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20 February 1986

Dr. John E. Glenn, Chief Nuclear Materials Safety Section B Division of Radiation Safety and Safeguards U.S. Nuclear Regulatory Commission Region 1 631 Park Avenue King of Prussia, PA 19406

License No. 20-11085-01 Docket No. 030-04694 Control No. 104636

Gentlemen:

In reference to your letter dated January 22, 1986, the following are the responses to your questions concerning our amendment request:

- See the attached floor plan of the 328 Shrewsbury Street laboratory 1. identifying the areas where radioactive materials will potentially be stored and used.
- 2. All purchases of radioactive material will specify delivery to our 57 Union Street laboratories. No radioactive materials packages will be received during off-duty hours. Currently we only receive radioactive materials packages during the normal work hours, 8:00 a.m. to 5:00 p.m.
- 3. Solid waste contaminated with radioisotopes having a half life of less than 65 days are held for a minimum of ten half lives and surveyed. If no detectable contamination is found, the waste is disposed of as regular trash. All other solid radioactive waste is disposed of through an N.R.C. licensed waste disposal contractor. All aqueous liquid radioactive wastes are disposed by release to the sanitary sewage system in accordance with 10 CFR 20.303 and the applicable coucentrations in Appendix B, Table 1, Column 2. Liquid scintillation vials containing H-3 and C-14, as per 10 CFR 20.306, are disposed of via a licensed chemical waste disposal contractor. Records are maintained of all waste disposal activities.

Any solid radioactive wastes generated at the 328 Shrewsbury Street laboratory will be transported to the Union Street facility and processed as above.

"OFFICIAL RECORD COPY"

14.7 Due to the potential for release of volatile I-125 during protein iodination procedures, the following survey procedures are required:

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> The investigator is responsible for performing both environmental air sampling and breathing zone sampling during the iodination procedures. The samples are collected on charcoal filters for 24 hours during the iodination procedures and analysed in a Packard gamma counter. Any results exceeding the specified limits in 10 CRF 20 Appendix B will be investigated and appropriate controls implemented to limit the potential for future excessive results. The results of all surveys are reviewed by our consultants at the end of each month.

None of the planned tritium labeling experiments should release any volatile or gaseous tritium. If in the future any such labelings become necessary, our consultants will recommend the type of monitoring system needed and surveys will be performed as per the I-125 procedures.

5. Persons performing protein iodinations are required to have a thyroid measurement within 24-48 hours after the iodination procedures are completed. During our consultants monthly visits, all thyroid measurement results are reviewed, and they make independent measurements on all workers who performed iodinations during the month. Records of these measurements are maintained by the Radiation Protection Officer. Our action points along with the corrective actions will be those outlined in Item 5 of Regulatory Guide 8.20.

Whenever tritium is handled on a routine basis in quantities exceeding 1 millicurie, monthly urinanalysis will be performed. Whenever 10 millicuries or greater of tritium is handled, urine specimens will be collected the following day. Urine specimens will be analysed by our consultants. Our action points and corresponding correction actions will be those outlined in Item 5 of "Applications of Bioassay of Tritium".

I trust this information will be sufficien: to complete the review of our amendment request. If additional information is needed, please give me a call.

Sincerely.

r, Ph.D., Director

MRI Radiation Protection Officer

HJE/jk

Enc.

See attached floor plan identifying areas where radioactive material will be stored and used. Room 215 on the second floor will be designated as our in vivo radiation laboratory. The room measures 14 x 14 feet, is temperature and humidity controlled and contains a refrigerator/freezer for use within that room. The room and refrigerator will be labelled with appropriate radioactive symbols. Room 112 on the first floor will be used to store radioactive materials. This room contains a fume-hood with a face velocity of approximately 130 LFM of air when the hood is opened 10 inches and 90 LFM of air when the hood is opened to 21 inches. Hood air is filtered through charcoal filter and vented through a stack leading to the top of the building. The hood is equipped with a gast air sample (DCL-101-AA) to monitor the duct system. BOOM NUMBERS AND AREA LOCATIONS

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328 SHREWSBURY STREET-BASEMENT

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328 SHREWSBURY STREET-FIRST FLOOR



328 SHREWSBURY STREET-SECOND FLOOR





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EG&G Mason Research Institute (MRI)

Low Level Radioactive Waste Disponal Frogram

As the availability of low level radioactive waste disposal capacity at licensed disposal facilities decreases and the cost of disposal increases at an astronomical rate, it has become extremely important that only contaminated material be disposed of as radioactive waste. The philosophy of the MRI program is to dispose of, by shipment to a licensed disposal facility, only those wastes that cannot be disposed of by any other method. The MRI license allows us to store for decay any waste contaginated with radioisotopes with half lives less than or equal to 55 days. All 1251 contaminated waste will be disposed of by storage for decay. Waste potentially contaminated by radioisotopes with half lives greater than 65 days will be surveyed, and if found to be contaminated, disposed of as low level waste through a licensed waste disposal company. The key to the success of the program will be that workers survey all material before disposal, not just assume it's contaminated. The following pages describe how to dispose of the waste streams presently generated at MRI. If you plan to generate a form of waste not covered here, discuss the disposal of this waste with Dr. Henry Esber, MRI Radiation Safety Officer.

DISPOSAL PROCEDURE FOR SCINTILLATION VIALS CONTAINING 3H and/or 14C

An amendment to NRC regulations issued on March 11, 1981 deregulated the disposal of ${}^{3}\text{H}$ and ${}^{16}\text{C}$ at concentrations less than 0.05 µCi/ml in scintillation fluid. Vials meeting this requirement can be disposed of as chemical waste as follows:

> A DOT approved 17H 30 gallon drum without radioactive markings (provided by Radiac Research Corp.) is prepared by adding about 2" of absorbent to the bottow and then a 4 mil plastic liner. Small plastic bags containing about 100, 20 ml vials are then added to the barrel until full. The liner is taped closed and the barrel sealed. A record of the activity is stated on a Radioactive Waste Disposal Record card which is completed and taped to the lid of the barrel (Figure 1). The only other required labelling consists of a yellow sticker which states, "This drum contains deregulated liquid scintillation vials and the activity is less than 6.05 uCi/gm of ³H and/or 14C as per N.R.C. Regulations." (Figure 2). The full drum is then stored in the basement radioactive waste storage room until picked up by Radiac. All paperwork associated with this waste will be handled at the time of pick-up.

DISPOSAL OF DRY SOLID WASTE

This waste will consist of bench paper, gloves. test tubes, pipette tips, etc. that have been used while handling radioactive material.

1. Iodine-125

Solid material contaminated with 125 I will be placed in a footoperated plastic bag-lined solid waste container in the laboratory. A record will be kept of the approximate amount of activity disposed of. When the container is full, the bag will be transferred to a fiberboard drum in the MRI waste storage facility in the basement. A log will be maintained including the date, the amount of activity in the bag (add up the amount of activity from the record kept in the laboratory) and the initial of the person who disposes of the solid waste. A designated person will be responsible to check the storage facility on a monthly basis. If the liberboard drum is full, it will be closed and the date of disposal (600 days from the date when the last solid waste bag is added to the drum) will be clearly marked on the outside of the drum. At the end of the 600 days period the waste will be surveyed with a GM detector and if no radioactivity is detected, the waste will be disposed of as regular trash. Paneake Probe, Model 261-101 TGM detector C-14 specific 71 per Dr. Ester 0/01/86

2. Carbon-14

Solid material potentially contaminated with 14C will be surveyed with a GM detector. If no radioactivity is detected, the waste will be disposed of as regular trash. If the survey detects 14C contamination, then that item or the contaminated portion (as in the case of bench paper) of that item will be placed in a radioactive waste container in the laboratory. The contents of full waste containers will be transfered to a labeled 55 gallon radioactive waste disposal drum for removal by a licensed waste disposal company (e.g. Radiac Research Corp.). Records of the activity disposed of are maintained and transfered to the Radioactive Waste Disposal Record card on each drum prior to removal. A Radioactive Waste Shipment and Disposal Manifest must be completed for each waste shipment (Figures 3 & 4).

Contaminated tubes and tips are disposed of an regular trash after rinsing and confirmation of decontamination by the following procedure.

- a. Contiminated tubes, tips and vials are added to a bucket of water containing detergent for rinsing.
- b. At week's end the amount of activity in 1 ml of rinse water is determined. If the activity is >100 CPM/ml then the wash is dumped down the radioactive waste drain, the activity dumped is

DISPOSAL OF DRY SOLID WASTE (continued)

recorded and the tips and tubes, etc. are rewashed until the activity is <100 CPM/ml of wash water. Once this is accomplished they may be disposed of as regular trash.

3. Tritium-³H

Solid material potentially contaminated with 3h will be surveyed by wipe testing and liquid scintillation counting of wipes. This will be done for all bench top paper. If no activity is found in the wipe, the material can be disposed of in the regular trash.

Vials, test tubes, pipette tips that have been used with ³H solutions will be soaked in a rinse bucket as described above. An aliquot (1 ml) of the liquid will be liquid scintillation counted to determine activity. The liquid will be disposed of via the sanitary system and the tubes, vials, and tips will be rinsed. If activity >100 CPM/ml is detected, rerinse and retest until activity is <100 CPM/ml. If no activity is detected, dispose of solid material in regular trash.

Contaminated material will be placed in the radioactive waste container in the lab. A record of the amount of waste being disposed will be maintained. When the container is full, the waste will be transferred to a drum in the basement. Full drums will be disposed of through a licensed waste disposal company.

DISPOSAL OF AQUEOUS LIQUIDS

This waste consists of liquids from labeling experiment and the liquid used to rinse glass and plastic ware (vials tubes etc.).

1. Iodine-125

Aqueous liquids from iodinations (usually small volume and large activity) will be collected and stored for decay. Larger volumes of liquid with smaller activities can be disposed of via the sanitary sewage system. The allowable concentration for disposal of 125 I is 0.04 µCi/liter with a total of 25 mCi per calendar quarter. A record of the total activity disposed of via the sanitary sewage system must be maintained (See Item #4).

2. Carbon-14

Aqueous liquids containing ¹⁴C will be disposed of via the sanitary sewage system. The allowable concentration is 20 μ Ci/liter with a total activity per calendar quarter of 250 mCi. If you are not sure of the activity you are disposing, analyze a 1 ml sample in the liquid scintillation counter. A record of the total activity disposed of via the sanitary sewage system must be maintained (See Item #4).

3. Tritium-³H

Aqueous tritium waste will be disposed of via the sanitary sewage system. The allowable disposal concentration is 1 mCi/liter with a total activity of 1.25 curies per calendar quarter. If you are not sure of the activity you are disposing, analyze a 1 ml sample in the liquid scintillation counter. A record of the total activity disposed of via the sanitary sewage system must be maintained (See Item #4).

4. Record Keeping

Separate racords of the radioactivity disposed of via the sanitary sewage system for each radioisotope will be kept in a log book and will include the following entries.

Isotope			Quarter		Year
Date of	Disposal	Amount	Disposed of	(µci)	Initial

Quarterly total uci

ANIMAL CARCASS DISPOSAL

1. 3H and 14C

Animal carcasses and tissues contaminated with 3H and/or 14C in concentrations of less than 0.05 μ Ci/g averages over the entire weight of the animal, will be disposed of as regular animal waste. A record of the total activity disposed of will be maintained in the institute.

2. 125 I

Animal carcasses and tissues contaminated with ¹²⁵I must be held frozen for decay for 10 half-lives. Records will be maintained detailing first date of decay period, total activity, end of decay period, monitoring results and final disposal date.

3. Regulated Quantities

Carcasses and tissues contaminated in excess of 0.05 $\mu\text{Ci/gm}$ with 3H or 14C must be disposed of as radioactive waste by the following procedure:

- Container must be a DOT approved double wall 30 gallon size inside 55 gallon.
- b. Line 30 gallon drum with 4 mil plastic liner.
- c. Place animal carcasses into 30 gallon drum with absorbent and lime. Ratio: One part lime to ten parts absorbent.
- d. Seal plastic liner and 30 gallon drum.
- e. Place inside 55 gallon drum.
- f. Place absorbent between walls of 30 gallon drum and 55 gallon drum.
- g. Seal 55 gallon drum.
- h. Approved absorbents are:
 - (1) Diatomaceus Earth (Medium Grade)
 - (2) Super Fine (Diatomite)
 - (3) Speedi Dry
- i. In the case of regulated quantities of 3H and/or 14C a Radioactive Waste Disposal Record card (Figure 1) and a Radioactive Waste Shipment and Disposal Manifest must be completed prior to disposal by a licensed radioactive waste disposal company.