40-17

DOW THE DOW CHEMICAL COMPANY

MIDLAND MICHIGAN

February 24, 1958

Mr. J. C. Delaney
Chief, Materials Section
Licensing Branch, Div. of Licensing & Regulation
U. S. Atomic Energy Commission
Washington, D. C.

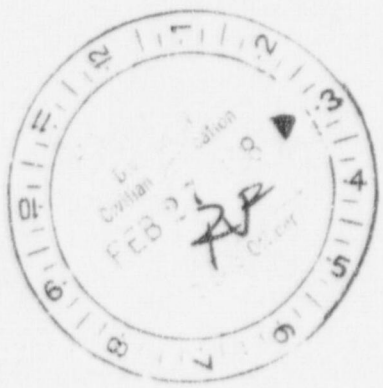
Dear Mr. Delaney:

Reference is made to your letter of January 7. Does this letter also O.K. our dumping over the 10 pound limit mentioned under paragraph 40.10 and 40.11(a) in your Code of Federal Regulations Title 11 - Atomic Energy? If not, we would like your authorization by license to do so.

Our source material number is A.E.C. No. C-2782.

Very truly yours,

W. Otis Heath
Statistician



A116

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PDR FOIA
CAROW98-54 PDR

DOCKET NO. 40-17

DOW THE DOW CHEMICAL COMPANY

MIDLAND MICHIGAN

March 24, 1958

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

Ref: Docket #40-17

Dear Mr. Johnson:

Please refer to the above Docket #40-17 as noted in your letter received here August 16, 1957. This refers to our application for exemption from the requirements of section 20.203 (e) (2) and 20.203 (f) (2) of 10 CFR 20 with respect to magnesium base-thorium alloys containing up to 4% thorium.

In as much as we have not received further official notification concerning this request, we would very much appreciate hearing from you as to its present status.

As previously noted in our correspondence, we feel that the intent of 10 CFR part 20 will not be violated in granting the exemption from these storage and packaging restrictions. The thorium in its maximum concentration of 4% is well distributed within the metalic mass and does not present an air-borne contamination problem due to the lack of surface oxidation and dusting. Normal storage conditions provide adequate ventilation to dispose of the very limited amount of thoron gas which may be generated.

A recent survey of aircraft and missile fabrication plants has shown that the labeling requirements of the above noted paragraphs have produced hardships in the various companies particularly with this respect to labor problems. If the presence of stored magnesium alloys of this type actually produced a working hazard, it would obviously be necessary to properly label the material or the area and conduct necessary educational programs with the workers to prevent accidental injury. However, since these magnesium-thorium alloys do not produce an air-borne contamination problem and the direct radiation from an infinitely large pile of material is relatively low, we feel that it is quite reasonable to request complete exemption from the storage area and container labeling requirements.

Very truly yours,

John A. Peloubet

John A. Peloubet
Technical Service & Development
Magnesium Department
Hopkins Building

lc

8507300456 1P

RECEIVED Division of Civilian Application MAR 31 1958 Docket Officer

A117

APR 1 1958

40-17
LRL:JCD

The Dow Chemical Company
Midland, Michigan

Attention: Mr. W. Otis Heath
Statistician

Gentlemen:

Reference is made to your letter of February 24, 1958, and to license C-2782.

You are authorized to dispose of source material received under your license if disposal is made in accordance with the provisions of 10 CFR 20, "Standards for Protection Against Radiation".

Very truly yours,

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

Enclosure:
10 CFR 20

CC: Document room
Formal file
Suppl file

A118

OFFICE ▶	LRL					
SURNAME ▶	DeLaney					
DATE ▶	4-1-58					

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—63761-2

8507300448 1P

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

April 17, 1958

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

THE DOW CHEMICAL COMPANY, FREEPORT, TEXAS

SYMBOL: DLR:CMF

Conclusion:

The information contained in the subject company's letter of April 1, 1958 for a source material license appears satisfactory from a radiation safety standpoint.

Location:

The Dow Chemical Company, Texas Division, Freeport, Texas

Purpose:

Source material to be used in the production of thorium magnesium alloy.

Quantity:

They request an unlimited amount

Equipment:

Thorium pellets will be melted in a charged magnesium pot. Radiation survey equipment, air sampling devices and film badges will be used.

Health Safety Procedures:

A high rate of air flow of 250,000 cu ft/min. will pass over the melting pot and out the stack to remove any air contamination. Radiation surveys and air samples will be taken. Film badges are available. A radiation hazard committee has been formed with a radiation safety officer responsible for safety throughout the plant.

Waste Disposal:

The waste sludge will be stored in an area posted with radiation signs. In view of their radiation safety committee personnel they should be technically qualified to handle the material requested.

OFFICE ▶	DLR	DLR	DLR		
SURNAME ▶	CMFerrell/rh	RFBarker	LRRogers		
DATE ▶	4/17/58	4/17/58			

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-2

8507300482 1P

40 - 11

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

MAY 9 1958

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

Dispatched

CONSIDERATION OF DOW CHEMICAL APPLICATION FOR EXEMPTION FROM SECTIONS 20.203(e)(2) AND 20.203(f)(2) FOR 4% THORIUM ALLOYS

SYMBOL: DLR:RFB

Conclusions

The exemption appears reasonable and satisfactory from the health and safety standpoint.

References

Their letters of March 24, 1958, and June 26, 1957.
Convair exemption request and meeting of April 25 with Dow people.

Considerations

In this case they are asking exemption only for the material in the 4% alloy form. Any handling of thorium of higher per cent alloy would require posting and labeling radiation hazard. The hazards are associated with melting, grinding, or chemical milling and not with the solid materials. Other sections of 20.203 would require posting of areas in which radiation levels or concentrations might create a hazard.

OFFICE ▶	DLR	DLR			
SURNAME ▶	RFBarker:lwj	LRRogers			
DATE ▶	5/1/58				

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

8507300476 1P

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

TO : Files

DATE: JUN 3 1958

FROM : Robert F. Barker, Radiation Safety Branch
Division of Licensing and Regulation

SUBJECT: VISIT FROM JACK MATHES, WASHINGTON REPRESENTATIVE OF DOW CHEMICAL, MAY 27, 1958

Mr. Mathes inquired as to the status of action on their request for exemption from posting storage areas containing thorium magnesium alloys. The procedure for requesting exemption was reviewed with Mr. Mathes and it was suggested that Douglas who had inquired concerning Dow's exemption might be advised to request a similar exemption.

CC: 40-17 Supplementary file

A/21

8507300468 IP

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

TO : Files

DATE: July 11, 1958

FROM : H. L. Price
Director, Division of Licensing and Regulation

SUBJECT: DOW CHEMICAL COMPANY REQUEST FOR EXEMPTION FROM PARTS 20.203(e)(2) AND (f)(2) OF 10 CFR 20 - DOCKET No. 40-17

ANALYSIS AND FINDINGS

An analysis of the request dated June 26, 1957, supplemented March 24, 1958, for exemption from the container labeling and area posting requirements of Part 20 as applicable to 4% magnesium-thorium alloy, has resulted in the following observations, conclusions and findings.

The applicant states, in support of its request, that it feels the intent of 10 CFR 20 will not be violated in granting these exemptions since thorium, in a maximum concentration of 4%, is well distributed within the metallic mass of the alloy and does not present an airborne contamination problem due to lack of surface oxidation and dusting. Normal storage conditions provide adequate ventilation to dispose of the very limited amount of thorium gas which may be generated.

The Dow Company has also submitted a comprehensive report entitled "Industrial Health Experience with Magnesium-Thorium Alloys", which presents specific data in evidence of the small hazard associated with the use of this alloy.

Based upon our review of the information contained in the request, it can be concluded that the radiation hazard associated with the proposed use of this alloy is so low that compliance with the requirements of Sections 20.203(e)(2) and 20.203(f)(2), not only would not be required for the protection of public health and safety but would cause unnecessary expense and administrative burden on the Company.

All other provisions of Part 20, however, shall remain in force.

It is therefore determined that the granting of the requested exemption from compliance with the provisions of Sections 20.203(e)(2) and (f)(2) is authorized by law and would not result in undue hazard to life or property.

It is further determined that source material license C-2782 may be amended to incorporate the requested exemption.

A/22

8507300453 IP

Docket No. 40-17

SOURCE MATERIAL LICENSE

License No. C-2782, as amended

Dated: JUL 14 1958

The Dow Chemical Company
Magnesium Department
Midland, Michigan

Gentlemen:

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to thorium metal and/or thorium compounds, without limitation as to quantity, both domestically and through import from Canada, during the term of this license for use in the preparation of magnesium alloys at your plants located in Midland, Michigan; Bay City, Michigan; Madison, Illinois; and Freeport, Texas.

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

As a condition of this license, you are required to maintain records of your inventories, receipts and transfers of refined source material.

This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all applicable rules and regulations of the U. S. Atomic Energy Commission, including 10 CFR 20, "Standards For Protection Against Radiation" except that the licensee is exempt from compliance with the provisions of Sections 20.203(c)(2) and (f)(2) of 10 CFR 20 during the storage and fabrication of magnesium-thorium alloys, containing not more than four (4) percent thorium.

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire January 1, 1959.

Distribution:
M. M. Mann, INS
(plus files)

FOR THE ATOMIC ENERGY COMMISSION

OFFICE ▶	L&R	L&R:RSB	L&R		OGC	L&R
SURNAME ▶	McCallum/mgh		L. Johnson	H. L. Price Director Division of Licensing and Regulation		H.L.Price
DATE ▶	7-11-58	7/11/58	7/11		7/11/58	7/14

Form AEC-318 (Rev. 9-52) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

8507300444 1P

Docket No. 40-17
L&R:CPM

JUL 14 1958

The Dow Chemical Company
Magnesium Department
Midland, Michigan

Attention: Mr. Lawrence G. Silverstein
Biochemical Research Department
12-634 Building

Gentlemen:

Enclosed is Source Material License No. C-2782, as amended.

The Commission having considered your request of June 26, 1957, as supplemented on March 24, 1958, for exemption from the posting and labeling requirements of Sections 20.203(e)(2) and (f)(2) of Part 20, Title 10, Code of Federal Regulations, has determined that such exemptions may be granted. Accordingly, pursuant to the provisions of Section 20.501, 10 CFR 20, the enclosed license has been amended to incorporate this exemption.

DISTRIBUTION:
Formal Docket, w/encl.
Suppl. Docket, w/encl.
Document Room, w/encl.
M. M. Mann, INS, w/encl.

Sincerely yours,

H. L. Price
Director
Division of Licensing and Regulation

Enclosure:
License C-2782, as amended

PDR letter 5-18-07

OFFICE ▶	L&R	L&R	L&R:RSB	OGC	L&R	
SURNAME ▶	McCallum/msd	L. Johnson			H.L. Price	
DATE ▶	7-11-58	7/11	7/11/58			

Form AEC-318 (Rev. 9-53)

U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

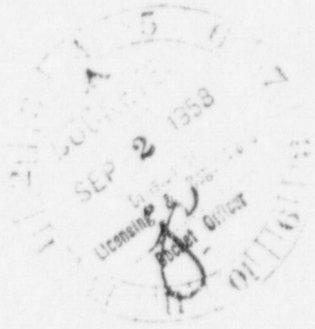
8507300423 1P

40-11

THE DOW CHEMICAL COMPANY

MIDLAND MICHIGAN

August 29, 1958



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

Dear Mr. Johnson:

The expanded usage of magnesium base alloys containing thorium has developed a general industry hardship related to licensing and accountability as applied to finished products. A fabricator obtains the semi-finished alloy in the form of extrusions, sheet, castings, ingot, etc., in the present regulated system based on an AEC license subject to the conditions of the Code of Federal Regulations Title 10 --Atomic Energy, Chapter 1, Part 40 and is also subject to the regulations of 10 CFR 20. The fabricators and possibly sub-contractors use this material to produce finished parts which then become component parts of other assemblies. These assemblies in turn, if not complete in themselves, become sections of other products.

The transfer of these component parts from one firm or contractor to another may involve several changes of ownership or location. This causes a hardship on the part of these firms in attempting to keep adequate records required by AEC licenses and tends to restrict the large scale use of magnesium-thorium alloys. In many cases, the concentration of thorium in the component or finished parts is well below the level of 0.05% which under Section 40.2 (a) exempts it from application of the term "source material" and licensing control. In others, the thorium concentration may approach the percentage in the particular magnesium-thorium alloy being employed.

Current applications of magnesium base-thorium alloys include those of nominal 1% thorium content. As an example, A.S.T.M. alloy HM11-XA has a composition range of 0.8 to 2.0% thorium. Manufacturers using these nominal 1% thorium magnesium alloys as component parts and finished products have advised us of many problems in accountability during repeated transfer.

A125

9567200344 ZAP

Based on our experience in handling magnesium base-thorium alloys and data available from other sources, we feel that there is no practical health hazard in handling and storing these magnesium alloys containing a nominal 1% thorium particularly where they are in the form of component parts or products completed to the point where no additional major fabrication work will be done on the alloy itself. We, therefore, request exemption of component parts and finished products which contain magnesium base alloys with nominal 1% thorium from licensing and regulation as covered by 10 CFR 40.

Very truly yours,

John A. Peloubet
Safety Engineer
Magnesium Products Department

bw

DLR:CMF
40-17

SEP 2 8 1958

The Dow Chemical Company
Midland
Michigan

Attention: Mr. John A. Pelcubet, Safety Engineer
Magnesium Products Department

Gentlemen:

We wish to acknowledge the receipt of your letters of August 29, 1958, concerning the exemption from the licensing requirements of Part 40, "Control of Source Material," of component parts and finished products containing one and four percent thorium in thorium-magnesium alloy.

This matter is under consideration and we shall contact you when a decision is reached.

Very truly yours,

Lyall Johnson, Chief
Licensing Branch
Division of Licensing and Regulation

bcc: Inspection Div., Hdqtrs.
Inspection Div., COO
R. E. Cunningham
Public Document Room

OFFICE ▶	DLR CMF:LRR:ps	DLR JCDelaney	DLR LJohnson			
SURNAME ▶		Delaney	L Johnson			
DATE ▶	9/22/58	9/23/58	9-23-58			

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

8507300355 1P

Files

Robert F. Barker, Radiation Safety Branch
Division of Licensing and Regulation

TELEPHONE CALL ON SEPTEMBER 23 FROM MR. PELOUBET OF DOW CHEMICAL COMPANY - DOCKET NO. 40-17

Called in regard to exemption of fabricated parts using thorium-magnesium alloys. At present the alloy is used in aircraft structural members, some electronic equipment for Bomark missile, and most recently as a template for location of holes to avoid correction for temperature stretching. In each case finished parts require some repair material and this repair material, in sheet form frequently, is supplied along with the finished parts. In each case where the repair material accompanies the finished part, there will be no fabrication involved other than perhaps drilling of holes. The quantity of repair material accompanying finished parts is small, and the amount of repair parts for any one location very limited. Therefore, it seems appropriate to include in the exemption in part 40 something which provides for additional material specifically for repair of finished parts as well as the finished parts themselves.

Mr. Peloubet asked if we had information which would be helpful in discussing with the Montreal Aviation and Fire Protection Committee the proper control of aircraft accidents involving radioactive material. Three areas are of interest to the Committee: (1) shipments of isotopes inside the plane; (2) presence of radioactive material in the aircraft structure; and (3) reactors aboard aircraft.

cc: G. Charnoff, OGC

9/27

OFFICE ▶	DLR:RSB					
SURNAME ▶	RFBarker:lwj					
DATE ▶	9/24/58					

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

8507300374 1P

40-17
IRL:ND

NOV 17 1958

The Dow Chemical Company
Magnesium Department
Midland, Michigan

Attention: Mr. John A. Peloubet, Safety Engineer
Magnesium Products Department

Gentlemen:

Enclosed is Source Material License No. C-2782, Amendment No. 2.

We have issued this amendment to exclude your Freeport, Texas plant from your license C-2782.

This action was taken at the request of Ralph H. Langner, Ph. D., Radiological Safety Officer of your Texas Division, Freeport, Texas, pursuant to his letter of November 5, 1958.

Very truly yours,

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

Enclosure:
SM License C-2782,
Amendment No. 2

CC: R. H. Langner, Ph.D.
Texas Division, Freeport, Texas

CC: Inspection
Suppl. & Formal
Public Document Room

OFFICE ▶	LRL	LRL				
SURNAME ▶	NDoulos/fla	JCDelaney				
DATE ▶	11-17-58	11-17-58				

Form AEC-318 (Rev. 9-53)

U. S. GOVERNMENT PRINTING OFFICE 16—62701-3

8507300277 1P

SOURCE MATERIAL LICENSE

40-17
LRL:ND

License No. C-2782,
Amendment No. 2

Dated: NOV 17 1958

The Dow Chemical Company
Magnesium Department
Midland, Michigan

Gentlemen:

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to thorium metal and/or thorium compounds, without limitation as to quantity, both domestically and through import from Canada, during the term of this license for use in the preparation of magnesium alloys at your plants located in Midland, Michigan; Bay City, Michigan; and Madison, Illinois.

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

As a condition of this license, you are required to maintain records of your inventories, receipts and transfers of refined source material.

This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all applicable rules and regulations of the U. S. Atomic Energy Commission, including 10 CFR 20, "Standards For Protection Against Radiation" except that the licensee is exempt from compliance with the provisions of Sections 20.203(e)(2) and (f)(2) of 10 CFR 20 during the storage and fabrication of magnesium-thorium alloys, containing not more than four (4) percent thorium.

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire January 1, 1959. 1960

CC: Inspection
Public Document Room
Suppl. - Formal

FOR THE ATOMIC ENERGY COMMISSION

OFFICE ▶	LRL	LRL	J. C. Delaney, Chief
SURNAME ▶	NDoulos/fla	JCDelaney	Nuclear Materials Section
DATE ▶	11-17-58	11-17-58	Licensing Branch Division of Licensing and Regulation

Form AEC-518 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-2

8507300270 1P

DOW THE DOW CHEMICAL COMPANY
MIDLAND MICHIGAN

December 5, 1958

40-17

Mr. H. L. Price, Director
The Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D.C.

Dear Mr. Price:

Enclosed are three copies of Form AEC-2 for the renewal of our License No. C-2782, which expires January 1, 1959. As in our license for 1958 as amended, please state that we are exempt from compliance with the provision of Sections 20.203(e)(2) and (f)(2) of 10CFR20 during the storage and fabrication of magnesium-thorium alloys, containing not more than four percent (4%) thorium.

Thanks very much.

Very truly yours,

W Otis Heath

W. Otis Heath
Statistical Department

Encs: 3

Miss

4/29

8507300097 1P

40-17

FORM (4-47) AEC-2

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

APPLICATION FOR AEC LICENSE TO TRANSFER, DELIVER, EXPORT, OR RECEIVE URANIUM OR THORIUM SOURCE MATERIAL

Pursuant to Code of Federal Regulations, Title 11—Atomic Energy, Part 40—Control of Source Material

Form approved
Budget Bureau No. 38-R002.2.

2. PREVIOUS AEC LICENSE NUMBER, IF ANY.
C-2782

TO: U. S. Atomic Energy Commission,
P. O. Box 30, Ansonia Station,
New York 23, N. Y.

1. NAME AND ADDRESS OF APPLICANT (*Street, city, zone, state*)

The Dow Chemical Company
Magnesium Department
Midland, Michigan
Attn: W. Otis Heath

INSTRUCTIONS

File 3 ~~and (2)~~ *copies* of this application with the U. S. Atomic Energy Commission, P. O. Box 30, Ansonia Station, New York 23, N. Y. This application may be used for an original license or for the renewal of a license. In the case of a renewal, this application should be received by the Commission on or before *30 days* before the expiration of the previous license. Complete blocks 1, 2, 3, 9, and if you combine two or more of the activities of Producer, Processor, Distributor, Exporter, or Consumer, complete each of the applicable blocks numbered 4 through 8.

3. INVENTORY. INVENTORY OF SOURCE MATERIAL, RAW AND REFINED, AS OF October 31, 1958
(Specify date of last inventory)

INSTRUCTION.—Include all source material in your possession or under your control, regardless of location. Include any source material you have possession of but which is owned by others, whether or not they are licensees of the Commission. Please specify that part of your inventory which is owned by other persons, listing the names, addresses, and quantities owned by each. Do not include in this inventory any raw source material not yet removed from its place of deposit in nature.

(a) Raw Source Material

DESCRIPTION OF MATERIAL	ESTIMATED PERCENT URANIUM OR THORIUM	QUANTITY IN INVENTORY (*Gross tons*)	NAME AND ADDRESS OF OWNER, IF DIFFERENT FROM THAT IN BLOCK 1 ABOVE

(b) Refined Source Material

DESCRIPTION OF MATERIAL	GRADE (*Comm., CP, USP, etc.*)	PERCENT OF URANIUM OR THORIUM	QUANTITY (*Lb.*)	NAME AND ADDRESS OF OWNER, IF DIFFERENT FROM THAT IN BLOCK 1 ABOVE
Thorium Metal Sintered Pellets	Pure	97% Th	2,426	
Thorium Scrap	Comm.	3%	4,799	
Thorium Fluoride	Comm.	71% Th	9,700	
Thorium Scrap	Pure	100%	1,312	

RECEIVED
DEC 8 1958
Division

8507300110 4PP

9. **CERTIFICATION AND AGREEMENT.** THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION AND AGREEMENT ON BEHALF OF THE APPLICANT (1) CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH CODE OF FEDERAL REGULATIONS, TITLE 11—ATOMIC ENERGY, PART 40—CONTROL OF SOURCE MATERIAL; (2) CERTIFY THAT ALL INFORMATION CONTAINED IN THIS APPLICATION IS TRUE AND COMPLETE TO THE BEST OF THEIR KNOWLEDGE AND BELIEF; AND (3) AGREE THAT IN THE EVENT THAT THIS APPLICATION IS APPROVED BY THE ATOMIC ENERGY COMMISSION, AND A LICENSE IS ISSUED, THAT THE DULY AUTHORIZED REPRESENTATIVES OF THE COMMISSION MAY FREELY INSPECT AT ALL REASONABLE TIMES FACILITIES AND RECORDS, TAKE SAMPLES FOR ASSAY, AND DO SUCH OTHER THINGS AS WILL, IN THE OPINION OF THE COMMISSION, ASSURE THAT ALL SOURCE MATERIAL HANDLED BY THE APPLICANT UNDER THE AUTHORITY OF HIS LICENSE, IS PROPERLY ACCOUNTED FOR AND USED.

BY J B Burnett
(Signature of applicant)

12/5/58
(Date)

Assistant Treasurer
(Title)

Section 35 (A) of the United States Criminal Code, 18 U. S. C. Sec. 35, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

(FOR GOVERNMENT USE ONLY)

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

LICENSE NO. .....

SOURCE MATERIAL LICENSE

U. S. GOVERNMENT PRINTING OFFICE 16—67081-1

Form AEC-2 (4-47)

5. PROCESSORS. ☐ IF YOU REQUEST AN ATOMIC ENERGY COMMISSION LICENSE TO CHEMICALLY PROCESS SOURCE MATERIAL, CHECK THIS BOX AND SUPPLY THE INFORMATION REQUESTED IN THIS BLOCK, AS WELL AS THE INFORMATION REQUESTED IN BLOCKS 1, 2, 3, AND 9.

(a) THE APPLICANT CHEMICALLY PROCESSES SOURCE MATERIAL IN PLANTS LOCATED AT: (*These plants include all of the plants in which the applicant will process source material under the terms of any license issued by the Commission.*)

1. Midland, Michigan
2. Bay City, Michigan
3. Madison, Illinois
4. Freeport, Texas

(b) IN THE EVENT RESIDUES AND TAILINGS ARE TO BE DISCARDED PLEASE DESCRIBE THESE RESIDUES AND TAILINGS, THE FREQUENCY OF DISCARDS, THE PROBABLE SOURCE MATERIAL CONTENT AND THE REASONS FOR NOT CONSERVING THE MATERIAL:

6. DISTRIBUTORS. ☐ IF YOU REQUEST AN ATOMIC ENERGY COMMISSION LICENSE TO RECEIVE SOURCE MATERIAL FOR RESALE ONLY, WITHOUT ANY INTERMEDIATE PROCESSING, CHECK THIS BOX AND COMPLETE BLOCKS 1, 2, 3, AND 9.

7. CONSUMERS. ☒ IF YOU REQUEST AN ATOMIC ENERGY COMMISSION LICENSE TO USE SOURCE MATERIAL IN CHEMICAL ANALYSIS OR IN THE MANUFACTURE OF, OR FOR INCORPORATION IN, ANY PRODUCT, CHECK THIS BOX AND SUPPLY THE INFORMATION REQUESTED IN THIS BLOCK AS WELL AS THE INFORMATION REQUESTED IN BLOCKS 1, 2, 3, AND 9.

DESCRIPTION OF SOURCE MATERIAL TO BE USED	ESTIMATED ANNUAL REQUIREMENTS (Lb.)	USES: INDICATE WHETHER (1) AS ANALYTICAL REAGENT, (2) FOR INCANDESCENT MANTLES, (3) MEDICINAL, OR (4) OTHER. IN THE CASE OF OTHER USES, DESCRIBE THE PRODUCT, THE SOURCE MATERIAL CONTENT, AND THE MANNER IN WHICH THE PRODUCT WILL BE USED.
Thorium Metal	135,000	Magnesium Alloys for Structural Use
Thorium Fluoride or Thorium Oxide	30,000	" "

8. EXPORTERS. ☐ IF YOU REQUEST AN ATOMIC ENERGY COMMISSION LICENSE TO EXPORT SOURCE MATERIAL, CHECK THIS BOX AND SUPPLY THE BALANCE OF THE INFORMATION REQUESTED IN THIS BLOCK AS WELL AS THE INFORMATION REQUESTED IN BLOCKS 1, 2, 3, AND 9. (*Note that approval on Form AEC-7 is required for each individual export transaction.*)

Name and address of each of your agents who for your account will prepare Department of Commerce "Shipper's Export Declaration" (Form 7525-V), will request permission to export on Form AEC-7, and will ship source material.

NAME OF AGENT	ADDRESS

4. PRODUCERS. (*Miners of uranium and thorium containing ores and gravels*) ☐ IF YOU REQUEST AN ATOMIC ENERGY COMMISSION LICENSE TO TRANSFER AND DELIVER SOURCE MATERIAL AFTER ITS REMOVAL FROM ITS PLACE OF DEPOSIT IN NATURE, CHECK THIS BOX AND SUPPLY THE INFORMATION REQUESTED IN THIS BLOCK AS WELL AS THE INFORMATION REQUESTED IN BLOCKS 1, 2, 3, AND 9.

NAMES OF OPERATING PROPERTIES (*Show number of claims included on each property*)	LOCATIONS (*Mining district and county*)	NAMES AND ADDRESSES OF OWNERS IF DIFFERENT FROM APPLICANT	ESTIMATED QUANTITY OF ORE TO BE PRODUCED IN NEXT 12 MONTHS	ESTIMATED PERCENT URANIUM OR THORIUM

16—67031-2

SOURCE MATERIAL LICENSE

License No. C-4762

40-17
LRL:ND

Dated: Effective Jan. 1, 1959

DE[illegible]

The Dow Chemical Company
Magnesium Department
Midland, Michigan

Gentlemen:

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to thorium metal and/or thorium compounds, without limitation as to quantity, both domestically and through import from Canada, during the term of this license for use in the preparation of magnesium alloys at your plants located in Midland, Michigan; Bay City, Michigan; and Madison, Illinois.

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

As a condition of this license, you are required to maintain records of your inventories, receipts and transfers of refined source material.

This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all applicable rules and regulations of the U. S. Atomic Energy Commission, including 10 CFR 20, "Standards for Protection Against Radiation", except that the licensee is exempt from compliance with the provisions of Sections 20.203(e)(2) and (f)(2) of 10 CFR 20 during the storage and fabrication of magnesium-thorium alloys containing not more than four (4) percent thorium.

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire January 1, 1960.

FOR THE ATOMIC ENERGY COMMISSION

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

CC: Document room
Formal file
Suppl. file
INS
S/health

OFFICE ▶	LRL	LRL
SURNAME ▶	NDoulos/cw	JCDelaney
DATE ▶	12-17-58	12-17-58

EC-818 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

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THE DOW METAL PRODUCTS COMPANY
A DIVISION OF THE DOW CHEMICAL COMPANY

MIDLAND MICHIGAN

40-17

August 28, 1959

Mr. Lester R. Rogers, Chief
Radiation Safety Branch
Division of Licensing and Regulation
United States Atomic Energy Commission
Washington 25, D. C.

Dear Mr. Rogers:

During our visit in your offices on August 14 with Mr. Nussbaumer, we discussed the welding of magnesium base thorium alloys and mentioned that in our production facilities we had not found the need for local exhaust ventilation. A review of previous data and the inclusion of more recent survey results indicate conditions of natural convection in shops with high ceilings plus time factors of operation which permit production welding without resorting to the local exhaust methods as recommended on pages 11 through 14 of our Bulletin No. 141-179 (copy attached).

Information available to date has been assembled in the attached table. With the exception of the check made on an automatic welder using a filter, all samples were taken with an electrostatic precipitator. The thorium content of the samples was obtained by spectroscopic analysis and reported as micrograms of thorium per cubic meter of air. These values may be compared with the limit shown in Appendix B of 10 CFR 20. The airborne limit of 5×10^{-11} µc/ml is equivalent to 75 µg/m^3 based on a specific activity of 0.67 µc/g. According to the proposed amendment of 10 CFR 20, the permissible level would be 137 µg/m^3.

The position of the air sampling device in relation to both the point of welding and the welder's mask is very critical... When the samples are taken as close as possible to the face mask in the welder's breathing zone, the thorium values are below the proposed limit of 10 CFR 20. If the sample is taken half way between the mask and the point of welding, some visible welding fume is taken into the precipitator tube with resultant variable and higher thorium recorded, although some values are still low. Where the welder operates in a manner such that his breathing zone is at arm's length from the arc, he receives a very low exposure to thorium, approaching the level in air measured 10 feet away.

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While the presence of zinc in magnesium base thorium alloys appears to increase the amount of thorium that becomes airborne during welding, the varied position of the sampling device in relation to the visible fumes and welder's breathing zone results in greater variations in recorded thorium. The measurements made nearest to the true breathing zone do not indicate any increase in airborne thorium in the presence of zinc in the alloy.

The values of airborne thorium were obtained during hand welding operations under conditions of continuous arcing. Except on an automatic welder, this is not possible due to the time required for loading and unloading the jig, hand cleaning the weld and other delaying factors. Based on our own experience, actual hand arc operation for non-thorium containing alloys may reach 50% of the time in production while typical welding of magnesium-thorium alloys is likely to be in the range of 5 to 20% of the time. Assuming the 20% maximum, the airborne limit during arc operation could be 5 x 137 or 685 $\mu g/m^3$. This is in excess of any values measured.

This information on the welding of magnesium-thorium alloys may be of some assistance to the AEC in considerations related to radiation protection and is presented for your files. We suggest that the data also be reviewed prior to making proposed changes in 10 CFR 40 dealing with the exemption of completed or component parts from licensing except where subsequent "heating" is involved. Occasional welding (a form of heating) would not cause sufficient air contamination to warrant exclusion of parts to be "heated" from the proposed exemption. Parts which may be heated for forming purposes do not reach a temperature which is high enough to cause any vaporization of the metal. Typical forming is carried out in the range of 650 to 700°F.

We would appreciate hearing from you if any clarification of this information is necessary.

Very truly yours,

John A. Peloubet
Safety Engineer

Encl: (1)

jn

Air Sampling During the Welding of Magnesium Base-Thorium Alloys

Helium Shielded Arc

Percent Thorium	Percent Zinc	Amperes	Spectroscopic Analysis micrograms Th/cubic meter air Without Exhaust	With Exhaust	Total Fume mg/m³	Building	Remarks
3							
2	6	160	448 (c)			1	Argon gas shield
2	6	320	24 (c)			1	
			400 (c)			1	
1							
3			113 (c)				
3		180	24 (c)			1	
3		180	71 (c)			1	
3							
3		320	194 (c)				
3		320	59 (c)			1	
3	2	320	353 (c)	17 (c)		1	
				90* (c)		1	*point of weld 6" from exhaust
3	2	320					
2	6	240		17 (c)		1	
3		90	193 (c)	104* (c)		1	
			100 (d)			1	
3					30	2	
3			52 (d)				
3			29 (d)		15	2	
		145	34 (e)			2	
2						2	
2	6		2.3 (b)				Automatic welder
			5.1 (b)			3	
				2.9 (b)		3	
3						3	
3			2	5.2 (b)			
						3	
						3	Area sample at 10 ft. from welder

Bldg. 1 roof height 40 ft.---experimental welding.
Bldg. 2 roof height 20 ft.---production welding.
Bldg. 3 roof height 35 ft.---production welding.

(a) Gelman AM-5 filter---all other samples obtained with an electrostatic precipitator.
(b) Welder's breathing zone at arm's length from arc.
(c) Sample tube approximately half way between point of weld and breathing zone. Frequently, this position included visible welding fumes with higher recorded values of thorium than in the actual breathing zone.
(d) Sample taken close to welder's mask.
(e) Sample taken 8" above unit with filter (a)

THE DOW CHEMICAL COMPANY

MIDLAND, MICHIGAN

November 30, 1959

DOCKET NO. 40-17

Mr. H. L. Price, Director
U. S. Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D.C.

Dear Mr. Price:

Enclosed are three copies of Form AEC-2 for the renewal of our License No. C-2782 which expires January 1, 1960. Please return the new license to my attention.

Thanks very much.

Very truly yours,

W. Otis Heath

W. Otis Heath
Statistician

Encs: 3

DOCKETED
USAEC
DEC. 2 1959
Division of
Licensing & Regulations
Docket Officer

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DOCKET NO. 40-7

FORM AEC-2 (4-57)

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

APPLICATION FOR AEC LICENSE TO TRANSFER, DELIVER, EXPORT, OR RECEIVE URANIUM OR THORIUM SOURCE MATERIAL

Pursuant to Code of Federal Regulations, Title 10—Atomic Energy, Part 40—Control of Source Material

TO: U. S. Atomic Energy Commission
P. O. Box 30, Ansonia Station
New York 23, N. Y.

2. PREVIOUS LICENSE NUMBER, IF ANY

C-2782

INSTRUCTIONS

File two (2) copies of this application with the U. S. Atomic Energy Commission, P. O. Box 30, Ansonia Station, New York 23, N. Y. This application may be used for an original license or for the renewal of a license. In the case of a renewal, this application should be received by the Commission on or before 30 days before the expiration of the previous license. Complete blocks 1, 2, 3, 6, and if you continue two or more of the activities of Producer, Processor, Distributor, Exporter, or Consumer, complete each of the applicable blocks numbered 4 through 7.

1. NAME AND ADDRESS OF APPLICANT (Street, city, zone, state)

The Dow Chemical Company
Magnesium Department
Midland, Michigan
Attn: W. Otis Heath

3. INVENTORY. IN (STOCK) OF SOURCE MATERIAL ON HAND AS OF October 31, 1959

INSTRUCTION

(a) Raw Source Material

DESCRIPTION OF MATERIAL	GRADE (Comm., C.P., Purified, etc.)	PERCENT OF URANIUM OR THORIUM	QUANTITY (lb.)	NAME AND ADDRESS OF OWNER IF DIFFERENT FROM THAT IN BLOCK 1 ABOVE

(b) Refined Source Material

DESCRIPTION OF MATERIAL	GRADE (Comm., C.P., Purified, etc.)	PERCENT OF URANIUM OR THORIUM	QUANTITY (lb.)	NAME AND ADDRESS OF OWNER IF DIFFERENT FROM THAT IN BLOCK 1 ABOVE
Thorium Metal Sintered Pellets	Pure	97% Th	12,580	
Thorium Scrap	Comm.	3%	1,012	
Thorium Fluoride	Comm.	71% Th	9,480	
rium Scrap	Pure	100%	114	

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6. PRODUCERS. *(Miners of uranium and thorium containing ores and gravels)* ☐ IF YOU REQUEST AN ATOMIC ENERGY COMMISSION LICENSE TO TRANSFER AND DELIVER SOURCE MATERIAL AFTER ITS REMOVAL FROM ITS PLACE OF DEPOSIT IN NATURE, CHECK THIS BOX AND SUPPLY THE INFORMATION REQUESTED IN THIS BLOCK AS WELL AS THE INFORMATION REQUESTED IN BLOCKS 1, 2, 3, AND 9.

NAMES OF OPERATING PROPERTIES (Show number of claims included on each property)	LOCATIONS (Mining district and county)	NAMES AND ADDRESSES OF OWNERS IF DIFFERENT FROM APPLICANT	ESTIMATED QUANTITY OF ORE TO BE PRODUCED IN NEXT 12 MONTHS	ESTIMATED PERCENT URANIUM OR THORIUM

Form AEC-2 (4-67)

5. **PROCESSORS.** ☐ IF YOU REQUEST AN ATOMIC ENERGY COMMISSION LICENSE TO CHEMICALLY PROCESS SOURCE MATERIAL, CHECK THIS BOX AND SUPPLY THE INFORMATION REQUESTED IN THIS BLOCK, AS WELL AS THE INFORMATION REQUESTED IN BLOCKS 1, 2, 3, AND 6.

(a) THE APPLICANT CHEMICALLY PROCESSES SOURCE MATERIAL IN PLANTS LOCATED AT: (*These plants include all of the plants in which the applicant will process source material under the terms of any license issued by the Commission.*)

1. Midland, Michigan
2. Bay City, Michigan
3. Madison, Illinois
4.

(b) IN THE EVENT RESIDUES AND TAILINGS ARE TO BE DISCARDED PLEASE DESCRIBE THESE RESIDUES AND TAILINGS, THE FREQUENCY OF DISCARDS, THE PROPOSED SOURCE MATERIAL CONTENT AND THE REASONS FOR NOT CONSERVING THE MATERIAL.

6. **DISTRIBUTORS.** ☐ IF YOU REQUEST AN ATOMIC ENERGY COMMISSION LICENSE TO RECEIVE SOURCE MATERIAL FOR RESALE ONLY, WITHOUT ANY INTERMEDIATE PROCESSING, CHECK THIS BOX AND COMPLETE BLOCKS 1, 2, 3, AND 6.

7. **CONSUMERS.** ☒ IF YOU REQUEST AN ATOMIC ENERGY COMMISSION LICENSE TO USE SOURCE MATERIAL IN CHEMICAL ANALYSIS OR IN THE MANUFACTURE OF, OR FOR INCORPORATION IN, ANY PRODUCT, CHECK THIS BOX AND SUPPLY THE INFORMATION REQUESTED IN THIS BLOCK AS WELL AS THE INFORMATION REQUESTED IN BLOCKS 1, 2, 5, AND 6.

DESCRIPTION OF SOURCE MATERIAL TO BE USED	ESTIMATED ANNUAL REQUIREMENTS (Lb.)	USES: INDICATE WHETHER (1) AS ANALYTICAL REAGENT, (2) FOR INCANDESCENT MANTLES, (3) MEDICINAL, OR (4) OTHER. IN THE CASE OF OTHER USES, DESCRIBE THE PRODUCT, THE SOURCE MATERIAL CONTENT, AND THE MANNER IN WHICH THE PRODUCT WILL BE USED.
Thorium Metal	135,000	Magnesium Alloys for Structural Use
Thorium Fluoride or Thorium Oxide	2,000	" " "

8. **EXPORTERS.** ☐ IF YOU REQUEST AN ATOMIC ENERGY COMMISSION LICENSE TO EXPORT SOURCE MATERIAL, CHECK THIS BOX AND SUPPLY THE BALANCE OF THE INFORMATION REQUESTED IN THIS BLOCK AS WELL AS THE INFORMATION REQUESTED IN BLOCKS 1, 2, 3, AND 6. (*Note that approval on Form AEC-7 is required for each individual export transaction.*)

Name and address of each of your agents who for your account will prepare Department of Commerce "Shipper's Export Declaration" (Form FC&S-7), will request permission to export on Form AEC-7, and will ship source material.

NAME OF AGENT	ADDRESS

9. CERTIFICATION AND AGREEMENT. THE APPLICANT AND THE OFFICIAL EXECUTING THIS CERTIFICATION AND AGREEMENT ON BEHALF OF THE APPLICANT (1) CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH CODE OF FEDERAL REGULATIONS, TITLE 10—ATOMIC ENERGY, PART 40—CONTROL OF SOURCE MATERIAL, (2) CERTIFY THAT ALL INFORMATION CONTAINED IN THIS APPLICATION IS TRUE AND COMPLETE TO THE BEST OF THEIR KNOWLEDGE AND BELIEF, AND (3) AGREE THAT IN THE EVENT THAT THIS APPLICATION IS APPROVED BY THE ATOMIC ENERGY COMMISSION, AND A LICENSE IS ISSUED, THAT THE DULY AUTHORIZED REPRESENTATIVES OF THE COMMISSION MAY FREELY INSPECT AT ALL REASONABLE TIMES FACILITIES AND RECORDS, TAKE SAMPLES FOR ASSAY, AND DO SUCH OTHER THINGS AS WILL, IN THE OPINION OF THE COMMISSION, ASSURE THAT ALL SOURCE MATERIAL HANDLED BY THE APPLICANT UNDER THE AUTHORITY OF HIS LICENSE, IS PROPERLY ACCOUNTED FOR AND USED.

BY P O Buxton
(Signature of applicant)

November 30, 1959
(Date)

The Dow Chemical Company
Treasurer
(Title)

Section 80 (A) of the United States Criminal Code, 18 U. S. C. Sec. 80, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

(FOR GOVERNMENT USE ONLY)

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

LICENSE NO .....

SOURCE MATERIAL LICENSE