

ATOMIC ENERGY COMMISSION
APPLICATION FOR BYPRODUCT MATERIAL LICENSE

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application. If application is for renewal of a license, complete only Items 1 through 7 and indicate new information or changes in the program as requested in Items 8 through 15. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail three copies to: U. S. Atomic Energy Commission, Washington 25, D. C. Attention: Isotopes Branch, Division of Licensing and Regulation. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 31, and the Licensee is subject to Title 10, Code of Federal Regulations, Part 20.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. (Institution, firm, hospital, person, etc.) The Dow Chemical Company Building 1602 Midland, Michigan 48640		(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. (If different from 1 (a).) Locations in United States	
2. DEPARTMENT TO USE BYPRODUCT MATERIAL Dow Industrial Service		3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.) Renewal of AEC license #21-00265-07	
4. INDIVIDUAL USER(S). (Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.) Individuals approved by Radiation Safety Committee		5. RADIATION PROTECTION OFFICER (Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience in Items 8 and 9.) L. G. Silverstein C. L. Lagerquist	
6. (a) BYPRODUCT MATERIAL. (Elements and mass number of each.) a) 50,000 curies, other than H ³ or C ¹⁴ b) Hydrogen-3 and Carbon-14; 25,000 curies c) Source material 50,000 lbs d) 350 g of U-235 or 200 g of U-233 or Pu-239		(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. (If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.) any chemical or physical form The sum of ratios of each quantity $\frac{\text{wt of A}}{\text{limit of A}} + \frac{\text{wt of B}}{\text{limit of B}} + \dots = \text{as } < 1$ See Radiation Safety Manual, Appendix G.	

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. (If byproduct material is for "non-use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)

Materials in item 6(a) may be possessed by Dow Industrial Service Division of The Dow Chemical Company during decontamination and clean-up procedures of equipment in nuclear power plants or other nuclear installations at various plant locations of various corporations or governmental agencies.

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TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	RECEIVED See Attachment I and		Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments	Appendix D, Radiation Safety Manual		Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity	S. ATOMIC ENERGY COMM.		Yes No	Yes No
d. Biological effects of radiation	REQUIREMENT MANUAL SECTION		Yes No	Yes No

9. EXPERIENCE WITH RADIATION. (Actual use of radioisotopes or equivalent experience.)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		See Attachment III		

10. RADIATION DETECTION INSTRUMENTS. (Use supplemental sheets if necessary.)

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm ²)	USE (Monitoring, surveying, measuring)
See Attachment III					

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

See Attachment III

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. (For film badges, specify method of calibrating and processing, or name of supplier.)

See Attachment IV

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. (Circle answer) Yes No

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source. See Attachment II, Radiation Safety Manual, of prior license application dated 8/8/68 with amendment of Section 4.16*

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved. See Attachment II

CERTIFICATE (This item must be completed by applicant)

16. 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 THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

Date

Sept. 16, 1970

By: X

The Dow Chemical Co.

Applicant named in item 1

H. R. Hays

Chairman, Radiation

Title of certifying official

Safety Committee

*as listed in Attachment I.

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.

ATTACHMENT I

(Item 8)

Radiation Safety Committee

The Dow Chemical Company

Midland Plant

Chairman

H. R. Hoyle -- B.S., Industrial Hygienist, Biochemical Research Laboratory - Environmental Research Laboratory, Industrial Hygiene & Toxicology, Industrial Safety - 25 years, Radiation Safety on Sealed Radioactive Sources - 17 years.

Secretary

L. G. Silverstein -- M.S., Manager of Midland Division Safety & Industrial Hygiene Department, see Resume, Attachment III.

D. J. Ducommun -- M.D., Staff Physician, Medical Department (certified by AEC as having satisfactorily completed training seminar on medical care and treatment of radiation accidents held in Richmond, Washington, January 22, 1969), Industrial Physician - 11 years.

O. U. Anders -- Ph.D., Associate Scientist, Head of Nuclear Chemistry Group, Radiochemistry Research Laboratory, Radiochemist with Dow since 1957, development and application of neutron activation analysis techniques utilizing nuclear instrumentation and charged particle scattering methods.

A. W. Wilson -- B.S., Safety Engineer, Safety Department, Chemist - 5 years, Industrial Safety in Chemical Plants - 19 years, Radiation Safety on Sealed Radioactive Sources - 17 years.

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RESUME

L. G. Silverstein
Midland, Michigan

Born ~~XXXXXXXXXXXX~~ Education - A.B. in chemistry, Harpur College of the State University of New York, 1954; M.S. in radiation biology, University of Rochester, 1956 (A.E.C. Health Physics Fellowship); certified health physicist by American Board of Health Physics, 1963.

Organizations - Health Physics Society, charter member; American Industrial Hygiene Association, member since 1960.

Employment Record. Employed by The Dow Chemical Company, September 1, 1955. Radiological Safety Officer, Midland location, 1955-60 and 1962 to the present; Texas Division, 1961 and 1962. Promoted to Senior Research Environmental Health Engineer, 1967.

Work experience includes health physics surveys of all radiation sources including X-ray machines, accelerators, radioisotope sealed sources, radioisotope tracers, kilocurie cobalt-60 gamma radiation facilities and Dow's TRIGA research reactor.

Responsibilities include the review of engineering plans for new radiation facilities, the education of new radiation workers, advising radiation workers on the selection, maintenance, calibration of radiation survey instruments, providing and interpreting personnel monitoring by film badge, dosimeter and bio-assay techniques, developing a radiation emergency program which involves fire and plant protection and medical personnel, disposing of radioactive waste, and assuring the freedom of Dow products from radioactive contamination.

Other responsibilities in the area of environmental health utilize most of the technical skills and human relation skills that are required in activities related to health physics.

Completed Civil Defense radiological monitoring instructor course, 1961, Head of Radiological Monitoring, Civil Defense, Lake Jackson, Texas, 1961-1962, active in Midland County Civil Defense, 1957-1960, 1962-65; Head, Midland County Radiological Monitoring Civil Defense, 1965-67; Member of Michigan Health Commissioner's Radiation Advisory Board, 1957-60, 1962-present.

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RESUME

CLAYTON ROSS LAGERQUIST

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EDUCATION

Bachelor of Arts degree from Mankato State College
(Mankato, Minnesota) in 1955

Majors: Mathematics, physics, and chemistry

AEC Fellowship program in "Radiological Physics,"
University of Washington, 1955-1956

Master of Science degree in chemical engineering
from the University of Minnesota (Minneapolis,
Minnesota) in 1961

Major: Nuclear engineering
Minor: Mathematics

EXPERIENCE

Seven years (1956-1963) as health physicist and
instructor at the University of Minnesota

Four years (1963-present) as health physicist
at The Dow Chemical Company, Rocky Flats Division

CERTIFICATIONS

Certified in health physics (by examination) by the
American Board of Health Physics, 1964

PROFESSIONAL ORGANIZATIONS

Health Physics Society (member)
The Scientific Research Society of America (member)

Item 10

Attachment III

Type	No.	Radiation Detected	Sens. mr/hr	Window Thickness	Use
Victoreen 592B	1	X, γ	1000	metal wall	Meas. X and γ rad. 50 kev- 1.3 Mev
Victoreen 440	1	β , X, γ	300	$\frac{1}{2}$ mil mylar	Meas. X and γ rad. 6.5 kev - 1.3 Mev
Tracerlab SU14	1	β , γ	25	2 mg/cm ² mica	Monitoring
Jordan Radector AG 500 Sr		γ	500 r/hr	Metal wall	Meas. r

Other instruments will be purchased as required by the specific needs of future operations, e.g. list entitled "Instruments for Dresden Project."

Instruments for Dresden Project

PORTABLE COUNTING SYSTEM PCS-5

Wm. B. Johnson and Associates, Inc.
Research Park
Boonton Avenue
Montville, New Jersey

Model PCS to include:
GSM-5 with spare parts and grips
MSC-1 Manual Sample Changer
GP-200 Alpha, Beta, Gamma Probe (20 mr)
GP-90X10 Beta, Gamma Probe (200 mr)
GP-90X50 Beta, Gamma (1R)
DIG-1 Digital Recorder and Timer
ASA-2 Audible Monitor
GSM-5 Survey Meter

RAMP-4 REMOTE AREA MONITORING SYSTEMS

C. W. Fowler Company
9000 Menaul Boulevard NE
Albuquerque, New Mexico 87112

5 - Station Units
5 - Remote Unit Assemblies
1 - Station Unit Housing