

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

Lic. Clk.

IN REPLY REFER TO:

Docket No. 70-139
L&R:CPM

MAY 2 1958

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

Attention: Mr. W. F. Mittendorf
Vice President and Division Manager

Gentlemen:

Enclosed is Special Nuclear Material License SNM-185.

You will note that the procedures authorized under the terms of this license are limited to those described in your feasibility report DBM-2. In the event that you still desire the full authority requested in your application of February 5, 1958, you should submit more detailed information on any additional processes you intend to use. Such information should include, but not be limited to a description of the processes, specific batch sizes, method of separation between batches in processing, the specific criteria used in computing always-safe masses, including calculations where applicable, details regarding always-safe equipment and your administrative procedures to assure that these criteria are met.

Upon receipt of this additional information an amendment to your license to include this additional authorization will be given our prompt consideration.

DISTRIBUTION:

- Formal Docket, w/encl.
- Suppl. Docket, w/encl.
- Document Room, w/encl.
- M. M. Mann, INS, w/encl.
- D. F. Musser, NMM, w/encl.
- J. C. Ryan, FIN, w/encl. (2)
- H. Steele, L&R, w/encl.

Very truly yours,

SIGNED
and
Dispatched
H. L. Price
Director
Division of Licensing and Regulation

Enclosure:
License SNM-185

- S. R. Gustavson, L&R, w/encl.
- Br. & Div. Reading files, w/encl.



UNITED STATES
ATOMIC ENERGY COMMISSION

SPECIAL NUCLEAR MATERIAL LICENSE

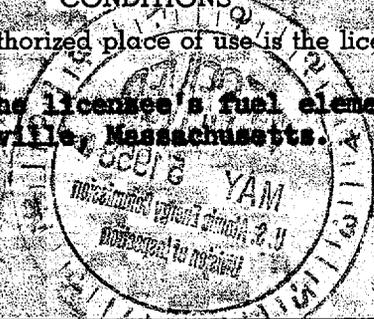
Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 70, "Special Nuclear Material Regulations," a license is hereby issued authorizing the licensee to receive and possess the special nuclear material designated below; to use such special nuclear material 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		3. License No. ENM-185
1. Name	Engelhard Industries, Inc. D. E. Makepeace Division	4. Expiration Date September 30, 1962
2. Address	Pine & Dunham Streets Attleboro, Massachusetts	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 Twenty-four (24) kilograms of U-235 contained in uranium enriched in the U-235 isotope.
8. Authorized use	For the manufacture of uranium-aluminum foil using the procedures described in the licensee's application of July 30, 1957, as amended February 5, 1958 but limited by the procedures described in the D. E. Makepeace feasibility report DD-2 concurrently submitted.	
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.



For the U. S. ATOMIC ENERGY COMMISSION

Date of issuance MAY 2 1958

and
dispatched

H. L. Price
Director, Division of Licensing & Regulation

Extra copy

ENGELHARD INDUSTRIES, INC.

D. E. MAKEPEACE DIVISION
Pine & Dunham Streets
Attleboro, Mass.

Attleboro 1-0090

February 5, 1958

United States Atomic Energy Commission
Division of Licensing and Regulation
Germantown, Maryland

Att: J. C. Delaney, Chief Materials Section

Docket 70-139

Gentlemen:

This letter is in response to yours of Aug. 26, 1957, and presents additional information in support of our application for a special Nuclear Materials License.

We wish to change the name of the applicant from D. E. Makepeace Co., Division Union Plate & Wire Co., to D. E. Makepeace Division, Engelhard Industries, Inc. This new designation became effective on January 3, 1958 when our organization, as well as several other companies wholly owned by Engelhard Industries, became divisions. Principal officers of the company are as follows:

- C. W. Engelhard - Chairman of Board
- G. V. Richdale - President
- S. R. Bryant - Senior Vice President
- W. P. Mittendorf - Vice President, Division Manager
- L. Hoguet - Vice President & Treasurer
- K. Huber - Vice President & Secretary
- W. Irving - Vice President, Asst. Division Manager
- J. H. Bell - Asst. Secretary & Division Controller

In specific reference to the questions you have raised, we submit the following.

1. We hereby make application for a license to possess a total of 100 Kilograms of contained uranium 235. The enrichment levels would range from low to highly enriched material - in both pure and alloyed form. The chemical form would be metallic, except as discussed below. The physical form would vary in accordance with established fabrication procedures, including ingot, rods, plates, tubes, bars, foil, and scrap generated therefrom.

2. The operations planned and for which the facility is equipped include melting, casting, forging, rolling, welding, roll bonding, machining, heat treating, chemical and abrasive cleaning, and storage in two separate vaults for special nuclear material. A separate in-process area is also provided for residence between process steps, as well as a third vault for the storage of normal uranium. Dimensions of enriched vaults are:

1. 8' high x 12' wide x 20' long.
2. 7'11" high x 8' wide x 10' long.

See Exhibit A - "Facilities for Production of Nuclear Fuel Elements and Components."

3. Exhibit B illustrates the exclusion area, showing equipment locations and demarcation areas which separate material inventories are maintained. These are indicated in the plant by high contrast colored lines painted on the floor.

4. (a) The permissible accumulations of materials at the individual inventory points are dictated by the alloy analysis enrichment level, and physical form of a specific project. See Exhibit C for a typical Feasibility Report which specifies these limits.

(b) The "margin of safety" situation again would be dictated by degree of enrichment being processed. In general the facility is regulated to remain subcritical by a factor of at least two to protect against analytical and sampling errors.

5. Criticality calculations are based upon the following references:

- A. LA - 2063
Nuclear Safety Guide
D. Callihan, W. J. Ozieroff, H. C. Paxton, C.L. Schuske
- B. LA - 1958
Critical Masses of Fissionable Metals As Basis
Nuclear Safety Data
H. C. Paxton, Glen A. Graves
- C. HW - 4091
Criticality Considerations When Processing Enriched
Irradiated Uranium.
N. Ketzlach, E. A. Coppinger
- D. K - 643
Critical Mass Studies Part V
D. Callihan, D. F. Cronin, J. K. Fox, J. W. Morfitt

E. Critical Masses of Oralloy Assemblies

G. A. Graves, H. C. Paton LASL Nucleonics, 6/57

F. Nuclear Safety in Processing Reactor Fuel Solutions

D. Callihan ORNL Nucleonics, July, 1956

6. An outline of procedures for adherence to specified limits in various process inventories is contained in Exhibit D - "General Program for Criticality Control."

7. Process Points where probability of hazards is greatest from the criticality point of view are:

A. Pickling: At this step material gets into chemical form, occasionally combined with finely divided metallic form. It is planned to predetermine the amount of material removed per unit time, form, solution concentration, and temperature of solution in the solution. This rate would determine the accumulation of isotope in the solution, which would not be permitted to exceed 10 grams per liter. A liquid waste disposal system, which comprises an integral portion of the plant's utilities, is employed to collect insoluble material down to 5 micron particle size. An ion exchange system is provided to collect dissolved materials, which are then suitably packed for return as instructed.

B. Vapor Blasting: A vapor blast cleaning unit also generates small particles in an aqueous suspension. Amount of material removed per pass will be determined to indicate the frequency of removing accumulations below the 10 gram/liter limit.

C. Melting: In the event of a mishap or equipment failure in melting, which could spill molten metal outside the furnace, the total mass in the designated area would be kept subcritical at any given time for the case of a water reflector.

D. General: In other operations presently contemplated the metal will be handled in the solid state. In all such cases the maximum permissible amount in any storage or work area would be subcritical by a factor of 2 under complete flooding conditions.

8. The distinction between normal and abnormal waste disposal is interpreted to mean waste containing no source or special nuclear material, as distinguished from wastes containing such material.

Normal material which may contain pyrophoric metals such as zircaloy are collected in dry particle solid or liquid form,

separated from organic material by burning where feasible, or by settling from liquids. A determination is made concerning the health and safety or accountability requirements. Further refining or concentration may be required, otherwise, wastes deemed harmless are disposed of through normal industrial channels. In cases where health and safety demands it, materials are collected by an approved dangerous waste contractor.

Abnormal waste, after collection by the liquid waste disposal system, the ventilation system, or by vacuum cleaners, is concentrated using appropriate chemical, filtration or incinerating techniques, and packaged for shipment as directed by customers or the AEC.

Monitoring procedures are outlined in Exhibit F - Health & Safety Manual.

9. Avoidance of accidental criticality during shipment to and from our plant on our order is the responsibility of the criticality officer. Bird cage or other packing containers which assure separation would be employed where necessary, and are furnished where necessary in connection with incoming and outgoing shipments of special nuclear material. Assurance of compliance with criticality considerations is assured by providing an informed courier who accompanies shipments where necessary and supervises loading, unloading, and temporary storage in transit. Specific jobs involving shipment of special nuclear material would be the subject of individual applications which would include such information as quantity, isotopic composition by individual containers and the entire shipment, container specification, anticipated safeguards, transportation method and general evaluation of adequacy in the event of accidental fires, floods, or wrecks.

Very truly yours,

D. R. MAKEPEACE DIVISION

/s/ W.F. Mittendorf

W. F. Mittendorf
Vice President and Division
Manager

JA

c.c: W.F.M.
G.H.B.
S. Friedland

D. E. Makepeace Division, Engelhard Industries, Inc.

Special Nuclear Materials License Application

List of Exhibits

- A. Facilities for Production of Nuclear Fuel Elements and
Components
- B. Nuclear Area Floor Plan, Dwg. 2-AE
- C. Typical Feasibility Report (Nuclear Metals)
- D. General Program for Criticality Control
- E. Health and Safety Manual

D. E. Makepeace Co.DIVISION OF
UNION PLATE AND WIRE CO.*Industrial Department**Precious Metals, Solid and Laminated, Contacts, Collector Ring, Assemblies, Precision Wave Guides*

SALES OFFICES

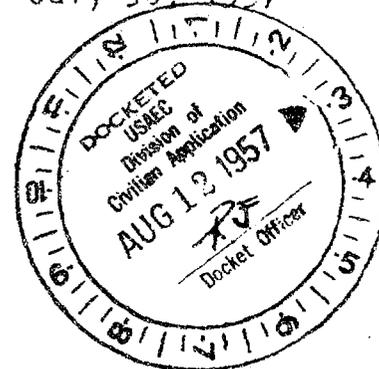
NEW YORK, N.Y.
CHICAGO, ILL.
LOS ANGELES, CALIF.

MAIN OFFICE AND FACTORY

ATTLEBORO, MASS.Telephone **1-0088**

July 30, 1957

Mr. Lyall Johnson
 Chief, Licensing Branch
 Division of Civilian Applications
 U.S. Atomic Energy Commission
 Washington 25, D.C.



Dear Mr. Johnson:

The D. E. Makepeace Co., herewith makes application of license under Part 70 - Special Nuclear Material for permission to receive, possess, use, and transfer special nuclear material in connection with its proposed operations in a new facility for the manufacture of atomic fuel elements. Specifically, we will be equipped to melt uranium alloys of all enrichments, and to cast, roll, and machine bare and clad uranium alloys. The finished products will be bare and clad fuel plates.

Beginning in July, 1956, this company entered the field of uranium fuel processing under a series of contracts negotiated with the Westinghouse Electric Corporation, Bettis Field operation. On October 1, 1956, the D. E. Makepeace Co., was designated an approved accountability station by the Chicago Operations Office, under the jurisdiction of the Pittsburgh Area Office. For security purposes, access to "secret" restricted data is authorized under access permit Q-110 held jointly with Baker and Co., Inc., our parent company.

We are proposing to expand our interest in atomic fuel processing through the construction of new facilities which will enable us to increase our scope and capacity to process plate-type fuel elements for delivery to the Commission and its contractors, and to the Commission's licensees in the commercial research and power fields. The building for this expansion is located on Route 152 in Plainville, Mass., and is virtually complete. We are beginning to move in machinery and we would expect to be ready for limited operations by the end of August. We have designed the building in accordance with accepted practices after discussions with the Chicago Operations Office of the Atomic Energy Commission with regard to water disposal, security, vaults, etc.

July 30, 1957

1. Information concerning D. E. Makepeace Co.

At present, the D. E. Makepeace Co., is legally known as the D. E. Makepeace Co., Division of Union Plate & Wire Co. However, we are in the process of changing the name to the D. E. Makepeace Co., a Massachusetts corporation located in Attleboro, Mass. The Union Plate & Wire Co., is wholly owned by Baker and Co., Inc., Newark, New Jersey, with whom we believe you are well acquainted. Upon conversion of the name to the D. E. Makepeace Co., Baker and Co., Inc., will remain as the sole owner of the company. In this application, we will use "D. E. Makepeace Co.," as representing the applicant.

Our principal business is the melting, alloying and fabrication of the precious metals (platinum, gold, silver, etc.) for decorative and industrial use. Among our products are many miscellaneous shapes for the jewelry industry which are precision rolled and machined, electrical contacts, inlay material and electrical sub-assemblies such as slip ring contactors, clad bi-metals such as rolled gold plate, silver clad base metals as sheet, rod and seamless tubing.

Following is a listing of the officers and directors of D. E. Makepeace Co:

1. Charles W. Engelhard, Chairman of the Board
2. Gordon V. Richdale, President
3. W. F. Mittendorf, Vice-President and Director
4. S. R. Bryant, Vice-President
5. Ross Bayes, Director
6. Lawrence Hogue, Treasurer
7. W. Irving, Assistant Treasurer and Director
8. R. P. Pasley, Assistant Treasurer
9. *John Bell*

Each of the above is a citizen of the United States except Gordon V. Richdale, a British subject, who on March 4, 1954, filed first citizenship papers in the United States and S. R. Bryant a citizen of the Union of South Africa who has applied for naturalization papers. Mr. Peter W. Marshall, a director of Baker and Co., Inc., is a British subject with headquarters in Switzerland from which point he directs several foreign operations of Baker and Co., Inc. Mr. Marshall, though a director of Baker & Co., Inc., is not associated with the D. E. Makepeace Co., operation. There is no other control or ownership exercised over D. E. Makepeace Co., by any alien, foreign corporation, or foreign government.

The address of Mr. Mittendorf, Mr. Irving, and Mr. Bell is D. E. Makepeace Co., Pine and Dunham Sts., Attleboro, Mass. The address of each of the remaining officers of the company is at Baker and Co., Inc., 113 Astor St., Newark 5, New Jersey. The location of the facility under construction is Route 152, Plainville, Mass.

July 30, 1957

II. Activity for which the Special Nuclear Material is requested.
License

The special nuclear material for which/is requested is required for use in:

1. The rolling and machining of pure uranium (of various enrichments up to fully enriched) including the rolling of uranium foil.
2. The melting of uranium-aluminum, uranium-zirconium and other uranium bearing alloys in induction and arc melting equipment of suitable design.
3. The vacuum heat treating of uranium and uranium bearing alloys.
4. The rolling and machining of uranium alloys.
5. The roll bonding and machining of clad plate-type fuel elements.
6. The corrosion testing of clad fuel elements at high pressure and at high temperature in autoclaves of suitable design.

melt
In general, we anticipate being called upon to perform these services both individually and in sequence. For example, we will heat or machine or corrosion test at the request of our customers; or we will provide the complete sequence of operations from melting to corrosion testing, as the case may be.

III. Term of License.

A license is requested for an initial term of five years.

IV. Amounts and Specifications of Special Nuclear Material Required.

Since we do not yet hold orders from other licensees for fuel elements, we are not able to specify the amounts nor the form in which we will require special nuclear material. In practice, we expect that our licensed customers will themselves obtain allocations of special nuclear material which will in turn be passed along to us. At some later date, it might become economically desirable for the D. E. Makepeace Co., to itself have an allocation of special nuclear material in order to better serve its customers. We therefore reserve the right to ask for an allocation at a later date. However, we ask permission to receive, possess and use special nuclear material without limitation as to quantity for use in the manufacture of fuel elements, the allocations to be provided by our licensed customers.

V. Technical qualifications of Staff.

G. H. Barney, metallurgist, assistant superintendent in charge of facility.

Mr. Lyall Johnson

-4-

July 30, 1957

A. J. Schulte, B S degree in metallurgy, general engineer for nuclear work.

Ray Blackler, Chemist, responsible for health and hygiene as well as all chemical applications. He will have the assistance of the chemical and tool engineers of our main manufacturing plant in Attleboro (6 miles away), as well as the advisory assistance of the research department of Baker and Co., Inc., our parent company in Newark, New Jersey. There are over 40 graduate scientists on research work and metallurgical problems at Baker and Co., Inc., and in addition, we have a consulting contract with Nuclear Corporation of America to supply criticality service and a check up health and hygiene service.

Criticality will be directed by Dr. Friedland and hygiene by Lester Smith.

VI/ Equipment and Facilities to Protect Health and Property - Waste Disposal.

Please refer to manual attached herewith.

VII. Procedures to Protect Health - Criticality - Personnel Monitoring.

Please refer to manual attached herewith.

VIII. Financial Responsibility.

Neither D. E. Makepeace Co., nor Baker & Co., Inc., our parent company, publish annual reports nor profit and loss statements. Baker and Co., Inc., holds a license under Part 70 in connection with its operation of a cold enriched uranium scrap plant. With its application under Part 70, Baker and Co., Inc., submitted certain financial information and insurance certificate which has been deemed sufficient by the Commission for the granting of a license under Part 70.

With this application, we submit an original and three copies of a similar insurance certificate noting that D. E. Makepeace Co., is covered under the identical insurance policy. The certificate, as requested by the Commission Finance Division, is endorsed to indicate payment direct to the Commission in the event any payments under the policy are required.

We trust that the information contained in this application is in keeping with your requirements. If additional information is required, we shall be pleased to hear from you.

Very truly yours,

D. E. MAKEPEACE CO., DIV.

W. F. Attendorf
W. F. Attendorf, Vice-President

WFM/as
Enclosures