

INSTRUCTIONS: Complete Items 1 through 19 if this is a new application. If renewal is requested, complete only Items 1 through 11 provided that with respect to the other items there has been no change in the information previously submitted. Mail two copies to: U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tennessee, Attention: Isotopes Extension, Division of Civilian Application. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. General requirements for issuance of an AEC Byproduct Material License are contained in Title 10, Code of Federal Regulations, Part 30.

1. (a) NAME AND SHIPPING ADDRESS OF APPLICANT <i>(Institution, firm, hospital, person, etc.)</i> <b>Michigan Chemical Corporation</b> <b>Saint Louis, Michigan</b>	(b) ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED <i>(If different from shipping address)</i> <b>Michigan Chemical Corporation</b> <b>Saint Louis, Michigan</b>
2. DEPARTMENT TO USE BYPRODUCT MATERIAL <b>Operations Division</b>	
3. INDIVIDUAL USER <i>(Name and title of individual(s) who will use or directly supervise use of byproduct material)</i> <b>Mark Frimodig, Process Engineer</b>	
4. RADIOLOGICAL SAFETY OFFICER <i>(Name of person qualified in radiological safety, if other than individual user)</i> <b>A. M. Gammill</b>	
5. PREVIOUS LICENSE OR AUTHORIZATION NUMBER <i>(If this is an application for renewal of a license for byproduct material obtained under a prior license or authorization for radioisotope procurement)</i> <b>None</b>	

**BYPRODUCT MATERIAL OR IRRADIATION SERVICE DESIRED**

6. BYPRODUCT MATERIAL <i>(Element and mass number)</i> <b>Sb-Be neutron source</b> <b>or Po-B source</b>	7. CHEMICAL AND/OR PHYSICAL FORM <i>(Or catalog number)</i> <b>Prepared as neutron source</b>	8. MAXIMUM AMOUNT OF RADIOACTIVITY IN MILLI-CURIES THAT YOU WILL POSSESS AT ANY ONE TIME <b>Ca 1-3 curies (neutron flux of 10<sup>4</sup>-10<sup>5</sup>)</b>
9. IF IRRADIATION SERVICE IS DESIRED, STATE PERTINENT DETAILS SUCH AS: CHEMICAL COMPOSITION AND WEIGHT IN GRAMS OF TARGET MATERIAL, RADIOACTIVITY, IRRADIATION TIME IN DAYS, AND NEUTRON FLUX <b>As required to conform to items 6-8 above</b>		

**STATEMENT OF USE**

10. (a) DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. *(If material is for "human use" complete Supplement A in lieu of this item. If material is to be used in or manufactured as a "sealed source" complete Supplement B in addition to this item.)*

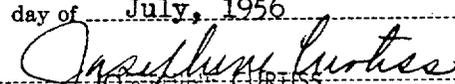
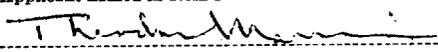
**This neutron source will be used for monitoring the production of rare earth elements. It is hoped that further experimental will establish neutron absorption analysis as a quantitative analytical tool. Preliminary work on neutron absorption analysis has been done by Mr. George Leddicotte at the Oak Ridge National Laboratory.**

(b) DESCRIBE PROCEDURES WHICH WILL BE OBSERVED TO MINIMIZE HAZARD FROM HANDLING, STORAGE, AND DISPOSAL OF THE BYPRODUCT MATERIAL

**Suitable shielding will be provided for the neutron source to reduce it down to tolerance level. Prescribed health physics practices will be used for handling, storage and disposal and for safeguarding personnel.**

**CERTIFICATE**

11. The applicant and any official executing this certificate on behalf of the applicant named in Item 1, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and do solemnly swear (or affirm) that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

State of <u>Michigan</u> County of <u>Gratiot</u> Subscribed and sworn to before me this <u>10</u> day of <u>July, 1956</u>  Notary Public, <u>Gratiot County, Mich.</u>	<u>Michigan Chemical Corporation</u> Applicant named in Item 1 By  <u>President</u> Title of Certifying Official <u>July 10, 1956</u> Date
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My Commission Expires Nov. 30, 1959

**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.

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INSTRUCTIONS: Complete Items 12 through 19 if this is a new application. This information may be omitted from subsequent applications provided there is no change in the information previously submitted, and reference is made in Item 5 to the application on which this information appears.

**TRAINING AND EXPERIENCE WITH RADIOACTIVITY OF INDIVIDUAL USER NAMED IN ITEM 3**

12. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
1. Principles and practices of radiological health safety. . . . .	Will receive training		<input checked="" type="radio"/> Yes No	Yes No
2. Radioactivity measurement standardization and monitoring techniques and instruments . . . . .	Michigan Chemical	limited	<input checked="" type="radio"/> Yes No	Yes No
3. Mathematics and calculations basic to the use and measurement of radioactivity. . . . .	Will receive training		<input checked="" type="radio"/> Yes No	Yes No
4. Biological effects of radiation. . .	Will receive training		<input checked="" type="radio"/> Yes No	Yes No
5. Actual use of radioisotopes in the types and quantities for which application is being made, or equivalent experience . . . . .	Michigan Chemical	Occasional examination of radioactive ores	<input checked="" type="radio"/> Yes No	Yes No

13. ISOTOPE HANDLING EXPERIENCE **None**

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE

14. If Radiological Safety Officer named in Item 4 is different from individual user named in Item 3, use supplementary sheet to provide equivalent information on "Training and Experience With Radioactivity of Radiological Safety Officer." Supplementary sheet is attached (Circle answer) **See attachment**  Yes  No

**PHYSICAL FACILITIES, EQUIPMENT, AND RADIATION INSTRUMENTATION**

15. RADIATION DETECTION INSTRUMENTS (Use separate sheet if necessary)

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm <sup>2</sup> )	USE (Monitoring, surveying, measuring)
Precision radiation Model 107 RCL twin scaler, mark 13, Model 6	1	$\alpha, \beta, \gamma$	0-20mr/hr	Unknown	Monitoring
	1	$\beta, \gamma$	Normal	30mg/cm <sup>2</sup>	Measuring

16. FILM BADGES, DOSIMETERS, AND OTHER PERSONNEL MONITORING DEVICES INCLUDING BIO-ASSAY PROCEDURES

Film badge will be obtained for technicians

17. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE (For film badges specify method of calibration and processing, or name supplier)

Standard 0.1 mr/br source for survey meter

18. (a) DESCRIBE BRIEFLY REMOTE HANDLING EQUIPMENT, STORAGE CONTAINERS, SHIELDING, AND LABORATORY FACILITIES (Working areas, fume hoods, etc.)

None, will be provided per prescribed requirement

(b) SKETCHES OF SUCH FACILITIES ARE ATTACHED (Circle answer)

Yes  No

19. DESCRIBE BRIEFLY RADIATION SURVEYING PROCEDURES AND METHODS OF DISPOSING OF RADIOACTIVE WASTES

None employed at present. Surveying procedures will be developed for this particular application in consultation with Dr. Elda Anderson at Oak Ridge. Prescribed AEC disposal methods will be used.