

DEC 2 1961

Charles D. Luke, Chief, Criticality Evaluation Branch, Division of Licensing and Regulation

Donald A. Nussbaumer, Chief, Source and Special Nuclear Materials Branch, Division of Licensing and Regulation

ENGELHARD INDUSTRIES, INC., APPLICATION REQUESTING APPROVAL OF SHIPPING PROCEDURES (70-139)

LR:JCD

The subject application dated December 20, 1961, is transmitted for your review and comments. Please return the docket with your comments.

Attachment:
Docket 70-139

OFFICE ▶	LR	LR				
SURNAME ▶	Delaney <i>JCD</i>	Nussbaumer				
DATE ▶	12/26/61	12/ /61				

UNITED STATES GOVERNMENT

Memorandum

TO : Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Br.

DATE:

NOV 22 1961

FROM : Charles D. Luke, Chief
Criticality Evaluation Br. *CDL*

SUBJECT: ENGELHARD INDUSTRIES, INC. APPLICATION FOR AUTHORIZATION TO
SHIP ENRICHED SCRAP - DOCKET 70-139

We have reviewed the Engelhard telegram dated November 20, 1961, submitted in response to our telephone conversation with Norton Weiss on November 15 (ref: my memo November 15, 1961).

Engelhard proposes to change the diameter of the inner container from 6" to 5", to weld angle iron tripods on top of the drum birdcages to prevent stacking, and limit the number of containers in a shipment to twenty.

These procedures are acceptable and we recommend approval of the application.

Attachment:

1. TWX dtd 11/20/61 fm Engelhard
2. Ltr dtd 10/20/61 " "
3. Docket 70-139

Docket: 70-139
Project: S-49

NOV 23 1961

Donald A. Musbauer, Chief
Source & Special Nuclear Materials Br.

Charles D. Luke, Chief
Criticality Evaluation Br.

**ENGELHARD INDUSTRIES, INC. APPLICATION FOR AUTHORIZATION TO
SHIP ENRICHED SCRAP - DOCKET 70-139**

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1. TWX dtd 11/20/61 fm Engelhard
2. Ltr dtd 10/20/61 " "
3. Docket 70-139

OFFICE ▶	DL&R:FL:CEB					
SURNAME ▶	CDLuke/vj					
DATE ▶	11/22/61					

UNITED STATES GOVERNMENT

Memorandum

TO : Donald A. Nussbaumer, Chief
Source and Special Nuclear Materials Br. DATE: NOV 15 1961

FROM : Charles D. Luke, Chief CDZ
Criticality Evaluation Br.

SUBJECT: ENGELHARD INDUSTRIES, INC., APPLICATION FOR AUTHORIZATION TO
SHIP ENRICHED SCRAP - DOCKET 70-139

We have reviewed the Engelhard application dated October 20, requesting approval of shipping procedures for scrap.

In order to expedite action on this amendment, Joe Delaney and I talked to Norton Weiss this afternoon (11/15/61). This is to confirm that telephone conversation.

We agreed that the proposed 5.75" diameter would be safe for scrap materials, as described by Engelhard. We asked if the drums were to be stacked and Weiss replied that they were not. We suggested some provision for assuring that the drums would not be stacked and Weiss agreed to installation of a tripod on the drum top to prevent stacking.

Engelhard proposed that 50 units be shipped at one time but in justification of this proposal misapplied a criterion. In order to assist Engelhard we suggested the following procedures:

- a. Use 5" diameter Schedule 40 Pipe within a 55-gallon drum, the drums to be arranged in planar array.
- b. For 5" diameter one can use a k of 0.58 which allows a total solid angle of 3.2 steradians.
- c. Apply the solid angle method for determination of the maximum number of containers in the shipping array. I told Weiss that the total should come out to be in the neighborhood of 50 units.

Inasmuch as Engelhard is anxious to ship the material soon, we told Weiss that they could submit the revised plans in a teletype and that we would take prompt action upon receipt of their message.

Attachment:
Application, 10/20/61

NOV 15 1961

Docket: 70-139

Project: S-49

Donald A. Hunsbarger, Chief
Source and Special Nuclear Materials Br.

Charles D. Luke, Chief
Criticality Evaluation Br.

ENGELHARD INDUSTRIES, INC., APPLICATION FOR AUTHORIZATION TO
SHIP ENRICHED SCRAP - DOCKET 70-139

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Attachment:
Application, 10/20/61

OFFICE ▶	DL&R:FL:CEB				
SURNAME ▶	<i>CDL</i> CDLuke/vj				
DATE ▶	11/15/61				

UNITED STATES GOVERNMENT

Memorandum

TO : Charles Luke, Chief
Criticality Evaluation Branch

FROM : *J. A. Nussbaumer*
Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch

SUBJECT: ENGELHARD INDUSTRIES, INC. (70-139)

DATE: November 21, 1961

IR:JLL

By telegram, copy attached, of November 20, 1961, Engelhard has provided additional data in support of their October 20, 1961, application, also attached, as requested during the telephone conversation of November 15, 1961, confirmed by your memo of the same date.

Please return the back-up with your comments.

Attachment:
As stated

Charles Luke, Chief
Criticality Evaluation Branch

November 21, 1961

Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch

ENGELHARD INDUSTRIES, INC. (70-139)

LR:JLL

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Attachment:
As stated

OFFICE ▶	LR	<i>JLL</i>				
SURNAME ▶	JCDelaney:sjs	DANussbaumer				
DATE ▶	11-21-61	11-21-61				

OCT 26 1961

C. D. Luke, Chief, Criticality Evaluation
Branch, Division of Licensing and Regulation

Donald A. Nussbaumer, Chief, Source and Special Nuclear
Materials Branch, Division of Licensing and Regulation

ENGELHARD INDUSTRIES, INC., APPLICATION FOR AUTHORIZATION TO SHIP
ENRICHED SCRAP - DOCKET 70-139

LR:JCD

The subject application dated October 20, 1961, is attached for
your review. Please return the application with your comments
regarding the adequacy of the applicant's proposed procedures.

Enclosure:
10-20-61 appl.

OFFICE ▶	LR	<i>JCD</i> LR				
SURNAME ▶	Delaney/je	Nussbaumer				
DATE ▶	10/26/61	10/ 28 /61				

Leo Dubinski, Assistant Director for
Materials, Division of Compliance, HQ.

OUT 3 1961

Robert W. Kirkman, Director
Region I, Division of Compliance

ENGELHARD INDUSTRIES, INC. (DOCKET NO. 70-139),
ATTLEBORO, MASSACHUSETTS, LICENSE NOS. SNM-185
AND SUB-172 - ALLEGED DEFICIENCIES IN WASTE
DISPOSAL SYSTEM (YOUR MEMO, 9/22/61, CO:LD)

CO-NY:PBK

Mr. Worthen H. Taylor, Director, Division of Sanitary Engineering, Commonwealth of Massachusetts, was tele-contacted by P. B. Klevin of this office regarding any additional information or action taken by his division with regard to the licensee's waste disposal activities. Taylor stated that his people had not re-checked Engelhard's facility in Attleboro, but that they intend to visit the facility within a short time. Taylor referred Klevin to Mr. Richard Powers, Sanitary Engineer, and a member of Taylor's group.

Powers confirmed the information noted in our memo to you dated September 19, 1961. He added that he was satisfied that Weiss had taken the necessary action to correct the deficiency of the leaching pits. He noted that all the liquid waste effluent released to the leaching pits had met the levels specified in 10 CFR 20. Powers added that his office does not expect any additional problems with regard to disposal of wastes into the pit for several years. He noted that trouble with pit blockage could occur with time (several years) if there is a buildup of laundry wastes and detergents in the leaching pits.

No further action is recommended by this office at this time. We intend to review this matter during the next regularly scheduled inspection of the licensee's activities.

UNITED STATES GOVERNMENT

Memorandum

70
Carp
70-139

TO : Eber R. Price, Assistant Director
Division of Licensing and Regulation

DATE: SEP 22 1961

FROM : Leo Dubinski, Assistant Director
for Materials
Division of Compliance



SUBJECT: ENGELHARD INDUSTRIES, INC. (DOCKET 70-139)
ATTLEBORO, MASSACHUSETTS
LICENSES NOS. SNM-185 AND SUB-172
ALLEGED DEFICIENCIES IN WASTE DISPOSAL SYSTEM

CO:LD

In a memorandum dated August 23, 1961 from R. Lowenstein to L. D. Low, in connection with the above subject, a request was made to check on the situation indicated in the letter by Dr. W. H. Taylor, Department of Public Health, Boston, Massachusetts. This has been done by the NY Compliance Area and attached is a copy of the memo from R. W. Kirkman to me dated September 19, 1961, furnishing preliminary information on the basis of telephone inquiries. You will note that Dr. Taylor was contacted and Mr. Kirkman expects to hear further from him. When we get additional information it will be forwarded to you.

An enforcement letter requiring a 30-day reply was sent to the licensee on August 4, 1961. Presumably enforcement action should be completed at an early date. It is quite possible that a followup of enforcement action, reinspection and the need for any further looking into the matter raised by the Health Department could all be accomplished at the same time within the near future.

Attachment:
Cpy memo NY to CO
dtd 9/19/61

cc: R. W. Kirkman, NY

Leo Dubinski, Assistant Director for
Materials, Division of Compliance, HQ.

SEP 19 1961

Robert W. Kirkman, Director
New York Compliance Area

ENGELHARD INDUSTRIES, INC., ATTLEBORO, MASSACHUSETTS;
LICENSE NOS. SMB-185 AND SUB-172 - ALLEGED DEFICIENCIES
IN WASTE DISPOSAL SYSTEM (YOUR MEMO, 8/29/61, CO:EGO)

CO-NY:PBK

Mr. Norton M. Weiss, Manager of Health Physics, Engelhard Industries, was tele-contacted on 9/9/61 regarding the alleged deficiencies in the subject licensee's waste disposal system. Weiss made reference to a letter sent to him from Worthen H. Taylor, Director, Division of Sanitary Engineering, dated August 9, 1961, concerning the radioactive liquid waste disposal system at Engelhard Industries. He stated that the mode of discharging of wastes is the same as reported during our inspection of his facility. He added that the incident reported in the letter of 8/9/61 occurred when wash waters and laundry waste were discharged to several leaching pits. A scum, consisting of detergents, lint, etc., had formed in one of the pits, thus blocking it and causing some of the waste waters to overflow onto the surrounding ground. Weiss stated he added sulphuric acid to the pits, and the action of the sulphuric acid dissolved the scum and corrected the deficiency of the pits. He added that, on August 15, he visited the Division of Sanitary Engineering, Commonwealth of Massachusetts, and spoke to Messrs. Richard Powers and Roger Leopold regarding the action taken in response to their letter. He stated that they agreed that proper corrective action appeared to have been taken.

Weiss stated that all waste waters to the leaching pits were only released if they met the provisions of Part 20. He stated that records of disposal to the pits are maintained, and that the average liquid effluent disposed to the pits was 4.5×10^{-6} uc U/ml.

On 9/8/61, Worthen H. Taylor, Director, Division of Sanitary Engineering, was contacted regarding the aforementioned occurrence. Taylor stated that Weiss had been up to see Powers and Leopold, but that both men were not presently available. He stated that he intended to send one of his inspectors back to Engelhard to check whether the disposal system is now satisfactory. He added that he will contact this office as soon as this inspection is made. As soon as we receive the report from Mr. Taylor, we will forward same to Headquarters.

No other action is contemplated by this office at this time. However, a full review of the licensee's waste disposal system and this occurrence will be reviewed during the course of the next regularly scheduled inspection.

WASHINGTON, D. C.
FEDERAL BUREAU OF INVESTIGATION

SEP 12 5 41 PM '61

RECEIVED
FEDERAL BUREAU OF INVESTIGATION



Lawrence D. Low, Director
Division of Compliance

Supp. Lowenstein, Acting
Robert Lowenstein, Director
Division of Licensing and Regulation

AUG 23 1961

ENGELHARD INDUSTRIES, INC., DOCKET 70-139

LR:DAN

- see back section of this file -

Attached is a copy of a letter dated August 9, 1961, written by the Division of Sanitary Engineering, Department of Public Health, Massachusetts, to Engelhard Industries, Inc., Attleboro, Massachusetts, alleging deficiencies in the liquid waste disposal system of this firm.

Engelhard Industries, Inc. possesses Special Nuclear Material License SNM-185 covering 1180 kilograms of U-235 for the fabrication of reactor fuel elements and related activities and a source material license SUB-172 covering 60,000 pounds for the same purpose. An inspection of this firm was conducted December 12 and 13, 1960, and a notice of alleged violation based on this inspection was sent on August 4, 1961. The inspection report and notice of alleged violation do not indicate any items of non-compliance with respect to the liquid waste disposal system of the licensee.

It is requested that an investigation be conducted in light of the above letter to provide information as to whether or not the licensee is in compliance with AEC regulations and license conditions with respect to the liquid waste disposal system.

Enclosure:
As stated above

CC: Eber Price

OFFICE ▶	I&R	I&R	I&R	I&R		
SURNAME ▶	Nussbaumer:sjs	LJohnson	RKirk	RLowenstein		
DATE ▶	8-21-61	8- -61	8-21-61	8-22-61		

L. Dubinski, Asst. Dir. for Materials
Division of Compliance

JUL 26 1961

R. E. Cunningham, Chief, Enforcement Branch
Division of Licensing and Regulation

YOUR MEMORANDUM, WARNER TO ROGERS, DATED MARCH 23, 1961
SUBJECT: ENGELHARD INDUSTRIES, INC.
ATTLEBORO, MASSACHUSETTS

LICENSE NOS. SNM-185, C-5161 AND 20-5216-1

DLR:CGW

Please refer to the last two paragraphs of subject memorandum. With respect to enforcement action on the inspection report dated January 14, 1960, the licensee answered Mr. Delaney's letter of November 21, 1960 on November 30, 1960. Our letter to the licensee dated February 10, 1961 acknowledged the November 30 letter and confirmed that deficiencies reported in the January 14, 1960 report had been corrected.

Our February 10, 1961 letter also constituted a "Notice of Violation," with respect to deficiencies listed in the investigation report dated October 5, 1960 which you transmitted to L. R. Rogers on October 17, 1960.

Please be further informed that we are not citing the licensee under Section 20.105 for failure to limit the exposure of the malt operator to 10% of the permissible weekly dose following the alleged excessive 13 week exposure. This is not a requirement of present 10 CFR 20. Therefore, it will not be brought to the attention of the licensee.

SIGNED CONCURRENCE COPY IN DOCKET 40-768

OFFICE ▶	DLR:EB CGW:lrn:REC	DLR:EB RECunningham				
SURNAME ▶						
DATE ▶	7-24-61					

UNITED STATES GOVERNMENT

Memorandum

TO : Donald A. Nussbaumer, Chief
Source and Nuclear Materials Branch

DATE: JUN 20 1961

FROM : *W.K. Eister for*
Charles D. Luke, Chief
Criticality Evaluation Branch

SUBJECT: ENGELHARD INDUSTRIES INCORPORATED REQUEST FOR SHIPPING PROCEDURES
APPROVAL - DOCKET 70-139

Please refer to your memorandum of April 21, 1961 regarding the subject application. Mr. John Lane has informed this office that Engelhard Industries has requested that this application be withdrawn.

S-49
Docket 70-139

Donald A. Nussbaumer, Chief
Source and Nuclear Materials Branch

JUN 20 1961

Charles D. Luke, Chief
Criticality Evaluation Branch

ENGELHARD INDUSTRIES INCORPORATED REQUEST FOR SHIPPING PROCEDURES
APPROVAL - DOCKET 70-139

Please refer to your memorandum of April 21, 1961 regarding the
subject application. Mr. John Lane has informed this office
that Engelhard Industries has requested that this application
be withdrawn.

OFFICE ▶	DI&R:CEB					
SURNAME ▶	<i>WKS</i> Weister; jrw					
DATE ▶	6/19/61					

UNITED STATES GOVERNMENT

Memorandum

TO : Donald A. Nussbaumer, Chief
Source and Special Nuclear Materials Branch

DATE: MAY 29 1961

FROM : Charles D. Luke, Chief
Criticality Evaluation Branch *CDL*

SUBJECT: ENGELHARD INDUSTRIES, INC., REQUEST FOR AMENDMENT DATED MAY 18, 1961,
DOCKET 70-139

In reply to your memorandum of May 25, 1961 forwarding the subject application it is recommended that approval be granted.

The Engelhard Industries wishes to increase their storage for 24 additional PRDC core subassemblies. They propose to use the same storage procedure previously approved in our memorandum dated March 14, 1961.

The new storage area is sufficiently isolated from other existing storage areas that there is no interaction problem.

S-49
Docket 70-139

Donald A. Nussbaumer, Chief
Source and Special Nuclear Materials Branch

MAY 17 1961

Charles D. Luke, Chief
Criticality Evaluation Branch

ENGELHARD INDUSTRIES, INC., REQUEST FOR AMENDMENT DATED MAY 18, 1961,
DOCKET 70-139

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OFFICE ▶	DL&R:NFS:C&EB	DL&R:NFS:C&EB			
SURNAME ▶	<i>WKE</i> W.K. Eister:jrw	<i>CDL</i> C.D. Luke			
DATE ▶	5/26/61	5/26/61			

C. D. Luke, Chief, Criticality Evaluation
Branch, Div. of L&R

MAY 25 1961

Donald A. Nussbaumer, Chief, Source and Special Nuclear
Materials Branch, Div. of L&R

ENGELHARD INDUSTRIES, INC. REQUEST FOR AMENDMENT DATED MAY 18, 1961
DOCKET 70-139

L&R:JCD

The subject request is submitted for your review and should be returned with your comments regarding the adequacy of the applicant's proposed procedures to avoid a condition of accidental criticality.

Enclosure:
Appl. dtd 5-18-61

OFFICE ▶	L&R	L&R				
SURNAME ▶	<i>je</i> Delaney/je	<i>DN</i> DANussbaumer				
DATE ▶	5/25/61	5/25/61				

C. D. Luke, Chief, Criticality Evaluation
Branch, Division of Licensing and Regulation

APR 21 1961

Donald A. Nussbaumer, Chief, Source and Nuclear Materials Branch
Division of Licensing and Regulation

ENGELHARD INDUSTRIES, INC., REQUEST FOR SHIPPING PROCEDURE APPROVAL
DOCKET 70-139

L&R:JCD

Attached is Docket 70-139 containing an April 18, 1961, request for approval of shipping procedures. Please review the procedures and advise us of your comments regarding their adequacy. The docket should be returned with the comments.

Enclosure:
Docket 70-139

OFFICE ▶	L&R	L&R				
SURNAME ▶	<i>D. Nussbaumer</i>	D. Nussbaumer				
DATE ▶	4/21/61	4/21/61				

Project S-49
Docket 70-139

Joseph Delaney, Chief
Nuclear Materials Branch

Charles D. Luke, Chief
Criticality Evaluation Branch

ENGELHARD INDUSTRIES - MARCH 1, 1961 - DOCKET 70-139

Please refer to your memorandum of March 6th, forwarding the subject application for review.

Engelhard Industries wishes to temporarily store 39 PRDC core subassemblies; of these, 15 are to be placed in PRDC's shipping containers and the remaining 24 are mounted in substantial wall racks. The shipping containers maintain an edge-to-edge spacing of $24\frac{1}{2}$ inches between subassemblies, and the wall racks a spacing of 16 inches. Transport trucks are constructed such that these spacings cannot be compromised by movement of subassemblies within the vaults. As these spacings exceed those needed for isolation in case of water flooding, and the subassemblies are also safe individually for full water moderation and reflection, we conclude that there can be no criticality, under the conditions of the application, in the event of water inundation. For the dry case, there can again be no criticality, as the total U-235 mass in the 39 subassemblies is 191 kgs, or far less than the 444 kg fast-critical mass.

We therefore recommend that the application be approved.

OFFICE ▶	DL&R:NFS:CEB	DL&R:NFS:CEB				
SURNAME ▶	<i>PH</i> P. Hogroian; jrw	<i>CDL</i> C.D. Luke				
DATE ▶	3/13/61	3/13/61				

UNITED STATES GOVERNMENT

Memorandum

TO : Joseph Delaney, Chief
Nuclear Materials Branch

DATE: MAR 14 1961

FROM : Charles D. Luke, Chief
Criticality Evaluation Branch

CDL

SUBJECT: ENGELHARD INDUSTRIES - MARCH 1, 1961 - DOCKET 70-139

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*Review
Docket 70-139
29
when available*

Charles Luke, Chief
Criticality Evaluation Branch

March 6, 1961

J. C. Delaney, Chief
Nuclear Materials Branch

ENGELHARD INDUSTRIES, INC. APPLICATION DATED MARCH 1, 1961 -
DOCKET NO. 70-139

L&R:JLL

Please review the subject request for the adequacy of the applicant's procedures to avoid a condition of accidental criticality. The application may be retained for your files. Please return the docket with your comments.

Enclosures:
Appl. dtd 3-1-61
& Docket 70-139

OFFICE ▶	L&R					
SURNAME ▶	J. C. Delaney:sjs					
DATE ▶	3-6-61					

Joseph Delaney, Chief
Nuclear Materials Branch

FEB 21 1961

Charles D. Luke, Chief
Criticality Evaluation Branch

ENGELHARD INDUSTRIES - FEBRUARY 13, 1961 MEMO AND FEBRUARY 17, 1961
TEX - DOCKET 70-139

Please refer to our memorandum of February 10, 1961, which commented on Engelhard Industries' application of December 23, 1960. The subject correspondence supplements that application.

Based upon our review of the additional information, we comment as follows:

1. It is possible that the batch size of 4.6 kg U-235 could approximate a critical mass for the enrichment used, if optimum water moderated, reflected, and of reactive configuration. However, it is difficult to conceive that such a situation would result from ingot melting and casting.

2. Engelhard's maintenance of 12-inch spacing between plates will insure in-process critical safety, as such a spacing will result in isolation for the flooded (moderated) case, and the total batch is less than a fast-critical mass for the dry (un-moderated) case.

3. The pickling bath volume is such that even the inadvertent dissolution of an entire 1.14 kg U-235 fuel plate would not cause a criticality. In view of the fact that only four such plates are present at this station, and that they are only pickled singly, it is difficult to conceive that operating error would exceed complete solution of one plate. The waste solution container is similarly of safe volume for such an eventuality.

4. The same provisions which govern item 2 above also apply to in-process storage, and we therefore have no further objection on this point.

5. The shipments planned by Engelhard will contain a maximum of 3 kg U-235 (bound as a single slab) which is a safe mass at 20% enrichment, regardless of configuration or water reflection or

OFFICE ▶						
SURNAME ▶						
DATE ▶						

FEB 21 1961

moderation. We recommend that there be assurance that commingling of Engelhard's nuclear materials and those of another shipper be prevented. One acceptable procedure, in view of the fact that Engelhard will ship by air freight, would be certification by the airline that no other SNM would be put on the same plane with the Engelhard shipment.

OFFICE ▶	NES:CEB <i>PA</i>	NES:CEB <i>BOX</i>				
SURNAME ▶	P. Hogroian; jr C.D. Luke					
DATE ▶	2/21/61	2/21/61				

UNITED STATES GOVERNMENT

Memorandum

TO : Joseph Delaney, Chief
Nuclear Materials Branch

DATE: FEB 21 1961

FROM : Charles D. Luke, Chief
Criticality Evaluation Branch

CDL

SUBJECT: ENGELHARD INDUSTRIES - FEBRUARY 13, 1961 MEMO AND FEBRUARY 17, 1961
TWX - DOCKET 70-139

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1961

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Charles Luke,
Chief, Criticality Evaluation Branch

February 20, 1961

J. C. Delaney,
Chief, Nuclear Materials Branch

ENGELHARD INDUSTRIES TWX DATED FEBRUARY 17, 1961 - DOCKET 70-139

Memor 134

JJL:L&R

Please review the subject request for the adequacy of the applicant's procedures to avoid a condition of accidental criticality. The application may be retained for your files.

Enclosure:
Cy twx dtd 2-17-61

Distribution:
Suppl.
Br. & Div. Rdgs.
J. J. Lane

OFFICE ▶	<i>JJL</i>					
SURNAME ▶	JJLane:sjs					
DATE ▶	2-20-61					

Charles Luke,
Chief, Criticality Evaluation Branch

February 15, 1961

J. C. Delaney,
Chief, Nuclear Materials Branch

ENGELHARD INDUSTRIES APPLICATION DATED FEBRUARY 10, 1961 -
DOCKET NO. 70-139

L&R:JLL

Please review the subject request for the adequacy of the applicant's procedures to avoid a condition of accidental criticality. Please return the enclosed Docket No. 70-139 with your comments. The application may be retained for your files.

Enclosures:
Cy twx dtd 2-10-61 &
Docket No. 70-139

Distribution:
Suppl.
Br. & Div. Rdgs.
J. J. Lane

OFFICE ▶	L&R					
SURNAME ▶	JJLane:sjs					
DATE ▶	2-15-61.					

UNITED STATES GOVERNMENT

Memorandum

TO : Joseph Delaney, Chief
Nuclear Materials Branch

DATE FEB 10 1960

FROM : Charles D. Luke, Chief
Criticality Evaluation Branch

Charles D. Luke

SUBJECT: ENGELHARD INDUSTRIES - December 23, 1960 - Docket 70-139

Please refer to your memorandum of January 9, 1961, forwarding the subject application for review.

Engelhard Industries wishes to fabricate plates composed of 20% - enriched uranium metal. The batch size proposed by Engelhard for this operation is 4.6 kilograms of contained U-235. Although this is a safe mass for an individual system such as a single ingot, it could constitute a critical mass for the fabricated items when suitably spaced, water-reflected, and moderated. Unfortunately, Engelhard has not cited criteria for critical safety, nor described how such criteria would be satisfied in each of their processing steps. Specifically, we must be furnished the following, in much greater detail, to permit our further review of this application:

1. An analysis of the criticality hazards involved in ingot melting and casting. This should include a more complete description of the furnace and take cognizance of the possible consequences of crucible or cooling coil failure, and admission of water during any credible accident.
2. An analysis of the criticality hazards in all steps where the batch size of 4.6 kilograms of U-235 occurs in other than ingot form (this means all operations from hot-rolling into plates of 0.300" thickness, through inspection and storage of finished plates). This should fully describe the conditions under which the hazards analyses are made, including spacing of individual pieces, and degree of actual or potential moderation.
3. An analysis of the criticality hazards for both of the pickling operations. Specific points of information needed in such an analysis would include (a) the maximum concentrations of U-235 in pickling baths and in discarded pickling solutions; (b) the procedures by which it will be ascertained that such concentrations will actually prevail; and (c) the volumes of and dimensions occupied by solutions in pickling baths and in discarded pickling solution containers.
4. A hazards analysis of all storage procedures, including a description of the special nuclear materials to be stored, their containers and [birdcages,] their arrangement within arrays, and storage areas.

in process - 1/10/61

(continued)

5. A complete hazards analyses of all shipments, including the following information: mass and configuration of special nuclear materials in each container; descriptions of containers and [bird-cages;] and the number of such units and their arrangement within each shipment.

In the matter of shipping, Engelhard should also safeguard against the commingling of their nuclear materials with those of other shippers, by any of the following means: exclusive use of common carrier (i.e., sealed boxcar or van), or exclusive use of company vehicle; certification by common carrier that the shipment will not be mingled with nuclear materials from another source; physical escort of the shipment to insure that additional nuclear materials are not placed aboard the carrier enroute to its destination; or use of a heavily poisoned shipping container (we must first evaluate the construction and intended use of each individual container prior to our acceptance of this latter alternative).

*Telecon: 2/10/61 P. Hogroian & J. Lane, DLR,
transmitted above questions to
Engelhardt* 

Project S-2
Docket 70-139
FEB 10 1961

Joseph Delaney, Chief
Nuclear Materials Branch

1961
FEB 10 1961

Charles D. Luke, Chief
Criticality Evaluation Branch

FEB 10 1961

ENGELHARD INDUSTRIES - December 23, 1960 - Docket 70-139

Please refer to your memorandum of January 9, 1961, forwarding the subject application for review.

Engelhard Industries wishes to fabricate plates composed of 20% - enriched uranium metal. The batch size proposed by Engelhard for this operation is 4.6 kilograms of contained U-235. Although this is a safe mass for an individual system such as a single ingot, it could constitute a critical mass for the fabricated items when suitably spaced, water-reflected, and moderated. Unfortunately, Engelhard has not cited criteria for critical safety, nor described how such criteria would be satisfied in each of their processing steps. Specifically, we must be furnished the following, in much greater detail, to permit our further review of this application:

1. An analysis of the criticality hazards involved in ingot melting and casting. This should include a more complete description of the furnace and take cognizance of the possible consequences of crucible or cooling coil failure, and admission of water during any credible accident.
2. An analysis of the criticality hazards in all steps where the batch size of 4.6 kilograms of U-235 occurs in other than ingot form (this means all operations from hot-rolling into plates of 0.300" thickness, through inspection and storage of finished plates). This should fully describe the conditions under which the hazards analyses are made, including spacing of individual pieces, and degree of actual or potential moderation.
3. An analysis of the criticality hazards for both of the pickling operations. Specific points of information needed in such an analysis would include (a) the maximum concentrations of U-235 in pickling baths and in discarded pickling solutions; (b) the procedures by which it will be ascertained that such concentrations will actually prevail; and (c) the volumes of and dimensions occupied by solutions in pickling baths and in discarded pickling solution containers.

4. A hazards analysis of all storage procedures, including a description of the special nuclear materials to be stored, their containers and bircages, their arrangement within arrays, and storage areas.

OFFICE ▶				
SURNAME ▶				
DATE ▶				

(continued)

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In the matter of shipping, Engelhard should also safeguard against the commingling of their nuclear materials with those of other shippers, by any of the following means: exclusive use of common carrier (i.e., sealed boxcar or van), or exclusive use of company vehicle; certification by common carrier that the shipment will not be mingled with nuclear materials from another source; physical escort of the shipment to insure that additional nuclear materials are not placed aboard the carrier enroute to its destination; or use of a heavily poisoned shipping container (we must first evaluate the construction and intended use of each individual container prior to our acceptance of this latter alternative).

OFFICE ▶	CEB:DI&R	CEB:DI&R				
SURNAME ▶	<i>PH</i> PHogroian:bh	<i>CDL</i> CDLuke				
DATE ▶	2/10/61	2/10/61				

UNITED STATES GOVERNMENT

Memorandum

TO : Files

DATE: January 30, 1961

FROM : C. G. Welty, Radiation Safety Branch
Division of Licensing and Regulation



SUBJECT: ENGELHARD INDUSTRIES, ATTLEBORO, MASSACHUSETTS
INVESTIGATION ON JULY 19, 1960, IN REGARD TO HIGH
FILM BADGE READINGS FOR TWO EMPLOYEES

A letter to the licensee concerning the subject investigation was prepared but not sent out. The reason for withholding the letter was the concern that Engelhard might confuse citations and statements concerning the investigation with compliance action in progress concerning the initial inspection conducted on November 19, 1959, at the licensee's facilities.

A letter will be sent to the licensee concerning the incident investigation on July 19, 1960, and acknowledging receipt of their December 22, 1960, report of a more recent radiation overexposure. Included also, will be confirmation of steps outlined in their letter of November 30, 1960, for correcting air survey deficiencies found during the inspection conducted on November 19, 1959, at the licensee's facilities.

Charles Luke,
Chief, Criticality Evaluation Branch

January 9, 1961

J. C. Delaney,
Chief, Nuclear Materials Branch

ENGELHARD INDUSTRIES, INC. APPLICATION DATED DECEMBER 23, 1960 -
FABRICATION OF FN CONVERTER PLATES - DOCKET NO. 70-139

L&R:JLJ

Please review the subject request for the adequacy of the applicant's procedures to avoid a condition of accidental criticality. The enclosed copy of the application should be returned with your comments.

Enclosure:
Appl. dtd 12-23-60

Distribution:
Suppl.
Br. & Div. Rdgs.
JLlane

OFFICE ▶	L&R					
SURNAME ▶	JLlane:sjs					
DATE ▶	1-9-61					

UNITED STATES GOVERNMENT

Memorandum

TO : Files

DATE: October 24, 1960

FROM :  J. J. LaneSUBJECT: ENGELHARD INDUSTRIES, INC. APPLICATION DATED SEPTEMBER 13, 1960,
FOR AMENDMENT TO SNM-185 - DOCKET NO. 70-139

I&R:JLL

ANALYSIS AND FINDINGS

Reference is made to the memorandum to the files dated May 3, 1960, and the memoranda to the files to which in turn it refers regarding the observations, conclusions and findings resulting from the review of Engelhard Industries, Inc.'s request for amendment to their SNM license.

By application dated September 13, 1960, approval is requested for their proposed fuel element shipping container.

Based on our review of the information provided by the applicant, it is hereby determined that their license No. SNM-185 be amended to provide for the use of the proposed shipping container for fuel elements.

APPROVED:



J. C. Delaney
Chief, Nuclear Materials Branch

UNITED STATES GOVERNMENT

Memorandum

TO : Lyall Johnson, Asst. Director
Facilities And Materials Licensing, DL&R

DATE: OCT 21 1960

FROM : Clifford K. Beck, Asst. Director
Nuclear Facilities Safety, DL&R *CKB*

SUBJECT: ENGELHARD INDUSTRIES - SEPTEMBER 13, 1960, DOCKET NO. 70-139

Please refer to your September 16th memorandum, forwarding the subject application for criticality review.

Engelhard Industries proposes a fuel element shipping container designed to be "always - safe" -- i.e., a container that cannot, under any circumstances, nor in any numbers, be assembled into a critical mass. The container is essentially a box constructed of 1-inch plywood backed with $\frac{1}{2}$ -inch polyethylene, which is stiffened with angle irons and lined with a 20-mil thickness of cadmium poison. Six Wright Air Development Center Test Reactor fuel elements (two groups of three, separated by cadmium) are placed in the container, with foam rubber spacers, and the container lid secured with clamp-locks.

We agree that the proposed container represents an isolated unit. The cadmium poison has a large capture cross section, due to the moderating effect of the plywood and polyethylene, and does not permit neutron interaction between any more than three fuel elements. Admission of water to the containers will not materially affect their nuclear safety, providing the fuel elements and cadmium poison remain in position.

The most drastic incident one could hypothesize, would be that of a transportation accident damaging the containers to such an extent that fuel elements are released, without the benefit of cadmium poisoning, into a moderator such as water. We believe that the possibility of such an incident occurring to an extent resulting in criticality is extremely remote. A cold, clean critical mass would be in the order of 25-30 fuel elements, stacked together, and water-moderated and reflected. As an entire core consists of 30-40 such elements,

Lyall Johnson

-2-

it is almost incredible that in any given shipment, sufficient containers could be broken and their fuel elements assembled, in a moderator, into a close-packed critical lattice which excludes poisons.

We therefore recommend that the proposed container be approved, both for storage and shipment of the present 124-gram element (which would total 744 g U-235 per container) and the future 200-gram element (totalling 1200 g U-235 per container).

*Propit 5-49
Docket - 70-139*

Lyall Johnson, Asst. Director
Facilities And Materials Licensing, DL&R

Clifford K. Beck, Asst. Director
Nuclear Facilities Safety, DL&R

ENGELHARD INDUSTRIES - SEPTEMBER 13, 1960, DOCKET NO. 70-139

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Lyall Johnson

-2-

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We therefore recommend that the proposed container be approved, both for storage and shipment of the present 124-gram element (which would total 744 g U-235 per container) and the future 200-gram element (totalling 1200 g U-235 per container).

OFFICE ▶	CEB:DL&R	CEB:DL&R	NFS:DL&R			
SURNAME ▶	<i>Hogroian</i> Hogroian:pb	<i>CDLuke</i> CDLuke	<i>CKBeck</i> CKBeck			
DATE ▶	10/19/60	10/20/60	10/ /60			

C. K. Beck, Chief
Hazards Evaluation Branch

September 16, 1960

Lyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC. APPLICATION DATED SEPTEMBER 13, 1960,
DOCKET NO. 70-139

SYMBOL: LRL:JLJ

Please review the subject request for the adequacy of the applicant's procedures to minimize the hazards from radiation. The enclosed Docket No. 70-139 should be returned with your comments.

Enclosure:
Docket No. 70-139

Distribution:
Suppl.
LRL Rdg.
I&R Rdg.
JLlane

OFFICE ▶	I&R					
SURNAME ▶	JLlane:sjs					
DATE ▶	9/16/60					

Files
 (THRU) Clifford K. Beck, Chief
 Hazards Evaluation Branch
 Paul Hogroian
 Hazards Evaluation Branch

August 8, 1960
 Project S-49
 Docket 70-139

ENGLEHARD INDUSTRIES, INC. - TELETYPE 7/26/60

At the verbal request of T. G. McCreless, we have reviewed the subject teletype, which seeks to modify the Englehard Application of February 19, 1960 (approved by our 3/18/60 memo, Beck to Johnson).

The present application requests that the number of flanged supports between the inner WTR element shipping container and the outer spacing container be reduced from four to two. However, this has been compensated for by filling the annulus with vermiculite as packing material.

This proposed modification to the shipping container was approved verbally, this date.

OFFICE ▶	HEB:DL&R	HEB:DL&R	HEB:DL&R			
SURNAME ▶	<i>PA</i> PHogroian:alp	<i>CD</i> CDLuke	<i>CK</i> CKBeck			
DATE ▶	8/8/60	8/8/60	8/8/60			

Lyall E. Johnson, Chief, Licensing Branch
Division of Licensing and Regulation

JUL 14 1960

Walker E. Campbell
Assistant Controller for Accounting

FINANCIAL ANALYSIS OF ENGELHARD INDUSTRIES, INC.

SYMBOL: FAC:CAL

This is with regard to the request of Engelhard Industries, Inc. for transfer of existing licenses SNM-98, SNM-185, and C4941 from Engelhard Industries, Inc., a New Jersey corporation, to a Delaware corporation of the same name.

We have reviewed the Certificate of Insurance covering all loss or damage of uranium owned by the AEC while in the custody of the insured, and the financial data contained in the Preliminary Prospectus of Engelhard Industries, Inc. dated May 26, 1960 submitted by the applicant to your office. Based upon the facts presented in the Certificate and the Prospectus, we are of the opinion that Engelhard Industries, Inc. (a Delaware corporation) is financially able to assume the financial responsibility for custody of the nuclear materials which it may possess under these licenses.

The corporation appears to be adequately insured against any reasonable loss or damage to the uranium of the AEC while in the care, custody and control of the corporation or while in transit. In addition, the following financial data taken from the Preliminary Prospectus reflect a sound financial position:

Calendar Year - Dollars in Millions

	<u>1959</u>
Current Assets	\$46.4
Current liabilities	27.7
Current ratio	1.68
Working capital	18.7
Fixed assets (net)	14.1
Long term debt	8.8
Ratio	1.60

Calendar Year - Dollars in Millions

	<u>1959</u>		
Capital			\$24.2
Total assets			60.8
Proprietary ratio			.40
Paid in surplus			22.6
	<u>1957</u>	<u>1958</u>	
Net profit	\$ 1.7	\$.5	3.7
Net sales	112.4	99.1	126.7
Profit percentage	1.5	.5	2.9
Net profit	1.7	.5	3.7
Interest charges	.7	.8	.9
Times earned	2.4	-	4.1

The financial statements from which the above data have been extracted were prepared to present the financial position of the new Delaware corporation on a consolidated basis as if the corporation had been incorporated prior to December 31, 1959 and the transfer of assets, liabilities, etc. accomplished as of that date. The operating data presented cover only the operations applicable to the business and properties to be transferred to the new Delaware corporation.

Lyall E. Johnson, Chief
Licensing Branch

Project S-49
Docket 70-139

Clifford K. Beck, Chief
Hazards Evaluation Branch

ENGELHARD INDUSTRIES, INC.

We have reviewed the Engelhard application dated May 17, 1960 requesting approval of shipping procedures for solutions of 25.6% enriched uranium.

The maximum U-235 per shipping unit will be 350 g. The inner container is an 18 gage galvanized cylinder, 6.5" dia. in which are placed three polyethylene bottles with screw caps, packed in vermiculite. This inner container is braced in a 55 gallon drum with 2" x 4" wood braces, and both the inner container and 55 gallon drum are covered. A maximum of five such containers will be shored in an in-line array on the refiner's truck.

The mass limits and spacing are satisfactory. However, the 18 gage inner container is not substantial enough for shipments of this type. The inner container should be equivalent to Schedule 40 stainless steel pipe, with welded bottom and flanged and gasketed top (Ref. p. 47, TID-7019).

When the solution containers are to be transported by other than Engelhard (Baker) truck, there is no assurance that the material will have exclusive use of the carrier vehicle. We cannot recommend approval until the applicant describes arrangements which insure that no other special nuclear material will be combined with the Engelhard shipment enroute to the refiner.

OFFICE ▶	HEB:DL&R	HEB:DL&R			
SURNAME ▶	<i>EDZ</i> CDLuke:alp	CKBeck <i>CKBeck</i>			
DATE ▶	6/8/60	6/18/60			

Rela

Edson Case, Acting Chief
Hazards Evaluation Branch

May 24, 1960

Lyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC., D. E. MAKEPEACE DIVISION, REQUEST
DATED MAY 17, 1960 FOR AMENDMENT TO THEIR SPECIAL NUCLEAR MATERIAL
LICENSE NO. SNM-185 - DOCKET NO. 70-139

SYMBOL: LRL:ND

Please review the subject request for the adequacy of the
applicant's procedures to avoid a condition of accidental
criticality. The enclosed copy of the application may be
retained for your files.

Enclosure:
Cy appli. dtd 5/17/60

DISTRIBUTION

Supl.
L&R - LRL Readings
J. J. Lane, LRL

OFFICE ▶	LRL	LRL	LRL			
SURNAME ▶	<i>JJ Lane</i> JJ Lane/rh	<i>J. J. Lane</i> J. J. Lane	<i>L Johnson</i> L Johnson			
DATE ▶	5/24/60	5/26/60	5/16/60			

UNITED STATES GOVERNMENT

Memorandum

TO : Files

DATE: May 3, 1960

FROM :  J. J. Lane

SUBJECT: ENGELHARD INDUSTRIES, INC. REQUESTS DATED FEBRUARY 19, 1960 AND MARCH 11, AS SUPPLEMENTED MARCH 24, 1960 FOR AMENDMENT TO THEIR SPECIAL NUCLEAR MATERIAL LICENSE NO. SNM-185 - DOCKET NO. 70-139

ANALYSIS AND FINDINGS

Reference is made to the memoranda to the files dated March 18 and April 28, 1960, and the memoranda to the files to which in turn it refers regarding the observations, conclusions and findings resulting from the review of Engelhard Industries, Inc.'s requests for amendment to their special nuclear material license.

By application dated February 19, 1960, approval is requested for the proposed procedures for manufacturing and shipping tubular fuel elements for WTR and by application dated March 11, 1960 supplemented on March 24, 1960, approval is requested for a new storage facility, a part of which will be used for the storage of PRDC fuel pins.

Based on our review of the information provided by the applicant, it is hereby determined that their License No. SNM-185 be amended to authorize the additional procedures and storage facility.

APPROVED:



J. C. Delaney
Chief, Nuclear Materials Section

UNITED STATES GOVERNMENT

Memorandum

TO : Lyall Johnson, Chief
Licensing Branch

FROM : Clifford K. Beck, Chief
Hazards Evaluation Branch

DATE: APR 28 1960

CK Beck

SUBJECT: ENGELHARD INDUSTRIES, INC.; STORAGE OF PRDC FUEL PINS

We have reviewed the Engelhard applications dated March 11 and March 24, 1960 requesting approval of a new storage facility, a part of which will be used for the storage of PRDC fuel pins.

The building will be 36' wide x 80' long x 12' high, constructed of corrugated metal on a concrete floor. There will be no water lines in the building. The building will be 40' from nuclear operations in the main building.

Engelhard proposes to store 14,400 pins containing a total of 490 kg U-235. The pins are 0.158" dia x 30.5" long. 144 pins will be placed inside a 2½" pipe, 36" long with a screw-on cap. This container will be placed inside a 3½" dia steel pipe also equipped with a screw-on cap. 25 such containers will be placed at an inclined angle in a steel rack 36' long. The containers will be on 15½" centers corresponding to 12" edge-to-edge. There will be 4 such arrays spaced 6' apart.

Engelhard states that k_{eff} for a single array if flooded will be 0.6. Flooding of the entire storage area will result in no interaction between containers because of the 12" separation distance. We believe that these calculations are reasonable and feel that there is a substantial margin of safety in the plans proposed by Engelhard.

Plans submitted in compliance with Section 70.24 assures that the monitor alarm system and emergency procedures will be adequate to warn of criticality and provide for the evacuation of personnel.

We recommend that the applications be approved.

ZP

Project S-49

Docket 70-139

Lyall Johnson, Chief
Licensing Branch

Clifford K. Beck, Chief
Hazards Evaluation Branch

ENGELHARD INDUSTRIES, INC.; STORAGE OF PRDC FUEL PINS

We have reviewed the Engelhard applications dated March 11 and March 24, 1960 requesting approval of a new storage facility, a part of which will be used for the storage of PRDC fuel pins.

The building will be 36' wide x 80' long x 12' high, constructed of corrugated metal on a concrete floor. There will be no water lines in the building. The building will be 40' from nuclear operations in the main building.

Engelhard proposes to store 14,400 pins containing a total of 490 kg U-235. The pins are 0.158" dia x 30.5" long. 144 pins will be placed inside a 2½" pipe, 36" long with a screw-on cap. This container will be placed inside a 3½" dia steel pipe also equipped with a screw-on cap. 25 such containers will be placed at an inclined angle in a steel rack 36' long. The containers will be on 15½" centers corresponding to 12" edge-to-edge. There will be 4 such arrays spaced 6' apart.

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Plans submitted in compliance with Section 70.24 assures that the monitor alarm system and emergency procedures will be adequate to warn of criticality and provide for the evacuation of personnel.

We recommend that the applications be approved.

OFFICE ▶	HEB:DL&R	HEB:DL&R			
SURNAME ▶	CDuke; jwl	CKBeck			
DATE ▶	4/26/60	4/28/60			

C. K. Beck, Chief
Hazards Evaluation Branch

March 30, 1960

Lyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC. - D. E. MAKEPEACE DIVISION - REQUEST
DATED MARCH 24, 1960 FOR AMENDMENT TO THEIR SPECIAL NUCLEAR
MATERIAL LICENSE NO. SNM-185 - DOCKET NO. 70-139

SYMBOL: LRL:JL

Please review the subject application for the adequacy of the
applicant's procedures to avoid a condition of accidental
criticality. The enclosed copy of the application may be retained
for your files.

Enclosure:
Cy appli. dtd 3/24/60

DISTRIBUTION

Suppl.

I&R - LRL Readings

J. J. Lane, LRL

OFFICE ▶	LRL	LRL	LRL			
SURNAME ▶	JJ Lane /rh	Johnson	ELJ			
DATE ▶	3/30/60	3/30/60	3/30/60			

C. K. Beck, Chief
Hazards Evaluation Branch

March 21, 1960

Lyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC. - D. E. MAKEPEACE DIVISION - REQUEST DATED
MARCH 11, 1960 FOR AMENDMENT TO THEIR SPECIAL NUCLEAR MATERIAL LICENSE
NO. SNM-185 - DOCKET NO. 70-139

SYMBOL: LRL:JL

Please review the subject application for the adequacy of the applicant's
procedures to avoid a condition of accidental criticality. The enclosed
copy of the application may be retained for your files.

Enclosure:
Appli. dtd 3/11/60

DISTRIBUTION

Suppl.

L&R - LRL Readings

J. J. Lane, LRL

OFFICE ▶	LRL	LRL	LRL			
SURNAME ▶	JJLane /rh	JJLane	LJohnson			
DATE ▶	3/21/60	3/21/60	3/21/60			

UNITED STATES GOVERNMENT

Memorandum

TO : Lyall E. Johnson, Chief
Licensing Branch

FROM : Clifford K. Beck, Chief *CKB*
Hazards Evaluation Branch

SUBJECT: ENGELHARD INDUSTRIES, INC.

DATE: *Delaney*
MAR 19 1960

We have reviewed the Engelhard application dated February 19, 1960, requesting approval of proposed procedures for manufacturing and shipping tubular fuel elements for WTR.

Engelhard proposes to fabricate the three-concentric-tube WTR elements in a series of operations involving casting, rolling, shearing, degreasing, roll-bonding (picture-frame technique), tube-forming and inspection. Through the rolling operation, the mass of an individual unit will be limited to 2.52 kg U-235. In the remaining operations the amount of U-235 in each fabricating area will be limited to 1000 g U-235. Procedures for wet operations appear safe in view of the proposed procedures for limiting both U-235 per batch and the U-235 in solution.

Shipping procedures involve four WTR elements (807 g U-235) per container, 21.5" dia x 58" long, with a maximum of 18 containers per vehicle. Shipment from Engelhard to Westinghouse, Waltz Mill, Pa., will be via exclusive use truck.

Based upon our review of the Engelhard application we recommend approval of the proposed procedures for fabricating and shipping the WTR elements.

Lyall E. Johnson, Chief
Licensing Branch

Project S-49
Docket No. 70-139

Clifford K. Beck, Chief
Hazards Evaluation Branch

MAR 18 1960

ENGELHARD INDUSTRIES, INC.

We have reviewed the Engelhard application dated February 19, 1960, requesting approval of proposed procedures for manufacturing and shipping tubular fuel elements for WTR.

Engelhard proposes to fabricate the three-concentric-tube WTR elements in a series of operations involving casting, rolling, shearing, degreasing, roll-bonding (picture-frame technique), tube-forming and inspection. Through the rolling operation, the mass of an individual unit will be limited to 2.52 kg U-235. In the remaining operations the amount of U-235 in each fabricating area will be limited to 1000 g U-235. Procedures for wet operations appear safe in view of the proposed procedures for limiting both U-235 per batch and the U-235 in solution.

Shipping procedures involve four WTR elements (807 g U-235) per container, 21.5" dia x 58" long, with a maximum of 18 containers per vehicle. Shipment from Engelhard to Westinghouse, Waltz Mill, Pa., will be via exclusive use truck.

Based upon our review of the Engelhard application we recommend approval of the proposed procedures for fabricating and shipping the WTR elements.

OFFICE ▶	HEB:DL&R	HEB:DL&R			
SURNAME ▶	CDLuke:alp	CKBeck			
DATE ▶	3/17/60	3/18/60			

Office Memorandum • UNITED STATES GOVERNMENT

TO : Files

DATE: March 17, 1960

FROM :  J. J. Lane

SUBJECT: ENGELHARD INDUSTRIES, INC. - D. E. MAKEPEACE DIVISION - REQUESTS DATED DECEMBER 15, 1959 AND JANUARY 22, 1960 AND MARCH 8, 1960 FOR AMENDMENT TO THEIR SPECIAL NUCLEAR MATERIAL LICENSE SNM-185 - DOCKET NO. 70-139

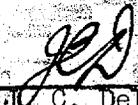
ANALYSIS AND FINDINGS

Reference is made to the memorandum to the files dated February 29, 1960 and the memoranda to the files to which it in turn refers regarding the observations, conclusions and findings resulting from the review of Engelhard Industries, Inc.'s request for a special nuclear material license and the subsequent amendments thereto.

By application dated December 15, 1959, as augmented January 22 and March 8, 1960, the applicant requests that their License No. SNM-185 be further amended to authorize the incineration of their uranium scrap material.

Based on our review of the information provided by the applicant, it is hereby determined that the license may be amended to authorize the additional procedures.

APPROVED:



J. C. Delaney
Chief, Nuclear Materials Section

UNITED STATES GOVERNMENT

Memorandum

TO :Lyall Johnson, Chief
Licensing Branch

FROM :Clifford K. Beck, Chief
Hazards Evaluation Branch

SUBJECT:ENGELHARD INDUSTRIES, INC.

DATE: MAR 7 1960

CKB

We have reviewed the Engelhard application dated January 22, 1960, supplying supplemental information requested through your office in answer to my memorandum of December 21, 1959.

We approve the proposed procedures for storing scrap, fuel element components and finished elements. We also approve the shipping container itself for the use described in the application.

Engelhard states that shipment is to be made by Railway Express, Protective Signature Service. However, the applicant has not submitted plans to assure that the shipment will be safe if combined with other special nuclear material en route to the destination or how it would be kept isolated from other shipments during transit. Labeling alone is not a sufficient means of maintaining necessary separation during shipment - without such information we cannot evaluate the shipping procedures or their safety.

Project S-49
Docket 70-139

Lyall Johnson, Chief
Licensing Branch

MAR 7 1960

Clifford K. Beck, Chief
Hazards Evaluation Branch

ENGELHARD INDUSTRIES, INC.

We have reviewed the Engelhard application dated January 22, 1960, supplying supplemental information requested through your office in answer to my memorandum of December 21, 1959.

We approve the proposed procedures for storing scrap, fuel element components and finished elements. We also approve the shipping container itself for the use described in the application.

Engelhard states that shipment is to be made by Railway Express, Protective Signature Service. However, the applicant has not submitted plans to assure that the shipment will be safe if combined with other special nuclear material en route to the destination or how it would be kept isolated from other shipments during transit. Labeling alone is not a sufficient means of maintaining necessary separation during shipment - without such information we cannot evaluate the shipping procedures or their safety.

OFFICE ▶	HEB:DL&R 802	HEB:DL&R [Signature]			
SURNAME ▶	CDLuke;jwl	CKBeck [Signature]			
DATE ▶	3/2/60	3/2/60			

Office Memorandum • UNITED STATES GOVERNMENT

TO : Files

DATE: February 29, 1960

FROM : Charles P. McCallum, Jr.

SUBJECT: ENGELHARD INDUSTRIES, INC. - D. E. MAKEPEACE DIVISION - REQUEST DATED
FEBRUARY 16, 1960 FOR AMENIMENT TO THEIR SPECIAL NUCLEAR MATERIAL
LICENSE NO. SNM-185 - DOCKET NO. 70-139

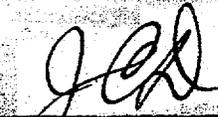
ANALYSIS AND FINDINGS

Reference is made to the memorandum to the files dated January 19, 1960 and the memoranda to the files to which it in turn refers regarding the observations, conclusions and findings resulting from the review of Engelhard Industries, Inc.'s request for a special nuclear material license and the subsequent amendments thereto.

By application dated February 16, 1960, the applicant requests that their License No. SNM-185 be further amended to authorize the decladding of zirconium clad fuel element scrap.

Based on our review of the information provided by the applicant, it is hereby determined that the license may be amended to authorize the additional procedures.

APPROVED:



J. C. Delaney
Chief, Nuclear Materials Section

Reba

C. K. Beck, Chief
Hazards Evaluation Branch

February 25, 1960

Lyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC. REQUEST DATED FEBRUARY 19, 1960 FOR AMEND-
MENT TO THEIR SPECIAL NUCLEAR MATERIAL LICENSE NO. SNM-185 - DOCKET
NO. 70-139

SYMBOL: IRL:CPM

Please review the subject request for the adequacy of the applicant's
procedures to avoid a condition of accidental criticality. The
enclosed copy of the application may be retained for your files.

Enclosure:
Cy appli. dtd 2/19/60

DISTRIBUTION
Div. of INS, w/appli. dtd
2/16 & 19/60
Suppl.
L&R Reading
LRL Reading
C. P. McCallum, IRL

OFFICE ▶	IRL	IRL	IRL			
SURNAME ▶	CPMcCallum	<i>Deberry</i>	LJohnson			
DATE ▶	2/25/60	2/26/60	2/27/60			

Office Memorandum • UNITED STATES GOVERNMENT

TO : Lyall Johnson, Chief, Licensing Branch
Division of Licensing and Regulation

FROM : Lester R. Rogers, Chief, Radiation Safety Branch
Division of Licensing and Regulation

SUBJECT: D. E. MAKEPEACE DIVISION
ENGELHARD INDUSTRIES INC.
DOCKET NO. 70-139

SYMBOL: DLR:RSB:CMF

DATE: FEB 15 1960

Conclusion:

The information contained in the subject's letters of December 15, 1959 and January 22, 1960 for an amendment to permit the incineration of radioactive waste material is not satisfactory from a radiological safety standpoint. To complete our evaluation of this proposal, a description should be submitted of the radiation safety procedures to be followed in handling the ash from the incinerator.

The applicant plans to incinerate approximately 200 lbs. of waste material per day which will require about a 2-hour burning time. To determine compliance with 10 CFR 20, air samples will be taken, during incineration, of the stack and at downwind locations and monitored for alpha activity on a gas flow proportional counter.

The area near the incinerator is not frequently occupied. The incinerator operator will be provided with film badges and periodic urinalyses will be made. No more than 100 drums of ashes will be stored at any one time. They will be disposed of by burial at sea. We assume by transfer to a sea disposal licensee. It should be pointed out that sea disposal requires special approval from the Commission.

Incinerator Construction:

Drawing No. 50013 dated December 3, 1959 shows the construction of the 3/16-sheet-steel incinerator. The point of exhaust is 22 feet above the surface of the ground.

Incinerator Location:

Drawing No. 50016 dated December 4, 1959 shows the location of the incinerator with respect to the plant area and the Turnpike Lake, a nearby body of water. In connection with this application, we have reviewed a memo dated January 4, 1960 from W. A. Brobst, Health and Safety Division, C00, pointing out possible public relations problems from

Lyall Johnson

- 2 -

smoke blowing over the lake which is used for recreational purposes and suggesting the permissible limit for air concentration in the proposed 10 CFR 20 be used since this is the limit the company is using in incinerating contract wastes. The licensee's letter of January 22, 1960 specifies that wastes will not be incinerated when the wind is blowing toward the lake because of monitoring difficulties. The licensee is required to comply with the present 10 CFR 20, and we have no basis for changing the airborne concentration limit in this case.

Lyall Johnson, Chief, Licensing Branch
Division of Licensing and Regulation

FEB 10 1960

Lester R. Rogers, Chief, Radiation Safety Branch
Division of Licensing and Regulation

D. E. MAKEPEACE DIVISION
ENGELHARD INDUSTRIES INC.
DOCKET NO. 76-139

SYMBOL: DLR:RSE:CMF

Conclusion:

The information contained in the subject's letters of December 15, 1959 and January 22, 1960 for an amendment to permit the incineration of radioactive waste material is not satisfactory from a radiological safety standpoint. To complete our evaluation of this proposal, a description should be submitted of the radiation safety procedures to be followed in handling the ash from the incinerator.

The applicant plans to incinerate approximately 200 lbs. of waste material per day which will require about a 2-hour burning time. To determine compliance with 10 CFR 20, air samples will be taken, during incineration, of the stack and at downwind locations and monitored for alpha activity on a gas flow proportional counter.

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SEARCHED INDEXED
SERIALIZED FILED
FEB 10 1960
FBI - MEMPHIS

Lyall Johnson

- 2 -

smoke blowing over the lake which is used for recreational purposes and suggesting the permissible limit for air concentration in the proposed 10 CFR 20 be used since this is the limit the company is using in incinerating contract wastes. The licensee's letter of January 22, 1960 specifies that wastes will not be incinerated when the wind is blowing toward the lake because of monitoring difficulties. The licensee is required to comply with the present 10 CFR 20, and we have no basis for changing the airborne concentration limit in this case.

OFFICE ▶	DLR: RSB					
SURNAME ▶	<i>DMF</i> CMF: lwj: LRR					
DATE ▶	2-15-60 <i>2/15/60</i>					

UNITED STATES GOVERNMENT

Memorandum

TO : Lyall Johnson, Chief
Licensing Branch

FROM : Clifford K. Beck, Chief
Hazards Evaluation Branch

SUBJECT: ENGELHARD INDUSTRIES, INC.

DATE: FEB 12 1960

CKB

We have reviewed the Engelhard Industries applications dated December 15, 1959, and January 22, 1960, requesting authorization of procedures for burning waste materials containing small quantities of uranium of various enrichments.

The applicant proposes to construct a sheet metal furnace 4' x 6' x 4' high with a grate, concrete base and a stack which extends to an elevation of 22'. Natural circulation of air is provided through ports in the ash clean out door.

No filters are provided for removal of particulate matter from the stack gas. Engelhard proposes to insure that the uranium concentration in the air downwind from the stack is at all times within the maximum permissible limits set forth in 10 CFR Part 20, by measuring air concentrations during the burning operations.

It is not possible for us to evaluate the effectiveness of the proposed procedures for assuring that the uranium concentration in the stack effluent will not constitute a hazard to off-site population, i.e., that the requirements of Part 20 will be met. It is usual in such installations that the furnace be provided with exhaust blowers preceded by a filter system to assure that particulate matter will be effectively removed from the stack gas.

If, however, the applicant intends to employ the furnace as presently designed, we require the following supplementary information:

- a. The procedure to be followed in monitoring the air at various sectors and at various altitudes at the site boundary, downwind from the furnace.
- b. Quantitative estimates of the actual concentrations of uranium expected from burning various types of combustible residue, together with the basis for these estimates.
- c. Applicant's emergency procedures if the concentration at any time exceeds the limits of 1.7×10^{-12} microcuries per milliliter of air specified as a maximum in 10 CFR Part 20.

Lyall Johnson

- 2 -

FEB 2 1960

With regard to disposal procedure by burial at sea, we suggest you refer this matter to the Radiation Safety Branch and to the Isotopes Branch of this Division.

Lyall Johnson, Chief
Licensing Branch

FEB 12 1960

Clifford K. Beck, Chief
Hazards Evaluation Branch

ENGELHARD INDUSTRIES, INC.

We have reviewed the Engelhard Industries applications dated December 15, 1959, and January 22, 1960, requesting authorization of procedures for burning waste materials containing small quantities of uranium of various enrichments.

The applicant proposes to construct a sheet metal furnace 4' x 6' x 4' high with a grate, concrete base and a stack which extends to an elevation of 22'. Natural circulation of air is provided through ports in the ash clean out door.

No filters are provided for removal of particulate matter from the stack gas. Engelhard proposes to insure that the uranium concentration in the air downwind from the stack is at all times within the maximum permissible limits set forth in 10 CFR Part 20, by measuring air concentrations during the burning operations.

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If, however, the applicant intends to employ the furnace as presently designed, we require the following supplementary information:

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- b. Quantitative estimates of the actual concentrations of uranium expected from burning various types of combustible residue, together with the basis for these estimates.
- c. Applicant's emergency procedures if the concentration at any time exceeds the limits of 1.7×10^{-12} microcuries per milliliter of air specified as a maximum in 10 CFR Part 20.

OFFICE ▶						
SURNAME ▶						
DATE ▶						

Lyall Johnson

- 2 -

FEB 12 1960

With regard to disposal procedure by burial at sea, we suggest you refer this matter to the Radiation Safety Branch and to the Isotopes Branch of this Division.

OFFICE ▶	HEB:DL&R <i>CDZ</i>	HEB:DL&R				
SURNAME ▶	CDLuke;jwl	CKBeck <i>CKB</i>				
DATE ▶	2/11/60	2/11/60				

Office Memorandum • UNITED STATES GOVERNMENT

TO : Lester R. Rogers, Chief
Radiation Safety Branch

DATE: February 3, 1960

FROM : Lyall Johnson, Chief *LJ*
Licensing Branch

SUBJECT: ENGELHARD INDUSTRIES, INC. - D. E. MAKEPEACE DIVISION - REQUEST DATED
DECEMBER 15, 1959, SUPPLEMENTED JANUARY 22, 1960 FOR AMENDMENT TO THEIR
SPECIAL NUCLEAR MATERIAL LICENSE SNM-185 - DOCKET NO. 70-139

SYMBOL: LRL:CPM

Please review the subject request for the adequacy of the applicant's procedures to minimize the hazards from radiation. Mr. Brobst's memo of January 4, 1960, enclosed with the docket, should be noted. The enclosed Docket No. 70-139 should be returned with your comments.

Enclosure:
Docket No. 70-139

Handwritten signature/initials

Lester R. Rogers, Chief
Radiation Safety Branch

February 3, 1960

Lyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC. - D. E. MAKEPEACE DIVISION - REQUEST DATED
DECEMBER 15, 1959, SUPPLEMENTED JANUARY 22, 1960 FOR AMENDMENT TO THEIR
SPECIAL NUCLEAR MATERIAL LICENSE SNM-185 - DOCKET NO. 70-139

SYMBOL: LRL:CPM

Please review the subject request for the adequacy of the applicant's
procedures to minimize the hazards from radiation. Mr. Brobst's memo
of January 4, 1960, enclosed with the docket, should be noted. The
enclosed Docket No. 70-139 should be returned with your comments.

Enclosure:
Docket No. 70-139

DISTRIBUTION

Suppl.

L&R - LRL Readings

C. P. McCallum, LRL"

OFFICE ▶	LRL	LRL	LRL			
SURNAME ▶	CPMcCallum/rn	<i>[Handwritten]</i>	LJohnson			
DATE ▶	2/3/60	2/3/60	2/7/60			

Rebo 8

C. K. Beck, Chief
Hazards Evaluation Branch

February 3, 1960

Iyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC., D. E. MAKEPEACE DIVISION, TWO REQUESTS
DATED JANUARY 22, 1960 FOR AMENDMENT TO THEIR SPECIAL NUCLEAR MATERIAL
LICENSE NO. SNM-185 - DOCKET NO. 70-139

SYMBOL: LRL:CPM

Enclosed are the subject letters, one of which provides additional information requested in your memorandum of December 21, 1959, relative to the applicant's November 13, 1959 application and Feasibility Report, DEM-9. The other letter provides supplementing information relative to the applicant's application of December 15, 1959, for authority to incinerate scrap material contaminated with enriched uranium.

Please review this information in conjunction with that previously submitted in order to determine the adequacy of the applicant's procedures to avoid a condition of accidental criticality.

The enclosed copies of the referenced submittals may be retained for your files.

Enclosures:
Cys. appli. dtd
1/22/60 (2)

DISTRIBUTION

Suppl.
Div. of Ins. sent 1 cy ea.
1/22/60 applications (2 sent)
L&R - LRL READINGS
C. P. McCallum, LRL

OFFICE ▶	LRL	LRL	LRL			
SURNAME ▶	CPMcCallum/rb	<i>[Signature]</i>	LJohnson			
DATE ▶	2/3/60	2/3/60	2/3/60			

Office Memorandum • UNITED STATES GOVERNMENT

TO : Files

DATE: January 19, 1960

FROM : 
Charles P. McCallum, Jr.SUBJECT: ENGELHARD INDUSTRIES, INC. - D. E. MAKEPEACE DIVISION - REQUESTS
DATED SEPTEMBER 25, NOVEMBER 2 & 6, DECEMBER 28, 1959 AND JANUARY 6,
1960 FOR AMENIMENT TO THEIR SPECIAL NUCLEAR MATERIAL LICENSE NO.
SNM-185 - DOCKET NO. 70-139ANALYSIS AND FINDINGS

Reference is made to the memorandum to the files dated November 17, 1959 and the memoranda to the files to which it in turn refers regarding the observations, conclusions and findings resulting from the review of Engelhard Industries, Inc.'s request for a special nuclear material license and the subsequent amendments thereto.

By application dated September 25, November 6 and December 28, 1959, as modified January 6, 1960, the applicant requests that their license be amended to authorize additional storing and operating procedures. By application dated November 2, 1959, the applicant requests that their license be amended to authorize the use of a revised container and birdcage for shipping primary extrusions, canned slugs and secondary co-extrusions to and from Nuclear Metals, Inc.

Based on our review of the information provided by the applicant, it is hereby determined that the license may be amended to authorize the additional procedures.

APPROVED:


 J. C. Delaney
 Chief, Nuclear Materials Section

Office Memorandum • UNITED STATES GOVERNMENT

TO : James McCallum, Division of Licensing
and Regulation, Washington

DATE: January 4, 1960

FROM : William A. Brobst, Radiological Physicist *336b.1*
Health and Safety Division, Chicago Operations
Office

SUBJECT: D. E. MAKEPEACE COMPANY REQUEST FOR AMENDMENT TO LICENSE

SYMBOL: HS:WAB

I received a copy of a letter written by D. E. Makepeace Company to Mr. Lyall Johnson, in which they requested an amendment to their SNM License No. 185 to allow the incineration of combustible low-level waste material. As you probably know, they have been operating as an accountability station under our office for a couple of years, and through our visits there, we are quite familiar with their operations and facility.

They have been burning small amounts of combustible scrap during the past year, all of which was generated under our AEC contracts. They have had good experience in this process, and I have no doubts about their capabilities to incinerate this scrap safely. There is one problem I would like to point out to you, however; this is the one I discussed with you briefly over the telephone recently.

The small lake nearby (I believe it is called Turnpike Lake) is very popular in the summer months for boating, swimming and fishing. In the winter it is infrequently used for ice fishing. With the lake shore just on the other side of the fence from the incinerator, there could be severe public relations problems should it become known that the company is burning radioactive materials and the smoke is drifting out over the lake. Sampling downwind, as DEM say's it will do, is essentially impossible if the wind is blowing towards the lake. Considering the material DEM will be burning, there is probably very little, if any, actual hazard involved. However, due to the uncertainties in monitoring and the possible adverse public relations, I would like to suggest that if permission is given DEM to incinerate their waste, it should be with the provision that no burning operations be conducted when the wind is blowing over the lake. This could be worded in such a manner that certain arcs are forbidden, perhaps a sector including the lake and fifteen degrees on either side, as measured from the incinerator.

James McCallum

- 2 -

January 4, 1960

I would also like to point out an error in Paragraph 2 on Page 2. The MPC for this type of material should be 1×10^{-13} uc/cc rather than 1.7×10^{-12} as listed. This is the change in the proposed Part 20, and is the one which DEM is now bound by in their AEC contract operations (AEC Manual Chapters 0550 and 0524). Although Part 20 has not been actually revised, this MPC should be specified.

I would appreciate your letting me know what action will be taken on this request for amendment to the license.

*note: Will be taken care of
in new Part 20
goes into effect. CME*

G. K. Beck, Chief
Hazards Evaluation Branch

December 28, 1959

Lyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC. - D. E. MAKEPEACE DIVISION - REQUEST DATED
DECEMBER 15, 1959 FOR AMENDMENT TO THEIR SPECIAL NUCLEAR MATERIAL
LICENSE SNM-185 - DOCKET NO. 70-139

SYMBOL: LRL:CFM

Please review the subject request for the adequacy of the applicant's
procedures to avoid a condition of accidental criticality. The
enclosed copy of the application may be retained for your files.

Enclosure:
Appli. dtd 12/15/59

DISTRIBUTION

Suppl.

L&R - LRL Readings
C. P. McCallum, LRL

OFFICE ▶	LRL	LRL	LRL			
SURNAME ▶	C. P. McCallum	J. DeLaney	L. Johnson			
DATE ▶	12/28/59	12/24/59	12/15/59			

Office Memorandum • UNITED STATES GOVERNMENT

TO : Lyall Johnson, Chief
Licensing Branch

DATE: DEC 22 1959

FROM : Clifford K. Beck, Chief
Hazards Evaluation Branch

CKB

SUBJECT: ENGELHARD INDUSTRIES

- References:
- Engelhard application, 1-30-59.
 - HEB memo, 3-30-59, raising certain questions on pickling procedures.
 - Engelhard reply, 4-17-59.
 - HEB memo, 5-22-59, requesting more information on pickling procedures.
 - Engelhard reply, 6-3-59.
 - HEB memo, 7-27-59, requesting still further information on pickling.
 - Engelhard application, 9-25-59, with revised report DEM-5.
 - Engelhard application, 11-6-59, with clarification of pickling procedures.

We have reviewed the last two applications listed above.

The September 25 application listed minor changes in the operating procedures, which are either more conservative or are equivalent to approved procedures. We approve these changes.

The November 6 application furnished additional detail and a safety analysis of the pickling process in question. The application evaluates the safety of the process according to several criteria, principally on the basis of a 1" solution height (ever-safe infinite slab). We approve the procedures as described in the November 6 application.

Lyall Johnson, Chief
Licensing Branch

SIGNED

Clifford K. Beck, Chief
Hazards Evaluation Branch

Dispatched

ENGELHARD INDUSTRIES

- References:** Engelhard application, 1-30-59.
 HEB memo, 3-30-59, raising certain questions on pickling procedures.
 Engelhard reply, 4-17-59.
 HEB memo, 5-22-59, requesting more information on pickling procedures.
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OFFICE	HEB:DL&R	HEB:DL&R			
SURNAME	DL&R; jwl	CKBeck			
DATE	12/21/59	12/27/59			

Office Memorandum • UNITED STATES GOVERNMENT

TO : Lyall E. Johnson, Chief
Licensing Branch

DATE: DEC 21 1959

FROM : Clifford K. Beck, Chief
Hazards Evaluation Branch

SUBJECT: ENGELHARD INDUSTRIES, DEM-9

We have reviewed the November 13, 1959, application and Feasibility Report, DEM-9, requesting approval of manufacturing procedures for enriched U-Al fuel elements for the Wright Field AF-NETR.

The fuel elements are MTR-type, containing either 18 plates (105.4 g U-235 per element) or 19 plates (124 g U-235 per element). Manufacturing procedures involve melting and casting the uranium (93% enriched) - aluminum alloy, rolling, shearing, forming into plates by the picture frame technic, and assembly into elements. With the exception of the points noted in the following paragraph, the mass limits imposed on the various batches are consistent with acceptable criteria and may be approved.

The application does not specify mass limits for accumulations of scrap and rejected cores, nor is mention made of storage plans for components and finished elements, including mass limits and an evaluation of the spacing to avoid interaction. The description of the shipping container is limited to a sketch which does not give dimensions. Hence, we cannot evaluate its safety.

Finally, we must know the total number of fuel elements per shipment. In addition, since shipment is to be made by common carrier, Engelhard should outline plans and arrangements with the carrier to assure that the Engelhard shipment will not be combined with shipments of other special nuclear material, either on the same vehicle or at points of transshipment or delivery.

Lyall E. Johnson, Chief
Licensing Branch

Clifford K. Beck, Chief
Hazards Evaluation Branch

ENGELHARD INDUSTRIES, DEM-9

We have reviewed the November 13, 1959, application and Feasibility Report, DEM-9, requesting approval of manufacturing procedures for enriched U-Al fuel elements for the Wright Field AP-NETR.

The fuel elements are MTR-type, containing either 18 plates (105.4 g U-235 per element) or 19 plates (124 g U-235 per element). Manufacturing procedures involve melting and casting the uranium (93% enriched) - aluminum alloy, rolling, shearing, forming into plates by the picture frame technique, and assembly into elements. With the exception of the points noted in the following paragraph, the mass limits imposed on the various batches are consistent with acceptable criteria and may be approved.

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Finally, we must know the total number of fuel elements per shipment. In addition, since shipment is to be made by common carrier, Engelhard should outline plans and arrangements with the carrier to assure that the Engelhard shipment will not be combined with shipments of other special nuclear material, either on the same vehicle or at points of transshipment or delivery.

OFFICE ▶	HEB:DL&R	HEB:DL&R			
SURNAME ▶	<i>DL</i> 12/21/59	12/21/59	<i>CK</i>		
DATE ▶	<i>DL</i> 12/21/59	CKBeck			

Office Memorandum • UNITED STATES GOVERNMENT

TO : Lyall E. Johnson, Chief
Licensing Branch

DATE:

DEC 21 1959

FROM : Clifford K. Beck, Chief
Hazards Evaluation Branch

SUBJECT: ENGELHARD INDUSTRIES, INC.

We have reviewed the Engelhard application dated November 2, 1959, which requested approval of a revised container and birdcage for shipping primary extrusions, canned slugs and secondary coextrusions to and from Nuclear Metals, Inc. We previously reviewed and recommended approval of processing and shipping procedures for the original version of these components on March 30, 1959.

The revised shipping container is a 5" steel pipe braced inside a 24" x 30" x 13' long birdcage of angle iron covered on all sides with expanded metal sheeting. The 5" pipe will be capped on both ends. The spacing between adjacent units will be the same as for the presently approved shipping containers.

We recommend approval of the redesigned containers since we believe that they provide assurance of nuclear safety during interplant shipments between Engelhard Industries and Nuclear Metals, Inc., when shipments are made in Engelhard trucks.

Lyall E. Johnson, Chief
Licensing Branch

Clifford K. Beck, Chief
Hazards Evaluation Branch

DEC 21 1959

ENGELHARD INDUSTRIES, INC.

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We recommend approval of the redesigned containers since we believe that they provide assurance of nuclear safety during interplant shipments between Engelhard Industries and Nuclear Metals, Inc., when shipments are made in Engelhard trucks.

OFFICE ▶	HEB:DL&R	HEB:DL&R			
SURNAME ▶	<i>CDL</i> DLake;jwl	CKBeck <i>CKB</i>			
DATE ▶	<i>pm</i> 12/21/59	12/21/59			

Martin Biles, Acting Chief
Hazards Evaluation Branch

November 18, 1959

Lyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC. - D. E. MAKEPEACE DIVISION - REQUEST
DATED NOVEMBER 13, 1959 FOR AMENDMENT TO THEIR SPECIAL NUCLEAR
MATERIAL LICENSE SNM-185 - DOCKET NO. 70-139

SYMBOL: LRL:CFM

Please review the subject request for the adequacy of the appli-
cant's procedures to avoid a condition of accidental criticality.
The enclosed copy of the application may be retained for your
files.

Enclosure:
Appli. dtd 11/13/59

DISTRIBUTION
Suppl.

L&R - LRL Readings
C. P. McCallum, LRL

OFFICE ▶	LRL	LRL	LRL			
SURNAME ▶	<i>C.P. McCallum</i> CPMcCallum/rh	<i>J. DeLaney</i> JDeLaney	<i>L. Johnson</i> LJohnson			
DATE ▶	11/ /59	11/18/59	11/18/59			

Martin Biles, Acting Chief
Hazards Evaluation Branch

November 18, 1959

Lyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC. - D. E. MAKEPEACE DIVISION - REQUEST
DATED SEPTEMBER 25, 1959, AS SUPPLEMENTED NOVEMBER 2 & 6, 1959
FOR AMENDMENT TO THEIR SPECIAL NUCLEAR MATERIAL LICENSE SNM-185
DOCKET NO. 70-139

SYMBOL : LRL:CFM

Please review the subject requests for the adequacy of the applicant's procedures to avoid a condition of accidental criticality. The November 2, 1959 supplement has been previously forwarded to you for review. The enclosed copies of letters dated September 25 and November 6, 1959 may be retained for your files.

Enclosures:
Ltrs dtd 9/25/59 &
11/6/59

DISTRIBUTION

Suppl.

L&R - LRL Readings
C. P. McCallum, LRL

OFFICE ▶	IRL	IRL	IRL			
SURNAME ▶	<i>C. P. McCallum</i> CPMcCallum/zh	<i>J. J. O'Keefe</i> JJO'Keefe	<i>L. Johnson</i> LJohnson			
DATE ▶	11/ /59	11/18/59	11/18/59			

Office Memorandum • UNITED STATES GOVERNMENT

TO : Files

DATE: November 17, 1959

FROM : Charles P. McCallum, Jr.

SUBJECT: ENGELHARD INDUSTRIES, INC. - D. E. MAKEPEACE DIVISION - REQUEST DATED OCTOBER 8, 1959, AS SUPPLEMENTED OCTOBER 30 AND NOVEMBER 5, 1959 FOR AMENIMENT TO THEIR SPECIAL NUCLEAR MATERIAL LICENSE SNM-185 - DOCKET NO. 70-139

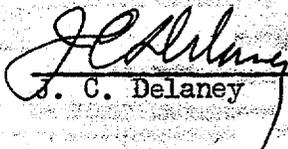
ANALYSIS AND FINDINGS

Reference is made to the memorandum to the files dated October 16, 1959 and the memoranda to the files to which it in turn refers regarding the observations, conclusions and findings resulting from the review of Engelhard Industries, Inc.'s request for a special nuclear material license and the subsequent amendments thereto.

By application dated October 8, 1959, as supplemented October 30 and November 5, 1959, the applicant requests that their license be amended to authorize additional procedures for the fabrication of uranium metal.

Based on our review of the information provided by the applicant, it is hereby determined that the license may be amended to authorize the additional activities.

APPROVED:


J. C. Delaney

C. K. Beck, Chief
Hazards Evaluation Branch

November 13, 1959

Lyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC. - D. E. MAKEPEACE DIVISION - REQUEST DATED
NOVEMBER 2, 1959 FOR AMENDMENT TO THEIR SPECIAL NUCLEAR MATERIAL
LICENSE, SNM-185 - DOCKET NO. 70-139

SYMBOL: LRL:CFM

Please review the subject request for the adequacy of the applicant's
procedures to avoid a condition of accidental criticality. The
enclosed copy of the application may be retained for your files.

Attachment:
Application dtd 11/2/59

DISTRIBUTION

Suppl.

I&R - IRL Readings
C. P. McCallum, LRL

OFFICE ▶	LRL	LRL	LRL			
SURNAME ▶	<i>C P McCallum</i> CPMcCallum/zp	<i>J C Delaney</i> JCDelaney	<i>L Johnson</i> LJohnson			
DATE ▶	11/13/59	11/12/59	11/13/59			

Office Memorandum • UNITED STATES GOVERNMENT

TO : Files

DATE: October 16, 1959

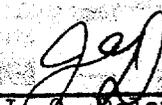
FROM : 
Charles P. McCallum, Jr.SUBJECT: ENGELHARD INDUSTRIES, INC. REQUEST DATED SEPTEMBER 23, 1959, AS
SUPPLEMENTED OCTOBER 14, 1959 FOR AMENDMENT TO THEIR SPECIAL NUCLEAR
MATERIAL LICENSE NO. SNM-185 - DOCKET NO. 70-139ANALYSIS AND FINDINGS

Reference is made to the memorandum to the files dated August 14, 1959 and the memoranda to the files to which it in turn refers regarding the observations, conclusions and findings resulting from the review of Engelhard Industries, Inc.'s request for a special nuclear material license and the subsequent amendments thereto.

By application dated September 23, 1959, as supplemented October 14, 1959, the applicant has requested that they be authorized additional procedures for the storage of special nuclear material.

Based on our review of the information provided by the applicant, it is hereby determined that the license may be amended to authorize the additional activities.

APPROVED:



J. C. Delaney

DeLaney

Office Memorandum • UNITED STATES GOVERNMENT

TO : Lyall E. Johnson, Chief
Licensing Branch

DATE: OCT 7 1959

FROM : Clifford K. Beck, Chief
Hazards Evaluation Branch *CKB*

SUBJECT: ENGELHARD INDUSTRIES, INC.

We have reviewed the August 14, 1959 application of Engelhard Industries submitting information on the proposed alarm system and emergency plan for D. E. Makepeace Co., Plainville, Massachusetts.

The application did not present sufficient information to enable us to determine that the alarm and emergency procedures would comply with the requirements of Section 70.24. We suggest that the following be included in your communication to Engelhard:

"The four Model RN-2 monitors are so located as to adequately cover operations in the Nuclear (hot roll) Area, the Partition Area and the two storage areas. However, none of the four monitor locations comply with distance specifications of Section 70.24 with relation to part of the Form Roll area. If the Form Roll area is to involve quantities of U-235 in excess of the quantities specified in Section 70.24, we request that you submit plans for monitoring of this area.

"With regard to the operating range and time constant of the instruments we request further information on the high and low settings (mr/hr) and on the overall response times from signal input to the sounding of the alarm for different radiation levels. Also, please furnish descriptions of fail-safe features of the instrumentation and alarm system, emergency power supply and method and frequency of testing the monitor-alarm systems.

"With regard to emergency evacuation resulting from a criticality incident, we request further information on procedures for assuring that congregation areas will be safe from radiation hazard. Also, please furnish plans for utilizing alternate assembly areas if the designated areas are not safe."

10/13

*This information communicated to John Stewart
on 10/13 by telecon. He'll wire in reply.
-CKB*

Lyall E. Johnson, Chief
Licensing Branch

Project S-49
Docket No. 70-139
(70.24)

Clifford K. Beck, Chief
Hazards Evaluation Branch

OCT 7 1959

ENGELHARD INDUSTRIES, INC.

We have reviewed the August 14, 1959 application of Engelhard Industries submitting information on the proposed alarm system and emergency plan for D. E. Makepeace Co., Plainville, Massachusetts.

The application did not present sufficient information to enable us to determine that the alarm and emergency procedures would comply with the requirements of Section 70.24. We suggest that the following be included in your communication to Engelhard:

"The four Model EM-2 monitors are so located as to adequately cover operations in the Nuclear (hot roll) Area, the Partition Area and the two storage areas. However, none of the four monitor locations comply with distance specifications of Section 70.24 with relation to part of the Form Roll area. If the Form Roll area is to involve quantities of U-235 in excess of the quantities specified in Section 70.24, we request that you submit plans for monitoring of this area.

"With regard to the operating range and time constant of the instruments we request further information on the high and low settings (mr/hr) and on the overall response time from signal input to the sounding of the alarm for different radiation levels. Also, please furnish descriptions of fail-safe features of the instrumentation and alarm system, emergency power supply and method and frequency of testing the monitor-alarm systems.

"With regard to emergency evacuation resulting from a criticality incident, we request further information on procedures for assuring that congregation areas will be safe from radiation hazard. Also, please furnish plans for utilizing alternate assembly areas if the designated areas are not safe."

OFFICE ▶	HEB:DL&R	HEB:DL&R			
SURNAME ▶	CDLuke:alp	CKBeck			
DATE ▶	10/6/59	10/7/59			

C. K. Beck, Chief
Hazards Evaluation Branch

August 20, 1959

Lyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC., (D. E. MAKEPEACE DIVISION) COMPLIANCE WITH
SECTION 70.24 - DOCKET NO. 70-139 - SNM-185

SYMBOL: IRL:JCD

Attached is Docket No. 70-139. By letter dated August 14, 1959,
the licensee has provided further information regarding the proced-
ures and equipment for achieving compliance with Section 70.24.

Please review the new information provided by the licensee. The
docket should be returned with your comments.

Enclosure:
Docket No. 70-139

DISTRIBUTION

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I&R Reading
IRL Reading
C. P. McCallum, IRL

OFFICE ▶	IRL	IRL				
SURNAME ▶	J. C. McCallum	L. Johnson				
DATE ▶	8/20/59	8/20/59				

Office Memorandum • UNITED STATES GOVERNMENT

TO : Files

DATE: August 14, 1959

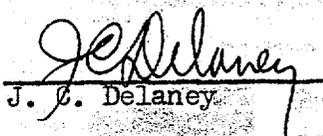
FROM : 
Charles P. McCallum, Jr.SUBJECT: ENGELHARD INDUSTRIES, INC. REQUEST DATED AUGUST 3, 1959 FOR AMENDMENT
TO THEIR LICENSE, SNM-185 - DOCKET NO. 70-139

Reference is made to ~~your~~^{the} memorandum to the files dated April 3, 1959 and the memoranda to the files to which it in turn refers regarding the observations, conclusions and findings resulting from the review of Engelhard Industries, Inc.'s request for a special nuclear material license and the subsequent amendments thereto.

By applications dated December 9, 1958, January 13 & 30, March 3, April 9, April 17 (2), May 28 (2), June 3 and August 3, 1959, the applicant requests approval of procedures to increase the scope of activities at their fuel element fabrication facilities.

Based on our review of the information provided by the applicant, it is hereby determined that the license may be amended to authorize the additional activities.

APPROVED:


J. C. Delaney

Office Memorandum • UNITED STATES GOVERNMENT

TO : Lyall Johnson, Chief
Licensing Branch

FROM : Clifford K. Beck, Chief
Hazards Evaluation Branch

SUBJECT: ENGELHARD INDUSTRIES, INC.

DATE: JUL 27 1959

C/KB

As requested in your memorandum of June 10, we have reviewed the Engelhard application of June 3, 1959, submitting further information on the three pickling processes.

On the basis of this information, we believe that the proposed procedures for controlling U-235 in the pickling solutions will insure that the total amount of U-235 in each pickling solution will not exceed 350 grams of contained U-235. Consequently, the individual batches of pickling solution should be safe from criticality. On the basis of information presented in the Engelhard application dated January 30, 1959, we believe there will be no criticality hazard in storing the solutions in 13 gallon polyethylene bottles, stored 18" edge-to-edge.

Information submitted in the January 30 and June 3 applications is not sufficient to enable us to determine that there will be no criticality hazard in the pickling tanks containing 25.6% enriched uranium metal parts immersed in pickling solution containing 350 grams U-235. We request information relative to the criteria and methods of calculation employed by Engelhard in justification of the pickling procedures.

7/28

This info communicated to John Durant, Engelhard
Lab., on July 24 by telecon. He will submit
additional data by letter. jcp/07

Lyall Johnson, Chief
Licensing Branch

Project SNM 2

Docket 70-139

Clifford K. Beck, Chief
Hazards Evaluation Branch

JUL 27 1959

ENGELHARD INDUSTRIES, INC.

As requested in your memorandum of June 10, we have reviewed the Engelhard application of June 3, 1959, submitting further information on the three pickling processes.

On the basis of this information, we believe that the proposed procedures for controlling U-235 in the pickling solutions will insure that the total amount of U-235 in each pickling solution will not exceed 350 grams of contained U-235. Consequently, the individual batches of pickling solution should be safe from criticality. On the basis of information presented in the Engelhard application dated January 30, 1959, we believe there will be no criticality hazard in storing the solutions in 13 gallon polyethylene bottles, stored 18" edge-to-edge.

Information submitted in the January 30 and June 3 applications is not sufficient to enable us to determine that there will be no criticality hazard in the pickling tanks containing 25.6% enriched uranium metal parts immersed in pickling solution containing 350 grams U-235. We request information relative to the criteria and methods of calculation employed by Engelhard in justification of the pickling procedures.

OFFICE ▶	HEB:DL&R <i>EDR</i>	HEB:DL&R			
SURNAME ▶	CDLuke, jwl	CKBeck <i>CKB</i>			
DATE ▶	7/24/59	7/27/59			

Edson G. Case, Acting Chief
Hazards Evaluation Branch

June 10, 1959

Lyall Johnson, Chief
Licensing Branch

ENGELHARD INDUSTRIES, INC. REQUEST DATED JUNE 3, 1959 FOR AMENDMENT
TO THEIR SPECIAL NUCLEAR MATERIAL LICENSE SNM-185 - DOCKET NO. 70-139

SYMBOL: LRL:CPM

Pursuant to your memorandum of May 22, 1959, the information contained in the subject letter has been provided by the applicant.

Please review this application in conjunction with the previous submittals of April 17 and May 28, 1959, and advise us as to the adequacy of the applicant's procedures to prevent a condition of inadvertent criticality. You will note that in the applicant's proposed pickling procedures, the amount of U-235 permitted in the solution is in addition to that contained in the material being pickled.

Enclosed is a copy of the application which may be retained for your files.

Enclosure:
Appli. dtd. 6/3/59

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Suppl.
L&R Reading
LRL Reading
C. P. McCallum, LRL

OFFICE ▶	LRL	LRL	LRL			
SURNAME ▶	McCallum / rh	J. Delaney	L. Johnson			
DATE ▶	6/10/59	6/10/59	6/16/59			

Delaney
Office Memorandum • UNITED STATES GOVERNMENT

TO : Lyall E. Johnson, Chief
Licensing Branch

FROM : Clifford K. Beck, Chief
Hazards Evaluation Branch

SUBJECT: ENGELHARD INDUSTRIES

DATE: MAY 22 1959

We have reviewed the April 17, 1959, letter from Engelhard submitting further information on proposed procedures as requested in my memorandum to you dated March 30, 1959.

Engelhard has given sufficient information with regard to one of the pickling processes, so that we may determine that there would be no undue risk of criticality occurring as a result of U-235 buildup in that particular pickling solution. However, there are several other pickling processes employed and we do not have the necessary information on these.

With regard to the question on shipment on final product expressed in my memorandum of March 30, Engelhard states that the responsibility for such shipment will rest with PRDC. We will be pleased to review this problem when PRDC applies for a license which includes these procedures.

Project SNM-2

Docket 70-139

MAY 18 1959

Lyall E. Johnson, Chief
Licensing Branch

Clifford K. Beck, Chief
Hazards Evaluation Branch

ENGELHARD INDUSTRIES

We have reviewed the April 17, 1959, letter from Engelhard submitting further information on proposed procedures as requested in my memorandum to you dated March 30, 1959.

Engelhard has given sufficient information with regard to one of the pickling processes, so that we may determine that there would be no undue risk of criticality occurring as a result of U-235 buildup in that particular pickling solution. However, there are several other pickling processes employed and we do not have the necessary information on these.

With regard to the question on shipment on final product expressed in my memorandum of March 30, Engelhard states that the responsibility for such shipment will rest with PRDC. We will be pleased to review this problem when PRDC applies for a license which includes these procedures.

OFFICE ▶	HEB:DD&R	HEB:DL&R			
SURNAME ▶	ODL:uke;awl	CKBeck			
DATE ▶	5/22/59	5/24/59			

C. K. Beck
Chief, Hazards Evaluation Branch

April 22, 1959

Lyall Johnson
Chief, Licensing Branch

ENGELHARD INDUSTRIES, INC., LETTER DATED APRIL 17, 1959 - DOCKET NO.
70-139

SYMBOL: LRL:GPM

Enclosed is the subject letter which contains information obtained from the applicant pursuant to the request contained in your memorandum of March 30, 1959.

Please review this information in regard to the adequacy of the applicant's procedures to avoid a condition of accidental criticality.

Enclosure:
Application dtd. 4/17/59

DISTRIBUTION

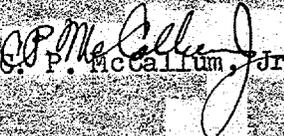
Suppl.
I&R Reading
LRL Reading
C. P. McCallum, LRL

OFFICE ▶	LRL	LRL	LRL			
SURNAME ▶	<i>C. P. McCallum</i> CPMcCallum/rh	<i>J. Johnson</i> JJohnson	<i>L. Johnson</i> LJohnson			
DATE ▶	4/22/59	4/22/59	4/22/59			

Office Memorandum • UNITED STATES GOVERNMENT

TO : Files

DATE: April 3, 1959

FROM : 
C. P. McCallum, Jr.SUBJECT: ENGELHARD INDUSTRIES, INC. REQUEST FOR AMENDMENT TO THEIR LICENSE,
SNM-185 - DOCKET NO. 70-139

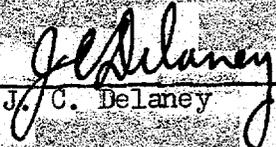
ANALYSIS AND FINDINGS

Reference is made to your memorandum to the files dated March 24, 1958 regarding the observations, conclusions and findings resulting from the review of the Engelhard Industries, Inc., (D. E. Makepeace Division) application for a special nuclear material license.

By letter dated January 13, 1959, the applicant requests that SNM-185 be further amended to authorize the receipt and storage of uranium metal ingots at their facilities in preparation for entering into fuel element fabrication activities. No allocation of special nuclear material is required.

Based on our review of the information provided by the applicant, it is hereby determined that the license may be amended to authorize the additional activities.

APPROVED:


J. C. Delaney

Office Memorandum • UNITED STATES GOVERNMENT

TO : Lyall E. Johnson, Chief
Licensing Branch

DATE MAR 30 1959

FROM : Clifford K. Beck, Chief
Hazards Evaluation Branch

SUBJECT: ENGELHARD INDUSTRIES, D. E. MAKEPEACE DIVISION

We have reviewed the Engelhard Industries application of January 13, 1959, requesting approval of storage procedures for 25.6% enriched uranium, to be used in fabricating fuel elements for the PRDC Enrico Fermi reactor.

We have no objection to approval of an increase in U-235 inventory from 24 kg. to 250 kg. U-235. Storage vaults are adequate to store properly this quantity of material.

Based upon our review of the proposed storage procedures, we see no reason why these procedures should not be approved.

Project SNM-2

Docket 70-139

Lyall E. Johnson, Chief
Licensing Branch

MAR 9 0 1959

Clifford K. Beck, Chief
Hazards Evaluation Branch

ENGELHARD INDUSTRIES, D. E. MAKEPEACE DIVISION

We have reviewed the Engelhard Industries application of January 13, 1959, requesting approval of storage procedures for 25.6% enriched uranium, to be used in fabricating fuel elements for the PRDC Enrico Fermi reactor.

We have no objection to approval of an increase in U-235 inventory from 24 kg. to 250 kg. U-235. Storage vaults are adequate to store properly this quantity of material.

Based upon our review of the proposed storage procedures, we see no reason why these procedures should not be approved.

OFFICE ▶	HEB:DL&R <i>CDLuke</i>	HEB:DL&R <i>CKBeck</i>			
SURNAME ▶	CDLuke;jwl	CKBeck			
DATE ▶	3/30/59	3/ /59			

Office Memorandum • UNITED STATES GOVERNMENT

TO : Lyall E. Johnson, Chief
Licensing Branch

DATE: MAR 30 1959

FROM : Clifford K. Beck, Chief
Hazards Evaluation Branch *CKB*

SUBJECT: ENGELHARD INDUSTRIES, INC., D. E. MAKEPEACE DIVISION

We have reviewed the Engelhard Industries application of January 30, 1959, requesting approval of procedures relating to the fabrication and assembly of fuel elements for the PRDC Enrico Fermi reactor.

Engelhard proposes to receive 25.6% enriched uranium in the form of 5 kg. derbies. The uranium will be cast into 52 kg ingots (13.3 kg U-235 each), which are to be clad in copper and sent to Nuclear Metals, Inc., for extrusion. The primary extruded rods, 1.525" dia x 9' long will be received from NMI, the copper removed and the rods cut into 25 slugs, 4.187" long. These slugs will be machined and canned in zirconium, and again sent to NMI for extrusion into rods 0.310" dia x about 10' long. Upon return from NMI the rods are swaged to 0.158" dia and cut into fuel pins 30½" long. After further processing, 144 of these pins (5 kg U-235) are assembled into each fuel element.

We believe the mass control limits proposed for billets and component parts throughout the process provides adequate margins of safety. Individual mass limits will vary from 6.4 kg U-235 in birdcages as received, to 13.3 kg U-235 in the single cast billets, to 6.6 kg U-235 per birdcage of canned slugs sent to NMI and to 5.25 kg U-235 per transfer cabinet for 0.158" dia fuel pins. Solid scrap is to be stored in 350 gram quantities, properly spaced. Lathe turnings are to be compacted and stored in 1 kg units for remelting with the original charge.

We are not convinced that the proposed procedures will insure against buildup of U-235 in the pickling tanks to the point of possible criticality. The application states that U-235 in the pickling solutions at any stage of processing will be limited to 350 grams, and that the amount of U-235 in each pickling solution will be determined by loss in weight of the component pickled. We do not believe this to be a reliable method, particularly in the pickling tanks where cladding (copper, nickel or steel) is to be dissolved, since this would obviously interfere with the loss-in-weight determination. Consequently, we request further information on the absolute control of U-235 concentration and amount in the pickling solutions.

Lysil E. Johnson, Chief
Licensing Branch

MAR 30 1959

Clifford K. Beck, Chief
Hazards Evaluation Branch

ENGELHARD INDUSTRIES, INC., D. E. MAKEPEACE DIVISION

We have reviewed the Engelhard Industries application of January 30, 1959, requesting approval of procedures relating to the fabrication and assembly of fuel elements for the PRDC Enrico Fermi reactor.

Engelhard proposes to receive 25.6% enriched uranium in the form of 5 kg. derbies. The uranium will be cast into 52 kg ingots (13.3 kg U-235 each), which are to be clad in copper and sent to Nuclear Metals, Inc., for extrusion. The primary extruded rods, 1.525" dia x 9' long will be received from NMI, the copper removed and the rods cut into 25 slugs, 4.187" long. These slugs will be machined and canned in zirconium, and again sent to NMI for extrusion into rods 0.310" dia x about 10' long. Upon return from NMI the rods are swaged to 0.158" dia and cut into fuel pins 30 1/4" long. After further processing, 144 of these pins (5 kg U-235) are assembled into each fuel element.

We believe the mass control limits proposed for billets and component parts throughout the process provides adequate margins of safety. Individual mass limits will vary from 6.4 kg U-235 in birdcages as received, to 13.3 kg U-235 in the single cast billets, to 6.6 kg U-235 per birdcage of canned slugs sent to NMI and to 5.25 kg U-235 per transfer cabinet for 0.158" dia fuel pins. Solid scrap is to be stored in 350 gram quantities, properly spaced. Lathe turnings are to be compacted and stored in 1 kg units for remelting with the original charge.

We are not convinced that the proposed procedures will insure against buildup of U-235 in the pickling tanks to the point of possible criticality. The application states that U-235 in the pickling solutions at any stage of processing will be limited to 350 grams, and that the amount of U-235 in each pickling solution will be determined by loss in weight of the component pickled. We do not believe this to be a reliable method, particularly in the pickling tanks where cladding (copper, nickel or steel) is to be dissolved, since this would obviously interfere with the loss-in-weight determination. Consequently, we request further information on the absolute control of U-235 concentration and amount in the pickling solutions.

OFFICE ▶	HEB:DL&R CDL	HEB:DL&R			
SURNAME ▶	CDLuke;jwl	CKBeck			
DATE ▶	3/30/59	3/ /59			

DeLaney
Office Memorandum • UNITED STATES GOVERNMENT

TO : Lyall E. Johnson
Chief, Licensing Branch

DATE: MAR 16 1959

FROM : Clifford K. Beck
Chief, Hazards Evaluation Branch

C. K. Beck
by CDK.

SUBJECT: ENGELHARD INDUSTRIES, INC.

We have reviewed the Engelhard application dated March 3, 1959, for amendment of License SNM-185 requesting approval of proposed procedures for fabrication of fuel pins for the SRE test program.

In order to complete our evaluation we must have further information as follows:

- a. What procedures are to be followed in order to insure against buildup of special nuclear material in the pickle tank to the point of criticality?
- b. We see no objection to the shipping container for the final product, but we request information concerning procedures which will assure that inadvertent criticality will not be brought about through close proximity and interaction with containers of other special nuclear material during shipment and at points of intermediate storage.

Project No. SNM-2

Bucket No 70-139

Lyall E. Johnson
Chief, Licensing Branch

MAR 16 1959

Clifford K. Beck
Chief, Hazards Evaluation Branch

ENGELHARD INDUSTRIES, INC.

We have reviewed the Engelhard application dated March 3, 1959, for amendment of License SNM-185 requesting approval of proposed procedures for fabrication of fuel pins for the SRE test program.

In order to complete our evaluation we must have further information as follows:

- a. What procedures are to be followed in order to insure against buildup of special nuclear material in the pickle tank to the point of criticality?
- b. We see no objection to the shipping container for the final product, but we request information concerning procedures which will assure that inadvertent criticality will not be brought about through close proximity and interaction with containers of other special nuclear material during shipment and at points of intermediate storage.

OFFICE ▶	HEB:DL&R	HEB:DL&R			
SURNAME ▶	CDLuke;jwl <i>CDL</i>	CKBeck			
DATE ▶	3/16/59	3/16/59			

C. K. Beck
Chief, Hazards Evaluation Branch

March 6, 1959

Lyall Johnson
Chief, Licensing Branch

ENGELHARD INDUSTRIES, INC. (MAKEPEACE DIV.) REQUEST FOR AMENDED
LICENSE, DOCKET 70-139

SYMBOL: LRL:JCD

By application dated March 3, 1959, Engelhard Industries has requested amendment of their license SM-185 to permit fabrication of fuel pins for the SRE test program.

Please review the application and advise us regarding the adequacy of the applicant's proposed procedures to prevent a condition of accidental criticality.

Enclosure:
Engelhard ltr dtd 3-3-59

XTRA copy sent - I kept the original.

OFFICE ▶	LRL	LRL				
SURNAME ▶	JCD	LJohnson				
DATE ▶	3-6-59	3-6-59				

Office Memorandum • UNITED STATES GOVERNMENT

TO : Wilbur A. Strauser, Deputy Director
Division of Classification

DATE: MAR 6 1959

FROM : E. R. Fleury, Assistant Chief, Licensing Branch
Division of Licensing and Regulation

SUBJECT: CLASSIFICATION REVIEW OF SNM APPLICATION
SUPPLEMENT - DOCKET NO. 70-139

SYMBOL: IRL:ERF

Attached is a supplement to an application for special nuclear material license, filed by Engelhard Industries, Inc., dated March 3, 1959 (consisting of Engelhard letter, Feasibility Report DEM-6 and Drawing 1038), which we propose to place in the AEC Public Document Room in accordance with established procedures.

Please review the above supplement, and if no Restricted Data are contained therein, indicate this determination in the space provided below. One copy of this memorandum should be retained for your file.

In the event the supplement does contain Restricted Data, return it to us with your memorandum indicating the specific references which include Restricted Data.

Enclosure:
Engelhard Supplement of 3/3/59
w/Encls. as listed above

The supplement listed above has been reviewed and it has been determined that it contains no Restricted Data:

Division of Classification

10 MAR 1959
Date

*Copy to AEC March for
PDR Room 3/17/59*

Wilbur A. Strauser, Deputy Director
Division of Classification

MAR 6 1959

E. R. Fleury, Assistant Chief, Licensing Branch
Division of Licensing and Regulation

CLASSIFICATION REVIEW OF SNM APPLICATION
SUPPLEMENT - DOCKET NO. 70-139

SYMBOL: IRL:ERF

Attached is a supplement to an application for special nuclear material license, filed by Engelhard Industries, Inc., dated March 3, 1959 (consisting of Engelhard letter, Feasibility Report DEM-6 and Drawing 1038), which we propose to place in the AEC Public Document Room in accordance with established procedures.

Please review the above supplement, and if no Restricted Data are contained therein, indicate this determination in the space provided below. One copy of this memorandum should be retained for your file.

In the event the supplement does contain Restricted Data, return it to us with your memorandum indicating the specific references which include Restricted Data.

Enclosure:

Engelhard Supplement of 3/3/59
w/Encls. as listed above

The supplement listed above has been reviewed and it has been determined that it contains no Restricted Data:

Division of Classification

Date

OFFICE ▶	IRL					
SURNAME ▶	RDiggs:rd ERFleury					
DATE ▶	3/6/59					

C. K. Beck
Chief, Hazards Evaluation Branch

February 9, 1959

Lyall Johnson
Chief, Licensing Branch

ENGELHARD INDUSTRIES, INC., D. E. MAKEPEACE DIVISION REQUEST OF
JANUARY 13 AND 30, 1959 FOR AMENDMENT TO THEIR SPECIAL NUCLEAR
MATERIAL LICENSE SNM-185 - DOCKET NO. 70-139

SYMBOL: LRL:CPM

Please review the subject requests for the adequacy of the applicant's proposed procedures to avoid a condition of accidental criticality. The request of January 13, contains the applicant's storage procedures while that of January 30 pertains to the fabrication procedures. The review of the earlier request should be made first and independently of the later one. Docket file 70-139, forwarded herewith, should be returned with your comments upon the completion of your review, however, an extra copy of the January 30 application has also been enclosed which you may retain for your files.

Enclosures:
As stated above

DISTRIBUTION

Suppl.
L&R Reading
LRL Reading
C. P. McCallum, LRL

OFFICE ▶	LRL	LRL	LRL			
SURNAME ▶	CPMcCallum	JJohnson	LJohnson			
DATE ▶	2/9/59	2/9/59	2/10/59			

Office Memorandum • UNITED STATES GOVERNMENT

TO : Wilbur A. Strauser, Deputy Director
Division of Classification

DATE: FEB 2 1959

FROM : E. R. Fleury, Assistant Chief, Licensing Branch
Division of Licensing and Regulation

SUBJECT: CLASSIFICATION REVIEW OF SNM APPLICATION
SUPPLEMENT - DOCKET NO. 70-139

SYMBOL: IRL:ERF

Attached is a supplement to an application for special nuclear material license, filed by D. E. Makepeace Division of Engelhard Industries, Inc., dated January 13, 1959 (consisting of letter, Feasibility Report DEM-4, dated 9/26/58, Section I of PRDC Feasibility Report DEM-5 and drawings 6XN-1716, 6XN-1723, 5XN-1722 and 1033), which we propose to place in the AEC Public Document Room in accordance with established procedures.

Please review the above supplement, and if no restricted data are contained therein, indicate this determination in the space provided below. One copy of this memorandum should be retained for your file.

In the event the supplement does contain restricted data, return it to us with your memorandum indicating the specific references which include restricted data.

Enclosure:
Makepeace Appl. Supplement of 1/13/59
w/Enclosures as listed above

The supplement listed above has been reviewed and it has been determined that it contains no restricted data:

Division of Classification

2/3/59
Date

K-1055

Cy to Dave Marsh
for Pa. Doc. Room
2/4/59

Wilbur A. Strauser, Deputy Director
Division of Classification

FEB 2 1959

E. R. Fleury, Assistant Chief, Licensing Branch
Division of Licensing and Regulation

CLASSIFICATION REVIEW OF SNM APPLICATION
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w/Enclosures as listed above

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Division of Classification

Date

OFFICE ▶	LR RDiggs:rd				
SURNAME ▶	ERFleury				
DATE ▶	2/2/59				

Office Memorandum • UNITED STATES GOVERNMENT

TO : Files
 (THRU) J. C. Delaney, Chief, Materials Section
 C. P. McCallum, Jr.

DATE: March 24, 1958

FROM : C. P. McCallum, Jr.

SUBJECT: ENGELHARD INDUSTRIES, INC. APPLICATION FOR SNM LICENSE - DOCKET No. 70-139

ANALYSIS AND FINDINGS

Analysis of the application dated July 30, 1957, as amended February 5, 1958 submitted by the D. E. Makepeace Division of Engelhard Industries has resulted in the following observations, conclusions and findings.

The applicant requests that it be licensed to receive, possess and use 100 kilograms of uranium enriched in the U-235 isotope in various alloys for the fabrication of fuel elements at its Plainville, Massachusetts Processing Plant. However, the processes included in the applicant's feasibility report DEM-2, concurrently submitted with its application, were the only ones in sufficient detail to warrant licensing.

The proposed use of the special nuclear material is for the conduct of research and development activities of the type specified in Section 31 of the Act.

Based upon our review of the information furnished by the applicant it is hereby determined that the applicant is qualified by reason of training and experience to use this special nuclear material for the purpose requested and that the applicant's procedures, facilities and equipment are adequate to protect health, minimize danger to life and property. The applicant's procedures to avoid a condition of accidental criticality are adequate. This applies only to the procedures included in the feasibility report.

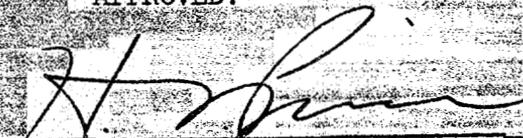
The application contains adequate corporate data and has been signed under oath or affirmation.

It is therefore determined that the application meets the requirements of the Act and the regulations of the Commission, and that a license may be issued authorizing the activities proposed by the applicant.

CONCUR:

APPROVED:


 Lynn Johnson
 Chief, Licensing Branch


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

Office Memorandum • UNITED STATES GOVERNMENT

TO : Lyall Johnson, Chief, Licensing Branch
Division of Licensing & Regulation

DATE: MAR 26 1958

FROM : Walker E. Campbell
Assistant Controller for Accounting

SUBJECT: LICENSEE INSURANCE COVERAGE

SYMBOL: FAc:CBC

In order for us to determine the financial responsibility of Engelhard Industries, Inc., D. E. Makepeace Division, Attleboro, Massachusetts, to protect us from material loss contingency and public liability, it will be necessary for them to furnish us a copy of their Lloyd's London Policy No. 53/4501 issued to Baker & Co., Inc. and purporting to cover the Engelhard Industries, Inc., D. E. Makepeace Division. The application for the proposed nuclear material license SNM 185, Docket No. 70-139 does not contain any financial statements as the applicant avers it is not his policy to publish such statements. Therefore, we have to rely solely upon the proposed licensee's insurance for material loss contingency and public liability protection. As there is no allocation of material provided, we have no financial responsibility other than the material loss contingency and public liability.

Our only interest in the financial condition of the applicant is whether his financial situation is such as to warrant a determination that the Company will be able to conduct a safe operation. The financial data in our records is sufficient for this determination. (See letter)

W. E. Campbell
5/1/58

Lyall Johnson, Chief, Licensing Branch
Division of Licensing & Regulation

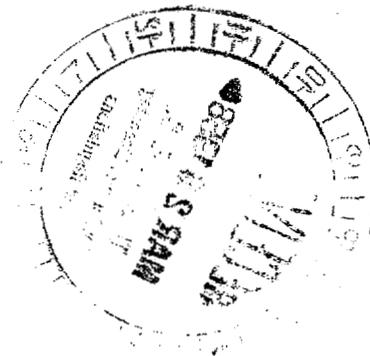
MAR 26 1958

Walker E. Campbell
Assistant Controller for Accounting

LICENSEE INSURANCE COVERAGE

SYMBOL: FAc:GBC

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Office Memorandum • UNITED STATES GOVERNMENT

TO : Harold L. Price, Director
Division of Licensing and Regulation

DATE: FEB 10 1958

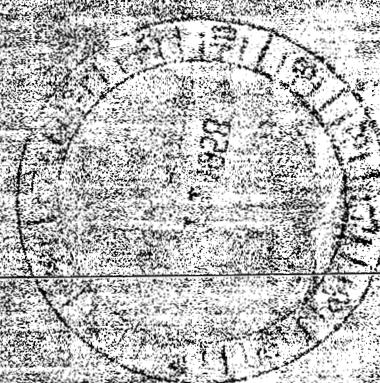
FROM : *E. L. Ferullo*
Earl F. Lane, Assistant Director for Washington
Area Security Operations, Division of Security

SUBJECT: MITTENDORF, WILLIAM FREDERICK

SYMBOL: SW:ELF

Attention: Charles P. McCallum, Jr.

Confirming your conversation with E. L. Ferullo, this is to advise that the Central Personnel Clearance Indices reflect Subject, as above, has an active Q(X) clearance with the New York Operations Office and Pittsburgh Area Office (NY-27569-FI).



FEB 10 1958

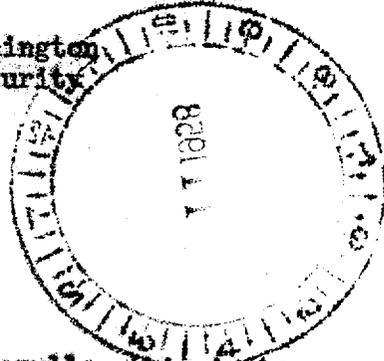
Harold L. Price, Director
Division of Licensing and Regulation

Earl F. Lane, Assistant Director for Washington
Area Security Operations, Division of Security

MITTENDORF, WILLIAM FREDERICK

SYMBOL: SW:ELF

Attention: Charles P. McCallum, Jr.



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