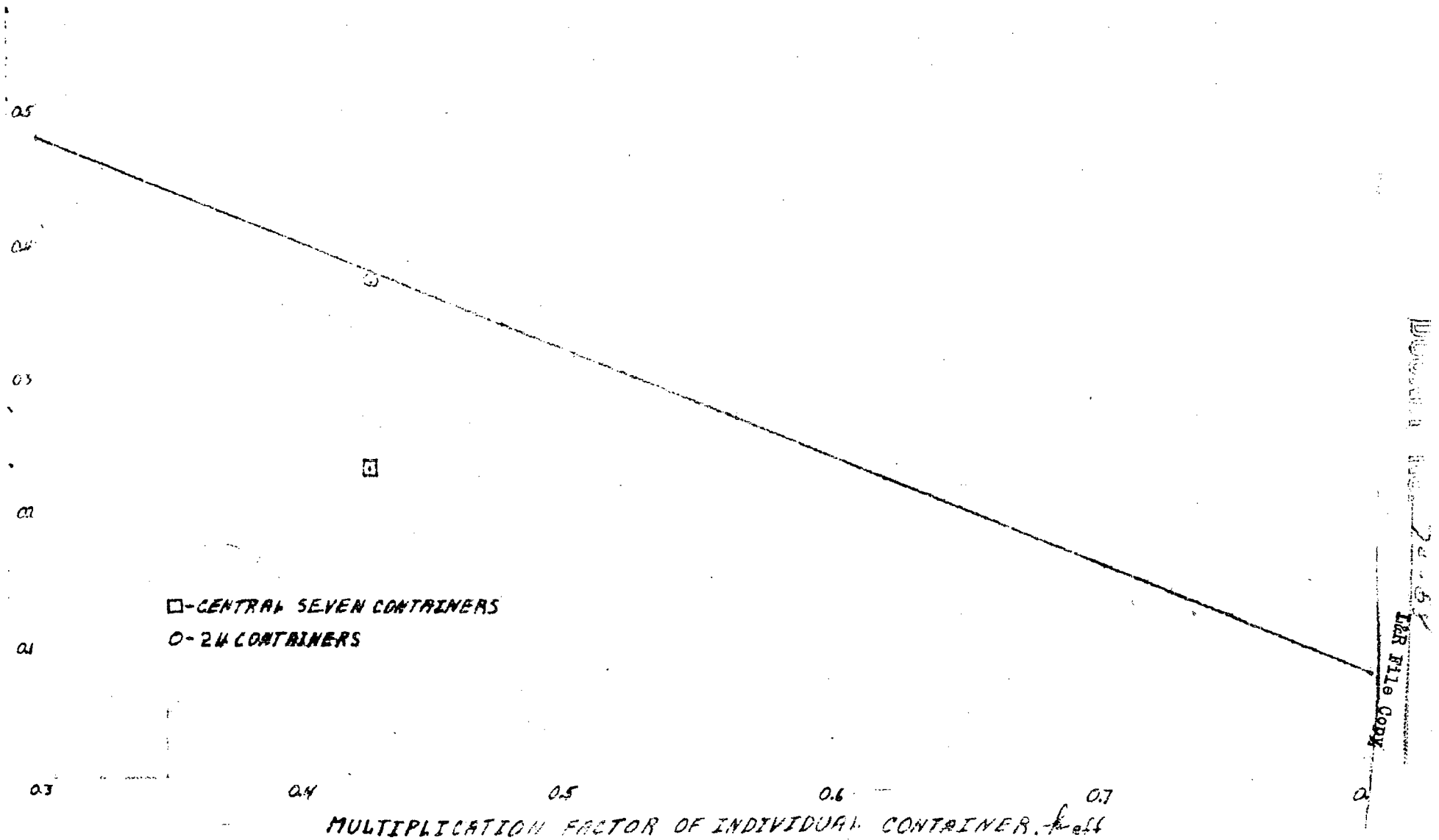


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(b)(4)

Fig. 2 SAFE INTERACTION FOR SPECIFIED MULTIPLICATION FACTORS



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