



Environmental Health & Safety

Hazardous Waste Management Manual

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Hazardous Waste Management Manual

I. INTRODUCTION

A. Purpose

This manual outlines the proper procedures for managing hazardous waste at Clemson University, Clemson, South Carolina. This document is intended to serve as a "how-to" manual for Clemson employees, students and subcontractors involved with the handling of hazardous waste. These procedures will be revised as necessary to reflect changes in Clemson practices and environmental regulations.

A description of hazardous waste and hazardous waste determination practices is provided in Section II. A discussion of hazardous waste minimization is also provided.

Hazardous waste storage procedures are presented in Section III. Section IV details the hazardous waste pick-up procedures. Section V provides off-site shipping requirements for hazardous waste. Procedures for addressing non-routine situations are detailed in Section VI. Section VII outlines the required training for applicable personnel.

B. Applicability

The procedures contained in this hazardous waste management manual shall be followed by all Clemson employees, students and subcontractor personnel employed by Clemson. The Environmental Compliance Officer must approve any deviation from the procedures defined in

this document in writing.

C. Regulatory Requirements

The Resource Conservation and Recovery Act of 1976 (RCRA) requires generators of hazardous waste to comply with the regulatory requirements contained in Title 40 of the Code of Federal Regulations Part 262 (40 CFR Part 262). This Part requires generators to ensure and fully document that the hazardous waste they produce is properly identified, managed on-site for no more than 90 days and transported to a RCRA-permitted treatment, storage or disposal (TSD) facility. These RCRA requirements are administered by the South Carolina Department of Health and Environmental Control (SCDHEC) and implemented under the South Carolina Hazardous Waste Management Regulations (R.61-79.262).

All procedures defined in this manual are written for compliance with the above regulations.

D. Clemson University's Classification

The South Carolina Hazardous Waste Management Regulations apply to the storage, treatment, transportation and disposal of wastes that either are listed by the Environmental Protection Agency (EPA) or meet one or more of the characteristics of ignitability, corrosivity, reactivity or toxicity as defined in 40 CFR 261.

Under these regulations, Clemson University's main campus is currently classified as a "Large Quantity Generator" of hazardous waste. Within this limitation, Clemson University personnel are prohibited from:

- Treating a hazardous waste,
- Storing a hazardous waste at an accumulation point for greater than ninety (90) days,
- Transporting hazardous waste away from the main campus, and
- Negligent or otherwise unlawful waste disposal.

Clemson University provides its departments with a single means for the lawful disposal of hazardous waste. A state contract service is maintained without charge to the generating department. Those within Clemson University who have a potential for generating hazardous waste are responsible for four primary management activities:

- Hazardous waste minimization
- Proper management of the waste material while it is being generated
- Processing hazardous waste for removal.

Obtaining the knowledge and putting that into practice in the proper management of hazardous waste in accordance with all federal and state regulations and laws

This manual defines the procedures a department must implement in order to properly conduct these activities. In order to simplify compliance with hazardous waste regulations, each department may wish to select an EHS Departmental Coordinator for safety and environmental compliance issues. This individual will be trained by EHS in the appropriate regulations. A fifth area of responsibility, Emergency Response Procedures for Accidental Release of Hazardous Waste, is discussed in the *Hazardous Waste Incident Standard Operating Procedures* (Appendix B).

CHEMICAL EXCHANGE BETWEEN CLEMSON UNIVERSITY DEPARTMENTS IS ENCOURAGED UNDER THE SUPERVISION OF THE ENVIRONMENTAL COMPLIANCE

OFFICER.

SOME CHEMICALS ARE NOT REGULATED AS HAZARDOUS SUBSTANCES BUT ARE, NONETHELESS, ENVIRONMENTALLY UNFRIENDLY AND IT IS CLEMSON UNIVERSITY'S INTENT TO PROTECT THE ENVIRONMENT.

THE ENVIRONMENTAL COMPLIANCE OFFICER WILL MAKE ALL FINAL DETERMINATIONS AS TO THE FINAL DISPOSITION OF ALL CHEMICAL AND BIOLOGICAL SUBSTANCES THAT MAY BE HAZARDOUS.

II. WASTE CHARACTERIZATION

A. General

Any substance that no longer serves its intended purpose and is destined for disposal should be evaluated by the generator to determine if it meets the definition of a hazardous waste. Every possible effort shall be made by the department to identify each waste stream. Unknowns can be accepted by the Environmental Compliance Officer conditionally, but may be returned to the generating department for chemical analysis if the hazardous waste contractor cannot categorize the waste through on-site tests. **DO NOT GUESS AT THE IDENTITY OR "CREATE" A NAME FOR AN UNKNOWN!** A wrongly identified waste, if released accidentally to the environment, if exploding during disposal, or if causing the fouling of an incinerator pollution control system, not only will harm life and property, but could result in potential litigation. Likewise, the indiscriminate discarding of unknown chemical substances can have equally serious consequences.

NOTE: All radioactive waste, including those radioactive wastes which meet the definition for a hazardous waste, must be processed through Clemson University's program for radioactive waste disposal.

The following sources shall be used to accurately characterize a waste stream:

Section II of this Manual,
Material Safety Data Sheets (MSDS),
Process Knowledge.

In the event that a waste chemical substance does not meet the regulatory definition of a RCRA hazardous waste, yet the generator recognizes unique hazardous characteristics which are not subject to other regulatory requirements, the generator shall contact the Environmental Compliance Officer (656-1770 or 656-2583) to determine if the waste substance should be disposed as a hazardous waste. Many hazardous chemicals may not be RCRA regulated but may be regulated by other laws and disposal restrictions.

B. Hazardous Waste Determination Procedures

Waste material, which may be a hazardous waste, is generated within three primary activities at Clemson University. These activities include:

teaching
research projects
physical plant operations and maintenance.

The generators in these areas are responsible for properly characterizing the waste generated to determine if it is a hazardous waste. These activities generate three general categories of hazardous waste:

off-specification chemical stock,
research effluent and residue,
facility operations and maintenance waste (e.g., paint related waste).

The waste characterization process is defined in Figures II-1 through II-10. These flow charts guide the user through a systematic decision-making process for categorizing the wastes. Note that a waste stream may belong to more than one category; therefore, **follow all of the flow charts in order to properly characterize the waste**. This process is discussed in more detail in the following sections.

1. Solid Waste

The first question to be answered when defining a waste stream is: "Is this material a solid waste?" A solid waste is any solid, semi-solid, liquid or contained gaseous material that is discarded or considered "inherently waste-like" (R.61-79.261.2). Materials, which are solid wastes, are identified in Figure II-1.

Several types of materials are specifically excluded from the definition of solid waste under R.61-79.261.4. These waste types are listed in Figure II-2. Some recycled materials are also exempt from the definition of a solid waste. Some materials when recycled are solid wastes and others are not; these materials are defined in Figure II-3.

After reviewing Figures II-1, II-2 and II-3 classify the waste stream as either a solid waste or not a solid waste. If it is a solid waste, proceed to Section II.B.2. and determine if the waste is also a hazardous waste or if other regulatory programs (such as the Toxic Substances Control Act (TSCA) regulate it. If the material is not a solid waste, it may still be a miscellaneous regulated waste; therefore, proceed to Section II.B.2.

2. Hazardous and Miscellaneous Regulated Wastes

In order for a waste material to be a hazardous waste, it must first meet the definition of a solid waste (Section II.B.1.). Figure II-4 outlines the procedure for determining which solid wastes are also hazardous wastes. There are two different ways a waste can be classified as a hazardous waste. It can be a listed hazardous waste and/or it can be a characteristic hazardous waste. Figure II-5, along with the tables in R.61-79.261.31 through 261.33, define listed hazardous wastes. If a waste is included in any of these lists, and in the case of U and P listed wastes it is un-used, it is a listed hazardous waste. These lists are as follows:

F-listed waste from operations that are not specific to a particular manufacturing operation (R.61-79.261.31). Example: Spent halogenated solvents used in degreasing.

K-listed waste from specific manufacturing process (R.61-79.261.32). Example: Sludge from wood preserving.

P-listed acute hazardous commercial chemical products (R.61- 79.261.33(e)).

U-listed toxic commercial chemical products (R.61-79.261.33(f)).

It is also necessary to determine if a waste is a characteristic hazardous waste. The four hazardous waste characteristics are:

ignitability,
corrosivity,
reactivity,
toxicity

To determine if a solid waste exhibits the characteristics of ignitability, follow Figure II-6. Use Figure II-7 to determine if the waste exhibits the characteristics of corrosivity, and Figures II-8 and II-9 to determine if the waste exhibits the characteristics of reactivity and toxicity, respectively. If a waste exhibits any of the above four characteristics, it is a characteristic hazardous waste. A waste may be both a listed and a characteristic hazardous waste.

The generator of the waste must also determine if it is regulated under TSCA or any other applicable federal or state laws or regulations. A waste does not necessarily have to be defined as a solid waste in order to belong in these categories. Use Figure II-10 to determine if the waste belongs in these additional waste categories.

3. Empty Containers

Residues of hazardous waste remaining in a container may not be subject to the requirements specified in this manual if the container meets the regulatory definition of an empty container.

A container or an inner liner removed from a container that has held a hazardous waste, except a compressed gas or acute hazardous waste, is empty if:

All wastes have been removed that can be removed using common practices (e.g., pouring, pumping, aspirating), **and**

No material pours out of the container when held upside down or for Department of Transportation (DOT) recycling, no more than 2.5 cm (one inch) of residue remain on the bottom of the container or inner liner, **or**

No more than 3% by weight of the total capacity of the container remains in the container or inner liner if the container is less than or equal to 100 gallons, **or**

No more than 0.3% by weight of the total capacity of the container remains in the container or inner liner if the container is greater than 100 gallons in size.

A container that has held a hazardous waste that is a compressed gas is empty when the

pressure in the container approaches atmospheric pressure. However, it should be noted that releasing hazardous waste from a compressed gas cylinder for the purpose of returning the cylinder to atmospheric pressure is considered illegal discharge of a hazardous waste.

CAUTION! A container or an inner liner removed from a container that has held a **P-listed** or **acute hazardous waste** (as identified in Appendix A) is not considered empty until:

The container or inner liner has been triple rinsed using a solvent capable of removing the waste,

The container or inner liner has been cleaned by another method that has been shown in the scientific literature, or by tests conducted by the generator, to achieve equivalent removal, or

In the case of a container, the inner liner that prevented contact of the acute hazardous waste with the container has been removed.

The rinsate generated when cleaning hazardous material from an acute hazardous waste containers, should be managed in accordance with the requirements specified in this manual unless it can be determined, using the procedures outlined in this section, that the material is not a hazardous waste. **NORMALLY, ALL RINSATE FROM ACUTE HAZARDOUS WASTE CONTAINERS IS AN ACUTE HAZARDOUS WASTE AND SHOULD BE COLLECTED AND MANAGED ACCORDINGLY.**

For disposal of empty containers into landfill at Clemson University see Appendix D for guidance on defacing. Recycling should be investigated.

C. Hazardous Waste Minimization Requirements

EPA defines waste minimization as the reduction, to the most feasible extent, of hazardous waste that is subsequently treated, stored and disposed of. Waste minimization includes any source reduction or recycling activity undertaken by a generator that results in either the reduction of the total volume or quantity of hazardous waste, or the reduction of toxicity of hazardous waste, or both, so long as the reduction is consistent with the goal of minimizing the present and future threat to human health and the environment.

The main ideas behind waste minimization are toxicity, volume reduction and material substitution. Toxicity reduction means reducing the degree of hazard associated with the raw material that, consequently, reduces the degree of hazard of the waste. Material substitution means the use of lesser or even nontoxic materials.

The South Carolina Hazardous Waste Management Regulations and the ever rising costs for disposal, dictate that all possible efforts be taken to eliminate or reduce the generation of hazardous waste. Clemson University departments are responsible for assessing each source of hazardous waste within their operations and for establishing control measures to ensure that the least possible amount of waste is generated.

In anticipation of future hazardous waste minimization audits by SCDHEC, each department should record any efforts undertaken for hazardous waste reduction and submit the documentation to the Environmental Compliance Officer on an annual basis. Waste reduction action is to be implemented by an effective combination of the following methods:

Non-hazardous reagents shall be substituted for hazardous reagents where possible, to avoid generating hazardous waste.

Current equipment that produces a hazardous waste stream and can be replaced by a new technology that reduces or eliminates that waste stream shall be given high priority in the selection and procurement of replacement equipment.

No greater quantity of a hazardous reagent shall be procured than will be necessary to satisfy immediate planned usage. Unused chemical overstock constitutes a large portion of hazardous waste generated at Clemson University.

Any written agreement entered into by a department with an industrial client, where hazardous reagents or samples are supplied for specific research or experimental use on behalf of that client, shall include a provision for return of the unused amounts to the client for appropriate disposal.

Any agent of a department shall not accept donations of chemicals unless immediate planned usage is confirmed for the entire amount.

Chemical reaction systems shall be preplanned and designed so that by-products and effluent may be rendered non-hazardous in the process, prior to reaching waste status.

Upon application of hazardous reagents such as paints, pesticides, etc., the entire volume of material shall be applied or an additional area shall be identified where any remaining excess can be properly applied at the same rate, so that the entire amount can be depleted.

Upon termination of an employee or separation of a student, the exit process shall include immediate collection of all chemical reagents and waste residues used by or in the possession of that person. Prior to separation, the department is responsible for documenting the identity of each chemical reagent collected.

The intent here is to ensure that unused chemicals are returned to the department chemical stores and placed on inventory for continued use, wherever possible. Also, this procedure can help prevent the need for future analysis of "unknown" chemicals.

Until an effective chemical stock management program is introduced throughout Clemson University, old chemical stock will be a major portion of the waste stream. Some of this old stock is hazardous waste. Other constituents of this old stock may not meet the definition of hazardous waste. However, these wastes usually cannot be accepted into local sanitary or solid waste landfills. In order that liabilities are minimized, these chemical wastes are given to a hazardous waste disposer and classified managed as non-RCRA regulated wastes. From a regulatory standpoint, these unused chemicals are not hazardous wastes. From a cost standpoint, disposal of these chemicals as wastes may cost as much as the disposal of hazardous waste.

When a department generates chemical wastes, old stock chemicals may not meet the hazardous waste criteria and should be separated from those determined to be hazardous waste. The hazardous wastes shall be fully managed as regulatory requirements dictate. The other chemical wastes should be managed in a practical way and recycled if possible. When pressed further by waste minimization requirements, Clemson University may examine other

options for dealing with these other chemical wastes.

**Figure II-1
Logic Diagram for Identifying Solid Wastes**

**Figure II-2
Exclusions from the Definition of
Solid Waste and Hazardous Waste**

**Figure II-3
Logic Diagram for Determining When a
Recycled Material is a Solid Waste**

**Figure II-4
Logic Diagram for Identifying Hazardous Wastes**

**Figure II-5
Logic Diagram for Determining if a
Solid Waste is a Listed Hazardous Waste**

**Figure II-6
Logic Diagram for Determining if a Solid Waste
Exhibits the Characteristics of Ignitability**

**Figure II-7
Logic Diagram for Determining if a Solid Waste
Exhibits the Characteristics of Corrosivity**

**Figure II-8
Logic Diagram for Determining if a Solid Waste
Exhibits the Characteristic of Reactivity**

**Figure II-9
Logic Diagram for Determining if a Solid Waste
Exhibits the Characteristic of Toxicity**

**Figure II-10
Logic Diagram for Identifying
Miscellaneous Regulated Wastes**

III. HAZARDOUS WASTE STORAGE PROCEDURES

A. General Procedures

Two types of hazardous waste accumulation points are present at Clemson University's main campus:

**Accumulation Points
Satellite Accumulation Points**

A hazardous waste accumulation point is a location on-site at which hazardous waste can

be accumulated for up to 90 days without a permit. At an accumulation point, any amount of hazardous waste can be collected and stored providing no container remains in the accumulation point storage for over 90 days. If hazardous waste is added to a container at the accumulation point, the 90-day limit for that container begins as soon as the first waste is added to the container. For this reason, container size selection is very important in minimizing costs when accumulating in these areas. Estimate your waste volume carefully while allowing for extra time to arrange shipping. It is recommended that you chose a container size that you can fill within a 30 or 60-day period in this situation.

A satellite accumulation point is a location at or near the point of generation that is under the control of the operator of the process generating the waste. No more than 55 gallons of hazardous waste or one quart of acute hazardous waste can be accumulated at a satellite accumulation point.

The difference between a satellite accumulation point and an accumulation point are the volume and the length of time wastes may be accumulated. At a satellite accumulation point, up to 55 gallons of hazardous waste or up to one quart of acute hazardous waste may be accumulated for a reasonable amount of time. At an accumulation point, an unlimited volume of waste may be accumulated in containers for up to 90 days. If a facility has not been approved by the Environmental Compliance Officer to maintain a hazardous waste accumulation point, then they are, by default, satellite accumulation points and must stay in status with the volumes stated above.

The location of any Departmental Accumulation Points will be inserted as necessary in Figure III-1. The location of the Central Hazardous Waste Accumulation Building is depicted in Figure III-2. No hazardous waste shall be stored at an Accumulation Point at Clemson University's main campus for greater than 90 days from the accumulation date on the container.

Hazardous waste must be kept in designated areas at all times. Wastes that are accumulated in these areas must be managed in accordance with the procedures specified below. The generator is responsible for ensuring compliance with these procedures for his/her hazardous waste satellite accumulation point(s). The Environmental Compliance Officer is responsible for managing the Central Hazardous Waste Accumulation Building(s) in compliance with these procedures.

All hazardous waste Accumulation Points must meet the following requirements:

A Hazardous Waste sign must be posted at each area.

The name and phone number of the accumulation point supervisor and an alternate contact must be posted at each area.

The area should be used for hazardous waste accumulation only. No raw materials or chemical stock should be stored in the same area with hazardous waste.

Flammable materials cabinet shall be used when possible for storage of ignitable hazardous wastes.

The area must be located at or near the point of waste generation and must be under the control of the person responsible for the waste-generating process.

All containers will be appropriately labeled and segregated for compatibility.

Access to the hazardous waste accumulation points and building must never be blocked. The area shall be quickly and easily accessible by emergency response personnel in the event of a spill, leak or fire. Appropriate emergency response equipment shall be maintained for each hazardous waste accumulation and satellite area. The accumulation point supervisor is

responsible for ensuring the equipment is in good condition at each of his/her accumulation points. The Environmental Compliance Officer is responsible for the Central Hazardous Waste Accumulation Building(s). Emergency equipment shall include the following:

Fire extinguisher, 20lb ABC type.

Absorbent of the proper type and of sufficient amount to absorb the volume present.

Broom, bucket and mop.

Telephone or other communication device.

First aid kit.

Safety shower and eye wash station as applicable.

Coveralls, eye protection and gloves compatible with wastes.

Empty containers and bags compatible with cleanup characteristics.

The **accumulation point** shall be managed as follows:

The person responsible for the area must meet the Occupational Safety and Health Administration (OSHA) requirements for hazardous waste training contained in 29 CFR 1910.120 and Department of Transportation (DOT) HM-181/ HM-126F.

Waste shall be stored in approved containers.

Containers shall be kept closed except during waste transfers.

Inspections shall be conducted weekly (see Section III.E).

Incompatible materials shall not be combined into one container. Containers of incompatible materials shall be separated to protect against mixture in the event of a spill, leak or release (see *EPA compatibility table - Table III-1*).

Containers shall be labeled with an approved hazardous waste label before any waste is received (see Section III.B).

Satellite accumulation points are subject to the following requirements defined below:

No more than 55 gallons total of hazardous waste or one quart total of acute hazardous waste may be accumulated. See Appendix A for a list of acute hazardous wastes.

Containers with the excess must be dated as soon as 55 gallons of hazardous waste or one-quart total of acute hazardous waste or more are accumulated. All subsequent containers will be dated upon initiation of the first addition of waste until the site's status is returned to a Satellite Accumulation point by the reduction of wastes at the site to meet the less than 55 gallons of hazardous or less than one quart of acutely toxic waste limit. This should be accomplished within 3 days. In order to minimize the establishment of new Accumulation Points, containers must be moved to an established or central accumulation point within three days of the date the storage volume limits are exceeded, unless permission to establish a new Accumulation Point is obtained from the Environmental Compliance Officer.

In order to minimize the risk of hazardous waste incidents and in order to comply with published regulations, each site of hazardous waste generation will be considered a satellite accumulation point unless designated otherwise by the Environmental Compliance Officer. This will be particularly useful considering the large number of laboratories generating hazardous waste on campus.

In spite of the flexibility allowed in the regulations concerning volume limits at satellite accumulation points, it will be Clemson University's procedure to pick up hazardous waste on demand. This will also minimize the risk of potential hazardous waste incidents by not allowing undue accumulation of waste.

B. Waste Storage Containers

Hazardous waste shall be placed only in approved hazardous waste containers. An approved hazardous waste container is made of or lined with a material compatible with the waste. Empty containers, which originally held the primary waste constituent or similar material, are acceptable hazardous waste containers. The original container label must be removed or defaced. An approved hazardous waste label with the appropriate information shall be affixed to the container **before** any hazardous waste is received. (Container labeling requirements are summarized in Section III.C)

The container must be in good condition without holes, rust or dents. The container shall always be closed during storage, except when waste is being added or removed. A hazardous waste container shall not be opened, handled or stored in a manner that may rupture the container or cause it to leak. Consideration should be given to doubly contain certain particularly dangerous chemicals if storage conditions and limitations are not ideal.

If drums are stacked in the Hazardous Waste Accumulation Building, pallets shall be used to separate the containers, and stacking and spacing shall meet applicable fire protection requirements. Aisle spacing for container storage in the Hazardous Waste Accumulation Building shall be such that each row of containers can be easily inspected for leakage or damage.

C. Labeling and Marking

An approved hazardous waste label (Figure III-3) shall be affixed to each hazardous waste container prior to receiving any waste material. The Environmental Compliance Officer is responsible for ensuring each container is properly labeled before being picked up from a Satellite Accumulation Point or an Accumulation Point and moved to the Central Accumulation Point. However, the Generator or Accumulation Point Supervisor responsible for the waste is responsible for ensuring each container in his/her area is properly labeled before placing waste into the container or receiving any waste into an Accumulation Point.

The following information shall be provided on each hazardous waste label:

HAZARDOUS WASTE - Federal law prohibit improper disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency.

The specific chemical name of the hazardous waste in the container shall be identified (e.g., waste acetone), including percentages of constituents if more than one.

Each container shall be appropriately labeled with EPA Hazardous Waste Number

The labels shall be placed on the side of each container in such a manner that they are clearly visible for inspection.

Up to 55 gallons total of hazardous waste or one quart total of acutely hazardous waste may be collected in each satellite area. The accumulation point supervisor is responsible for notifying the Environmental Compliance Officer as soon as 55 gallons of hazardous waste or one quart of acutely hazardous waste have been collected (see Section IV). Each container that is stored in the Central Hazardous Waste Accumulation Building or other at any other Accumulation Points shall have the accumulation start date on the label.

D. Accumulation Time Limits

Up to 55 gallons total of hazardous waste or one quart total of acutely hazardous waste may be collected in each Satellite Accumulation area. Once 55 gallons of hazardous waste or one quart of acutely hazardous waste has accumulated, the Generator shall date the container(s) containing the excess waste. The container(s) must be moved to a designated university Accumulation Point or picked up for off-site disposal within three (3) days of declaration to the Environmental Compliance Officer. Within 90 days of the accumulation start date, the container must be shipped off-site for disposal at an approved RCRA disposal facility. Hazardous waste may not be stored on-site at a designated Accumulation Point for greater than 90 days from the date it is first accumulated.

E. Inspections

The applicable accumulation point supervisor shall conduct weekly inspections of the hazardous waste accumulation points and a copy kept on file at the site. The Environmental Compliance Officer or his/her qualified designee shall inspect the Central Hazardous Waste Accumulation Building(s). During the inspection, the inspector shall check each item listed on Figure III-4. The results of the inspection shall be documented on this form. A copy of the form shall be sent to the Director of Environmental Health and Safety and one copy retained on site for inspection.

If any corrective action is required, the Accumulation Point Supervisor must comply immediately. Once the problem has been corrected, the Accumulation Point Supervisor is to date and initial a copy of the form and mail it to the Environmental Compliance Officer. The Environmental Compliance Officer shall maintain these records for three years.

F. Record keeping and reporting

During the weekly inspections of the departmental accumulation points and the Central Hazardous Waste Accumulation Building(s), the current inventory of waste shall be recorded (see Section IV). The Environmental Compliance Officer, for the purpose of coordinating shipments of hazardous waste, shall use this inventory.

Within 30 days after the end of each calendar quarter, a written report must be submitted by the Environmental Compliance Officer to SCDHEC summarizing the hazardous waste activities for that quarter. In addition to general facility information, the report must include the following information:

- Hazardous waste transporters used during the quarter to transport the waste to a treatment or disposal facility.

- The types and quantities of hazardous wastes generated, including the EPA waste number and the DOT hazard class.

- The types and quantities of wastes shipped off site during the quarter.

- The types and quantities of waste remaining in storage at the end of the quarter.

- A description of waste minimization and toxicity reduction efforts for the year (to be included with the fourth quarter report). And

- A description of the effectiveness of the waste minimization and toxicity reduction efforts using comparisons to previous years (to be included with the fourth quarter report).

All quarterly reports must be maintained at the facility for at least three years from the date

the report was filed.

G. Training

Personnel who handle or are occupationally exposed to hazardous waste are required to be trained initially in the proper methods for the management of hazardous waste and the implementation of the facility's contingency plan. The training program must be directed by a person trained in hazardous waste management. Personnel who are assigned to a position related to hazardous waste management must complete training within six months of their assignment. These personnel must not work in unsupervised positions until they have successfully completed training. Refer to Section VII for details regarding who must be trained and the scope of the required training.

Table III-1. Environmental Protection Agency (EPA) Compatibility Table.

EPA has published a list of potentially incompatible wastes, waste components and materials along with the harmful consequences of mixing those materials together. This list does not include every possible hazardous chemical reaction, but should be used as a guide in packaging and storing these materials. The list indicates the potential consequences of the mixing of a Group A material with a Group B material.

For example, mixing any Group 2-A waste, which include reactive metals and metal hydrides, with a Group 2-B waste, which include the Group 1-A alkaline and the Group 1-B acidic wastes, may produce a fire or explosion and the generation of flammable hydrogen gas. Mixing a Group 3-A waste, which includes alcohols and water, with a Group 3-B waste, which encompass Groups 1-A, 1-B and Group 3-B listed chemicals, may produce a fire, explosion or heat and the generation of flammable or toxic gases.

These compatibility listings and packaging guides should not be the only information used when packaging or accumulating waste chemicals. RCRA regulations require that wastes should be adequately analyzed by TSD facilities so uncontrolled substances or reactions do not occur. Pay close attention to any waste characterization data you receive on material reactivity and compatibility. There are also other sources of data that may be helpful in determining waste compatibility. MSDSs contain a section devoted to chemical reactivity and incompatibility. The National Fire Protection Association (NFPA) publishes a manual of hazardous chemical reactions which contains over 3,500 documented dangerous chemical reactions.

Group 1-A

- Acetylene sludge
- Alkaline caustic liquids
- Alkaline cleaner
- Alkaline corrosive liquids
- Alkaline corrosive battery fluids
- Caustic wastewater
- Lime sludge and other corrosive alkalies
- Lime wastewater
- Lime and water
- Spent caustic

Group 1-B

Acid sludge
Acid and water
Battery acid
Chemical cleaners
Electrolyte, acid
Etching acid liquid or solvent
Pickling liquor and other corrosive acids
Spent acid
Spent mixed acid
Spent sulphuric acid

Potential consequences: Heat generation; violent reaction.

Table III-1. EPA Compatibility Table (continued)

Group 2-A

Aluminum
Beryllium
Calcium
Lithium
Magnesium
Potassium
Sodium
Zinc powder
Other reactive metals and metal hydrides

Group 2-B

Any waste in Group 1-A or 1-B

Potential consequences: Fire or explosion; generation of flammable hydrogen gas.

Group 3-A

Alcohols
Water

Group 3-B

Any concentrated waste in Groups 1-A or 1-B
Calcium
Lithium
Metal Hydrides
Potassium

SO₂Cl₂, SOCl₂, PCl₃, CH₂SiCl₂

Other water-reactive waste

Potential consequences: Fire, explosion, or heat generation; generation of flammable or toxic gases.

Group 4-A

Alcohols

Aldehydes

Halogenated hydrocarbons

Nitrated hydrocarbons

Unsaturated hydrocarbons

Other reactive organic compounds and solvents

Group 4-B

Concentrated Group 1-A or 1-B wastes

Group 2-A wastes

Potential consequences: Fire, explosion or violent reaction.

Table III-1. EPA Compatibility Table (continued)

Group 5-A

Spent cyanide and sulfide solutions

Group 5-B

Group 1-B wastes

Potential consequences: Generation of toxic hydrogen cyanide or hydrogen sulfide gas.

Group 6-A

Chlorates

Chlorine

Chlorites

Chromic acid

Hypochlorites

Nitrates

Nitric acid, fuming

Perchlorates

Permanganates

Peroxides

Other strong oxidizers

Group 6-B

Acetic acid and other organic acids
Concentrated mineral acids
Group 2-A wastes
Group 4-A wastes
Other flammable and combustible wastes

Potential consequences: Fire, explosion, or violent reaction.

Source: 40 CFR 264, Appendix V.

Figure III-1
Map of Hazardous Waste Accumulation Points
(to be inserted by department)

Figure III-2

Figure III-3

Figure III-4

IV. HAZARDOUS WASTE PICK-UP PROCEDURES

A. General Procedures

When requesting a hazardous waste pick-up the generator shall:

Verify that a correct hazardous waste determination has been conducted.
Complete a Hazardous Waste Removal - Department Checklist (Figure IV-1).
Complete a Hazardous Waste Removal Request form (Figure IV-2) and submit it to the Environmental Compliance Officer with a copy of the completed Department Checklist.
Follow up with the Environmental Compliance Officer to ensure that the hazardous waste is removed from a satellite area within three days of the accumulation start date and that no waste is accumulated on site for greater than 90 days from the date it is generated.

The generator must initiate a request for a hazardous waste pick-up. Usually when the total accumulated volume of waste in the satellite area approaches 55 gallons of hazardous waste or one quart of acutely hazardous waste. All accumulated waste must be removed from the satellite area within three days of reaching these volume limits. However, it will be Clemson University's procedure to pick up waste immediately after generation and upon demand.

NO HAZARDOUS WASTE SHALL BE DISCARDED IN GENERAL REFUSE, THROUGH WASTEWATER DRAINS, BY BURNING, BURIAL, SALE, GIVEAWAY, OR ANY ROUTE OTHER THAN THAT PROVIDED BY CONTRACT WASTE DISPOSAL SERVICE THROUGH THE ENVIRONMENTAL COMPLIANCE OFFICER.

CHEMICAL EXCHANGE BETWEEN UNIVERSITY DEPARTMENTS IS ENCOURAGED

UNDER THE SUPERVISION OF THE ENVIRONMENTAL COMPLIANCE OFFICER.

B. Categorizing Hazardous Waste

The generator shall assign an EPA hazardous waste code to each waste stream upon generation. The following hazard codes shall be used to indicate the class or type of waste:

Ignitable Waste	D001- see Figure II-6 (and check the F-list)
Corrosive Waste	D002- see Figure II-7
Reactive Waste	D003- see Figure II-8
Toxicity Characteristic Waste	See Figure II-9 (D-List)
Acute Hazardous Waste	See appendix A the P-List (also check F-List)
Toxic Waste	See appendix A the U-List
Non RCRA regulated	NR (all waste hazardous materials not falling under an above category but destined for disposal or recycling)

Ignitable, corrosive, reactive and toxicity characteristic wastes are those hazardous wastes identified by the characteristics outlined in 40 CFR 261 Subpart C. The hazardous wastelists are found in 40 CFR 261.31, .32 and .33

C. Preparing Hazardous Waste Removal Request

The generator to request a hazardous waste pick-up shall follow the following procedures:

Complete a Hazardous Waste Removal Request form.

Obtain signature of the Department Head.

Submit completed form to the Environmental Compliance Officer.

Append one copy to the Department Checklist and attach paperwork to the associated hazard waste.

D. Satellite Accumulation Point

Hazardous waste shall be accumulated safely by the department until removed by the Environmental Compliance Officer or contract hazardous waste service representative. Removal will take place as soon as possible after notification is given to the Environmental Compliance Officer but no later than within three days of the accumulation start date for excess wastes.

Ignitable wastes shall be stored in accordance with fire safety requirements for storage of flammables. Contact the University Fire Department for information (656-2323).

Corrosive wastes shall be stored in accordance with procedures for storage of corrosive

materials, with secondary containment employed to prevent contamination or reaction from leakage.

Poisonous wastes shall be stored in exhaust-ventilated areas and double contained to prevent leakage.

Reactive wastes shall be isolated and reported to the Environmental Compliance Officer for immediate removal or special handling by the contract hazardous waste service representative.

Specific storage procedures referenced above may be found in "*Prudent Practices for Handling Hazardous Chemicals in Laboratories*". A copy of this book, cited in 29 CFR 1910.1450, OSHA's laboratory standard for occupational exposure to hazardous chemicals in laboratories, is kept at the office of Environmental Health & Safety.

Figure IV-1
HAZARDOUS WASTE REMOVAL - DEPARTMENT CHECKLIST

- (1) _____ Each potential waste substance is identified and its container marked with the container contents.
- (2) _____ The generator of the waste has confirmed that no further possible use of the substance exists within the department or in other Clemson University departments.
- (3) _____ The waste is a hazardous waste according to the South Carolina Hazardous Waste Management Regulations or after consultation with the Environmental Compliance Officer is declared hazardous.
- (4) _____ The waste is not radioactive and does not contain PCBs.
- (5) _____ The waste has been screened and categorized according to hazard type.
- (6) _____ A label with the words hazardous waste (see labeling and marking, pg. 39 for exact verbiage required) has been affixed to each container, complete with the chemical name(s) and waste code(s).
- (7) _____ A Hazardous Waste Removal Request form (Figure IV-2) has been prepared for each existing hazard category.
- (8) _____ Each request has been copied. One copy for department records directed through the Faculty member responsible and/or Department Head, and the remaining copy has been affixed to the waste group while awaiting pick-up.
- (9) _____ Each group of hazardous waste is being temporarily stored in accordance with safety requirements for that specific hazard category.

Figure IV-2

V. HAZARDOUS WASTE SHIPPING PROCEDURES

A. General Procedures

Pre-transport regulations are designed to provide safe transportation of a hazardous waste from origin to ultimate disposal. The pre-transport regulations used by the Department of Transportation (DOT) for transporting hazardous waste (49 CFR 172, 173, 178, and 179) were adopted by the South Carolina Public Service Commission and are referenced in R.61-79.262. These pre-transport regulations apply only to hazardous waste shipped off site.

B. Labeling and Marking

An approved hazardous waste label (Figure III-3) shall be affixed to each hazardous waste container prior to off-site shipment. Labeling requirements and marking regulations are found in R.61-79.262 and 49 CFR 172.101, Hazard Material Table. These regulations specify the following:

containers must be labeled in accordance with the DOT Hazardous Materials Table (available from the Environmental Compliance Officer); and containers must be marked with the following information:

- Proper chemical name
- Percent of constituents if applicable
- EPA waste codes
- University Tracking I.D. number
- Accumulation Date

The Environmental Compliance Officer is responsible for ensuring this information is provided prior to off-site shipment.

C. Manifesting

When hazardous waste is shipped off-site for treatment or disposal, it must be accompanied by a properly completed and signed Hazardous Waste Manifest. This form has multiple copies for distribution as described in this section. The facility to which the waste will be shipped will provide a copy of the blank manifest to Clemson University. Blank manifests may also be obtained from SCDHEC. Emergency response information for each waste shipped must accompany all manifest.

The Hazardous Waste Manifest must be completed by Clemson University before offering any hazardous wastes for shipment. To facilitate record keeping, the manifests are numbered in sequential order and no numbers are skipped.

The information listed in Item 11 of the Hazardous Waste Manifest (US DOT Description) must comply with DOT requirements (49 CFR 172.101) for proper shipping name, hazard class and identification number.

The quantity is to be specified by a whole number only (Item 13) and includes the entire container. The units for this quantity (Item 14) must also conform to DOT standards.

The EPA waste code number for each waste listed in Item 11 must be identified in Item I.

As a generator of hazardous waste, Clemson University is responsible for initiating the manifest with each shipment of waste. The generator completes the sections of the manifest

outlined above and signs and dates the appropriate section of the manifest. At the time the waste is picked up, the transporter signs and dates the manifest in the appropriate section indicating that he has accepted the waste and agrees to deliver it to the designated treatment, storage or disposal facility.

The generator must keep one copy of the manifest, which has been signed by the generator and transporter for each shipment of waste made to a hazardous waste facility. The original copy of the manifest must accompany the waste shipment along with two additional copies. Once the disposal facility receives the waste, the facility representative signs the manifest and returns it to the generator. Clemson University must retain the returned copy of the manifest signed by the receiving treatment, storage or disposal facility for three years from the date of shipment. Copies of manifests for shipments of hazardous waste sent out of South Carolina must be submitted to SCDHEC within 45 days of receiving the returned copy of the manifest from the disposal facility.

D. Land Disposal Restriction Certification

Listed and characteristic hazardous wastes have been evaluated by EPA to determine their suitability for land disposal. The result of this evaluation is a treatment standard for each waste. Any waste meeting the treatment standards may be land disposed without restriction in a RCRA land disposal unit. If the treatment standard for a waste is not met, the waste cannot be land disposed without prior treatment.

Information defining the restricted wastes and their treatment standards is available from the Manager of Environmental Programs. Whether the waste is restricted under the Land Disposal Restrictions 40 CFR Part 268 will be determined by testing the waste or using knowledge of the waste. At the time the waste is shipped for off-site disposal, a Notification and Certification Form must be completed in full and must accompany the shipment. This form will identify the appropriate land disposal treatment standards and whether or not these standards have been met.

All laboratory analyses used to determine if a waste is subject to the land disposal restrictions will be conducted in accordance with approved EPA test methods and procedures. For wastes with treatment standards expressed as constituent concentrations in the waste extract (40 CFR 268.41), waste residues or an extract of such residues will be tested using the toxicity characteristic leaching procedure (TCLP). For wastes with treatment standards expressed as constituent concentrations in the waste (40 CFR 268.43), waste residues will be tested using a total constituent analyses (TCA).

E. Placarding

Clemson University is responsible for providing the transporter with the proper placards when required to comply with DOT shipping and labeling requirements. If more than 1,000 pounds of flammable and/or combustible material are offered for shipment at one time, the placards for flammable and/or combustible material must be provided. The appropriate placards will be maintained at the facility or will be purchased by Clemson University prior to shipping quantities requiring placarding. Placards must be located on all sides of the motor vehicle.

F. Record keeping and Reporting

One copy of each manifest prepared for a hazardous waste shipment must be kept at the

facility until the original signed copy is returned from the disposal facility which received the waste. The copy signed by Clemson University, the transporter and the receiving facility must be maintained at the facility for three years from the date of shipment. If a hand-signed copy is not returned from the disposal facility within 35 days of the shipping date, Clemson University must contact the transporter or the disposal facility to determine the status of the hazardous waste.

If the completed manifest has not been returned from the disposal facility within 45 days of the date the waste was shipped from Clemson University, the Environmental Compliance Officer will submit an Exception Report to SCDHEC. The report must contain a copy of the manifest retained by Clemson University and a letter of explanation stating what efforts have been made to locate the completed manifest and the results of those efforts.

All manifests and exception reports must be maintained at the facility for at least three years from the date the report was filed or the waste shipment was made.

VI. NON-ROUTINE ACTIVITY PROCEDURES

A. New Waste Streams

A new waste stream may be generated in three ways:

change in an existing process,
implementation of a new process, or
change in the regulations.

The generator, with the assistance of the Environmental Compliance Officer, is responsible for reviewing any new waste streams to determine if they will be subject to the hazardous waste management regulations. If the new waste stream is not excluded from regulation, analysis of a waste stream sample may be required. Laboratory work may include analysis for the hazardous waste characteristics outlines in Section II.

Knowledge of the process shall be applied to determine analytical needs. Analytical data will be reviewed to determine potential concerns of ignitability or reactivity during storage. The generator is responsible for appropriately characterizing all new waste streams generated in his area.

Professors, students and employees shall notify the Environmental Compliance Officer if new waste streams are to be generated.

B. Unlabeled Containers

The potential exists for containers of unknown material to be discovered. Without knowledge of the container contents, appropriate disposal options cannot be determined.

If an unidentified container is discovered, the following steps shall be taken:

Mark the container with the words "Awaiting Administrative Determination" and date the container.

Initiate a hazardous waste pickup.

Immediately notify the Environmental Compliance Officer to arrange for the container to be

relocated to the Hazardous Waste Accumulation Building.

If laboratory analysis is required to appropriately characterize the waste material, a completed "Sample Out for Analysis" label shall be affixed to the side of the container (Figure VI-1). If the material is determined to be a hazardous waste, label and date the container immediately, and properly dispose of the material within 90 days.

**Figure VI-1
Sample Out-for-Analysis Label**

VII. TRAINING REQUIREMENTS

A. Who Must be Trained and How Often

The regulatory framework which identifies who must be trained may be circuitous, but must be complied with nevertheless. 40 CFR 265.16 and 40 CFR 264.16 require training for personnel at interim status and permitted hazardous waste management treatment, storage and disposal (TSD) facilities. Hazardous waste generators are instructed in 40 CFR 262.34(a)(4) to comply with the requirements of 40 CFR 265.16 which is included in Appendix C of this manual. Therefore, hazardous waste management training is required for personnel who work at facilities which fit into any of the following categories:

- Permitted hazardous waste TSD facilities,
- Interim status hazardous waste TSD facilities,
- Large quantity generators.

Persons who must be trained include those who are involved with or are occupationally exposed to hazardous waste. This may include (but is not limited to) persons who perform any of the following tasks:

- decide which wastes are hazardous waste,
- add hazardous waste into accumulation containers at accumulation points,
- remove hazardous waste from accumulation containers,
- transport hazardous waste to or from accumulation points,
- transport hazardous waste to or from storage units,
- respond to spills, fires or explosions involving hazardous waste,
- complete hazardous waste manifests, annual reports or exception reports,
- inspect hazardous waste accumulation points and storage facilities,
- operate or work at accumulation points,
- work at permitted or interim status TSD facilities,
- conduct any tasks involving occupational exposure to or which require management of hazardous waste.

The required training must be successfully completed by all of the personnel described above. For new personnel, training must be successfully completed within six months after assignment to the facility or to a new position at the facility, whichever is later. Until that time, untrained personnel must not perform any tasks involving hazardous waste management unless they are supervised by trained personnel. Facility personnel may be required to take part in an annual review of the entire training program.

The Environmental Compliance Officer will direct training of all applicable facility personnel in hazardous waste management procedures. Included in this training will be instruction in job

specific hazardous waste management as well as contingency plan implementation.

B. Scope of Mandatory Training Requirements

There are two general components to the training requirements in 40 CFR 265.16; personnel must be trained:

1. How to perform their duties in a way that ensures the facility's compliance with the regulations; and
2. How to respond to emergencies involving hazardous waste.

EPA regulations published in 40 CFR 265.16 regarding personnel training are presented in Appendix C of this manual (separate document, copies available from EH&S).

C. Training Required by Other Laws

Besides the required RCRA training, other laws and regulations require training for many of the same personnel who must receive RCRA training. For example, persons working at permitted TSD facilities as well as hazardous substance emergency response personnel are required to be trained in accordance with OSHA regulations published in 29 CFR 1910.120. Personnel who work in areas in which hazardous chemicals are present may be required to be trained in accordance with OSHA regulations published in 29 CFR 1910.1200 or in accordance with substance specific standards in 29 CFR 1910 Subpart Z. All employees who handle, prepare for shipment, load, unload or drive a vehicle hauling DOT hazardous materials must be trained in accordance with the DOT training requirements in 49 CFR 172.700-.704. These regulations require initial general awareness, function-specific and safety training as well as recurrent training every three years or when changes in the regulation occur. To ensure that Clemson University personnel meet all of the training requirements specified by environmental laws, the dean, director, department head or supervisor, with guidance from the Environmental Compliance Officer, should determine the necessary training required for associated employees.

D. Documentation and Training Records

The following documents and records must be maintained at Clemson University:

The job title for each position at Clemson University related to hazardous waste management including the name of the employee filling the job.

A written job description for each position listed including the requisite skill, education or other qualifications, and duties of personnel assigned to each position.

A written description of the type and amount of introductory and continuing training that will be given to each person filling the listed position.

Records documenting that the required training/job experience has been given to, and completed by applicable Clemson University personnel.

Training records on current personnel must be kept until closure of the facility. Training records on former employees must be kept for at least three years from the date the employee last worked at the facility. Personnel training records may accompany personnel transferred to a different department within the university.

APPENDIX A
Hazardous Waste Lists

(Remove this page and attach all current hazardous waste lists from SCDHEC regulation R.61-79 here)

APPENDIX B

**CLEMSON UNIVERSITY HAZARDOUS WASTE INCIDENT
CONTINGENCY PLAN**

APPENDIX B

**CLEMSON UNIVERSITY HAZARDOUS WASTE INCIDENT
CONTINGENCY PLAN**

Objective:

This SOP defines general responsibilities of the first responding agencies of Clemson University to a hazardous waste incident. It is intended to ensure safe and professional action by those agencies

who have responsibilities in hazardous waste response situations.

Definition:

Hazardous wastes will be as defined in R.61-79.261 of the South Carolina Hazardous Waste Management Regulations as revised. A hazardous waste incident may be defined as one of these wastes and/or certain other wastes that may be leaking, spilled, burning, reacting or having a release thereof, that may endanger life, property and/or the environment.

Notification and Initial Responsibility:

It will be the responsibility of the first on the scene recognizing a hazardous waste incident to assess the degree of life, property, and/or environmental safety hazard so that a preliminary determination can be made as to notification and/or response by other agencies.

If the first on the scene determines that a hazardous waste incident does exist, the following University departments will be notified:

- (1) Clemson University Fire Department 656-2211
- (2) Clemson University Police Department 656-2222
- (3) Environmental Health and Safety Department 656-2583

EH&S Emergency Coordinators:

Primary: W. Robert Newberry IV, Brookwood Dr., Clemson SC 29631
Home Phone (864) 654-2628, Work Phone (864) 656-1804

Secondary: Philip D. Carroll Jr., 130 Mt. Bethel Rd., Pickens SC 29671
Home Phone (864) 868-7412, Work Phone (864) 656-1770

First on Scene Procedures:

The first on scene recognizing a potential hazardous waste incident shall make a brief assessment to determine if:

- (A) The situation can be resolved by those available with no danger to persons, property and/or environment.
- (B) A hazardous waste incident exists.

EVERY POTENTIAL HAZARDOUS WASTE INCIDENT SHALL BE REPORTED TO ENVIRONMENTAL HEALTH AND SAFETY, 656-2583.

In Event of a Hazardous Waste Incident:

The first on scene recognizing a hazardous waste incident shall be the on-scene incident commander. That person shall:

- (1) EVACUATE the premises by activating the nearest FIRE ALARM pull box and/or by shouting for others to vacate.

- (2) NOTIFY the FIRE DEPARTMENT by FIRE ALARM pull box, and by telephoning 656-2211, with information about the incident. Also, NOTIFY the POLICE DEPARTMENT (656-2222).
- (3) NOTIFY DEPARTMENT PERSONNEL who may assist with the emergency.
- (4) NOTIFY ENVIRONMENTAL HEALTH AND SAFETY by telephoning 656-2583.
- (5) MEET AT THE FIRE DEPARTMENT COMMAND POST when it is established on site and relinquish command to the CLEMSON UNIVERSITY FIRE DEPARTMENT.

THE CLEMSON UNIVERSITY FIRE DEPARTMENT HAS THE AUTHORITY TO ASSUME COMMAND OF ANY HAZARDOUS MATERIALS INCIDENT (ACT. NO. 65 OF 1983, SECTION 6-11-1450). The Fire Department will proceed in accordance with CLEMSON UNIVERSITY FIRE DEPARTMENT STANDARD OPERATION PROCEDURES NO. 1021, 3-5.2, RESPONSE TO HAZARDOUS MATERIALS INCIDENTS.

Environmental Health and Safety Department Responsibilities:

The Environmental Health and Safety Department shall designate the Environmental Affairs Coordinator as emergency coordinator in the event of a hazardous waste incident. That person shall serve as support to the incident commander.

At all times, there must be at least one employee either on the facility premises or on call (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility for coordinating all emergency response measures. This emergency coordinator must be thoroughly familiar with all aspects of the facility's contingency plan, all operations and activities at the facility, the location and characteristics of waste handled, the location of all records within the facility, and the facility layout. In addition, this person must have the authority to commit the resources needed to carry out the contingency plan.

Emergency Procedures:

Whenever there is an imminent or actual emergency situation, the coordinator (or his/her designee when the emergency coordinator is on call) must immediately notify appropriate state or local agencies with designated response roles if their help is needed.

- (1) Whenever there is a release, fire or explosion, the emergency coordinator must immediately identify the character, exact source, amount, and extent of area involved. He/she may do this by observation or review of facility records or manifests, and, if necessary, by chemical analysis.
- (2) Concurrently, the emergency coordinator must assess possible hazards to human health or the environment that may result from the release, fire or explosion. This assessment must consider both direct and indirect effects of the release, fire or explosion (e.g., the effects of any toxic, irritating, or asphyxiating gases that are generated, or the effects of any hazardous surface water run-off from water or chemical agents used to control fire and heat-induced explosions).
- (3) If the emergency coordinator determines that the facility has had a release, fire or explosion which could threaten human health or the environment, outside the facility,

he/she must report his/her findings as follows:

(A) If his/her assessment indicates that evacuation of local areas may be advisable, he/she must immediately notify appropriate local authorities. He must be available to help appropriate officials decide whether local areas should be evacuated; and

(B) He/she must immediately notify SCDHEC (using its 24 hour number 803-253-6488). The report must include:

(i) Name and telephone number of reporter;

(ii) Name and address of facility;

(iii) Time and type of incident (e.g., release, fire);

(iv) Name and quantity of material(s) involved, to the extent known;

(v) The extent of injuries, if any; and

(vi) The possible hazards to human health or the environment, outside the facility.

(4) During an emergency, the emergency coordinator must take all reasonable measures necessary to ensure that fires, explosions and releases do not occur, recur or spread to other hazardous waste at the facility. These measures must include, where applicable, stopping processes and operations, collecting and containing release waste, and removing or isolating containers.

(5) If the facility stops operations in response to a fire, explosion or release, the emergency coordinator must monitor for leaks, pressure buildup, gas generation or ruptures in valves, pipes or other equipment wherever this is appropriate.

(6) Immediately after an emergency, the emergency coordinator must provide for treating, storing or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire or explosion at the facility. Unless the owner or operator can demonstrate, in accordance with South Carolina Hazardous Waste Management Regulations R.61-79.261.3(c) or (d), that the recovered material is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of R.61-79.262 Standards Applicable to Generators of Hazardous Waste, R.61-79.263 Standards Applicable to Transporters of Hazardous Waste and R.61-79.264. (amended 11/90)

(7) The emergency coordinator must ensure that, in the affected area(s) of the facility:

(A) No waste that may be incompatible with the released material is treated, stored or disposed of until cleanup procedures are completed; and

(B) All emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed.

(8) The owner or operator must notify SCDHEC (803-253-6488), and appropriate state and

local authorities, that the facility is in compliance with paragraph (7) of this Section before operations are resumed in the affected area(s) of the facility.

(9) The owner or operator must note in the operating record the time, date and details of any incident that requires implementing the contingency plan. Within 15 days after the incident, he/she must submit a written report on the incident to the department. The report must include:

(A) Name, address, and telephone number of the owner or operator;

(B) Name, address, and telephone number of the facility;

(C) Date, time, and type of incident (e.g., fire, explosion);

(D) Name and quantity of material(s) involved;

(E) The extent of injuries, if any;

(F) An assessment of actual or potential hazards to human health or the environment, where this is applicable; and

(G) Estimated quantity and disposition of recovered material that resulted from the incident.

Evacuation Plans: Entire campus plans are too numerous for inclusion here in this document. Individual building plans, including evacuation floor plans, are maintained and copies can be obtained at no charge from: Environmental Health and Safety, Clemson University, Moorman House, 208 N. Palmetto Blvd., Clemson SC., 29631-3012. (864) 656-2583, fax # (864) 656-7630. These plans must be obtained and the maps posted at each Accumulation Point. These plans are needed by other regulations and may require more extensive posting. For information on these contact the University Fire Marshal at (864) 656-2323 and the Chemical Hygiene Officer at (864) 656-7554 for compliance with these other regulations.

List of Emergency and Spill Control Equipment and Location: These lists are maintained by the Clemson University Fire Departments Hazardous Materials Response Team and Environmental health & Safety's Environmental Compliance Office. This list may be updated from the printing of this manual. Copies are kept current and available at the Office of Environmental Health and Safety, Clemson University, Moorman House, 208 N. Palmetto Blvd. (864) 656-2583 as well as at the University Fire Department (864) 656-2323. Copies may be obtained from the Environmental Compliance Officer at 656-1770.

The department of Environmental Health and Safety's Environmental Compliance Group, independently, for its waste operation at the Central Accumulation Point Maintains the following equipment :

At its Dike location shown on map in Figure III-2

Vermiculite 20 bags

Oil dry 2 bags

Aggressive fluids Spill kit Large for up to 65 gallons

Non Aggressive fluids Spill kit Large for up to 65 gallons

Non Sparking Shovels (2)
Drain Blockers 24X 24 pads (2)
Drain Plugs 4 (4)
Portable Spill kit Aggressives (on Truck)
Broom and Dust pan (one also on truck)
85 gallon over pack drums (4)
Nitrile Gloves
Coated Tyvex Coveralls
Non Sparking bronze tool kit (on truck)
Barrel leak plug kit (on truck)
First Aid kit (on truck)
20 # ABC Fire extinguisher (on truck)
Numerous plastic pans and containers of various sizes for repackaging or over packing
Full face respirators (individually assigned during fit testing)
Drum funnels and absorbent pads of assorted sizes
Barrel containment spill pans
Spill control pallets, plastic, numerous sizes
Waterproof tarps for above (6)
One fork lift with numerous barrel handling attachments
Drum sampling pipettes (10)
Portable pH meter and pH strips (on truck)
Mercury spill kits (2)
One-non aggressive fluids Spill kit Large for up to 65 gallons
One aggressive fluid Spill kit Large for up to 65 gallons
Nitrile gloves- several cases
One 30 gallon Hepa-filtered Vacuum
One Flammable fluid pump, electric
Two flammable fluids pumps, Pneumatic
One portable air compressor
Two Scott air pak- SCBAs
Lab coats- three each
Safety glasses- 20 pairs
One fork lift with numerous barrel handling attachments
First aid kit
Tool box with assorted tools
Full-face respirators (individually issued at fit testing)
pH meter
Spill containment pallets, numerous sizes

APPENDIX C

Hazardous Waste Management Regulations (Separate Documents)

For Copies of these documents to maintain a departmental library, contact Environmental Health and Safety at (864) 656-2583

APPENDIX C - Table of Contents

The following federal regulations (or parts thereof) concerning the management of hazardous waste are included in this appendix:

40 CFR 261	IDENTIFICATION AND LISTING OF HAZARDOUS WASTE
40 CFR 262	STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE
40 CFR 264 264.16; SUBPART C,D & I	STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES
40 CFR 265 265.15; SUBPART C,D & I	INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES
40 CFR 279	STANDARDS FOR THE MANAGEMENT OF USED OIL
49 CFR 172.700-.704	DOT TRAINING REQUIREMENTS
29 CFR 1910.120	OSHA HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

APPENDIX D

Hazardous Waste Storage and other Miscellaneous Information