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November 28, 1984

Mr. George Bruchmann, Chief
Division of Radiological Health
Department of Public Health
P.O. Box 30035
3500 N. Logan
Lansing, MI 48909

Dear Mr. Bruchmann:

This is in response to your October 31, 1984, letter in which you pose questions concerning uses and/or disposal methods authorized by the Nuclear Regulatory Commission (NRC) at two facilities: The Dow Chemical Company, Midland, Michigan; and Drug and Laboratory Disposal, Inc., Plainwell, Michigan.

The Dow Chemical Company

We are in the process of renewing one NRC license (No. 21-00265-06) issued to Dow Chemical, which authorizes disposal of byproduct waste material generated on this license or other Dow Chemical licenses via incineration. This license will authorize Dow Chemical to dispose of any ash residue from its incinerator without regard to its radioactivity, provided the limits of activity remaining are less than those specified for water in Appendix B, Table II, 10 CFR Part 20. Based on calculations submitted in Dow Chemical's renewal application, they should not have any radioactivity present in the Ash greater than 10% of the limits specified in Part 20. We have not required Dow Chemical to establish limits for landfill leachate. Any disposal requirements and/or environmental safeguards required for Dow Chemical's incineration operation are in Item 14 of their renewal application (copy enclosed). The last inspection we made of License No. 21-00265-06 was on December 14-15, 1981, and no items of noncompliance were identified.

Drug and Laboratory Disposal, Inc.

We have no record of an NRC license issued to Drug and Laboratory Disposal, Inc. This firm did apply in 1982, for a commercial license to incinerate waste and that application was discontinued. I have enclosed a copy of a June 21, 1982, letter to them concerning their proposed incineration operation for your information.

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OFFICE	B.Mallett/bs	Axelson	Lickus				
SIGNATURE	11/27/84		11/28/84				

As you are aware, Section 20.306 of 10 CFR Part 20 authorizes licensees to dispose of animal carcasses and liquid scintillation fluid containing less than 0.05 microcuries per gram of carbon-14 or hydrogen-3 without regard to its radioactivity (see enclosed Federal Register Notice). Consequently, a facility such as Drug and Laboratory Disposal, Inc. is not required to obtain an NRC license for handling 20.306 waste material. The rule states that Part (d) of 10 CFR 20.306 specifically does not relieve licensees from complying with other applicable federal, state and local regulations governing any other toxic or hazardous property of these materials.

If you have any further questions or require clarification of any of the information stated above, please contact Mr. Bruce Mallett at (312) 790-5742.

Sincerely,

Roland Lickus, Chief
State and Government Affairs

Enclosure: As stated

OFFICE ▶							
SURNAME ▶							
DATE ▶							

NRC Form 374
(5-84)

U.S. NUCLEAR REGULATORY COMMISSION

CORRECTED COPY

Amendment No. 41

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Dow Chemical Company	In accordance with application dated September 11, 1984
2. Midland, MI 48640	3. License number 21-00265-06 is amended in its entirety to read as follows:
	4. Expiration date: November 30, 1989
	5. Docket or Reference No.: SNM-1451/07001487

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Any byproduct material between Atomic Numbers 1 and 83 inclusive	A. Any	A. Not to exceed 1 curie per radionuclide and 75 curies total, except as listed below: Carbon 14 6 curies Cobalt 60 2 curies Cesium 137 2 curies Hydrogen 3 75 curies Krypton 85 10 curies
B. Any byproduct material	B. Mixed fission products	B. 2 curies
C. Americium-241	C. NRC approved sealed sources	C. Not to exceed 10 curies per source 150 curies total
D. Californium-252	D. NRC approved sealed sources	D. Not to exceed 0.2 curies per source, 2 curies total
E. Curium-244	E. NRC approved sealed sources	E. Not to exceed 0.5 curies per source 3 curies total
F. Any byproduct material between Atomic Numbers 3 and 84	F. NRC approved sealed sources	F. Not to exceed 5 curies per source 400 curies total

COPY 2

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number 21-00265-06

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6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
G. Plutonium-238	G. Sealed Sources (Amersham Model PPC-X)	G. 5 sources not to exceed 30 millicuries per source
H. Plutonium-238	H. Sealed Sources (Amersham Model PPC-X)	H. 1 source not to exceed 120 millicuries
I. Cesium-137	I. Sealed Sources	I. 144 curies

9. Authorized Use:

A. through E. For research and development as defined in Section 30.4(q), Title 10, Code of Federal Regulations, Part 30, including animal studies. Carbon-14 may also be used in field and human studies.

C. through F. To be used in NRC approved industrial productions gauges/source holders for physical measurements and analyses of materials or in Dow custom-made devices in accordance with protocol contained in application dated September 11, 1984.

G. For use in Telesec Model X-200 X-ray fluorescence analyzers for testing of materials.

H. For use in Texas Nuclear custom-designed thickness gauge for testing of materials.

I. To be used in Eberline Model 1000 instrument calibrator for instrument calibration.

CONDITIONS

10. Licensed material shall be used in facilities approved by the licensee's Radiation Safety Committee at the following locations:

A. Dow facilities located at and associated with the 1803 Building, Midland, Michigan.

B. Dow facilities located at and in conjunction with the 9001 Building, Agriculture Research Center, Midland, Michigan.

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C. Dow facilities located at and in conjunction with 4868 Wilder Road, Bay City, Michigan.

D. Dow facilities located at and in conjunction with Larkin Laboratories, Midland Michigan.

11. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 19, "Notices, Instructions and Reports to Workers; Inspections" and Part 20, "Standards for Protection Against Radiation."

12. Licensed materials may be used by or under the supervision of individuals designated by The Dow Chemical Company's Radiation Safety Committee, L. W. Rampy, Chairperson.

13. The use of licensed material in or on humans beings, shall be by, or under the supervision of a physician as defined in 10 CFR 35.3(b).

14. The Radiation Protection Officer for the activities authorized by this license is G. W. Engdahl and T. W. Parsons (according to duties outlined in application dated September 11, 1984).

15. A. (1) Each sealed source containing licensed material, other than hydrogen-3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months; except those sealed sources as specified by the manufacturer and specifically authorized by the Commission or an Agreement State may be leak tested at intervals not to exceed three years. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source received from another person shall not be put into use until tested.

(2) Notwithstanding the periodic leak test required by this condition, any licensed sealed source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.

(3) Except for alpha sources defined in 15.C. below, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six months prior to the date of use or transfer.

B. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source until it has been repaired, decontaminated and retested.

C. Each sealed source containing licensed material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months.

D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

E. If the test required by Subsection A or C of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within five (5) days of the test with the U.S. Nuclear Regulatory Commission, Region III, 799 Roosevelt Road, Glen Ellyn, Illinois 60137, describing the equipment involved, the test results, and the corrective action taken.

16. Sealed sources containing licensed material shall not be opened.

17. In lieu of using the conventional radiation caution colors (magenta or purple on yellow background) as provided in Section 20.203(a)(1), Title 10, Code of Federal Regulations, Part 20, the licensee is hereby authorized to label detector cells and cell baths, containing licensed material and used in gas chromatography devices, with conspicuously etched or stamped radiation caution symbols without a color requirement.

18. A. Detector cells containing titanium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding 225 degrees Centigrade.

B. Detector cells containing scandium tritide foil shall only be used in conjunction with a properly operating temperature control mechanism which prevents foil temperatures from exceeding 325 degrees Centigrade.

19. Experimental animals administered licensed materials or their products shall not be used for human consumption.

20. Installation, relocation, maintenance, repair, and initial radiation survey of devices containing licensed material and installation, replacement, and disposal of sealed sources containing licensed material used in devices shall be performed only by by the licensee or by other persons specifically authorized by the Commission or an Agreement State to perform such services.

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21. A. Pursuant to Sections 20.106(b) and 20.302, 10 CFR 20, the licensee is authorized to dispose of licensed materials authorized in Subitem 6.A. by incineration provided the gaseous effluent from incineration does not exceed the limits specified for air in Appendix B, Table II, 10 CFR 20. Ash residues may be disposed of as ordinary waste provided appropriate surveys pursuant to Section 20.201 are made to determine that concentrations of licensed material appearing in the ash residues do not exceed the concentrations (in terms of microcuries per gram) specified for water in Appendix B, Table II, 10 CFR 20.

B. This license does not authorize commercial incineration, or the incineration of sealed sources special nuclear, or source materials.

22. The licensee may transport licensed material or deliver licensed material to a carrier for transport in accordance with the provisions of Title 10, Code of Federal Regulations, Part 71, "Packaging of Radioactive Material for Transport and Transportation of Radioactive Material Under Certain Conditions."

23. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated September 11, 1984; letter dated September 28, 1984. The Nuclear Regulatory Commission's regulations shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

For the U.S. Nuclear Regulatory Commission

Original Signed
By George M. McCann
Materials Licensing Section, Region III

Date May 10, 1985

COPY

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

June 25, 1980

TO ALL MEDICAL AND ACADEMIC LICENSEES

There are a number of steps licensees engaged in nuclear medicine practice and biomedical research can take under NRC rules to substantially reduce, and in some cases eliminate, the need to send radioactive waste to commercial low-level waste disposal facilities. By taking advantage of these alternatives and following good waste management practices, licensees can often reduce the risk of having their programs impacted through further curtailment of commercial waste disposal facilities. Some of the more important steps that can be taken are to:

1. Segregate radioactive waste from non-radioactive waste to reduce unnecessary volume. This simply requires a little time and discipline in the laboratory.

2. Hold waste with short-lived radionuclides in storage for decay to background levels, then dispose of it in the ordinary trash. This procedure requires a license amendment. (See Enclosure 1 for information to be submitted with the amendment request).

3. Release certain materials into the sanitary sewage system in accordance with 10 CFR Part 20.303. No license amendment is required but 10 CFR Part 20.303 should be carefully reviewed to stay within limits.

Judicious use of these three steps can substantially reduce the volume of waste shipped to burial grounds. Some nuclear medicine laboratories using only short-lived radionuclides can eliminate waste shipments.

Waste from biomedical research is generally somewhat more difficult to manage. Two of the most common problems are disposal of liquid scintillation counting waste (LSCW) and animal carcasses. The most frequently used radioisotopes in both are tritium and carbon-14. LSCW presents a particularly troublesome problem due to the flammability and toxicity of the solvents. Disposal of LSCW has been given special consideration by NRC. The staff has investigated alternatives to managing these wastes and the results have been published in NUREG-0656.

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Consideration should be given to disposal by incineration for LSCW and laboratory animals containing small amounts of tritium and carbon-14. This method requires a license amendment; 10 CFR Part 20.305 contains the provisions for incineration. Enclosure 2 identifies the information to be submitted with an amendment request for incineration.

There are other provisions in the regulations that cover waste disposal. We have mentioned only the few that are most easily and commonly used. Other regulatory provisions include:

1. Disposal by burial in soil in accordance with 10 CFR 20.304 (A proposed rule change is under consideration to delete this provision. It will likely be replaced by a provision which requires specific approval by license amendment for burial).

2. Release as effluents to unrestricted areas pursuant to 10 CFR Part 20.106. In keeping with the ALARA concept, this method should normally be used only for releases incident to the procedures involved.

We suggest that you review and consider alternatives to commerical land burial for the management of your low-level radioactive waste. Implementation of some of these alternatives may require an amendment to your license. Amendment requests should be submitted to the Material Licensing Branch through the use of normal channels. Specific licensing questions concerning NUREG-0656 should be directed to the Material Licensing Branch (301) 427-4232. Copies of the NUREG-0656 may be obtained from the Division of Technical Information and Document Control, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

Sincerely,

Wandy L. Miller

Wandy L. Miller, Chief
Material Licensing Branch
Division of Fuel Cycle and
Material Safety

Enclosures:

1. Information to be submitted When Requesting Amendment to Dispose of Radioactive Waste by Decay-In-Storage.

2. Information Required for Commission Approval of Treatment or Disposal by Incineration.

Enclosure 1

Information to be Submitted When Requesting Amendment to Dispose of Radioactive Waste by Decay-In-Storage Method

This is in reference to your request for information concerning authorization to dispose of radioactive waste via decay-in-storage. In order to approve such an amendment request, we need the following information:

1. Please submit a diagram of the area where the waste will be decayed-in-storage. Show the type, location, and thickness of shielding that you will have available in this area on your diagram. Your storage area should be large enough to handle an accumulation of used Tc-99m generators as well as other solid waste.

   Identify adjacent unrestricted areas located across the walls from the storage area and show that adequate steps have been taken to assure that radiation levels do not exceed the limits specified in 10 CFR 20.105 (enclosed).

2. Describe your security measures for the decay-in-storage area.

3. Confirm that radiation levels in this area will be surveyed and recorded at least weekly.

4. Describe your procedures for monitoring the waste to assure that it has decayed to background levels prior to disposal. As a minimum, your description should include these points:

   a. Monitor the waste in a low background area.

   b. Monitor with a low level GM type survey meter as appropriate for contamination surveys. Use the most sensitive scale.

   c. Remove all shielding prior to monitoring.

   d. Maintain records of these surveys as required under 10 CFR 20.

5. Note that decay-in-storage may not be a practical method of disposal for Tc-99m generators. These generators may contain long-lived radioisotopic contaminants. If you intend to dispose of generators by this method, you should include procedures for segregating the generator columns so that they may be monitored separately.

Be certain to submit your amendment request in duplicate. Unless your institution is fee exempt, your request should be accompanied by the appropriate amendment fee. Refer to 10 CFR 170.

Enclosure 2

INFORMATION REQUIRED FOR COMMISSION APPROVAL OF TREATMENT OR DISPOSAL BY INCINERATION

Revised October 3, 1979

1. State specifically the isotopes you wish to incinerate. For each isotope listed, you should submit calculations demonstrating that air concentrations of the effluents at the stack are in accordance with the requirements of Section 20.106 of 10 CFR Part 20.

2. Submit the characteristics of the incinerator such as height of the stack, height of and distance to buildings in the surrounding areas, rated airflow of the incinerator in cubic feet per hour or similar units and its proximity to any air intake ducts.

3. The gaseous effluent from the incinerator stack should not exceed the limits specified for air in Appendix B, Table II, 10 CFR Part 20, when averaged over a twenty-four (24) hour period.

4. In order to be in compliance with the ALARA philosophy stated in Section 20.1(c) of 10 CFR Part 20, the gaseous effluent from the incinerator stack should be a fraction (approximately 10%) of the limits specified for air in Appendix B, Table II, 10 CFR Part 20, when averaged over a one year period.

5. Describe the method of measurement or estimation of the concentration of radioactive material appearing in ash residue.

6. Describe the procedures for handling and disposing of ash from the incinerator.

7. Describe procedures to be followed to prevent overexposure of personnel during all phases of the operation, including instruction given to personnel handling the combustibles and the ash.

8. Submit evidence that all State and local regulations concerning incineration of radioactive material have been met by your institution.

9. State the maximum number of burns to be performed in any one week and the maximum number of burns per year.