DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
National Institute of
Environmental Health Sciences
P.O. Box 12233
Research Triangle Park, N.C. 27709

January 22, 1988

Received 1-29-88.
CAC

U. S. Nuclear Regulatory Commission
Region II
Suite 2900
101 Marietta Street, NW
Atlanta, Georgia 30323

Attention: Ms. Carol A. Connell

Dear Ms. Connell:

As we discussed in our recent telephone conversation, I am sending additional information on our bioassay and incineration procedures (License No. 32-12358-01, Control No. 251856). If there are further questions, please let me know.

Sincerely,

Philip E. Hamrick

Philip E. Hamrick, Ph.D.

Attachments

Additional Information on Bioassay Procedures

The ICRP(ICRP 10) suggests that an investigational level be established for ingestion of activity that would result in 250 mrem of dose to the individual or about one twentieth of the 5 Rem per year limit. Using ICRP 10 the derived investigational limits for the principal radionuclides used at NIEHS are as listed below.

Isotope	DIL(urine) (uCi/l)	DPM/ml
3H	13	20,000
35S	11	17,000
14C	0.18	400
32P	0.032	50

The above limits were derived under the assumption that the measurement is made 14 days after intake of the amount that would lead to the 250 mrem dose. Since our assay system is set up on a two week basis for the first quarter this results in a conservative detection criterion. The dpm/ml values were determined based on the assumption that standard man will produce 1400 ml of urine per day. If any levels greater than this are found then the situation will be investigated and more refined calculations made to determine the dose. Depending on the results, recommendations for reducing or eliminating further exposure will be made. Our minimum detectable limit is about 10 dpm/ml above background.

The liquid scintillation counter used to detect the activity of 1 ml urine samples in scintillation fluid has an efficiency of about 50% for tritium and about 90% for the other beta emitters. The counter is calibrated as a function of quench and automatically calculates the dpm.

Isotopes other than 125I and the ones discussed above are used only infrequently and in amounts normally not requiring an assay. Limits for these will be developed as the need arises.

Our thyroid monitor is capable of detecting less than one nanocurie of 125I in the thyroid. A 10 nanocurie simulated 125I source in a neck phantom is used as a calibration source. Regulatory guide 8.20 indicates an action level of 0.12 microcuries for 125I and .04 microcuries for 131I. We will follow these guidelines, although we have not recently used any 131I. We have found that our investigators working with 125I have thyroid levels much below these action guides and any time we see elevated levels we report these to the investigators and discuss possible causes and means to reduce the levels.

As noted in our application, we have monitored those working with relatively small amounts of activity and have seen only rarely activity significantly above background. In those cases where we have found significant counts above background the investigators were working with greater than 100 mCi of tritium. Any time we see unusual or increased levels whether they are equal to investigational levels or not we will discuss these with the investigators.

Additional Information on Incineration

Additional information on the characteristics and operation of the incinerators is given below following the "Incineration Guidelines for Material Licensees" which you supplied. Items will be addressed in order as they appear in the guidelines.

1. The site plan is as submitted previously. Incinerator characteristics are given below.

Model	Number of Units	Location	Height of Stack	Effective Airflow CFM	distance 1 (feet)	distance 2 (miles)
C-120P	1	N. Campus	65 ft	90,000	275	0.25
C-125P	2	S. Campus	37 ft	5,900	290	>1.00
C-1000	2	S. Campus	44 ft	16,500	300	>1.00

Where distance 1 is the distance from the incinerator to the nearest air intake duct of the nearest adjacent building and to unrestricted areas of the NIEHS campus. Distance 2 is the nearest distance to residences not on the NIEHS campus.

2. The principal isotopes that we wish to incinerate and the amounts that can be burned per 24 hours without exceeding the limits in Appendix B, Table II, 10 CFR Part 20 are as given below.

Isotope	Table II Concentration (uCi/ml)	Incinerator Model C-120P	C-125P	C-1000
3H	2 x 10(-7)	731	47	134
14C	1 x 10(-7)	365	23	66
35S	9 x 10(-9)	32	2	6
32P	2 x 10(-9)	7	0.4	1.3
125I	8 x 10(-11)	0.29	0.19	0.05

The activities above were calculated using the relation

$A = C \times V$

where C is taken from the values in Table II and V is the volume of air through the incinerator per day. V = CFM x 2.82 x 10(4)ml/CF x 1440min/d. The amounts incinerated will be further restricted by the sum of ratios such that

[3H]/731 + [14C]/365 + [35S]/32 + [32P]/7 + [125I]/.29 < 1 for C-120P, where [ ] indicates the activity incinerated for that isotope. The same procedure is applied to the other two incinerators using the activities as given in the table above. If other isotopes are incinerated their activities will be calculated as above and the sum of ratios method applied. The total activity incinerated per year will be less than 10% of the amount that could be incinerated based on the above calculations. For example, in 1986 a total of 807 mCi of 3H, 14C and 35S was incinerated, much less than 10% of the maximum. Only trace quantities of 125I and 32P are normally incinerated since these are held for decay. We may also hold 35S for decay if this is necessary.

3. The concentration of radionuclides released as airborne effluents is determined from the rated CFM for the incinerator and the amount of activity

Only trace quantities of 125I and 32P are normally incinerated since these are held for decay. We may also hold 35S for decay if this is necessary.

3. The concentration of radionuclides released as airborne effluents is determined from the rated CFM for the incinerator and the amount of activity burned using C = A/V as discussed above. There are no scrubbers or associated systems that would produce contaminated liquid effluents.

4. The maximum number of burns to be performed per week would be 5 for 52 weeks per year or 260 per year. At present NIEHS incinerates most of the radioactive material in one or two major burns per week but some radioactivity may be incinerated on any one of the five days(primarily in animals).

5. The concentration of activity remaining in the ash is measured by sampling the ash each week. A known mass of ash is counted by liquid scintillation assay and the results corrected for quench. The concentrations are compared to those listed in table II of appendix B of 10CFR Part 20 and disposed of as ordinary ash if less or treated as radioactive if greater. If treated as radioactive then the ash is barreled,labeled and shipped to a radioactive waste disposal site along with other radioactive solid waste. All ash whether determined as radioactive or not is handled with care. Workers wear protective clothing and masks when shoveling out the ash and placing it in containers.

6. All radioactive materials delivered to the incinerator have been packed in plastic bags, the bags placed in cardboard boxes and the boxes sealed with tape. This includes animals as well as other radioactive material. This is done to avoid the possibility of plastic bags breaking and causing contamination. The material is much easier and safer to handle in this form. The incinerator operators are instructed to wear gloves when handling the boxes. No boxes are delivered for incineration that present an external hazard due to high energy beta or gamma radiation. Incinerator operators are instructed in the proper procedures for handling the ash as given in 5. Only amounts that are within the daily incineration limits are delivered to the incinerator so the operators do not have to make concentration or ratio calculations.

7. Copies of all permits required were previously submitted. The permits also included permits for the boilers used to heat water for the institute's heating and hot water needs. These boilers are not used to incinerate radioactive waste. The baghouses and multicyclones referred to in the permit are for these boilers and not the incinerators (parts d,e,f and g of permit number 4226R5).

NIEHS has incinerated radioactive waste since about 1970 and the state radiological protection section has been aware of our activities through many informal communications. Recently the state requested information on our radioactive waste disposal activities as part of a survey. A copy of the report is included. Other local agencies have been aware of our incineration activity but were not formally notified until recently as part of the RCRA requirements for notification of state and local officials of the NIEHS contingency plan. This plan includes the incineration of radioactive waste. A copy of letters to local officials and the contingency plan is attached.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
National Institute of
Environmental Health Sciences
P.O. Box 12233
Research Triangle Park, N.C. 27709

December 21, 1987

Mr. John Rudisill
Chief, Parkwood Volunteer
Fire and Rescue
P. O. Box 12224
Research Triangle Park, NC 27709

Dear Mr. Rudisill:

Enclosed please find a copy of the updated "RCRA Contingency Plan for the National Institute of Environmental Health Sciences" as required by the North Carolina Department of Human Resources under the Resource Conservation and Recovery Act. The enclosed document describes NIEHS hazardous waste activities as well as procedures to be followed should an emergency occur. Any previous copies of the NIEHS plan should be destroyed.

Please sign the attached acknowledgement of receipt of the NIEHS Plan and return it in the enclosed envelope. If there are any questions, or if you have suggestions regarding our emergency procedures, please feel free to contact me at 541-7933.

Sincerely,

John M. Dement

John M. Dement, Ph.D., CIH
Health and Safety Manager

Enclosure

cc:
Jim Critz, Chief, Office of Facilities Engineering, NIEHS
Christopher L. Hunt, Jr., Safety Officer, NIEHS
Philip E. Hamrick, Ph.D., Radiation Safety Officer, NIEHS
Larry D. Perry, Solid and Hazardous Waste Management Branch,
N. C. Division of Health Services

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
National Institute of
Environmental Health Sciences
P.O. Box 12233
Research Triangle Park, N.C. 27709

December 21, 1987

Mr. Richard J. Sauer
Durham County Fire Marshall
2515 Apex Highway
Durham, NC 27713

Dear Mr. Sauer:

Enclosed please find a copy of the updated "RCRA Contingency Plan for the National Institute of Environmental Health Sciences" as required by the North Carolina Department of Human Resources under the Resource Conservation and Recovery Act. The enclosed document describes NIEHS hazardous waste activities as well as procedures to be followed should an emergency occur. Any previous copies of the NIEHS plan should be destroyed.

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N. C. Division of Health Services

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
National Institute of
Environmental Health Sciences
P.O. Box 12233
Research Triangle Park, N.C. 27709

December 21, 1987

Mr. Rowland W. Leary
Durham County Sheriff's Office
P. O. Box 170
Durham, NC 27702

Dear Mr. Leary:

Enclosed please find a copy of the updated "RCRA Contingency Plan for the National Institute of Environmental Health Sciences" as required by the North Carolina Department of Human Resources under the Resource Conservation and Recovery Act. The enclosed document describes NIEHS hazardous waste activities as well as procedures to be followed should an emergency occur. Any previous copies of the NIEHS plan should be destroyed.

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N. C. Division of Health Services

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
National Institute of
Environmental Health Sciences
P.O. Box 12233
Research Triangle Park, N.C. 27709

December 21, 1987

Mr. Larry Suitt
Administrator
Durham County General Hospital
3643 N. Roxboro St.
Durham, NC 27704

Dear Mr. Suitt:

Enclosed please find a copy of the updated "RCRA Contingency Plan for the National Institute of Environmental Health Sciences" as required by the North Carolina Department of Human Resources under the Resource Conservation and Recovery Act. The enclosed document describes NIEHS hazardous waste activities as well as procedures to be followed should an emergency occur. Any previous copies of the NIEHS plan should be destroyed.

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Larry D. Perry, Solid and Hazardous Waste Management Branch,
N. C. Division of Health Services

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
National Institute of
Environmental Health Sciences
P.O. Box 12233
Research Triangle Park, N.C. 27709

December 21, 1987

Mr. William G. Anlyan
Administrator
Duke University Medical Center
Box 3701
Durham, NC 27710

Dear Mr. Anlyan:

Enclosed please find a copy of the updated "RCRA Contingency Plan for the National Institute of Environmental Health Sciences" as required by the North Carolina Department of Human Resources under the Resource Conservation and Recovery Act. The enclosed document describes NIEHS hazardous waste activities as well as procedures to be followed should an emergency occur. Any previous copies of the NIEHS plan should be destroyed.

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DEPARTMENT OF HEALTH & HUMAN SERVICES

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National Institute of
Environmental Health Sciences
P.O. Box 12233
Research Triangle Park, N.C. 27709

December 21, 1987

Mr. Larry D. Perry
Waste Management Specialist
Solid & Hazardous Waste Management Branch
N. C. Department of Human Resources
Division of Health Services
Environmental Health Sec.
P. O. Box 2091
Raleigh, NC 27602-2091

Dear Mr. Perry:

Enclosed please find a copy of the updated "RCRA Contingency Plan for the National Institute of Environmental Health Sciences" as required by the North Carolina Department of Human Resources under the Resource Conservation and Recovery Act. The enclosed document describes NIEHS hazardous waste activities as well as procedures to be followed should an emergency occur. Any previous copies of the NIEHS plan should be destroyed.

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Philip E. Hamrick, Ph.D., Radiation Safety Officer, NIEHS
Larry D. Perry, Solid and Hazardous Waste Management Branch,
N. C. Division of Health Services

ACKNOWLEDGEMENT OF RECEIPT

A copy of the updated "RCRA Contingency Plan for the National Institute of Environmental Health Sciences" has been received.

Signed: _____

Organization: _____

Date: _____

RCRA CONTINGENCY PLAN

FOR

NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES

Located at 104 and 111 Alexander Drive

Research Triangle Park, NC

Revised December 1987

CONTINGENCY PLAN

FOR

THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCE

Located at 104 and 111 Alexander Drive, RTP, N.C.

I. Introduction

The National Institute of Environmental Health Science(NIEHS) is a federal facility dedicated to basic research on the effects to public health of various chemical, physical, and biological agents in the environment. As such, the Institute works with a variety of hazardous materials and generates hazardous waste.

This contingency plan has been designed to minimize hazards to human health or the environment from fires, explosions or any unplanned release of hazardous waste to air, soil or surface water and to meet the requirements of 40CFR part 264.50. This document supplements general facility emergency procedures contained in the NIEHS "Occupant Emergency Plan."

The plan lists actions that should be taken in the event of various emergencies which may or may not involve the release of hazardous materials. The emergency coordinator or his alternate will determine if hazardous materials are involved, identify the source and extent of release if possible, assess the hazards to health and environment, assess if evacuation is advisable, and notify appropriate local, state and national agencies.

The following information should be given when reporting an incident involving hazardous wastes:

a) name and telephone number of reporter
b) name and address of facility
c) time and type of incident
d) name and quantity of waste involved(to extent known)
e) extent of injuries
f) evaluation of hazards to health and environment outside the facility.

Whenever the contingency plan is implemented for an incident involving release of hazardous waste, a written report will be filed within 15 days with the EPA regional administrator including the following information:

a) name, address and telephone number of the Institute director
b) name, address and telephone number of the facility
c) date and time of the incident
d) name and quantity of hazardous material involved
e) extent of injuries
f) assessment of actual or potential hazards to human health or the environment
g) estimated quantity and disposition of hazardous waste that resulted from the incident.

II. EMERGENCY PHONE NUMBERS AND CONTACTS

1. Policy - It is the policy of the Institute that the emergency phone numbers located below will be kept up-to-date and made available to security personnel. The primary emergency numbers will also be posted on bulletin boards and on Institute phones.

EMERGENCY PHONE NUMBERS

	Location	Phone
All Emergencies	NIEHS Guard Desk	2800
Chemical & Radioactive Spills	Health & Safety Office	3384/3383
Fire, Police, Rescue Units		9-911
NIEHS Guard Desk (routine business)	Building 101 (24 hrs)	7515, 7565
Health and Safety Manager (Emergency Coordinator) 1206 Lane Drive, Cary, NC	C-156	7933,7536 Office 467-9474 Home
Safety Officer, (Alternate Emergency Coordinator) 1014 D Sandlin Place Raleigh, NC	C-153	3384 Office 859-1494 Home
Radiation Safety Officer, (Alternate Emergency Coordinator) 1708 New Hill-Olive Chapel Road, Apex, NC	C-155	3383 Office 362-8204 Home
Fire Protection Officer	C-154B	3384
NIEHS Health Unit	E-111	4867
Office of Facilities Engineering (OFE)	102	3311
After Office Hours (OFE)		4809
National Emergency Response Center		800-424-8802
State Emergency Management (Disaster Control)		733-3867

III. EMERGENCY EQUIPMENT LOCATION

1. Policy - It is the policy of this Institute that the emergency equipment listed below shall be in constant readiness for use and maintained by the Health and Safety Office.

2. Equipment

   a. Emergency medical kits and oxygen are located at the guard stations and in the Health and Safety Office. Additional medical emergency equipment is located in the NIEHS Health Unit.

   b. Self-contained breathing apparatus units with 30 minute and 15 minute air supply are located in strategic locations on all NIEHS sites and are issued to Health and Safety Office and other selected trained personnel. A minimum of 2 self-contained breathing apparatus are provided by the hazardous waste contractor for their use. One unit is always available in the waste and surplus chemical transportation vehicle.

      A two person air supply respirator system is available for emergency use.

   c. At least one chemical spill kit or spill clean-up pillow is located in each laboratory Building or laboratory floor.

   d. Emergency spill supplies are located in Building 101, Room E-001 and in the Hazardous Waste Building 103 and in the Incinerator Building, 106.

   e. Fire fighting equipment including fire hoses, fire extinguishers and fire blankets are available in all NIEHS buildings and within each laboratory.

   f. Emergency safety showers and eye washes are available in all laboratory areas in Buildings 103 and 106 and in other areas where chemicals may be used.

IV. FIRE EMERGENCY PROCEDURES

1. Policy and General Information - It is the policy of the Institute that every employee must know the location of fire extinguishers and fire blankets and be familiar with the fire alarm system. The first person to see a fire should immediately sound the alarm, then attempt, if it can be done safely, to extinguish the fire with the best means available. Training in the use of all types of available fire extinguishers is available from the Health and Safety Office.

   Proper choice of extinguisher is equally important. The National Fire Protection Association divides fires into four classes according to the fuel involved: wood and paper, flammable liquids, electrical equipment, and combustible metals. Various extinguishing agents are suitable to each fuel. The following table shows approved applications for all of the kinds of extinguishers used at NIEHS.

Type of Extinguisher	Pressurized Water	Carbon Dioxide	Dry Chemical BC	Dry Chemical ABC	Halon 1211 1301	Dry Powder
Composition of Base Material	Water	Carbon Dioxide	Sodium or Potassium Bicarbonate	Ammonium Phosphate	Bromo-chloro-fluoro-methane	Sodium Chloride & Polymer or special for specific metal
Combustibles: wood, paper, etc.	Good	Good	Not Effective	Good	Fair	Not Effective
Flammable Liquids: oil, etc.	DO NOT USE	Good	Good	Good	Good	Not Effective
Electrical Equipment	DO NOT USE	Good	Good (except for electronic equipment)	Good (except for electronic equipment)	Good	Not Effective
Combustible Metals	DO NOT USE	Poor	Poor	Poor	DO NOT USE	Special Technique Required

See NFPA 10-Portable Fire Extinguishers

2. Responsibilities

a. Supervisor

1) Ensures personnel are trained in the proper use and function of fire fighting equipment required in their work.

2) Alerts the Health and Safety Office to areas or work which have a higher than usual fire hazard risk.

3) Screens all Hazardous Agent Protocols to minimize fire risk.

b. Health and Safety Office

1) Minimizes fire risk at NIEHS, to the extent possible.

2) Provides, periodically inspects and approves NIEHS fire protection equipment and immediately replaces equipment if defective or inadaquate.

3) Provides training to all NIEHS employees in the proper use and function of fire protective equipment (i.e. extinguishers, blankets, etc.).

4) Develops the NIEHS Occupant Emergency Plan and specific fire training plans (e.g. First Aid, CPR, etc.) for NIEHS Emergency Organization Members.

5) Screens and approves all Hazardous Agent Protocols to minimize fire hazard.

c. Employees and Contractors

1) Is familiar with NIEHS Fire Hazard Policies.

2) Knows the location, proper use and function of all fire protection equipment in the work area and locations of emergency exits.

3) Minimizes fire hazard in his/her work and work area.

4) Considers fire hazards in all Hazardous Agent Protocols.

5) Participates in fire and emergency drills.

3. Procedures for Specific Types of Fire Emergencies

a. Solvent Fires - Solvent fires can usually be extinguished by the proper use of dry chemical or carbon dioxide extinguishers.

Fires in small containers of solvents can often be snuffed out by placing the lid on the container tightly enough to exclude air. If a lid is not available, a piece of sheet metal, or other similar non-combustible material will suffice.

b. Gas Fires - The most effective means of extinguishing a gas fire is by closing a valve in the gas supply line, thereby shutting off the fuel supply. Building gas valves should be identified by sign and arrow. Call OFE (ext. 3311) to cut off building gas valves. Gas fires can also be extinguished by the proper use of carbon dioxide or dry chemical extinguishers. Serious consideration should be given to allowing gas fires to burn until the source of gas can be stopped to prevent possible explosions.

c. Chemical Fires - Chemical fires can be of many different sorts, and often special methods of fire fighting must be used. For example, a metal fire (sodium, titanium, magnesium, potassium, lithium) should be smothered with dry sand, graphite, salt or inert gas in confined areas, never with water. All laboratory workers must be taught the particular methods of handling these unusual kinds of fire hazards located in their work area.

d. Electrical Fires - If possible, first turn off the power to the motor or other electrical equipment. If power cannot be turned off, call OFE (ext. 3311). Use carbon dioxide or dry chemical on electrical equipment, never water. Electrical equipment involved in fires should not be returned to operation until inspected or repaired.

V. SPILLS, EXPOSURE HAZARDS AND EMERGENCY PROCEDURES

1. Policy - It is the policy of the Institute that all employees will be familiar with Institute guidelines and procedures to be followed in the event of a spill or exposure hazard.

2. Responsibilities

   a. Supervisor

      1) Minimizes risk of spill or exposure hazard in his area of responsibility.

      2) Requires, reviews and approves (before forwarding to the Health and Safety Officer) Hazardous Agent Protocols to ensure they are as complete as possible with respect to emergency considerations (e.g. spills, clean-up, decontamination, physical threat, monitoring, etc.).

      3) Ensures proper training is given to all personnel before using hazardous or potentially hazardous materials or procedures.

   b. Health and Safety Office

      1) Minimizes, to the extent possible, spill or exposure hazards at NIEHS.

      2) Assists in the control, clean-up, disposal, decontamination, monitoring, etc. of spills and exposure hazards.

      3) Reviews and approves Hazardous Agent Protocols and ensures they are as complete as possible.

   c. Employee

      1) Is acquainted with NIEHS spill and exposure hazard policy.

      2) Completes, in detail, pertinent sections of the Hazardous Agent Protocol or otherwise is knowledgeable about the chemicals used in his/her area.

      3) Employs work practices which minimize risk of spill or exposure hazard.

      4) Cleans up spills with guidance of the Health and Safety Office.

3. General Guidelines - In the event of an emergency situation involving material which presents an exposure hazard several factors must be considered. These are:

   a. To the extent possible, close off the area to all personnel.

b. THINK before you act. You have time. More harm can be done by careless, impulsive action which is not thought out. Use common sense.

c. Are there injuries or people already exposed?

d. Should the fire or other alarm be activated?

e. Remove injured people from hazard area if possible, seek help, if necessary, and administer First Aid dependent on training.

f. Send someone to meet and direct emergency vehicles to proper location.

g. Post warnings.

h. Can you handle the problem adequately with the personnel at hand, without being exposed to unreasonable risk?

i. If not, who should be called?
   Health and Safety Office,
   Safety Officer,
   Radiation Safety Officer,
   Guard Desk,
   Rescue Units,
   Other emergency units, Others.

j. Do you need protective clothing?

k. Determine the extent of the risk, plan clean-up procedure.

l. If appropriate, refer to the pertinent Hazardous Agent Use Protocol for specific details and references on containment, hazard, volatility, clean-up and disposal, etc. procedures.

m. Is the material spilled volatile or non-volatile? Is aerosol formation possible? Are fine dust particles generated?

n. Is the area contained or widely spread?

o. What is the nature of the risk?

p. Call supervisor and Health and Safety Office as soon as possible to report the problem.

4. Volatile or Non-Volatile Spills in Contained Areas (e.g. inside buildings, rooms, hoods, etc.)

   a. Evacuate area

   b. Post warning signs

c. Do not turn off or have turned off hoods or ventilation equipment.

d. Turn off fans and similar equipment.

e. Close off area, e.g. close doors, etc.

f. Summon aid, if necessary (Refer to Section II).

g. Immobilize the spill and minimize the risk of aerosol formation (e.g. cover powders with suitable liquid to keep down dust; add absorbent to liquid spills; soak up liquids with spill pillows, sponge, rag, etc.).

h. Avoid procedures which increase the risk of aerosol formation (e.g. do not neutralize acidic solutions with carbonates, since CO_2 is often released; use dilute, 5 or 10% NaOH).

i. Consult Hazardous Agent Protocol, if appropriate.

j. After area has been cleaned, monitor for decontamination, if possible, by a rapid, simple analytical procedure (e.g. spot tests for primary amines, U.V. fluorescence for polycylic aromatic hydrocarbons, PAH's) with adequate sensitivity depending on how hazardous (toxic) the material is or may be.

k. Decontaminate, if necessary, ventilation system, glassware, etc.

l. Have the Health and Safety Office remove all waste materials.

5. Spills in Non-contained Areas (areas outside the buildings, e.g. parking lots, walkways, etc.).

a. Non-volatile. Proceed according to V-D-4, Volatile or Non-volatile, Contained Area Hazard (omit parts c, d, and e).

b. Volatile. Proceed according to V-D-4 (omit parts c, d and e). Use extreme caution in immobilization and neutralization (parts f-i) so there is no undue risk to clean-up or surrounding personnel and the contamination is contained as much as possible.

6. Radioactive Spills

a. Principal user should determine the magnitude and severity of the spill.

b. If principal user is unavailable, the area should be evacuated, posted with warning signs and the Radiation Safety Officer should be notified immediately.

c. Minor spills

1) Confine the spill and clean-up (soap and water is usually sufficient or as indicated ikn Safety Protocol).

2) Monitor area for contamination after clean-up (Geiger counter or swipe).

d. Major spills

1) Proceed according to V-D-4.

2) Call Radiation Safety Officer.

7. Spill Prevention Control and Countermeasure Plan for Hazardous Waste Areas (Bldg. 103 and Bldg. 106 NIEHS South Campus)

a. Location - NIEHS South Campus, Alexander Drive
Research Triangle Park, N.C.

b. Primary Emergency Co-ordinator and Alternate

John M. Dement, Ph.D.
Health and Safety Manager
Bldg. 101, Room C-156
Ext. 7933, Home 467-9474

Home Address: 1206 Lane Drive
Cary, NC

Christopher L. Hunt, Jr.
Safety Officer
Bldg. 101, Room C-153
Ext. 3384, Home 859-1494

Home Address: 1014D Sandlin Place
Raleigh, NC

Philip E. Hamrick, Ph.D.
Radiation Safety Officer
Bldg. 101, Room C-155
Ext. 3383, Home 362-8204

Home Address: 1708 New Hill-Olive
Chapel Road
Apex, NC

c. Type of Facility - Building 103 is the packing and marshalling facility for waste chemicals and isotopes generated in NIEHS research facilities. Building 106 is the incinerator facility with one incinerator used for hazardous wastes.

d. Facility Site Plan - Attachment 1

e. Description of Waste and Packing Activities

Laboratory workers and shop personnel place wastes in appropriate labeled containers and request pick-up by the Health and Safety Office. Personnel collect these wastes and transport them in appropriately designed and placarded vehicles to the NIEHS Hazardous waste Facility (Bldg. 103). In this facility, wastes are appropriately segregated from reuseable or recyclable material, assayed and packed for ultimate disposal. Disposal methods currently used include incineration of low level radioactive and chemical wastes and liquid scintillation vials and off-site disposal of other radioactive wastes and chemical wastes. Materials for off-site disposal are packed in 55 gallon steel drums or 35 gallon fiber drums with absorbent materials such as vermiculite and diatomaceous earth ("lab packs") and shipped to RCRA permitted incinerators or approved land burial sites by contractor. Frequent shipments are made such that no wastes remain on-site more than 90 days, other than for wastes for which there is no current treatment or disposal methods. Packing and disposal methods for each waste category are as follows:

- Dry Wastes - Dry wastes are separated into burnable and non-burnable groups. Burnable wastes may be packed in cardboard boxes for incineration or delivered to the incinerator in their original plastic bag. Non-burnable wastes are placed in 55 gallon drums for off-site disposal.

- Bulk Liquids - Most liquid wastes are first segregated into compatible groups and then absorbed with diatomaceous earth and vermiculite in 55 gallon drums for shipment off-site. Selected solvents may be incinerated in an NIEHS incinerator. Solvent cans used solvents are then washed, inspected and returned to laboratories for use.

- Bulk Liquids Designated for Incineration - These liquids are placed in a temporary holding container in the incinerator building (106). The container is fitted with a pump and the liquid is injected into the incinerator.

- Labware Containers/Reagent Bottles - Unused chemicals, dose solutions or other hazardous chemical or radioactive wastes are received in small containers. These are first divided into those with known chemical compositions and unknowns. Unknowns are assayed and all wastes are properly segregated and placed in their original containers into 55 gallon drums containing vermiculite (lab packs) for off-site disposal.

- Animal Carcasses - Contaminated animal carcasses are received and frozen prior to being packed into 55 gallon drums for off-site disposal. Uncontaminated animal carcasses are incinerated on-site.

- Scintillation Vials - Most vials are incinerated and are packed in cardboard boxes and delivered to the NIEHS incinerator. Remaining vials are packed in 55 gallon drums with absorbent materials for off-site disposal.

- Contaminated Bedding/Cages - These are treated as non-burnable dry wastes and processed for off-site disposal.

- Ash - Ash produced from burning RCRA regulated waste is considered hazardous and is packed in 55 gal drums before transport to building 103 or pickup from 106 for ultimate disposal.

f. Facility Description

Building 103 is a permanent facility located on the NIEHS South Campus adjacent to the engineering complex. This building is cement and concrete block construction specifically designed for storage of hazardous materials. Building heating and cooling are provided by a heat pump located on the roof. No other activities are allowed in this building.

The hazardous waste processing area is divided into two large rooms of more than 400 square feet each. Both areas have roll-up doors to allow free movement of large items such as 55 gallon drums. Both areas have explosion safe electrical utilities as well as emergency roof ventilation panels. Emergency showers are available in both rooms. Floor drains are provided. However, these have caps to prevent any release to the sanitary sewer.

A special walk-in hood is provided for packaging of wastes into 55 gallon drums for off-site shipment. Air from this hood is filtered through HEPA and charcoal filters before being discharged to the roof top stack. Sink and drain facilities are provided for hand washing.

Both dry chemical and carbon dioxide fire extinguishers are provided in Building 103. A fire hydrant is located approximately 50 feet away. The building is sprinklered and provided with heat detectors.

Building 106 is a permanent facility located on the NIEHS South Campus near building 103. The building is cement and concrete block construction specifically designed as an incineration building. It contains two incinerators used to burn municipal type waste generated on site and two modified pathological incinerators. One of these modified pathological incinerators has been designated to handle all RCRA regulated waste that is segregated for incineration.

Waste packaged in building 103 is transported to building 106 and is loaded into a hopper with an automatic feed and ram. The bulk liquid holding tank is located in a separate room and pumped to the incinerator. The holding tank is placed in a secondary containment large enough to contain any liquid in case of leaks in the primary containment. Emergency showers and eye wash fountains are available. Fire hoses and dry chemical and carbon dioxide fire extinguishers are provided and a fire hydrant is located less than 100 feet away. Building 106 has heat detectors for fire control and warning.

g. Facility Posting and Security

The entrances to Buildings 103 and 106 are marked with hazardous materials, radioactive and no smoking signs. Facilities are locked with access by authorized personnel only.

The entire NIEHS complex is provided with 24 hour guard service. During after hours, guards make rounds checking to assure security of Buildings 103 and 106. Guards also make visual inspections to assure the absence of spills or leaking containers or other malfunctions such as power outage.

h. Spill Prevention

The potential for major spills in Buildings 103 and 106 is low. This is due to the methods used to handle and process wastes and routine precautions taken by NIEHS to minimize spill probability. The largest single container of bulk liquid processed is the 55 gallon drum. These are removed from the NIEHS facility frequently so that no partially full drum remains on the site more than 90 days.

Laboratory wastes are normally contained in the original laboratory reagent container and are packed in 55 gallon drums with absorbent materials daily. To prevent spills the following precautions are taken:

- Containers of waste material show signs of leakage or container weakening are not transported. These are immediately repacked.
- All wastes must be properly labeled and identified before pick-up by the waste contractor.
- All chemicals are properly sorted before transport so that no incompatible chemicals are transported or stored together.
- During transport and storage before packing all wastes are placed in secondary plastic containers of sufficient capacity to contain any spills or breakage.

- Whenever possible all chemicals and wastes are placed in either plastic or plastic coated glass containers to minimize possibility of breakage.

- Pouring of bulk liquid is done in a walk-in hood to minimize worker exposures and to contain spills within the waste processing building.

- Storage containers are inspected a minimum of once per week.

- Appropriate equipment is used to move packed 55 gallon waste barrels to minimize dropping, breaking or puncturing.

i. Spill Control and Evacuation Plan

Spill control measures described in Section V-D of this manual are followed for spills in the Buildings 103 and 106 facility. Absorbent materials and spill conntrol pillows are available in Buildings 103 and 106 for immediate use by the Emergency Coordinator and other Health and Safety Office personnel as well as the hazardous waste contractor. Other guidance may be obtained by contructing CHEMTREC 1-800-424-9300.

Buildings 103 and 106 will be evacuated immediately upon discovery of a spill or hazardous material that may cause harm to individuals. The Emergency Coordinator and Security shall be contacted immediately. (The area will be closed off to other personnel).

Evacuation shall be to the adjacent parking lot. Sufficient distance will be maintained to insure no injury in the event of fire or explosion. Security personnel will provide perimeter control and direct emergency personnel to the site.

All personnel involved with the NIEHS hazardous waste program shall receive initial and annual training concerning spill control and implementation of the Contingency Plan.

INVENTORY
SPILL CLEAN-UP ITEMS STORED
IN E-001

2 Bags Vermiculite
1 Bag Absorbent Microgranules
1 Bag Spill Control Pillows (24 with 1-gallon capacity)

1-55 Gallon Drum
(Contains the following items)
1-Non Sparking Shovel
3 Pairs Rubber Gloves
1 Pair Work Gloves
2 Large Yellow Plastic Bags

1-15 Gallon Drum
(Contains the following items)
7-1.5 ml Plastic Bags
2 Pairs Rubber Shoe Covers
2 Vinyl Coveralls
2 Pairs Rubber Gloves
1 Rope (20 ft.)
5 Radioactive Materials Signs
1 Pair of Tongs
2 Buckets
1 Mop Handle
1 Brush

12 Squeegees
4 Handles
4 Mop Heads
2 Wringers
2 Buckers
2 Handles
2 Floor Brushes
2 Handles
4 Smoke Fans
2 Dust Pans
2 Hand Brushes
3 Self-Contained Breathing Apparatuses
1 Willson Air Supply Respirator Compressor (2 persons)

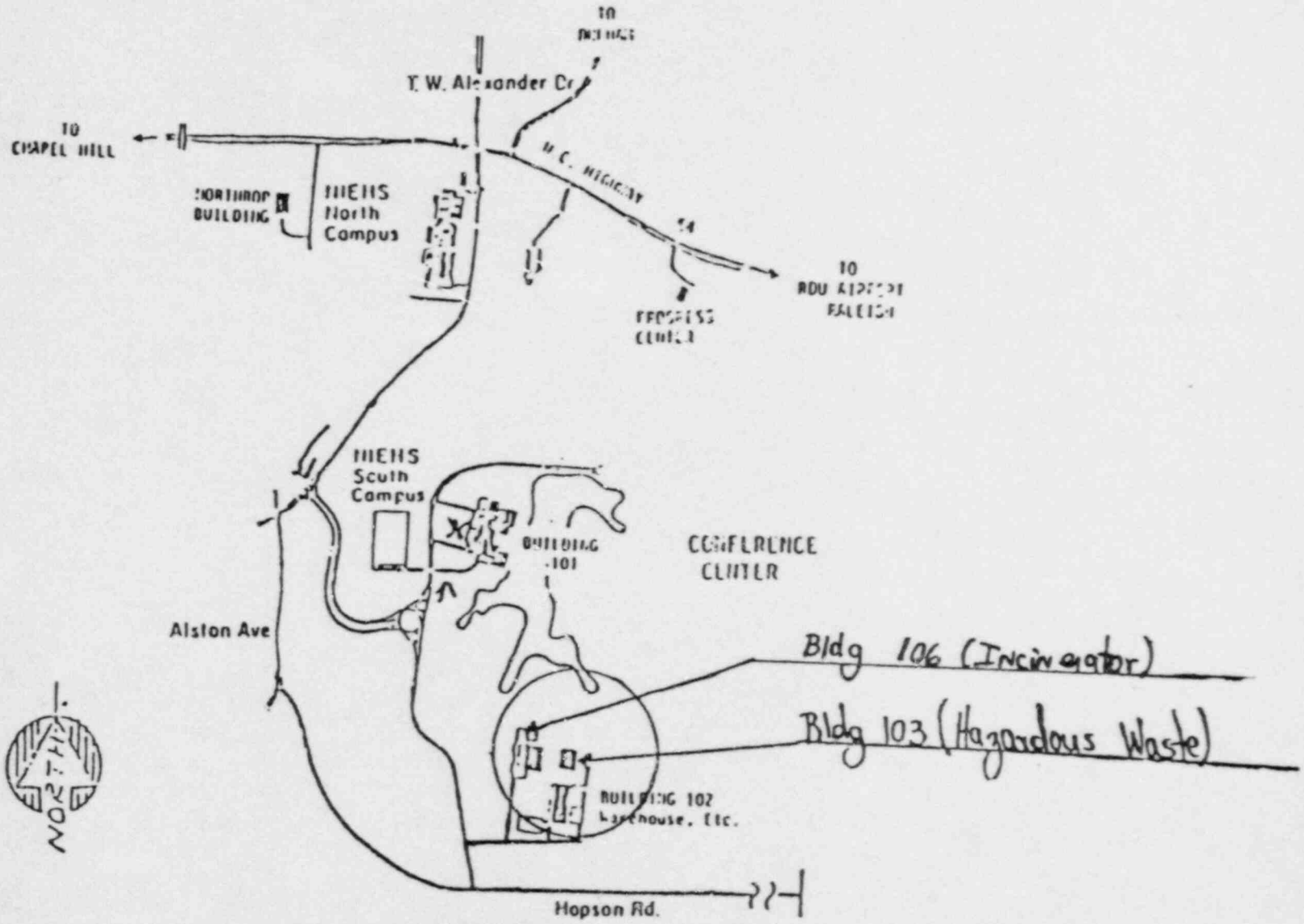
December 1987

APPENDIX

LIST OF PERSONNEL THAT HAVE RECEIVED TRAINING FOR TREATMENT OF MEDICAL EMERGENCIES

NAME	LOCATION	MAILDROP	EXTENSION
1. Fran Adams	C-148	C1-01	3383
2. Willie Allen	102/S113	102-03	7668
3. Michael Anderson	C-157	C1-01	3384
4. Allan Benton	EC/141	EC-02	4670
5. Amar Bhat	C-156	C1-01	0011
6. Dave Brewster	D-426	C3-02	1885
7. Destiny Brier	723	7-10	3296
8. David Brinn	C029	C0-01	4433
9. Nancy Brooks	D-103	D1-09	3349
10. William Caspery	E-408A	E4-03	2150
11. Sherry Coulter	737	7-01	1122
12. Karen Cowardin	E-442	E4-02	4130
13. Donald Cozart	C-029	C0-01	3480
14. Harold Davis	1014A	10-03	3431
15. Patricia Davis	D-356	D3-04	4121
16. Diane Daston	E-434	E4-03	2759
17. John Dement	C-156	C1-02	7933
18. Richard Dorsey	S103	102-03	2668
19. Bryant Duke	EC/181	EC-02	3301
20. Ronnie Dunn	E-364	E3-01	4043
21. Craig Everett	S111	102-03	2668
22. Bill Fitzgerald	C-152	C1-01	3383
23. Karen Furman	304B	3-04	7628
24. Diane Galanides	EC-149B	EC-02	7893
25. Debbie Garner	19-01A	19-05	3332
26. Dori Germolec	C-136	C1-03	3230
27. Linda Gilmore	D232B	D2-03	7781
28. Pat McClellan-Green	C-324	C3-01	3399
29. Arnold Greenwell	D-448	D4-03	3393
30. Phil Hamrick	C-155	C1-01	3383
31. Clyde Hasty	C-154B	C1-01	3384
32. Mary Hogan	EC/146	EC-02	2724
33. Chris Hunt	C-153	C1-01	3384
34. Hue-Hua Lily Hong	C-220	C2-02	2141
35. Cindy Innes	E-460	E4-02	4721
36. Beverly Irons	1402	14-01	3238
37. Noelene Jones	1402	14-01	3237
38. Jane Lambert	C-310	C3-03	3207
39. Claudia Langley	C-126	C1-06	3880
40. Teretha Lewis	B-356	B3-02	7817
41. Velvet McFarland	EC/C130	EC-02	5770
42. James D. McLeod	102/S111	102-03	7668
43. Kay Moore	101/B236	B2-01	7621
44. Rachel Patterson	C-314	C3-03	1813
45. Sabreen Rahmaan	1412	14-04	4024

46. Kelly Redcross	733	7-02	2630
47. Dorothy Ritter	A-261	A2-08	3406
48. Douglas Rockett	C-408	C4-04	7529
49. Monica Ross	E-142	E1-01	2766
50. David Sawyer	S115	102-03	2668
51. Loretta Sizemore	2/204	2-01	1409
52. Donna Shields	A-218	A2-03	3506
53. Valeria Shropshire	C-150B	C1-01	3384
54. Linda Uraih	C-225	C2-03	2431
55. Helen Watson	2/204	2-01	0039
56. Claire Weinberg	B-319	B3-02	4727
57. William C. White, Jr.	102	102-02	3816
58. Connie Williams	1/105	1-02	2475
59. Bill Willis	C-430	C4-02	3229
60. Heather Yeowell	C328	C3-01	3399



National Institute of Environmental Health Sciences
Research Triangle Park

NORTH CAROLINA LOW LEVEL RADIOACTIVE WASTE SURVEY FOR THE CALENDAR YEARS OF 1985 AND 1986

The following information is needed from ALL generators of radioactive waste in North Carolina to assist in planning for adequate waste management.

PLEASE COMPLETE AND RETURN TO: Radiation Protection Section, 701 Barbour Drive, Raleigh, North Carolina 27603-2008.

(Pre-addressed envelope is enclosed for convenience).
(Include attachments if necessary).

CALENDAR YEAR 1985

1. Complete the following for any low-level radioactive waste transferred to other persons for disposal (enter '0' in each blank if 'none'). (For definition of major radionuclides, see footnote No. 1).:

Recipient of Waste	Volume(cu.ft.)	Activity(curies)	Major radionuclides & % of total by activity (Example: Cs-137(10%), Co-60(25%))
a. Chem-Nuclear Barnwell, SC	0	0	
b. US Ecology Richland, WA	0	0	
c. US Ecology Beatty, NV	0	0	
OTHERS, NOT INCLUDED IN 1 ABOVE (brokers, hazardous waste management facilities, etc...)			
d. Radiation Services Organization	772.5	7.825	^{3}H(92.2%) others < 5%
e.			
f. TOTAL	772.5	7.825	^{3}H(92.2%)

2. For the waste reported in Item 1, please indicate the volume and activity of class A, B, C and waste higher than class C.

Waste Class	Volume(cu.ft.)	Activity(curies)
A structurally stable	0	0
A structurally unstable	772.5	7.825
B	0	0
C	0	0
HIGHER THAN C	0	0

3. Complete the following for ANY low-level radioactive waste not included in Item 1 above that you generated but managed onsite (e.g., stored for decay, incinerated, buried, etc.) (enter '0' in each blank if 'none'):

Description of Method	Volume (cu.ft.)	Activity (curies)	Major radionuclides & % of total by activity (Example: Cs-137(10%), Co-60(25%))
a. Stored for total decay -Generated in 1985	~230	1.142	^{32}P(48.1%) ^{35}S(45.1%) others < 5%
-disposed in 1985 after decay	230	XXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
b. Stored due to disposal site restriction -Generated in 1985 (Describe) (e.g. higher than class C)	0		0
c. Incinerated (Disposition of ash) Any ash disposed of as radioactive waste is included in 1A above	501.1	0.272	^{3}H(81.7%) ^{14}C(9.8%) ^{35}S(8.7%)
d. Land disposal (Burial or landforming)	0	0	0
e. Other (Describe)	0	0	0

CALENDAR YEAR 1986

1. Complete the following for any low-level radioactive waste transferred to other persons for disposal (enter '0' each blank if 'none'). (For definition of major radionuclides, see footnote No. 1).:

Recipient of Waste	Volume(cu.ft.)	Activity(curies)	Major radionuclides & % of total by activity [Example: Cs-137(10%), Co-60(25%)]
a. Chem-Nuclear Barnwell, SC	0	0	0
b. US Ecology Richland, WA	0	0	0
c. US Ecology Beatty, NV	0	0	0

OTHERS, NOT INCLUDED IN 1 ABOVE (brokers, hazardous waste management facilities, etc...)

d. Reduction Services Organization	803.6	0.483	$^{3}H(16.7\%)$ $^{35}S(34.7\%)$ $^{32}P(31.9\%)$ $^{125}I(11.1\%)$ other < 5%
e. 0			
0	0	0	0
f. TOTAL	803.6	0.483	$^{3}H(16.7\%)$ $^{35}S(34.7\%)$ $^{32}P(31.9\%)$ $^{125}I(11.1\%)$

2. For the waste reported in Item 1, please indicate the volume and activity of class A, B, C and higher than class waste.

Waste Class	Volume(cu.ft.)	Activity(curies)
A structurally stable	0	0
A structurally unstable	803.6	0.483
B	0	0
C	0	0
HIGHER THAN C	0	0

3. Complete the following for ANY low-level radioactive waste not included in Item 1 above that you generated but managed onsite (e.g., stored for decay, incinerated, buried, etc.) (enter '0' in each blank if 'none'):

Description of Method	Volume (cu.ft.)	Activity (curies)	Major radionuclides & % of total by activity [Example: Cs-137(10%), Co-60(25%)]
a. Stored for total decay -Generated in 1986	~ 400	1.586	$^{32}P(64.6\%)$ $^{35}S(35.6\%)$ $^{125}I(5.7\%)$ others < 5%
-disposed in 1986 after decay	400	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
b. Stored due to disposal site restriction -Generated in 1986 (Describe) (e.g. higher than class C)	0	0	0
-Total amount in storage on 12/31/86 (Describe)	0	0	0
c. Incinerated (Disposition of ash) Any LSA disposed of as radioactive waste is included in Id above	4813	0.807	$^{3}H(78.7\%)$ $^{14}C(5\%)$ $^{35}S(15.5\%)$
d. Land disposal (Burial or landfarming)	0	0	0
e. Other (Describe)			
0	0	0	0

4. Complete the following for any 'mixed waste' generated in 1986 (see footnote No. 2). (If unknown or none, so indicate in each blank.):

Hazardous waste No./Constituents	Density(lbs./gal)	Volume(cu.ft.)	Activity(curies)	Major radionuclides & % of total by disposition
Primarily liquid Scintillation fluid containing Xylene, Toluene and Pseudocumene	~ 6.6 lbs/gal	2000	0.154	$^{3}H(82.8\%)$ $^{14}C(5.7\%)$ $^{35}S(6\%)$ (all incinerated)
TOTAL				

5.A. Please describe any method(s) of volume reduction (compaction, storage, etc...) currently in use and indicate date implemented and the magnitude of volume reduction achieved since the program was implemented.

Incineration is the primary method of vol. reduction. The program was implemented about 1968 or 9 when the institute first began using radioactive material. It has become more important in the last few years with about 85% vol reduction. Some of the waste sent to RSO is also reduced in vol by compaction before being sent to Barnwell.

B. Please describe any method(s) of radioactive waste volume reduction which are planned but not currently in use, and estimated magnitude of volume reduction to be achieved. If possible, please give an estimated date for implementation.

A survey is presently being planned to see if it is feasible to switch to plastic vials for liq. scintillation counting and to biodegradable liquid scintillation fluids. This would reduce the amount of ash produced by perhaps a factor of 2 or more. If this appears feasible we would begin implementation in 1988.

6. Please complete the following radioactive waste volume projections for the calendar years 1987 through 1992. Enter 100% if there is no basis for projecting changes. Projections should only be given for waste volumes to be managed off-site.

Year	% of 1986 volume
1987	100
1988	
1989	
1990	
1991	
1992	

7. Please identify reasons for changes in projected waste volume as shown in 7 above, if applicable.

8. This form was completed by: Philip E. Hamrick

US DEPT. OF HEALTH AND HUMAN Services
NIEHS

SIGNATURE Philip E. Hamrick DATE 5/11/87

1 Major radionuclides are considered to be those that comprise 5% or greater of the total radioactivity disposed, with the exception of transuranic radionuclides. All transuranic radionuclides must be listed.

2 Mixed waste is defined as waste that satisfies the definition of low-level radioactive waste (LLW) in the Low Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA) and contains hazardous waste that either (1) is listed as a hazardous waste in Subpart D of 40 CFR Part 261 or (2) causes the LLW to exhibit any of the hazardous waste characteristics identified in Subpart C of 40 CFR Part 261.

CONVERSATION RECORD

TIME: PM DATE: 1/4/88

TYPE

☐ VISIT ☐ CONFERENCE ☒ TELEPHONE

☐ INCOMING
☒ OUTGOING

ROUTING
NAME/SYMBOL INT

Location of Visit/Conference

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO.
Dr. Phillip Hamrick	HHS - NIEHS - N.C.	(919) 541-3383

SUBJECT

Deficiencies in application for renewal of 32-12358-01

SUMMARY

I called Dr. Hamrick to discuss & request additional information on the following:

1) Incineration - Guidelines dated June 13, '84 were sent to him

2) Bioassay - collection, counting equipment & efficiency, action levels (related to % of NPBB) (eventually, they will need to relate to internal dose - new Part 20).

ACTION REQUIRED

Wait for additional information.

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
	Carol Connell	1-5-88

ACTION TAKEN

SIGNATURE	TITLE	DATE