



THE DOW CHEMICAL COMPANY

MIDLAND MICHIGAN

March 11, 1965

Mr. Donald A. Nussbaumer, Chief
Source and Special Nuclear Materials Branch
Division of Licensing and Regulation
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Nussbaumer:

Enclosed are four copies of Form AEC-2 application
for renewal of our AEC license No. STB-527.

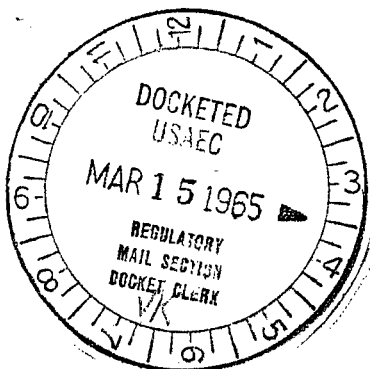
We would appreciate the exemption under item 9 on our
License No. STB-527 included on the renewal also.

Very truly yours,

W. Otis Heath
Statistician

WOH/jw

Enc.



COPY PROVIDED
COMPLIANCE *OPM*
3/10/65

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U.S. ATOMIC ENERGY COMM.
REGULATORY
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ACKNOWLEDGED

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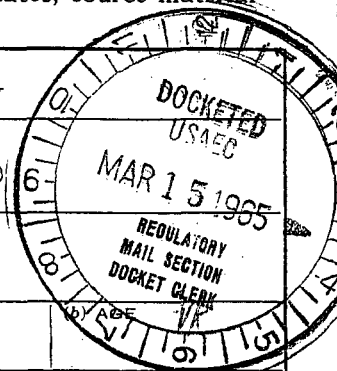
FORM APPROVED
BUREAU OF BUDGET NO. 38-R002.

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE

Pursuant to the regulations in Title 10, Code of Federal Regulations, Chapter 1, Part 40, application is hereby made for a license to receive, possess, use, transfer, deliver or import into the United States, source material for the activity or activities described.

1. (Check one) <input type="checkbox"/> (a) New license <input type="checkbox"/> (b) Amendment to License No. <input checked="" type="checkbox"/> (c) Renewal of License No. <u>STB-527</u> <input type="checkbox"/> (d) Previous License No.		2. NAME OF APPLICANT The Dow Chemical Company	
4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED Midland & Bay City, Michigan; Madison, Illinois		3. PRINCIPAL BUSINESS ADDRESS Midland, Michigan 48640	
5. BUSINESS OR OCCUPATION Chemical & Magnesium Prod'n		6. (a) IF APPLICANT IS AN INDIVIDUAL, STATE CITIZENSHIP	
7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED Manufacture of magnesium base-thorium alloys. Typical nominal thorium concentration is 3% in alloys prepared for structural purposes.			
8. STATE THE TYPE OR TYPES, CHEMICAL FORM OR FORMS, AND QUANTITIES OF SOURCE MATERIAL YOU PROPOSE TO RECEIVE, POSSESS, USE, OR TRANSFER UNDER THE LICENSE			
(a) TYPE	(b) CHEMICAL FORM	(c) PHYSICAL FORM (Including % U or Th.)	(d) MAXIMUM AMOUNT AT ANY ONE TIME (in pounds)
NATURAL URANIUM			
URANIUM DEPLETED IN THE U-235 ISOTOPE			
THORIUM (ISOTOPE)	Thorium Compounds Metal Oxide or fluoride	97% as pure pellets 3% as Mg alloy	500 lbs. 100,000 lbs. 10,000 lbs.
(e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (in pounds) 110,500 Pounds			
9. DESCRIBE THE CHEMICAL, PHYSICAL, METALLURGICAL, OR NUCLEAR PROCESS OR PROCESSES IN WHICH THE SOURCE MATERIAL WILL BE USED, INDICATING THE MAXIMUM AMOUNT OF SOURCE MATERIAL INVOLVED IN EACH PROCESS AT ANY ONE TIME, AND PROVIDING A THOROUGH EVALUATION OF THE POTENTIAL RADIATION HAZARDS ASSOCIATED WITH EACH STEP OF THOSE PROCESSES. Alloying in molten metal form of magnesium and thorium limited to a few hundred pounds of thorium per batch. As solid magnesium-thorium alloy, processing includes extrusion and rolling at temperatures well below the solidus. Standard metal working shop procedures followed in fabricating assemblies.			
10. DESCRIBE THE MINIMUM TECHNICAL QUALIFICATIONS INCLUDING TRAINING AND EXPERIENCE THAT WILL BE REQUIRED OF APPLICANT'S SUPERVISORY PERSONNEL INCLUDING PERSON RESPONSIBLE FOR RADIATION SAFETY PROGRAM (OR OF APPLICANT IF APPLICANT IS AN INDIVIDUAL). Chemists and chemical engineers. Radiation safety program under the direction of H. R. Hoyle, Chemist, with 20 years' experience in safety, industrial hygiene and health physics.			
11. DESCRIBE THE EQUIPMENT AND FACILITIES WHICH WILL BE USED TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE OR PROPERTY AND RELATE THE USE OF THE EQUIPMENT AND FACILITIES TO THE OPERATIONS LISTED IN ITEM 9; INCLUDE: (a) RADIATION DETECTION AND RELATED INSTRUMENTS (including film badges, dosimeters, counters, air sampling, and other survey equipment as appropriate. The description of radiation detection instruments should include the instrument characteristics such as type of radiation detected, window thickness, and the range(s) of each instrument). Health physics program includes use of film badges, survey instruments both ionization chamber and geiger tube, air sampling equipment and proportional counter. Equipment used to check working conditions insuring compliance with 10 CFR 20 and our own regulations.			
(b) METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED IN (a) ABOVE, INCLUDING AIR SAMPLING EQUIPMENT (for film badges, specify method of calibrating and processing, or name supplier). Survey meters are calibrated with a radium source each six months. Film badge service is from R. S. Landauer, Jr. & Co.			



11(c) VENTILATION EQUIPMENT WHICH WILL BE USED IN OPERATIONS WHICH PRODUCE DUST, FUMES, MISTS, OR GASES, INCLUDING PLAN VIEW SHOWING TYPE AND LOCATION OF HOOD AND FILTERS, MINIMUM VELOCITIES MAINTAINED AT HOOD OPENINGS AND PROCEDURES FOR TESTING SUCH EQUIPMENT.

Water wash dust collectors designed for use with magnesium dust. Standard foundry operation with high ceiling and natural ventilation through monitors. Local exhaust for welding and chemical treatment operations where required to minimize airborne thorium and daughters.

12. DESCRIBE PROPOSED PROCEDURES TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE AND LIMB AND PREVENT AND REDUCE PROCEEDURES TO THE OPERATIONS LISTED IN ITEM 9; INCLUDE: (a) SAFETY FEATURES AND PROCEDURES TO AVOID NONNUCLEAR ACCIDENTS, SUCH AS FIRE, EXPLOSION, ETC., IN SOURCE MATERIAL STORAGE AND PROCESSING AREAS.

Surveys indicate no need for change in standard magnesium operating procedures. The Recommendations of the National Fire Protection Assn. No. 48 Standard for Magnesium are followed to avoid fire, explosion or other nonnuclear accident.

(b) EMERGENCY PROCEDURES IN THE EVENT OF ACCIDENTS WHICH MIGHT INVOLVE SOURCE MATERIAL. Standard magnesium fire control procedures are followed, Thorium remains essentially in the ashes and is easily and safely cleaned up. Reference Dow Bulletin 141-179, Dow Radiation Protection Manual and report 11/29/60 Taylor Forge and Pipe Works. All are in your Radiation Safety Branch file.

(c) DETAILED DESCRIPTION OF RADIATION SURVEY PROGRAM AND PROCEDURES.

Equipment listed in 11(a) used for surveys under production conditions to insure compliance with 10 CFR 20 and in particular satisfy the requirements of 20.201 (b).

13. WASTE PRODUCTS: If none will be generated, state "None" opposite (a), below. If waste products will be generated, check here ☒ and explain on a supplemental sheet:

- (a) Quantity and type of radioactive waste that will be generated. See attached sheet.
(b) Detailed procedures for waste disposal.

14. IF PRODUCTS FOR DISTRIBUTION TO THE GENERAL PUBLIC UNDER AN EXEMPTION CONTAINED IN 10 CFR 40 ARE TO BE MANUFACTURED, USE A SUPPLEMENTAL SHEET TO FURNISH A DETAILED DESCRIPTION OF THE PRODUCT, INCLUDING:

- (a) PERCENT SOURCE MATERIAL IN THE PRODUCT AND ITS LOCATION IN THE PRODUCT.
(b) PHYSICAL DESCRIPTION OF THE PRODUCT INCLUDING CHARACTERISTICS, IF ANY, THAT WILL PREVENT INHALATION OR INGESTION OF SOURCE MATERIAL THAT MIGHT BE SEPARATED FROM THE PRODUCT.
(c) BETA AND BETA PLUS GAMMA RADIATION LEVELS (Specify instrument used, date of calibration and calibration technique used) AT THE SURFACE OF THE PRODUCT AND AT 12 INCHES.
(d) METHOD OF ASSURING THAT SOURCE MATERIAL CANNOT BE DISASSOCIATED FROM THE MANUFACTURED PRODUCT.

CERTIFICATE

(This item must be completed by applicant)

15. The applicant, and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 40, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

The Dow Chemical Company

(Applicant named in Item 2)

Dated 3-11-65

BY:

W. Otis Heath

(Print or type name under signature)

W. Otis Heath

Statistician

(Title of certifying official authorized to act on behalf of the applicant)

WARNING: 18 U.S.C. Section 1001; Act of June 25, 1948; 62 Stat. 749; 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.

* operations where required to minimize airborne thorium and daughters.

March 11, 1965

13. WASTE PRODUCTS

Limited thorium wastes are generally disposed of in compliance with 20.303 and 20.304. All possible material is returned to the production cycle for economic reasons. Some material which cannot be reclaimed and which is not suitable for disposal through release into sewerage systems or by burial is incinerated in a safe manner. In all cases, the material being incinerated has a maximum nominal concentration of only 3% thorium.

- A. Type of material--water wet chips or fines that are not suitable for reclamation.

Quantity: Bay City -- negligible amounts
Midland -- none to 100 lbs. per month
Madison -- 300 to 500 lbs. per month
(for weight of thorium multiply by 0.03)

Chemical Form--Thorium is alloyed with magnesium, zirconium and manganese with a maximum nominal concentration of 3% thorium.

- B. Measurements made during the burning of scrap chips are described in Dow Bulletin 141-179. The thorium remains in the residue.
- C. Since no thorium was found in the visible fumes, personnel are not exposed to airborne thorium. Values for daughter products are near or below the levels specified in 10 CFR 20 for 40 hour week exposure.
- D. Burning is accomplished on an open dump (not accessible to the public) at points 800 feet to a mile or more from the nearest plant building or habitation. An incinerator stack is not used.
- E. The normal care exercised in burning wet magnesium chips insures that the operator will not be excessively exposed to the fumes from the fire. Based on the tests conducted, direct inhalation of the smoke would not be injurious with respect to the radioactive material content.
- F. The ashes containing the thorium are left on the private dump where they are diluted by other ashes and buried.

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