

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

OCT 2 8 1981

TO ALL MEDICAL, ACADEMIC, AND INDUSTRIAL RESEARCH LICENSEES

On March 11, 1981 the Nuclear Regulatory Commission (NRC) amended its regulations to permit licensees greater leeway in disposing of liquid scintillation media and animal carcasses containing tracer levels of hydrogen-3 (tritium) or carbon-14. Most licensees previously disposed of these items by sending them to a radioactive waste burial ground or by obtaining special authorization from NRC for incineration or onsite burial. In the months since the amendments were adopted, licensees have raised questions concerning which wastes are covered by the rule change and whether the incineration and burial disposal methods are acceptable for them. The purpose of this notice is to clarify for licensees which wastes may be disposed of without regard to their radioactivity under the provisions of 10 CFR 20.306, and the use of the incineration or burial disposal methods for these wastes.

For your convenience, 10 CFR 20.306 is reproduced below:

20.306 Disposal of Specific Wastes

Any licensee may dispose of the following licensed material without regard to its radioactivity:

(a) 0.05 microcuries or less of hydrogen-3 or carbon-14, per gram of medium used for liquid scintillation counting: and

(b) 0.05 microcuries or less of hydrogen-3 or carbon-14, per gram of animal tissue averaged over the weight of the entire animal; provided however, tissue may not be disposed of under this section in a manner that would permit its use either as food for humans or as animal feed.

(c) Nothing in this section, however, relieves the licensee of maintaining records showing the receipt, transfer and disposal of such byproduct material as specified in 30.51 of Part 30 of this chapter; and

(d) Nothing in this section relieves the licensee from complying with other applicable federal, state and local regulations governing any other toxic or hazardous property of these materials.

Clearly, the rule applies to the disposal of liquid scintillation media and animal carcasses meeting the specified concentration limits. Liquid scintillation medium is described in the statement of considerations of the rule as follows: " A fraction of a milliliter of the biological sample containing tracer levels of hydrogen-3 or carbon-14 is combined with 20 milliliters or less of an organic solvent, primarily

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toluene, in a small vial to make a liquid scintillation medium." Since the rule provides relief for liquid scintillation media, items contaminated with the scintillation media are also covered by the rule. Items contaminated by radioactive material other than that contained in the liquid scintillation media are not covered by the rule.

Hence, the vials containing the scintillation media, or absorbent material used to clean a spill of scintillation media are covered under the rule. However, laboratory paraphernalia used in working with the chemical radio-tracer, the radioactivity tagged biological sample, or other non-scintillation media liquids are not covered.

The rule also clearly applies to animal carcasses which meet the specified concentration limits after averaging the radioactivity over the weight of the entire animal. Organs or tissues extracted from the animal after administration of the radioactivity, or items contaminated by these organs or tissues, are also covered by the rule. However, other items such as bedding materials or animal excreta are not considered animal tissue and are not covered by the rule.

Once deciding which wastes are covered by the rule, licensees may then decide how they want to dispose of them. Some licensees point to apparent conflicts between what the rule would allow them to do and the conditions of their license. No license amendments are necessary to dispose of these materials regardless of how your current license reads. In other words, any licensee may change his waste disposal methods to take advantage of the new rule change without a license amendment. This includes the use of incineration or burial disposal methods. Licensees are cautioned, however, 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.

Licensees wishing to dispose of materials not covered by 10 CFR 20.306 by using incineration or burial must still apply to NRC for authorization to do so. For further information, please contact Vandy L. Miller at (301) 427-4002.

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

INCINERATION GUIDELINES FOR MATERIAL LICENSEES

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Notes: These guidelines apply to non-commercial waste disposal, that is, incineration of a licensee's own waste. NRC may request additional information regarding proposed commercial incinerators as appropriate to assess adequately the potential impact on public health and safety and the environment.

> You do not need specific NRC approval in order to incinerate certain categories of radioactive waste. For example, 10 CFR Section 20.306 provides that tritium and carbon-14 in low concentrations in liquid scintillation media and animal tissue may be disposed of without regard to radioactivity. After you have reviewed your program and confirmed that you have waste which requires specific NRC approval for incineration, please provide all of the information specified below.

- Submit the characteristics of the incinerator and the site, including:

 (a) height of stack, (b) rated airflow, (c) distance from incinerator to nearest air intake duct of adjacent building, and (d) location and distance to nearest unrestricted areas, residence, school, hospital, etc.
- State specifically the isotopes and the maximum amount of each isotope that you wish to incinerate per burn. For the combination of isotopes listed, submit calculations to demonstrate that the following conditions will be met:
 - A. The gaseous effluent from the incinerator stack will not exceed the limits specified for air in Appendix B, Table II, 10 CFR Part 20 when averaged over a 24 hour period.
 - B. In order to be in compliance with the ALARA philosophy stated in section 20.1(c), 10 CFR Part 20, the gaseous effluent from the incinerator stack should be a fraction (less than 10%) of the limits specified for air in Appendix B, Table II, 10 CFR Part 20, when averaged over a period of one year.

If more than one isotope is involved, your calculations must follow the "sum of ratios" method in the "Note" at the end of Appendix B, 10 CFR Part 20.

- State how you will determine the concentration of radionuclides released, both as airborne effluents, and as any liquid effluents from scrubbers, condensers, or associated systems.
- State the maximum number of burns to be performed in any one week and the maximum number of burns per year.

5. Describe your method for measuring or estimating the concentration of radioactive material remaining in the ash residue. Unless you present scientific evidence to the contrary, you must use the most conservative assumption.

Describe your procedures for collection, handling and disposal of the ash residue, including radiation safety precautions to be observed.

- Describe procedures to be followed to minimize exposure to personnel during all phases of the operation, including instructions given to personnel handling the combustibles and the ash.
- A. Identify any state or local permits which are required to operate an incinerator, and submit evidence that such permits have been obtained.
 - B. State and local government agencies should be notified early of plans to incinerate radioactive waste, because they often must respond to inquiries from local citizens and organizations. It is preferable that the applicant make such notifications and obtain comments since the applicant is closer to the community. Indicate that such notifications have been made by including in your application copies of letters to state and local government agencies and their comments. If the applicant does not notify state and local governments, the NRC will do so directly.

STATE OF MICHIGAN





JAMES J. BLANCHARD, Governor

DEPARTMENT OF PUBLIC HEALTH

3500 N LOGAN P.O. BOX 30035. LANSING. MICHIGAN 48909 GLORIA R SMITH, Ph.D., M.P.H., F.A.A.N., Director

September 20, 1983

Mr. R. A. Olson Dow Chemical Company Industrial Hygiene Services 474 Building Midland, Michigan 48640

Dear Mr. Olson:

We have reviewed the Dow plan for evaluating the thorium concentration in the 159' by 300' area (north of the Shot Pond) at the Dow Chemical Company Midland plant site. In principle, we agree with the proposed evaluation plan, submitted to us by Randy Croyle on March 25, 1983. However, as discussed during telephone conversations and at our brief May 11 meeting, we have some concerns regarding the selection of boring locations, composite sampling intervals, and sample preparation prior to gamma spectral analysis.

Figure 1 of the Dow plan shows a 20 μ R/hr. contour surrounding the 159' by 300' area and a grid of exposure rate readings (μ R/hr.) within the area. It also delineates eight proposed boring locations to be used for sample collection. In an attempt to better characterize the radiation exposure levels within the area, we have redrawn the figure and plotted exposure level contours for 50 μ R/hr., 100 μ R/hr., and 200 μ R/hr. (see Attachment 1). To accomplish this, we assumed all grid points were equally spaced along north/south and east/west lines and used linear interpolation between adjacent points to calculate the positions of the contours. A set of eight proposed boring locations are indicated on our drawing as red-lined squares. In addition, we suggest that a minimum of two boring locations be added outside of the area (preferably at least 50' away from the area). Samples from the two borings would be used to determine the vicinity background.

Concerning composite sample collection, we recommend that a different set of sampling 'nterva's be used. We suggest sampling intervals of 0-6", 6-12", each foot from one to 10 feet, and then each 2 feet to an appropriate depth. Screening of the composite samples with a micro-R meter and visual examination during the sample collection process will aid in determining the appropriate sampling depth and in defining the depth of the thorium-contaminated soil. Depending upon the screening

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results, some of the samples may be combined to decrease the number of samples to be analyzed. We are interested in obtaining a limited number of split samples, and the Nuclear Regulatory Commission may also wish to be involved in the sampling and analysis activities.

Regarding sample preparation prior to gamma spectral analysis, samples should be dried before analysis. Also, soil samples should be sealed for at least 2 days after drying and prior to counting. This will assure that the secular radioactive decay equilibrium between 232Th and its daughters is not changed by loss of ²²⁰Rn during the collection and preparation processes.

Please advise us of your future intent regarding proposed thorium evaluation and disposition. If you have any questions concerning this review, do not hesitate to call.

Sincerely,

ENVIRONMENTAL AND OCCUPATIONAL HEALTH SEBUICES ADMINISTRATION

George W. Bruchmann, Chief Radiological Health Services Division

GWB/RDdh

cc: John G. Davis, NRC Bill Menczer (letter only).

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TELEPHONE DEFICIENCY CALL TO APPLICANT

last week in Date of call: February, 1981

PARTICIPANTS

NRC Employee: Bull Multit Control 10. 04113 Licensee Employee: July Parsons Dow Chomical Company, Midland, Michigan Liene Mo. 21-00265-16: 517-636-3205-

Items discussed:

Mr. Parome was calling to inquire as to status of his infrancy's amendment to incinerate. On Mallett informed Mr. Passone that the NRC needed the following information byfore continuing series of the amendment: the amendment:

1. Accumentation that all State and teate local signations incoming incineration of radioactives material have been met.

2. Arcumentation that all state and local juridictions have been notified of Dow chemical's plane to incinerate radioactions works.

Mr. Parene and that he would send the above - mentioned documentation to the NRC.

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APPENDIX 1

GUIDELINE FOR

INCINERATION OF LIQUID SCINTILLATION WASTE

- Specify the nuclides which will be contained in the liquid scintillation waste.
- Specify the approximate concentration of each nuclide and total quantity of radioactivity in material which will be incinerated in a single burn.
 Estimate the quantity of radioactivity in material to be incinerated per year.
- Provide information concerning the characteristics of the incinerator including temperature, air flow, and stack height.
- 4. Provide information concerning the location of the incinerator with respect to occupied buildings and areas in the vicinity. A sketch showing distances to occupied areas and buildings, prevailing wind direction, and designation of north should be provided.
- 5. Provide information concerning anticipated concentrations of nuclides at the exit of the incinerator stack. If concentrations will not exceed 10% of those specified in Appendix B, Table II, Column 1, 10 CFR Part 20, no further information concerning concentrations is necessary. If higher concentrations are anticipated, provide calculations which demonstrate

that individuals in the unrestricted area are not likely to be exposed to concentrations of radioactivity in excess of 10% of those specified in Appendix B, Table II, Column 1, of 10 CFR Part 20.

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- 6. If nuclides contained in the liquid scintillation waste will not be volatilized, provide procedures for collection, handling, and disposal of residues in the incinerator including radiation safety precautions for performing these operations.
- 7. Provide evidence of compliance with all State and local regulations concerning incinerations of radioactive material.

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