

## 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 checked="" type="checkbox"/> (b) Amendment to License No. <u>SUB-986</u> <input type="checkbox"/> (c) Renewal of License No. _____ <input type="checkbox"/> (d) Previous License No. _____		2. NAME OF APPLICANT <u>Kerr-McGee Corporation</u>	
3. PRINCIPAL BUSINESS ADDRESS <u>Kerr-McGee Building</u> <u>Oklahoma City, Oklahoma 73102</u>			
4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED <u>Research Department, 3301 Northwest 150th Street, Oklahoma City, Oklahoma</u>			
5. BUSINESS OR OCCUPATION <u>Production of Nuclear Fuel Materials</u>		6. (a) IF APPLICANT IS AN INDIVIDUAL, STATE CITIZENSHIP (b) AGE	
7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED  <u>Thorium containing materials will be used for the development of a solvent extraction process for the separation and purification of thorium.</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 ANY ONE TIME (in pounds)
NATURAL URANIUM			
URANIUM DEPLETED IN THE U-235 ISOTOPE			
THORIUM (ISOTOPE)	<u>Natural Thorium as ThO<sub>2</sub>, ThCl<sub>4</sub>, Th(NO<sub>3</sub>)<sub>4</sub></u>	<u>Wet cakes and Solutions ~10% Th</u>	<u>300 pounds</u>
(e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (in pounds) <u>800 pounds (uranium plus thorium)</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>Thorium in impure solutions will be extracted with an organic solvent and this solvent stripped with water to yield a pure solution from which thorium will be recovered by precipitation. The maximum amount in process at any one time should be about 30 pounds. Potential radiation hazard for this process is negligible.</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 OF APPLICANT IF APPLICANT IS AN INDIVIDUAL).  <u>At this time supervision of the use of this source material and radiation safety at the facility will be the responsibility of W. J. Robertson. A graduate chemist, Dr. Robertson has had 14 years of experience in Feed Materials processing.</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; 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).  (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).			

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Addendum to Application for  
Amendment of Source Material  
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Kerr-McGee Corporation  
Oklahoma City, Oklahoma

11. (a) The bulk of the thorium used in these studies will be in solution. Solutions and thorium cakes will be stored in covered containers well marked with approved warning signs.

Radiation monitoring will be accomplished by the following means:

1. Personnel film badges
  2. Alpha Counter, range 0-100,000 dpm (Eberline Instrument Company, Model PAC-3G)
  3. Geiger Counter, range 0-50 mr (Eberline Instrument Company, Model E-120)
- (b) Radiation instruments will be calibrated quarterly using standard isotopic sources. Personnel film badges are supplied by Landauer on a monthly basis.
- (c) Materials will be received as pure thorium compounds or wet cakes, and actual work will be done with solutions. No dusty operations are envisioned. Ordinary chemical laboratory hoods (face velocity 70-80 fpm) are available for solution preparation.
12. (a) The severity of a possible accident is minimized by the limited size scale of the proposed operations. Although flammable solvents will be used, the quantity on hand at any time is restricted so as not to constitute undue hazard. The building and storage areas are rated as fireproof construction. Normal safety procedures applicable to a good chemical laboratory are adhered to.
- (b) In case of accident involving source material, the affected area will be evacuated until adequate clean-up and decontamination procedures are carried out. A physician who has specialized in nuclear medicine is a consultant for the corporation. He has established a working arrangement with the University of Oklahoma Medical Center staff for assistance in case of emergency.
- (c) The radiation survey program comprises:
1. Personnel film badges (plus control badges).
  2. Routine survey on a monthly basis of the areas where source materials are stored or used. This includes use of a beta-gamma instrument and an alpha survey instrument.
  3. Any additional monitoring for which a need develops as the material is used.

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13. (a) Small amounts of raffinate solution from thorium extraction containing Ra-228 and Ac-228, will be generated. Analytical residues containing small quantities of natural thorium will also be generated.
- (b) These solutions will be disposed of within the limits of 10CFR20.