

ENGELHARD INDUSTRIES, INC.
D. E. Makepeace Division
Nuclear Materials Facility
Route 152
Plainville, Mass.

FEASIBILITY REPORT DEM - 9

Fabrication of Enriched U-Al Fuel Elements
for the Wright Field AF-NETR
Contract AF 33 (616) - 6059
DEM No. 8001

Information in this record was deleted
in accordance with the Freedom of Information
Act, exemptions
FOIA- 208-0214

Written by: Norton M. Weiss
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Criticality Office
November 12, 1959

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~~101-171-1140373~~

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DISTRIBUTION LIST

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Licensing Branch, Germantown, Md. (4)
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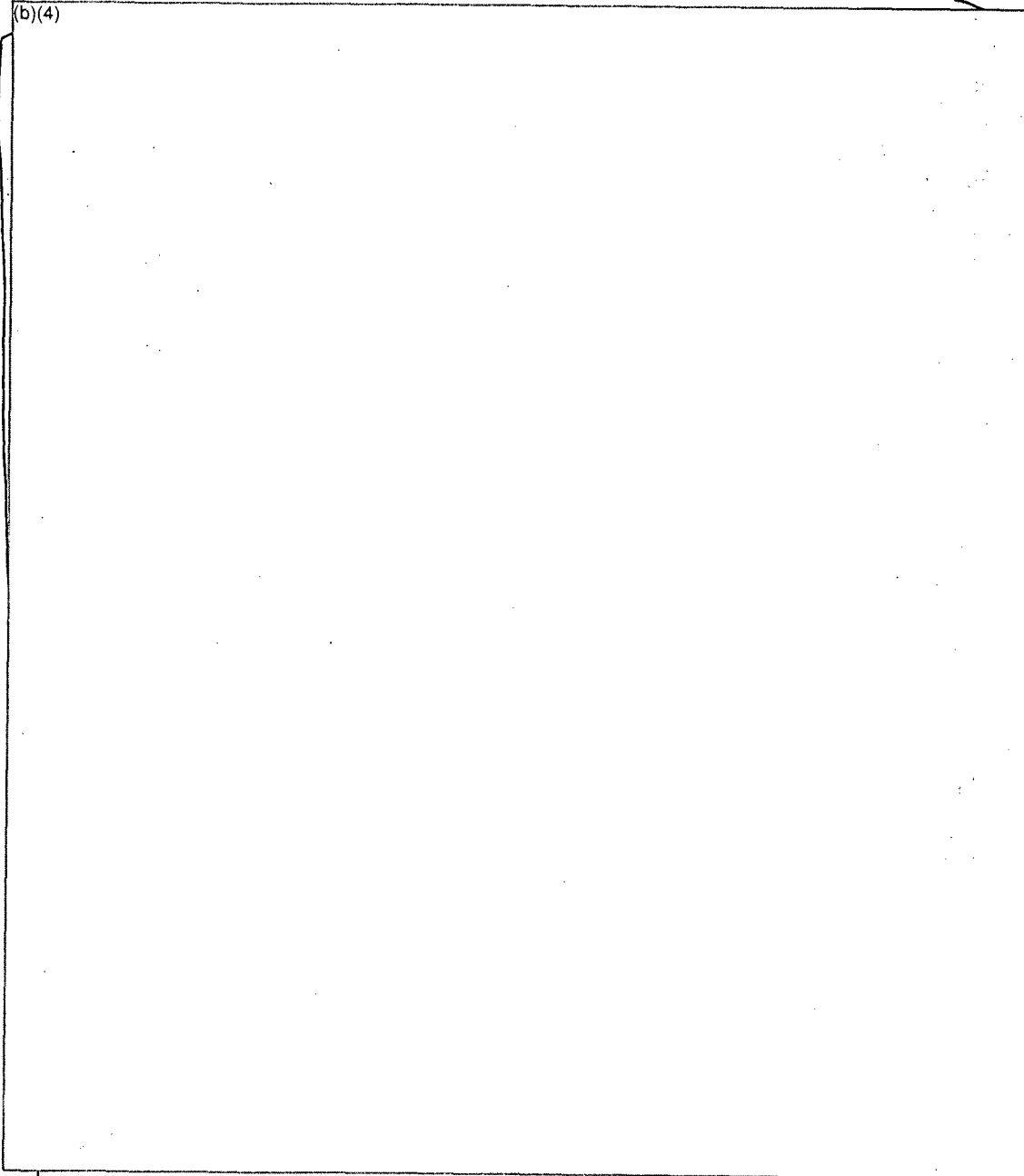
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A. J. Schulte

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1. WORK TO BE PERFORMED

D. E. Makepeace Division proposes to fabricate fuel elements for the Wright Field AF-NETR (Air Force Nuclear Engineering Test Facility). These elements, which are generally similar to the MTR type, will be manufactured to the following specifications:

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2. MATERIAL TO BE SUPPLIED

Enriched uranium will be received from Mallinckrodt Nuclear Corp. in the form of 93% enriched buttons. A total of 12.2 kg. of metal will be required. Six shipments of approx. 2 kg. each will be made at two week intervals commencing November 2, 1959.

3. FABRICATION PROCEDURES

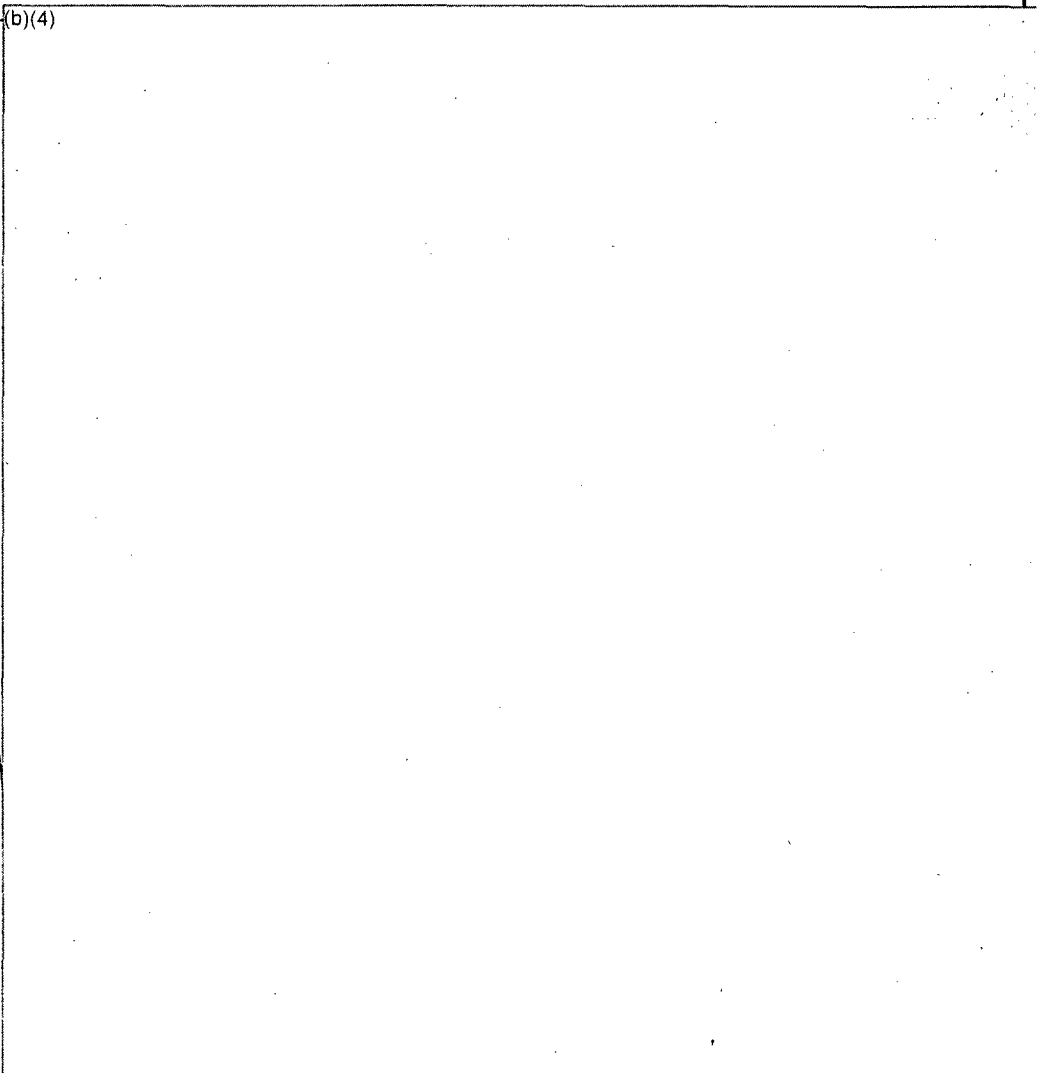
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B. Core Processing (Con't)

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Cores will be vapor degreased while in the tote tray and then returned to Accountability for weighing. Rejected cores and scrap will be placed in one gal. steel pails and stored at a 12" edge edge distance in the enriched scrap storage area.

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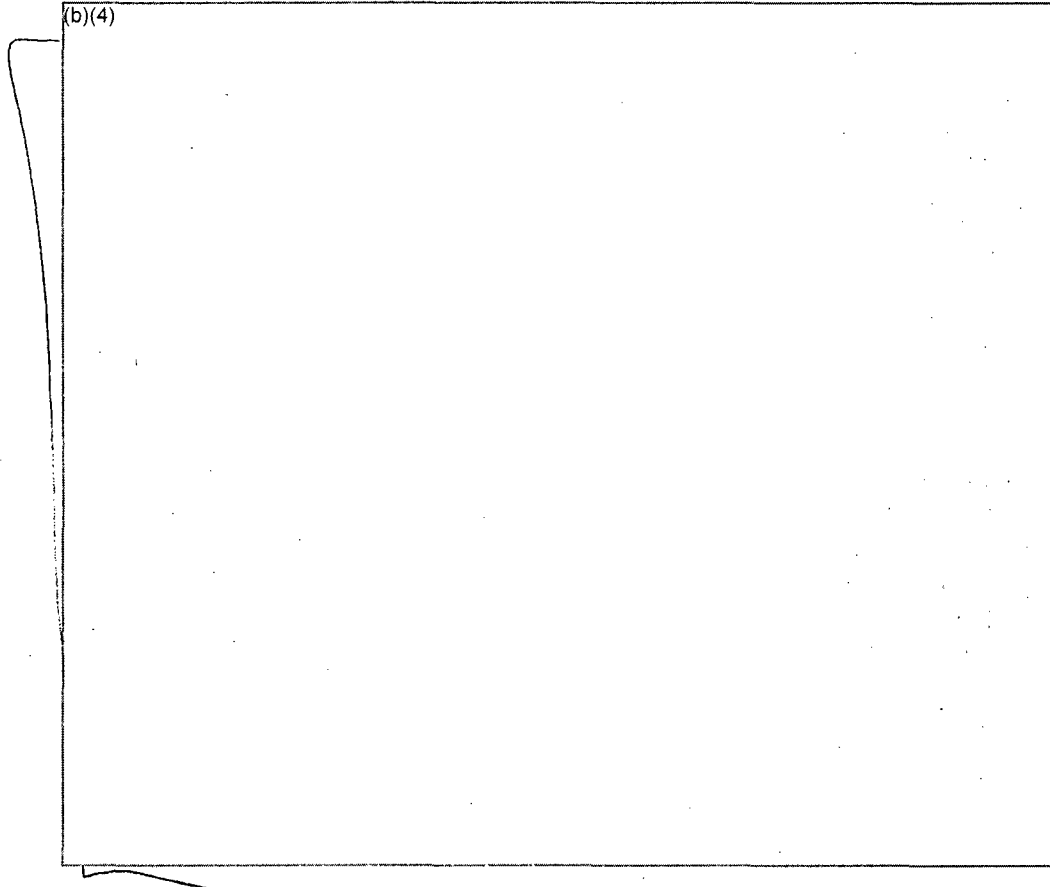
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C. Fuel Plate Processing (Con't)

They will then be sheared to finish size , identified, and inspected. When inspection has been completed, each lot of plates will be returned to Accountability where rejected plates will be removed.

If it should become necessary to use rejected clad material for remelting, the Aluminum cladding will be removed by caustic etching. This etching will be done in a stainless steel tank 6 ft. long

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D. Fuel Element Processing

Finished plates will be issued for assembly by Accountability in maximum lots of 19 plates (124 grams U-235). The plates, along with the other assembly components, will be transferred in a tote tray to the assembly area. The element will be assembled and then dip brazed. Brazed elements will be cleaned of flux and transferred to the machining area.

After machining and vapor degreasing, the element will be welded, vapor degreased, and inspected. Acceptable fuel element assemblies will be packed in shipping containers and sent to Accountability for storage prior to shipment. The shipping container will hold six fuel assemblies (756 gms. U-235). Construction of the shipping container will be of 1/2" laminated water-proof plywood. A drawing of the container is shown in Exhibit B. Elements will be individually wrapped in polyethylene before insertion into the container.

D. Fuel Element Processing (Con't)

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4. ACCOUNTABILITY

All material to be used by Production in processing will be issued by Accountability. A master control record will be maintained in addition to a daily material balance on all enriched material involving the generation of scrap. Punched cores will be individually weighed prior to issuance. This weight in conjunction with analytical data will serve to indicate the loading of each fuel plate.

5. GENERAL INFORMATION

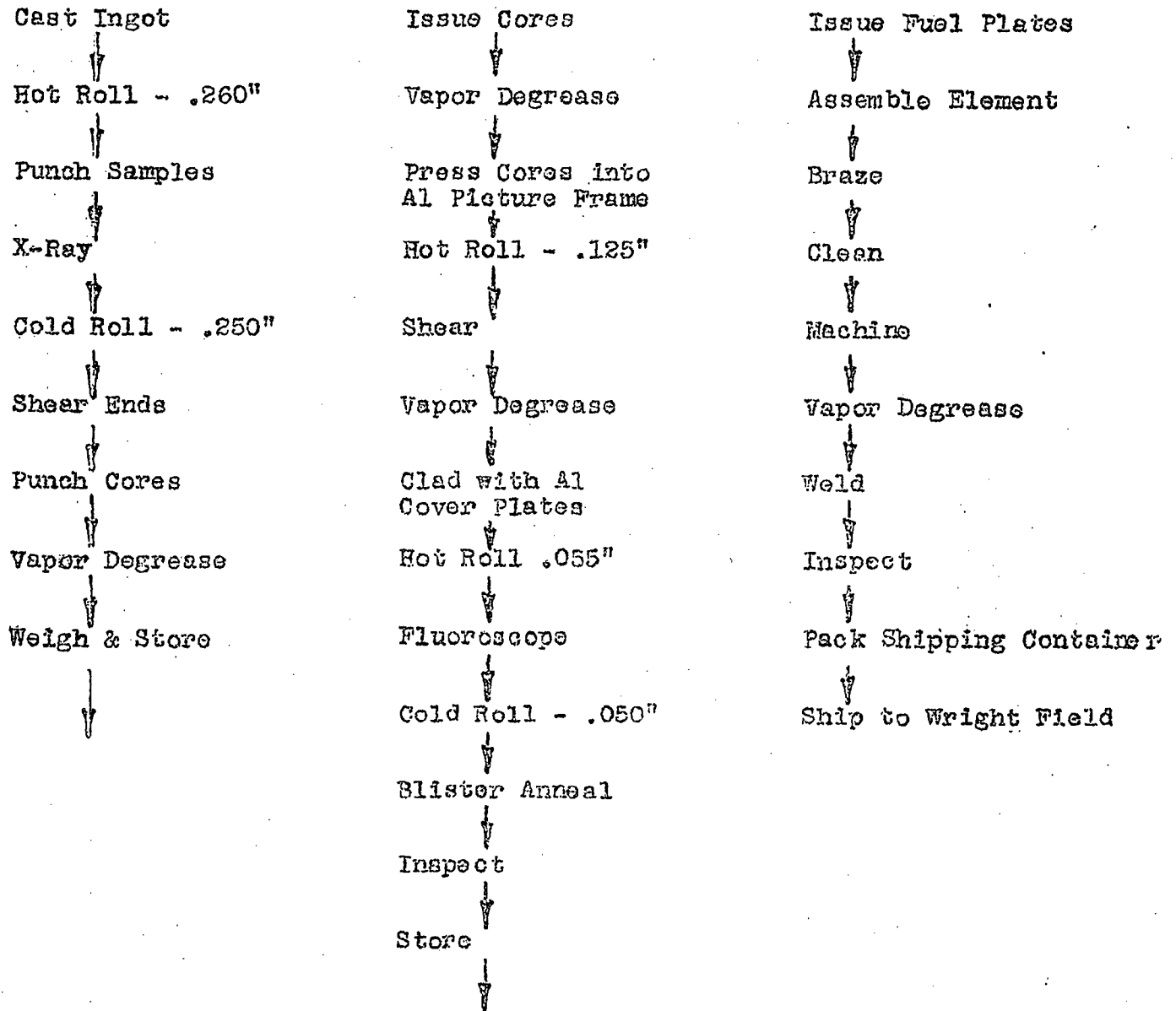
Other work involving enriched uranium which will be carried on concurrently with AP-NETR fabrication will be as follows:

1. PRDC U-Mo Fuel assemblies (Ref. Feasibility Report DEM - 5)
2. OMRR U-Al Fuel Elements (Ref. Feasibility Report DEM-8)

5. GENERAL INFORMATION (Con't)

Material flow in the manufacturing area will be under the control of Criticality representatives to assure that safe criteria are being maintained in all stages of manufacture and storage. A master control board will be used to plot batch movements between work areas and assure through policing that all movements are cleared in advance with Criticality Control.

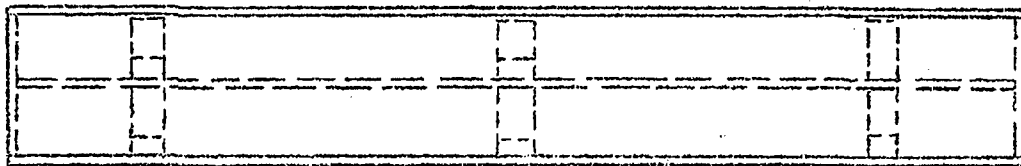
FLOW SHEET - AF - NETR FUEL ELEMENTS



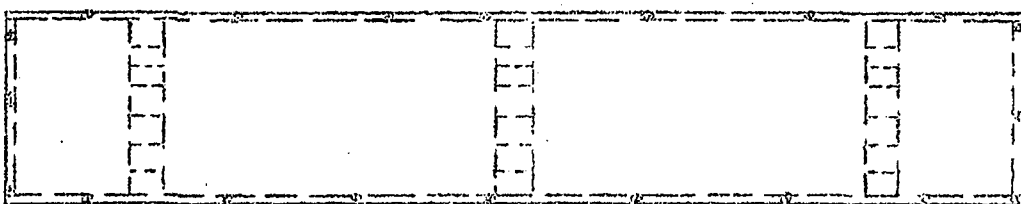
SHIPPING CONTAINER FOR

NOTE:- AF-NETR FUEL ELEMENTS

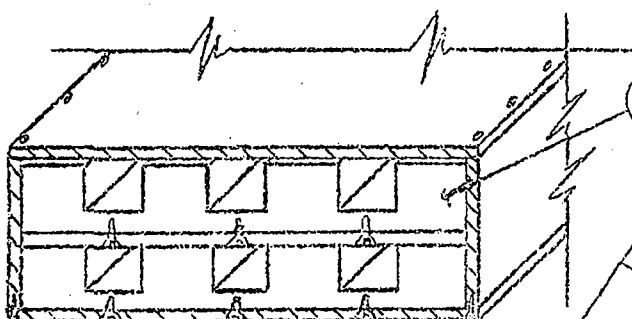
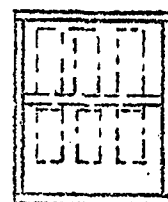
- (1) TO BE OF WATER PROOF PLYWOOD $\frac{1}{2}$ " THICK AND 2"x4" CONSTRUCTION - "ALL WOOD"
- (2) ONE COMPARTMENT TO BE REMOVABLE AND THE TOP COVER TO BE SCREWED



A



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SECTION A-A

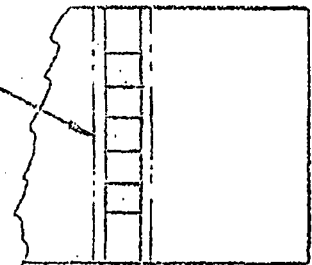
A REMOVABLE TRAY

$\frac{1}{4}$ " SPONGE RUBBER LAID IN CRADLE AS SHOWN

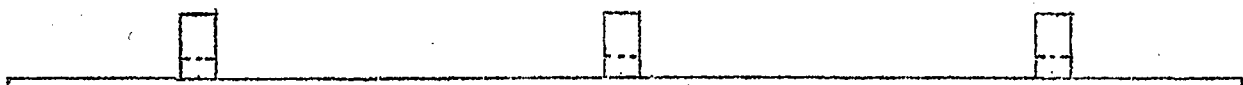


END VIEW

$\frac{1}{4}$ " THICK x 3" WIDE
6 PLACES



TOP VIEW



FRONT VIEW

TOP TRAY

ITEM A THREE VIEWS
PLY-WOOD - 2"x9" CONST.

W. A. Schuchman

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