

DOCKET NO. 20-139  
For Div of Inspection

**ENGELHARD INDUSTRIES, INC.**

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

November 6, 1959

U. S. ATOMIC ENERGY COMMISSION  
Germantown, Maryland

Att: Mr. Charles P. McCallum  
Division of Licensing and Regulations  
Licensing Branch

Ref: Docket 70 - 139  
SNM 185  
DEM - 5 Revision A

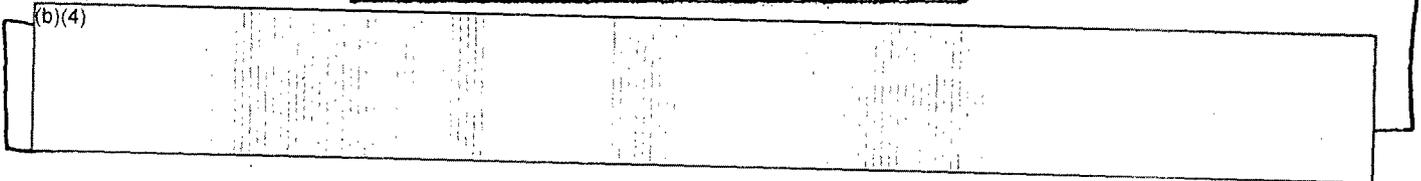
Gentlemen:

Your consideration of the following will be appreciated:

D. E. Makepeace requests that SNM license 185 (as of October 20, 1959) be amended with respect to feasibility report DEM - 5 Revision A, Section 14, pages 17 and 18 as follows:

FINISH PICKLING OF CORNTRUED RODS

(b)(4)



information in this record was deleted  
in accordance with the Freedom of Information  
Act, exemptions 4  
FOIA-208-0314

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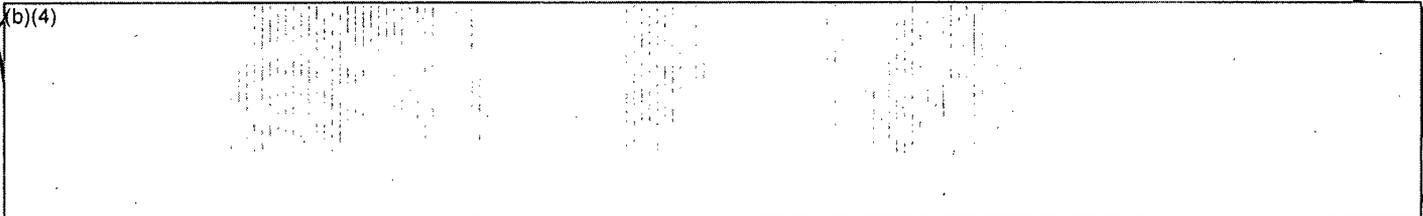
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November 6, 1959

We request that we be permitted to pickle six (6) coextruded rods (2.4 kg. U-235) instead of the original three (3) (1.2 kg. U-235) in our pickle tank containing dilute (1:9) sulfuric acid. The level of solution in the tank will be held to a 1" depth by means of an overflow leading to a 5" I.D. "always safe" polyethylene container. Our pickle tank is 14 ft. long x 6" wide x 12" high.

The solution height of 1" has been chosen to assure that "always safe" conditions will be met. This condition approaches that of an infinite slab which cannot become critical at a thickness less than 1.34" (Ref. KAPL - A - CM -1 Classified), Y-853 - Application of Criticality information to Y-12 plant problems).

(b)(4)



The pickle solutions would be sampled after every thirty (30) rods and transferred to 5 gal. polyethylene carboys. Upon receipt of analysis, the solutions would be transferred to 30 gal. polyethylene lined drums, a maximum of 200 grams U-235 per drum.

Our data based on the pickling of depleted rods of the same alloy composition has established an average loss in weight per rod of 5.25 gms. due to pickling for one (1) hour at room temperature. If we consider this weight to be U-Mo alloy, neglecting the weight of steel removed, the U-235 loss per rod will be 1.2 grams. For the 30 rods the total accumulation of U-235 in the acid solution will be 36 grams. We feel that this is a highly conservative estimate since the great majority of the material which is removed will be steel.

A further justification for this revised operation is provided in K-1380, Studies in Nuclear Safety, Fig. 12, pages F-16 and 17. Using the information contained in Fig. 12, the minimum critical mass for a lattice of 1/8" rods (93.2% enrichment) dispersed in water is 6 kg. U-235. By the use of a safe to minimum critical ratio of 43% (Ref. K-1380, Table I, page A-21), the safe batch size for such a system would be 2.58 kg. U-235.

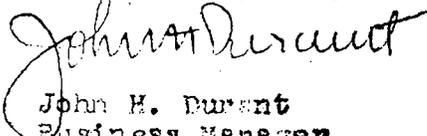
November 6, 1959

The system as described would be more reactive than the conditions under which we would operate since the enrichment is higher (98% vs. 25.6%), the diameter of the rods is smaller (1/8" vs. .310"), and optimum dispersion is assumed rather than random orientation. The application of the above safety factors to our operations will result in a safe procedure which includes the possibility of double batching.

It is hoped that on the basis of this information we will be allowed to incorporate this revised pickling procedure into our manufacturing process.

We will accept collect telephone communications in the interest of expediting and discussion of questions which arise during the consideration of this request.

Very truly yours,

  
John H. Durant  
Business Manager

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