Docket No. 70-139

For Div of Inspection

ENGELHARD INDUSTRIES, INC.

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

January 22, 1960

United States Atomic Energy Commission
Germantown, Maryland

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

Reference: SNM 185
Docket 70-139
Amendment Application DEM-9

Gentlemen:

In response to your letter of January 4th requesting clarification of our feasibility report on Fabrication of Fuel Elements for AFNETF, we are pleased to submit the following:

1. Scrap material which will be generated in the fabrication of AF-NETR fuel elements will fall into three categories; end croppings, blanked edges (ladders), and rejected cores. This material will be sheared when necessary to assure that it will fit into our standard one gallon steel scrap containers which are 8" in diameter and 7" deep. The maximum quantity of contained U-235 which will be placed in one pail is 350 grams. Scrap pails will be stored in our enriched scrap storage area which consists of three parallel arrays which maintain these containers at a 12" edge-edge distance from all others within the same array. There is a 2 ft. spacing between each of the three arrays.

   The conditions indicated above are consistent with safe interaction criteria as outlined in K-1380, Studies in Nuclear Safety, Part I, page 1 and tables I and II, pages I-3 and I-4. The stated criteria of K-1380 prescribe that a container of fissionable material should:

   1. Be safe under any conditions of moderation and complete water reflection.
   2. Be separated at a distance of at least 12" from other containers of fissionable materials.
   3. Satisfy the requirements of a safe solid angle subtended from other containers of fissionable materials.

United States Atomic Energy Commission
Germantown, Maryland

January 22, 1960

Gentlemen:

The first two criteria are met by our containers in that the amount of U-235 is "always-safe", and the spacing is 12" edge-edge between adjacent units. The fractional solid angle subtended by a central pail in our arrays has been calculated by the method outlined in K-1380, Table II (2.), page I-4, to be .0357 steradians which is considerably smaller than the safe value of .200 steradians which is used at ORGDP (Ref. K-1019, Rev. 4, page 26, table XX.)

2. With respect to semi-finished and finished elements, the same type of criteria will be applied. The maximum mass limits to be used will be 864 grams U-235. Spacing of 12" edge-edge between tote trays will be maintained in in-process storage areas. Fractional solid angles of in-process and finished materials range from .045 to .095 steradians in comparison with a safe value of .480 steradians for 1.25 in. slabs as presented in table XX. of K-1019.

3. Dimensions of the shipping container to be used will be 42" long by 28" wide by 20" high. This will allow for a 6" spacing of the elements in all directions while in the container. Similar containers which were stacked or placed adjacent to each other would thus provide a separation of 12" between the elements contained therein. We propose to ship completed fuel elements in maximum quantities of twelve (2 shipping containers each containing 744 grams U-235).

Shipment will be made via Railway Express, Protective Signature Service. The construction of the shipping container affords protection against interaction with similar types of containers which might be brought in contact while in transit. The size of the container is such that telescoping into a birdcage due to shifting of a load during shipment will be impossible. Standard ICC procedures will be followed with regard to labeling of containers to inform the carrier of the contents therein.

We trust the foregoing will enable early favorable action on our amendment applications

Very truly yours,

D. F. MAKEPEACE DIVISION

John H. Durant
Business Manager

70-139 EXTRA
for Inc.

ENGELHARD INDUSTRIES, INC.

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

January 22, 1960

United States Atomic Energy Commission
Germantown, Maryland

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

Reference: SNM 185
Docket 70-139
Amendment Application DKM-9

Gentlemen:

In response to your letter of January 4th requesting clarification of our feasibility report on Fabrication of Fuel Elements for APMETF, we are pleased to submit the following:

1. Scrap material which will be generated in the fabrication of AF-METR fuel elements will fall into three categories; end croppings, blanked edges (ladders), and rejected cores. This material will be sheared when necessary to assure that it will fit into our standard one gallon steel scrap containers which are 8" in diameter and 7" deep. The maximum quantity of contained U-235 which will be placed in one pail is 350 grams. Scrap pails will be stored in our enriched scrap storage area which consists of three parallel arrays which maintain these containers at a 12" edge-edge distance from all others within the same array. There is a 2 ft. spacing between each of the three arrays.

   The conditions indicated above are consistent with safe interaction criteria as outlined in K-1380, Studies in Nuclear Safety, Part I, page 1 and tables I and II, pages I-3 and I-4. The stated criteria of K-1380 prescribe that a container of fissionable material should:

   1. Be safe under any conditions of moderation and complete water reflection.
   2. Be separated at a distance of at least 12" from other containers of fissionable materials.
   3. Satisfy the requirements of a safe solid angle subtended from other containers of fissionable materials.

TO	ACTION	SIGNATURE	DATE
INS			

United States Atomic Energy Commission
Germantown, Maryland

January 22, 1960

Gentlemen:

The first two criteria are met by our containers in that the amount of U-235 is "always-safe", and the spacing is 12" edge-edge between adjacent units. The fractional solid angle subtended by a central pail in our arrays has been calculated by the method outlined in K-1380, Table II (2.), page I-4, to be .0357 steradians which is considerably smaller than the safe value of .200 steradians which is used at ORGDP (Ref. K-1019, Rev. 4, page 26, table XX.)

2. With respect to semi-finished and finished elements, the same type of criteria will be applied. The maximum mass limits to be used will be 854 grams U-235. Spacing of 12" edge-edge between tote trays will be maintained in in-process storage areas. Fractional solid angles of in-process and finished materials range from .045 to .095 steradians in comparison with a safe value of .480 steradians for 1.25 in. slabs as presented in table XX. of K-1019.

3. Dimensions of the shipping container to be used will be 42" long by 28" wide by 20" high. This will allow for a 6" spacing of the elements in all directions while in the container. Similar containers which were stacked or placed adjacent to each other would thus provide a separation of 12" between the elements contained therein. We propose to ship completed fuel elements in maximum quantities of twelve (2 shipping containers each containing 744 grams U-235).

Shipment will be made via Railway Express, Protective Signature Service. The construction of the shipping container affords protection against interaction with similar types of containers which might be brought in contact while in transit. The size of the container is such that telescoping into a birdcage due to shifting of a load during shipment will be impossible. Standard ICC procedures will be followed with regard to labeling of containers to inform the carrier of the contents therein.

We trust the foregoing will enable early favorable action on our amendment applications

Very truly yours,

D. F. WAKEFIELD DIVISION

John H. Durant
Business Manager

JHD/jet

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FEB 4 1960
RECEIVED

Div. of Inc.

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

IN REPLY REFER TO:
LRL:CPM
Docket No. 70-139

1959

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

Attention: Mr. J. H. Durant
Business Manager

Gentlemen:

This refers to your application of November 13, 1959 and Feasibility Report, DEM-9, requesting approval of manufacturing procedures for enriched U-Al Fuel Elements for the Wright Field AF-MSTR.

In order that we may continue our review of the referenced application, you should provide us with specific mass limits and an evaluation of the proposed 12" edge-to-edge spacing for accumulations of scrap. Also, for components and finished elements, we require mass limits and an evaluation of spacing to avoid criticality due to interaction.

We also require a more complete description of the proposed shipping container, including dimensions and an indication of the total number of fuel elements to be shipped at any one time. Since the shipments are to be made by common carrier, you should outline plans and arrangements to be made with the carrier to assure that a hazardous condition would not exist if your shipments were to be combined with shipments of other special nuclear material either on the same vehicle or at points of transshipment or delivery.

Very truly yours,

DISTRIBUTION
Div. of INS

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

Henderson