

DOCKET

40-6664

FORM APPROVED
BUREAU OF BUDGET NO. 36-R002

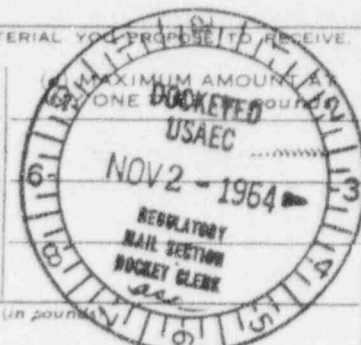
UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE

File COPY

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-489</u> <input type="checkbox"/> (d) Previous License No. _____		2 NAME OF APPLICANT <u>E. I. du Pont de Nemours & Co., Inc.</u>	
		3 PRINCIPAL BUSINESS ADDRESS <u>Wilmington, Delaware 19898</u>	
4 STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED <u>E. I. du Pont de Nemours & Co., Inc., Pigments Department, Newport, Delaware</u>			
5 BUSINESS OR OCCUPATION <u>Chemical Industry</u>		6 (a) IF APPLICANT IS AN INDIVIDUAL, STATE CITIZENSHIP (b) AGE 	
7 DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED <u>Production of dispersion modified metals and associated research.</u>			
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 ONE TIME
NATURAL URANIUM			
URANIUM DEPLETED IN THE U-235 ISOTOPE			
THORIUM (ISOTOPE)			
See supplemental sheets			
(e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (in pounds) <u>5,000 lbs.</u>			
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 <u>See supplemental sheets</u>			
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 IF APPLICANT IS AN INDIVIDUAL) <u>See supplemental sheets</u>			
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. INCL. J.C.E. (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. <u>See supplemental sheets</u>			
(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). <u>See supplemental sheets</u>			



8. Source Material

(a) Type: Thorium natural

NOTE: All subsequent weights are quoted in terms of contained thorium.

(b,c,d) Thorium nitrate, containing 33 to 48% thorium (depending on the amount of water of crystallization), 1,000 pounds maximum.

Thorium oxalate, containing 45 to 56% thorium (depending on the amount of water of crystallization), 1,000 pounds maximum.

Sub-finished products (temporary storage), 2,000 pounds maximum. (See Appendix B for description.)

Dispersion-modified metals, containing 0.01-20% thorium, 2,000 pounds maximum.

(e) Maximum total quantity of source material on hand at any one time: 1,000 pounds.

9. A.R.C.D. (See Appendix B)

E. Storage

This item is covered under Items 1 and 2, C. R. Whitecube to D. A. Musibaumer, dated October 4, 1963.



10. The minimum technical qualifications required for the person responsible for the radiation safety program are:
 (a) a bachelor's degree in chemistry, physics or chemical engineering from an accredited college or university,
 (b) completion of the formal course in "Safe Handling of Radioisotopes" conducted by the Du Pont Engineering Department, or equivalent formal instruction.

The minimum technical qualifications required for direct supervisory personnel are: (a) two years of college training in chemistry or the equivalent, and (b) on-the-job training, including familiarity with all parts of the area safety regulations, the radiation safety portions of which emphasize the job requirements for safe operation and compliance with 10CFR20.

11. (a) Cont'd.

dated November 20, 1961. In addition, 1200 cfm ventilating blower has been installed in the area, bringing the total ventilation to 10,800 cfm, in addition to the facility described in the November 20, 1961 Amendment to Appendix A.

Supporting research continues to be performed in laboratories with small samples, as described in Item 3, paragraph 3, of the letter from R. J. Gorman, Jr. to J. J. Delaney, dated July 20, 1962.

For further information see Appendix B.

12. (a) In all of the process, there are no unusual hazards. (A single exception is covered in Appendix B.) Materials of construction are non-flammable. In general, we operate in harmony with well-known, stringent, safety and fire protection standards which prevail throughout the Du Pont Company and are rigidly enforced through line supervision, as well as by periodic surveys and on-the-spot inspections by the Company's central Safety and Fire Protection Division.

A running inventory of all source material is maintained. It is checked and certified monthly by the Radiation Protection Officer.

- (b) The most likely accident is a spill. If a spill of over 100 g. ThO_2 (90 g. Th) occurs, area supervision must be notified so that proper cleanup, verified by smear tests, is assured. If visible dust occurs, the building is evacuated until the ventilating system clears the air.

In the case of major fire, in which the plant fire brigade is called, area personnel advise the fire brigade. All reactive gas flows and all electric power to the building are cut off. All persons entering the area during a fire must wear Air-Pak masks or equivalent, as protection against inhalation of thorium-bearing dust.

- (c) Dust Sampling - This is the main part of our monitoring program. Experience to date has shown potential ingestion as dust (approach to 10CFR20's RCG levels) as the only radiological hazard of this operation. Dust samples are collected continuously in all areas, read for permanent alpha-count rate daily in restricted

12. (a) - Cont'd.

areas and weekly in unrestricted areas. This sampling is done in all areas where dry, thoriated material is handled, except the small laboratory hoods, and including all points where dust can be ejected from our area. A total of fifteen dust samplers are now in use; this number may vary slightly from time to time as our experience dictates, or as a temporary experimental unit is built or dismantled.

Film Badges - Film badges are used for all personnel assigned to and working regularly in areas where thorium compounds are used in the production or storage of dispersion-modified metals. They are also used by selected personnel working with experimental quantities on a laboratory scale. The badges are read on a monthly basis. So far, they show no exposure to significant amounts of beta-gamma radiation.

Smear Tests - Smear tests are taken weekly in all areas, and daily at random locations in operating areas. The specimens are read for alpha count rate, to serve as a check on the effectiveness of cleanup procedures. (For details, see paragraph 4, H. J. Gorman, Jr. to D. A. Hussbaumer, dated August 7, 1961.) Cleanup is not required if smear sample counts exceed one count/min./cm².

Beta-gamma surveys of radiation levels are made weekly in operating and storage areas. This supplements the film badge service.

USHEC Inspection - Attention is drawn to the fact that these procedures were judged to be adequate by the Division of Compliance, U.S.A.E.C., on the occasion of an on-site inspection on November 12, 1963, during which no item of noncompliance was found.

13. (a) It is possible that up to 2,000 pounds per year of waste thorium may be disposed of by burying. A very small fraction of this could be raw material salts, but almost all of it would be thorium dispersed in intermediates or in metal as product. Most of it will be in the form of sludge or powders, chemically unreactive, and will be buried in accordance with 10CFR20.304.

A small part of the waste is aqueous effluent, overflowing from a settling tank, (see Par. 3, Supplement II to Appendix A, letter from C. R. Whitcomb to D. A. Muschbauer, dated October 4, 1963, see also Par. 3, H. J. Gorman, Jr. to D. A. Muschbauer, dated August 7, 1962, and Par. 3, H. J. Gorman, Jr. to D. A. Muschbauer, dated August 16, 1962). This effluent is sent to sanitary sewers in accordance with 10CFR20.303 and 10CFR20.106.

Wilmington, Delaware

10-30-64		2-64		510	
LTR	MEMO	ORT	OTHER		
E & encls.					
ORIG.	CC	OTHER			
X	3				
ACTION NECESSARY	<input type="checkbox"/>	CONCURRENCE	<input type="checkbox"/>	DATE ANSWERED	
NO ACTION NECESSARY	<input type="checkbox"/>	COMMENT	<input type="checkbox"/>	BY	
FILE CODE					
40-6664					
REFERRED TO		DATE	RECEIVED BY	DATE	
Huschammer: 11-3					
w/file cy. & file					
1-compliance cy.					
1-extras					
granted per 5-3-65 942					
PLEASE REVIEW FOR DETERMINATION AS TO WHETHER "APPENDIX B" SHOULD BE WITHHELD IN ACCORD. w/SECTION 2.790.					
ACKNOWLEDGED					
511					

TO: Layfield

CLASSIF. H Co.Conf. POST OFFICE REG. NO.

DESCRIPTION: (Must Be Unclassified)

tr. req. that the attached "Appendix B" be withheld from public inspection and furnishing justification to that effect; along with trans:

CLOSURES:

(4 cys. ea)

dtd. 10-30-64 for renewal of STB-489.

sent Sheets

Index B--which deals w/certain processes (COMPANY CONFIDENTIAL)

Mail Room Distribution:

1-PDR Copy w/Section 2.790 portion removed (Appendix B)

U. S. ATOMIC ENERGY COMMISSION

MAIL CONTROL FORM FORM AEC-3265 (8-60)

5/19