Div. of Inspection

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D.C.

LMD:CRM REFER TO:
Docket No. 70-139

NOV 19 1959

Engelhard Industries, Inc.
U. S. Mahoponce Division
Pine & Durham Streets
Attleboro, Massachusetts

Attention: Mr. John H. Durant
Business Manager

Gentlemen:

Enclosed is Special Nuclear Material License No.

SNM-185, as amended.

Very truly yours,

DISTRIBUTION
L. D. MacKay, FIN - OROO, w/encl.
Div. of INS, w/encl. & ltrs dtd
10/8, 29 & 30 & TWX dtd 11/5/59
B. F. Musser, MMM, w/encl.
S. R. Gustavson, LRL, w/encl.
H. Steele, LRL, w/encl.

J. C. Delaney
Chief, Nuclear Materials Section
Licensing Branch
Division of Licensing and Regulation

Enclosures:
SNM-185, as amended

Information in this record was deleted in accordance with the Freedom of Information Act, exemptions 4
FOIA- 2008-0314

Rec'd 1/7/60

Dean

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Form AEC-401
(1-56)

UNITED STATES
ATOMIC ENERGY COMMISSION

SPECIAL NUCLEAR MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 70, "Special Nuclear Material Regulations," a license is hereby issued authorizing the licensee to receive and possess the special nuclear material designated below; to use such special nuclear material for the purpose(s) and at the place(s) designated below; and to transfer such material to persons authorized to receive it in accordance with the regulations in said Part. This license shall be deemed to contain the conditions specified in Section 70.32(a) of said regulations, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee

1. Name Engelhard Industries, Inc.
D. E. Makepeace Division
2. Address Pine & Dunham Streets
Attleboro, Massachusetts

3. License No.
SNM-185, as amended

4. Expiration Date
September 30, 1962

5. Docket No.
70-139

6. Special Nuclear Material
Uranium enriched in the U-235 isotope.

7. Maximum quantity of special nuclear material which licensee may possess at any one time under this license
Three hundred thirty (330) kilograms of U-235 contained in uranium enriched in the U-235 isotope.

8. Authorized use For the fabrication of reactor fuel elements and related activities using the procedures described in the licensee's application of July 30, 1957, as amended Feb. 5 and Dec. 9, 1958 and Jan. 13 & 30, March 3, April 9 & (2) of 17, May 28(2), June 3, July 31, Aug. 3, Sept. 23, Oct. 8, 14 & 30(con'd)

9. Quantity of special nuclear material allocated to licensee pursuant to Section 70.31(b) of said part
None

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

Authorized place of use: The licensee's fuel element processing plant located on Route #152, Plainville, Massachusetts

8.(con'd) and Nov. 5, 1959.

For the U. S. ATOMIC ENERGY COMMISSION

Date of issuance NOV 19 1959

J. Q. Delaney
Division of Licensing and Regulation

U. S. GOVERNMENT PRINTING OFFICE: 1956—O-385852

INCOMING TELEGRAM

C-233

U.S ATOMIC ENERGY COMM.
TWX UNIT

1959 NOV 5 PM 1 47

DOCKET NO. 70-139

For Div of Inspection

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AC WUH109 PD

WUX PLAINVILLE MASS NOV 5 122PME

CHARLES P MCCALLUM, LICENSING BRANCH

US ATOMIC ENERGY COMMISSION GERMANTOWN MD

REF 70-139 DEM 8 PAGE 5'C AND LETTER OF OCT 30TH 002" REMOVAL GIVES 6 GMS U-235 IN CAUSTIC SOLUTION PER PLATE WILL DUMP AFTER 100 PLATES ARE STRIPPED CORRESPONDS TO 60 GRAMS U-235 CONTENT IN SOLUTION

ENGELHARD INDUSTRIES D E MAKEPEACE DIVN J H DURANT

144P

70-139 8 5'C 30 002" 6 U-235 100 60 U-235.

INCOMING TELEGRAM

70-139
For Div of Inspectio

ENGELHARD INDUSTRIES, INC.

D. E. MAKEPEACE DIVISION
PINE & DUNHAM STREETS
ATTLEBORO, MASS.
ATTLEBORO 1-0090

October 30, 1959

UNITED STATES ATOMIC ENERGY COMMISSION
Germantown, Maryland

Attention: C.P. McCallum
Division of Licensing and Regulation

Reference: SNML 185 - Feasibility Report - DEM - 8

Gentlemen:

In response to your questions on the subject request for amendment we submit the following additional information for your consideration:

Supplement to Feasibility Report DEM-8
Section C., Page 5 - "Fuel Plate Processing"

The potential build up of U-235 in the etching solutions will be restricted to 100 grams U-235 by limiting the number of plates which may be etched before the solution is changed. The maximum number of plates will be calculated by assuming that an over-etch into the core alloy of .002" will take place during the etching operation. This number will vary with the dimensions of the particular components to be etched.

Solutions will be sampled and placed in polyethylene carboys for temporary storage. When analytical data has been received, solutions may be combined in 30 gal. polyethylene lined drums to a maximum amount of 100 grams U-235 per drum. Drums will be retained for eventual refining and disposition.

Addendum:

Administrative Control of Material Issuance

All movement of enriched uranium into or out of storage areas and through fabrication will be under the supervision of criticality control representatives. Prior approval must be obtained before material may be moved to or from a processing area. This approval will be granted only when it has been established that the amount of material allotted to a particular work area does not exceed the maximum amounts as established in this feasibility report or in any prior reports covering uranium in the Manufacturing plant. There will be no build up of material in a work area due to the different rates of speed of various operations. All material which is awaiting further processing will be removed to a temporary storage area to be stored at a 12" edge-edge separation from other lots. Only when a lot of material has completed an operation and moved to the next processing area will the suceeding lot be issued to fabrication for that particular operation.

A material control chart will be used to plot the movements of enriched material as they are made. In this way the criticality control representative can establish the location of the various lots of material which are in process.

Tote trays will be color coded by job and also to distinguish enriched uranium from natural or depleted.

We trust this will make our application acceptable to you.

Very truly yours,

John Durant

John Durant
Business Representative

JD/jet

Div. of Inspection

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D.C.

IN REPLY REFER TO:

LML:CPM
Docket No. 70-139

OCT 2 1959

Engelhard Industries, Inc.
D. E. Makepeace Division
Pine & Dunham Streets
Attleboro, Massachusetts

Attention: Mr. John H. Durant
Business Manager

Gentlemen:

This refers to your letter of October 8, 1959 with which you submitted your Feasibility Report DEM-8, for the Fabrication of Enriched U-AL Fuel Elements for the Watertown Arsenal OMRR.

In order that we may continue our analysis of the procedures contained in the referenced application, you should provide us with the additional information outlined below:

1. The administrative or procedural controls which you will use to assure that the batch sizes for various processes are within the indicated limits.

2. An indication of the amount of U-235 which will go into solution in the caustic etching process used in removing the aluminum from clad material prior to its remanufacture and the consideration given this amount before the introduction of a second batch of plates into the etching bath.

DISTRIBUTION
Div. of INS

Very truly yours,

Charles P. McCallum, Jr.
Nuclear Materials Section
Licensing Branch
Division of Licensing & Regulation

DOCKET NO. 70-139

For Div of Inspection

ENGELHARD INDUSTRIES, INC.

D. E. MAKEPEACE DIVISION
PINE & DUNHAM STREETS
ATTLEBORO, MASS.
ATTLEBORO 1-0090

October 8, 1959

United States Atomic Energy Commission
Germantown
Maryland

ATTN: Mr. J. C. Delaney
Chief Materials Branch
Div. of Licensing and Regulation

REF: Request for License Amendment
Docket 70-139

Gentlemen:

Enclosed herewith are four (4) copies of Feasibility Report DEM-8 covering fabrication of enriched uranium aluminum fuel elements for the Watertown Arsenal OMRR.

It is requested that our license SNM-185 be amended to cover the receipt, storage, and fabrication of metal. Your prompt attention to this request for amendment will assist us materially in meeting our contract commitments for delivery of finished fuel elements to the Watertown Arsenal.

Very truly yours,

D. E. MAKEPEACE DIVISION

John H. Durant

John H. Durant
Business Manager

JHD/bs
encls:

DOCKETED USAEC Division of Licensing & Regulation OCT 1959 Docket Officer

DOCKET NO. 70-139
For Div of inspection

ENGELHARD INDUSTRIES, INC.
D. E. Makepeace Division
plant location - Route 152 , Plainville Mass.

Feasibility Report DEM - 8

Fabrication of Enriched U-AL Fuel Elements
for the Watertown Arsenal OMRR

Written by: Norton W. Weiss

Norton Weiss
Criticality office

October 9 , 1959

Approved by: G H Barney

G. H. Barney
Plant Manager

DISTRIBUTION -

USAEC	Licensing Branch, Washington, D.C. (4
USAEC	Chicago Operations Office (2)
J. J. O'Connor	Watertown Arsenal
W. F. Mittendorf	D. E. Makepeace
G. H. Barney	D. E. Makepeace
J. C. Robinson	D. E. Makepeace
N. Weiss	D. E. Makepeace
J. H. Durant	D. E. Makepeace

1. WORK TO BE PERFORMED

DEM proposes to fabricate Fuel elements for the Watertown Arsenal OMRR. The elements to be manufactured will be composed of the following classes:

CLASS A Standard Fuel Element

Quantity - 23
Composition - Assembly of eighteen Al clad U-AL plates
U-235 Content - 140 $\pm$ 2 grams

CLASS B Special Fuel Element

Quantity - 4
Composition - Assembly of 9 Al clad U-AL plates
U-235 Content - 70 $\pm$ 1 grams

CLASS C Six plate Fuel element

Quantity - 1
Composition - Assembly of 6 Al clad U-AL plates and 1 non-uranium - bearing Al plate
U-235 content - 46.7 $\pm$ 1 grams

CLASS D Twelve Plate Fuel Element

Quantity - 1
Composition - Assembly of 12 Al clad U-AL plates and 1 non-uranium - bearing Al plate
U-235 content - 93.4 $\pm$ 1 grams

CLASS E Void Fuel Element

Quantity - 1
Composition - A watertight assembly of 18 Al clad U-AL plates.
U-235 content - 140 $\pm$ 2 grams

Fuel Plate Dimensions:

1. End Plates	28 5/8" long 2.875 " wide .060 " thick	Core length-23 5/8"
2. Intermediate plates	24 5/8" long 2.875 " wide .060 " thick	

Upon completion of fabrication and assembly, these elements will be shipped to Watertown Arsenal, Watertown, Mass.

2. MATERIAL TO BE SUPPLIED

Enriched uranium in the form of broken buttons will be used as the starting material. The uranium will be supplied by Mallinckrodt Chemical Co. at a 93% enrichment. The amount to be supplied is 5.4 kg. Aluminum of 99.3% purity will be used as the alloying agent.

3. FABRICATION PROCEDURES

(b)(4)

Pages 12 through 14 redacted for the following reasons:

Exemption (b)(4)

Summary of Criticality Mass Limitations - OMRR

Operation	Max. Mass(Alloy)	Max. Mass (U-
(b)(4)		

4. ACCOUNTABILITY

Accountability will maintain complete control over the issuance of enriched material to Manufacturing. A material balance will be recorded for every operation involving the generation of scrap. Punched cores will be individually weighed prior to issuance and cladding. 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 OMRR fabrication is as follows:

1. PRDC U-Mo Fuel assemblies (Ref. Feasibility Repor DEM-5)

2. WADC U-Al Fuel elements (Feasibility Report to be written)

FLOW SHEET - OMRR FUEL ELEMENTS

Cast Ingot
↓
Hot Roll - .260"
↓
Punch Samples
↓
X-Ray
↓
Cold Roll - .250"
↓
Shear Ends
↓
Punch Cores
↓
Vapor Degrease
↓
Weigh & Store

Issue Cores
↓
Vapor Degrease
↓
Press Cores into Al Picture Frame
↓
Hot Roll - .125"
↓
Shear
↓
Vapor Degrease
↓
Clad with Al Cover Plates
↓
Hot Roll - .065"
↓
Fluoroscope
↓
Cold Roll - .060"
↓
Blister Anneal
↓
Inspect
↓
Store

Issue Fuel Plates
↓
Assemble Element
↓
Braze
↓
Clean
↓
Machine
↓
Vapor Degrease
↓
Weld
↓
Inspect
↓
Alodize
↓
Pack Shipping Container
↓
Ship to Watertown Arsenal

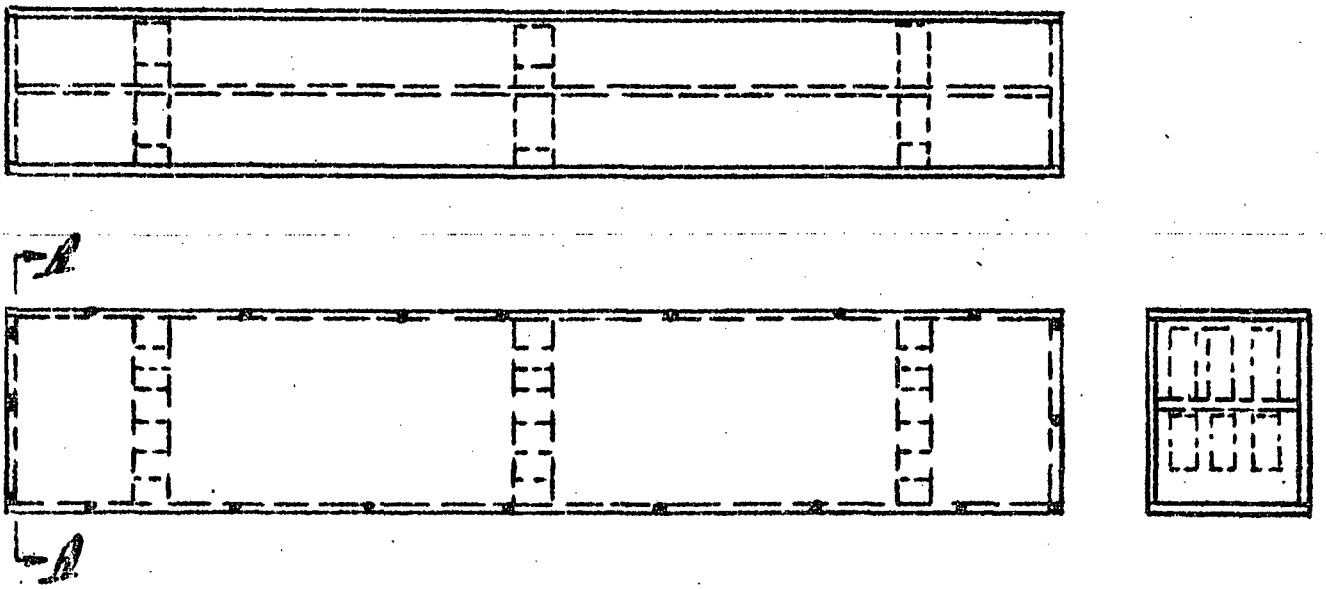
Page 17 redacted for the following reason:
- -
(b)(4)

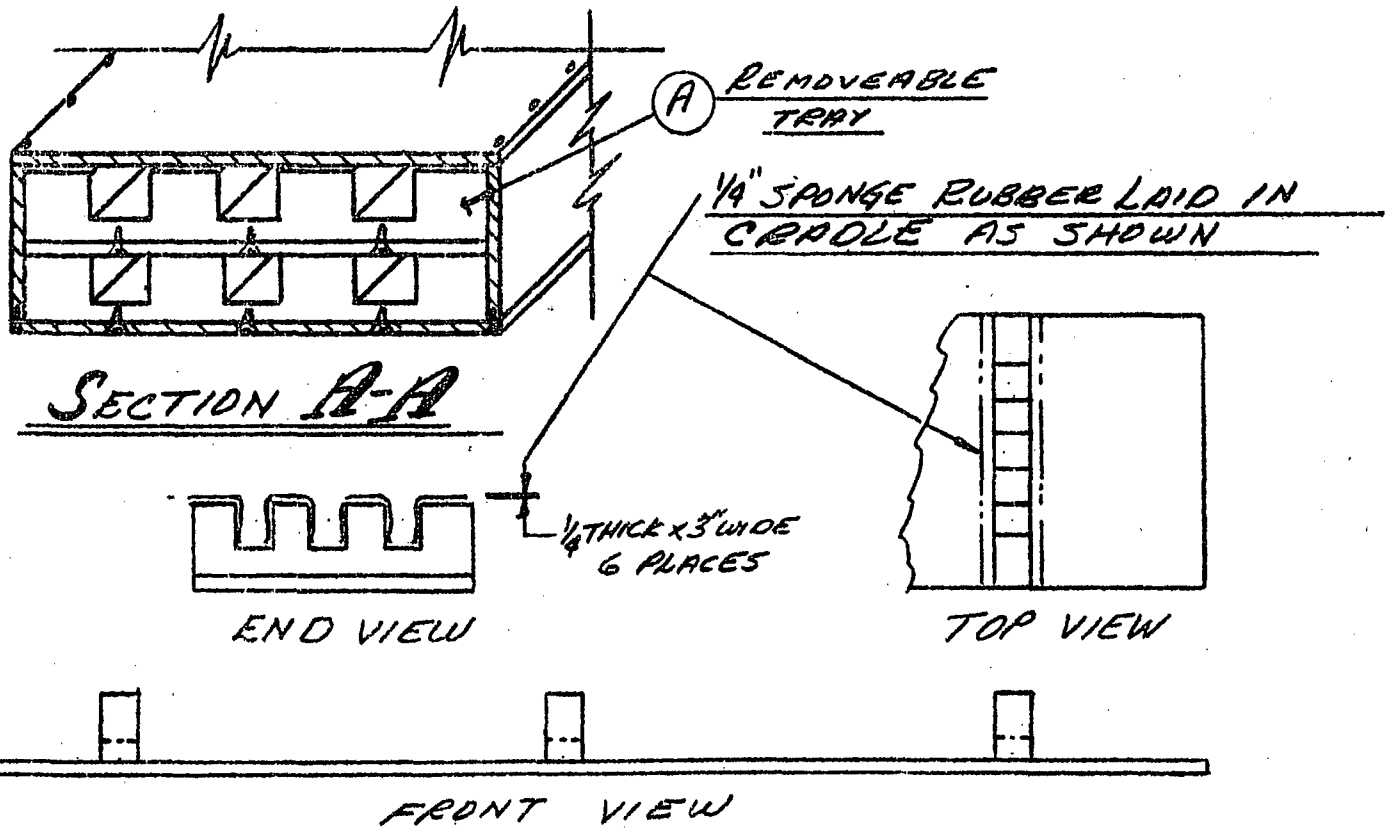
SHIPPING CONTAINER FOR O.M.R.R FUEL ELEMENTS

NOTE:-

(1) TO BE OF WATER PROOF PLYWOOD x 1/2 THICK. AND 2"x 4" CONSTRUCTION - "ALL WOOD"

(2) ONE COMPARTMENT TO BE REMOVEABLE AND THE TOP COVER TO BE SCREWED





TOP TRAY

ITEM (A) THREE VIEWS