

THE DOW CHEMICAL COMPANY

February 25, 1987

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Mr. Bruce Mallet Chief, Licensing Nuclear Regulatory Commission Region III 799 Roosevelt Road Glen Ellyn, Illinois 60137

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Dear Mr. Mallett:

Enclosed please find a copy of a small segment of The Dow Chemical Company license application pertaining to the incineration of low level radioactive waste from other NRC licensed sites of The Dow Chemical Company. Please note, at the time of our license renewal, we indicated that the subsidiary divisions of Dow would not require the incineration of more than a total of 100 mCi of C-14 and H-3 waste per year at the incinerator located in Midland, Michigan. Presently the subsidiaries are involved in pharmaceutical research involving the generation of larger amounts of C-14 and H-3 waste than had been predicted at the time of our NRC license renewal in 1984. At this time The Dow Chemical Company would like to request that this maximum limit of burnable radioactive waste from the subsidiary companies be increased to 1.0 Ci per year.

This requested increase will not affect the normal operation of the Midland incinerator. The type of waste transported to the Dow incinerator in Midland will remain the same; only the total volume will be increased. The rate of incineration of this waste will not be altered. Currently our licensed incinerator criteria used to establish burn limits are relatively conservative. The weekly average concentration of radioisotopes in effluents, generated by incineration, are limited to 10 percent of the allowable Maximum Permissible Concentration (MPC) for unconditional release to the environment. The present burn limits in our license will not be exceeded to accomodate this increase in waste from other Dow sites. Under certain circumstances, we may be forced to store, for a short duration, a portion of the C-14 and H-3 waste in designated radioactive waste storage sites. Periodically the remaining waste will be removed from storage and sent to the incinerator to assure our currently licensed incineration limits are never exceeded at the Michigan Division of The Dow Chemical Company.

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If any additional information is required or you foresee any difficulties in approving this request, please feel free to contact Gordon W. Engdahl, Radiation Safety Officer (517/636-3205) or Scott W. Maxey, Health Physicist (517/636-1536).

Regards, Je Kaupy

L. W. Rampy, Chairman Radiation Safety Committee Industrial Hygiene Laboratory 1803 Building 517/636-6260

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Enclosures

Item 14(b)(1). Non-Commercial Waste Disposal

Dow will dispose of low level radioactive waste by incineration. The incineration of low level radioactive waste is authorized by the State of Michigan Department of Natural Resources under permits 93-731 and 471-79.

The incinerator is located inside the fenced boundary of Dow's Midland, Michigan, site. Five warehouses are located from 300-450 feet east of the incinerator. Other than the administrative offices for these buildings, the nearest occupied building is approximately 600 feet to the southeast and is a single story structure. The Dow boundary fenceline relative to the incinerator is 800 feet south, 1200 feet west, 4400 feet north and 4400 feet east. The Tittabawassee River traverses the boundary on the west and south sections of the Michigan Division. Prevailing winds are from the southwest.

The incinerator is a rotary kiln design that discharges 27,000 to 32,000 cubic feet per minute (SCFM) of exhaust gases through a stack 200 feet in height with an inner diameter of 12 feet. The normal operation schedule is 24 hours per day, 7 days a week. Under normal conditions, it suspends operations only for breakdowns and scheduled shutdowns. Plant rubbish, industrial solid wastes and liquid organics are examples of typical nonradioactive wastes being incinerated.

Additional details about the operation of the Michigan Division Incinerator as related to its use for disposal of radioisotopes are described as follows. The major radioisotope wastes incinerated are C-14 and H-3 (tritium). Incineration is well within the requirements of the NRC regulations guidelines of 10 CFR 20, Apendix 8, Table II, for maximum permissible concentrations (MPCs) for unconditional release of effluents to the environment. The incineration criteria for radioisotopes limit the daily concentration to be equal to or below the allowable MPCs at the source of generation. The weekly average concentration of radioisotopes is limited to 10 percent of the allowable MPCs at the effluent release point (as effluent leaves incinerator facility). Potential exposure to radioactive effluents has been considered for personnel in buildings near the incinerator and to the general population offsite. Based on self-imposed effluent source limits and additional dilution, the potential exposure to all personnel are many fold less than acceptable exposure quidelines set by the NRC.

Enclosed is background information regarding the effluent flow rates of the incinerator, appropriate MPCs, NRC regulations, current NRC license conditions for incineration and calculations used as the basis for incineration guidelines. The effluent flow rates used for the stack gases and quench water are 10 percent less than actual flow rate ranges. This means that actual effluent concentrations for the stack gases and quench water will be less than those calculated and provides an additional safety factor. Included are sampling and analysis protocols for the incinerator when sampling is required.

Based on the enclosed calculations and operating criteria, Dow wishes to incinerate the following radionuclides.

RADIOISOTOPES APPROVED FOR DISPOSAL BY INCINERATION

H-3, C-14, and any byproduct material licensed with a physical half life greater than 15 days (e.g., excludes Na-24, P-32, Sc-47, Mn-56, I-131, etc.)

The incinerator operates approximately 300 days per year which accounts for breakdowns, maintenance, and planned shutdowns. Radioactive material will be burned not more than 5 days per week or 260 days per year.

The operating guidelines limit the quantity of each radiolsotope incinerated per burn. If more than one radionuclide are combined in a single burn, the maximum activity of each radionuclide allowed to be burned would be calculated by the "sum of the ratios" method described in "Note 1 to Appendix B" of 10 CFR 20.

Because of the near certainty that H-3 and C-14 will not be released as ash effluent products of combustion, ash from burns involving one or both of these radionuclides will be treated as ash generated during incineration of nonradioactive waste and will be disposed of as a nonradioactive ash in a hazardous materials landfill. A survey will be made by the RSO to verify these assumptions and calculations. If a burn includes one or more of any other radionuclide, the ash concentrations will be evaluated. If appropriate surveys verify the concentrations (in terms of microcuries per gram) specified for water in Appendix B, Table II, 10 CFR 20 are not exceeded, these ash residues will be disposed of as nonradioactive ash in a hazardous materials landfill. If ash residues are found to exceed Appendix B, Table II, concentration limits due to the incineration of known radionuclides, the ash will be segregated and packaged for shipment to a federally licensed burial site.

Dow intends to incinerate solid waste, animal carcasses, tissue, combustible liquids, liquid scintillation vials and fluids and any other combustible waste generated from the use of Dow's Midland byproduct materials license and byproduct material licenses held by subsidiaries or divisions of The Dow Chemical Company. It is estimated that the amount of low level radioactive laboratory wastes from other NRC licensed sites of The Dow Chemical Company will not exceed 100 millicuries. These wastes are likely to be limited to carbon-14 and hydrogen-3. This amount of radioactive waste will not significantly impact the overall Midland low level radioactive waste incineration operation. Incineration will not include sealed sources or devices. The Radiation Safety Officers of the Industrial Hygiene Laboratory will monitor the radionuclides and their activities to be incinerated so as not to exceed the limits specified.

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