HAZARDOUS MATERIALS MANAGEMENT PLAN

1. PURPOSE: This policy describes a program designed to accomplish the safe management of hazardous materials including chemical wastes, radioactive wastes, and infectious wastes of the medical center. This program, in conjunction with the safety and fire protection policy, addresses the health and safety concerns of patients, personnel, visitors, and the community.

2. POLICY: The VA Ann Arbor Healthcare System (VAAAHS) maintains and enforces a program to monitor and control entry, use, storage, and disposal of all hazardous materials, affording protection for all hospital patients, personnel, and visitors as its first priority. The program also protects property and environment, and ensures compliance with all pertinent federal, state, and local regulations. It is also VAAAHS policy to choose the least hazardous material in any procedure that allows for a choice of chemical agents, and to minimize the volume of hazardous materials used.

3. PROCEDURES: This policy will be distributed to all department heads and will be maintained by each department in a prominent place, and will be made available to all VAAAHS personnel.

4. RESPONSIBILITY: Responsibility for implementation of this program lies with the Industrial Hygienist. Responsibilities for individual aspects of the program are noted in appropriate sections.

5. REFERENCES:

40 CFR 240-399
29 CFR 1910 & 1926
AHA Hospital Environmental Safety Education Program
Department of Transportation Regulations, 49 CFR 100-199
Clean Water Act (1977)
Safety Management Program Policy Memorandum S-03, October 1, 2010
Hazardous Drug Safety & Health Plan: Preparation, Administration and Disposal of Cytotoxic Agents, Policy Memorandum 119-06, October 12, 2010
"Prudent Practices for Disposal of Chemicals from Laboratories", National Research Council, National Academy Press, Washington, D.C., 1995
JC Comprehensive Accreditation Manual for Hospitals, Management of the Environment of Care
"Sax's Dangerous Properties of Industrial Materials", 10th edition, Richard J. Lewis, John Wiley and Sons, 2000
"Safe Storage of Laboratory Chemicals", 2nd Edition, David E. Pipitone, Editor, John Wiley and Sons, 2001
"Prudent Practices for Handling Hazardous Chemicals in Laboratories", National Research Council, National Academy Press, 1981

Ann Arbor Code of Ordinances, Chapter 28, Ordinances No. 23-85, June 3, 1985
VHA Directive 2003-030, Management of Hazardous Chemicals, June 11, 2003
Spill Prevention Control and Countermeasure Plan (*on file in the Industrial Hygienist's Office, Bldg 3, Room 107*)
"Disposal Tips for Home Healthcare," EPA, 1993
"Prescription Drug and Personal Care Product Disposal" Office of Washtenaw County Drain Commissioner, 2006

6. RESCISSIONS: Policy Memorandum S-2 dated September 20, 2006

7. EXPIRATION: September 2014

8. FOLLOW-UP RESPONSIBILITIES: Industrial Hygienist (00BIH)

Robert P. McDivitt
ROBERT P. McDIVITT, FACHE/VHA-CM
Director

Policy Memorandum Tracking Sheet

Title of Policy Hazardous Materials Management Plan	**Policy Number** S-2	
Author of Policy J. Jurasek	**Date of submission** 7/28/2011	
Department Safety	**Routing Symbol** 00BIH	**Phone #** X55417

Items rescinded by this policy
Policy Memorandum S-2, "Hazardous Materials Management", dated December 22, 2009.

Reason for changes or creation of this policy
Tri-annual review.

Approval By Service Chief Or Supervisor

J. Jurasek _____ _____
Signature *Date*

__X__ This policy describes current practice.

___ This is a new procedure; implementation training will be provided by

_____
Name(s) of individual(s)

Symbol	**Concurrence Signatures**	**Date**
AFGE	Union Representative – David Maier	8-8-2011
00B	Assistant Director - Ginny L. Creasman, Pharm.D., FACHE	8/9/2011
138	Facilities Management – Assumed	
151	ACOS, Research – Assumed	
118	AD, Patient Care Services – Assumed	
118S	Chief, SPD – Assumed	
00Q	Quality Management – Assumed	
00BS	Safety Manager – Assumed	
001	Associate Director – Assumed	

DISTRIBUTION

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GENERAL RESPONSIBILITIES AND POLICIES

a-1 General: Safe use of hazardous materials can only be achieved with the cooperation of all involved personnel. It is the responsibility of all employees to follow the procedures and recommendations described in this policy. In addition, individual judgment may be called for in unusual or unexpected circumstances. In these cases it will be medical center policy to pursue the greatest reasonable level of caution. If an employee suspects that a material may present a significant hazard, he or she will bring the situation to the attention of his or her supervisor.

a-2 Scope and Application:

a. The hazardous material policy applies to all hazardous or potentially hazardous materials, as defined in Section a-9. All these materials have the potential to cause injury and environmental harm and will be handled accordingly.

b. This policy applies to all departments and to all VA personnel while they are at the facility.

c. This policy also applies to the Toledo VA Outpatient Clinic, which is understood to be included in references to this facility where such references are applicable.

a-3 Objectives:

a. The primary objective of this policy is to protect VA employees, personnel, patients, and visitors.

b. The policy of this facility will also be to protect the community and the environment from harm due to chemical exposure.

c. The hazardous waste policy will be in compliance with all federal, state, and local laws, as well as the Joint Commission (JC) regulations.

d. To the extent possible, the hazardous waste policy will minimize the generation of hazardous waste and the cost of waste disposal.

a-4 Employee Rights and Responsibilities:

a. Employees have the responsibility to follow, the hazardous material policy.

b. Employees have the responsibility to report any unsafe condition or use of hazardous materials to their supervisor.

c. Employees have the responsibility to promptly report accidents and spills that result in chemical exposure to VA patients or personnel.

d. All employees have the right to be informed about the potential hazards associated with materials to which they may be exposed. In addition, they will be informed of the results of any industrial hygiene monitoring done in their work area.

e. Employees who desire information regarding materials to which they may be exposed, or who have suggestions for safer use of hazardous materials, may direct questions and comments to the safety office.

f. All employees who may be exposed to hazardous materials will receive training in hazard recognition and in safe use of hazardous chemicals. Training will follow the guidelines of the federal hazardous communications act, 29 CFR 1910.1200.

a-5 Safety Office Responsibilities:

a. The safety office has responsibility to identify the hazards which may be associated with materials used in the medical center, and to develop guidelines and recommendations for their safe use.

b. The safety office has responsibility to investigate accidents and make recommendations to avoid recurrences of similar incidents.

c. The safety office has responsibility to train supervisors.

d. The safety office has responsibility to respond promptly to requests for assistance or information concerning hazardous materials.

e. The Industrial Hygienist has been designated Hazardous Materials Coordinator for the facility.

a-6 Department Head's Responsibilities:

a. The head of each department has responsibility for training employees of the department in safe handling, use, and disposal of hazardous materials.

b. The head of each department has responsibility to assist in investigations of accidents involving hazardous material exposures.

c. The head of each department has responsibility to report instances or circumstances where he/she feels that the hazardous materials policy requires modification to allow compliance or to achieve safe conditions.

d. The head of each department has responsibility to conduct an annual inventory of hazardous materials stored or used in his/her department and report the results to the Industrial Hygienist.

e. The head of each department has responsibility to designate a Hazardous Materials Coordinator for that department.

a-7 Inspections: The safety office will conduct annual inspections of all departments to assess the effectiveness of the hazardous materials policy, and to determine if each department is in compliance. These inspections will be conducted with the assistance of department heads or designees.

a-8 Review and Modification of the Policy: The use of hazardous materials at the medical center is expected to vary, and will therefore require modification of the policy on a regular basis. A formal review will be made by the Environment of Care Committee each year, and will include consideration of comments and suggestions made by employees. Compliance records, accident records, and reasons for any noncompliance will also be reviewed and considered.

a-9 Hazardous Materials Definition: For the purposes of this document, hazardous materials will be defined similarly to hazardous waste. Any material which, after use, will be considered a hazardous waste will be considered a hazardous material. VA Policy defines hazardous waste according to the Resource Conservation and Recovery Act (RCRA). This act defines a waste as hazardous if it meets any of the following three criteria:

a. It has been listed as a hazardous waste in 40 CFR 261, subpart D (Attachment B).

b. It contains a compound listed as hazardous in 40 CFR 261, subpart D (Attachment B).

c. It is hazardous due to a dangerous property defined in 40 CFR 261, subpart C. These dangerous properties include:

(1) Ignitability (Flash Pt. $<140^{o}F$)

(2) Corrosivity (pH <2.0 or >12.5)
(3) Reactivity (shock, light sensitive or reacts violently with water)

(4) Toxicity Characteristic Leaching Procedure (i.e. heavy metals or pesticides)

In addition, materials included on the OSHA Hazard Communication Standard (HAZCOM) List will be defined as hazardous and handled according to the hazardous materials policy. HAZCOM is considered the definitive list of hazardous chemicals and is composed of all chemicals for which American Conference of Governmental Industrial Hygienists (ACGIH) has developed a threshold limit value, all chemicals on the National Toxicology Program list of suspect carcinogens, and the International Agency for Research on Cancer list of possible human carcinogens.

Lists of hazardous materials, as defined in the Federal Hazard Communication Act and the Resource Conservation and Recovery Act, are included in the Appendices A and B..

Finally, it should be noted that exclusion of a chemical from the RCRA and HAZCOM lists does not mean that the material is necessarily non-hazardous. Many unlisted materials are capable of causing health or environmental damage if handled or disposed of improperly and will be used in compliance with this policy.

CHEMICAL INVENTORY

b-1 The Chemical Inventory: The Industrial Hygienist will maintain an inventory of chemicals used or stored at the medical center. The initial inventory list was complied in 1985 during a lab-by-lab survey of research and clinical labs and has been expanded to include all departments. The inventory file will include the following information:

a. Trade Name and/or Chemical Name

b. Synonyms (if applicable)

c. Manufacturer

d. Building Number

e. Room Number

f. Room Function

g. Quantity on Hand

h. Estimated Rate of Use Per Year

i. Disposal End Point

j. Material Safety Data Sheet Availability

b-2 Annual Reports: Each department head will develop and implement a system for the annual inventory of chemical substances. The annual report, due on September 1 of each year will include the above mentioned information. When completed, the inventory form is to be returned to the safety office for incorporation into the computerized data base.

CHEMICAL STORAGE

c-1 General:

a. Bulk storage of chemicals will be in compliance with National Fire Protection Association (NFPA) codes and OSHA standards. Research Service laboratories will store bulk chemicals in G-7. Laboratory Service will store bulk chemicals in B-230d.

b. Individual labs will store no more than a single one gallon bottle of each of their required acids, bases, and oxidizers. Individual labs may store up to 10 gallons of flammable liquid per 5000 square feet outside of storage cabinets. Up to 60 gallons may be stored in approved flammable storage cabinets.

c. Laboratory supplies can be refilled from bulk stores as needed. Storage of chemicals in individual labs is addressed in reactivity group safety sheets. Volumes allowed to be kept in chemical storage rooms will be regulated according to safety considerations and limitation of space.

c-2 Segregation of Chemical Storage Areas: Chemical storage rooms will be segregated into the six chemical compatibility groups indicated below.

a. Acids. Acids will be stored in designated acid storage areas which are separated from bases and flammable storage areas. Acid storage areas will be further subdivided into areas for oxidizing mineral acids, non-oxidizing mineral acids, and organic acids. Organic and oxidizing acids will be stored as far apart as feasible within the acid storage area. Bottles will be stored on corrosion resistant shelves, in acid cabinets, or on acid resistant mats. Bottles will be further segregated such that the largest bottles are stored on the lowest shelves. Plastic lined bottle carriers will be required for transporting acids to laboratories from the store room.

b. Bases. All bases will be stored in the designated base storage areas on corrosion resistant shelves. As with acids, the largest bottles will be stored on the lowest shelves. Inorganic hydroxides are to be stored in polyethylene or polyethylene lined bottles. Bottle carriers will be used to transport strong base solutions such as sodium and potassium hydroxide.

c. Oxidizers. Oxidizers will be stored in the designated area, well away from flammables and combustible materials, and reducing agents.

d. Flammables. Flammable liquids will be stored in enclosed storage cabinets in the designated area. Large metal cans should be grounded to minimize spark hazards. Flammables are to be stored well away from oxidizers and acids.

e. Water Reactives. Water reactive materials will be stored in tightly closed containers and

in closed cabinets in their designated areas. Signs warning that water is not to be sprayed on these compounds in event of a fire must be prominently displayed.

f. Toxics. Highly toxic materials will be stored in a cabinet in the designated area. These materials will be clearly labeled and segregated as acutely toxic, carcinogenic, teratogenic, or capable of releasing acutely toxic fumes on heating or contact with incompatible materials.

c-3 Warning Signs. Chemical storage rooms will be clearly marked as such. Segregated areas within the storage rooms will be clearly marked indicating what can be stored in that area.

c-4 Labeling of Containers. Any container left in a chemical storage area will be labeled with the following information:

a. Name of the person responsible for the material

b. Date of receipt

c. Date of opening

d. Expiration Date (See c-6 below)

c-5 Limitations of Storage. Because many chemicals become unstable during storage, a time limit will be placed on storage of chemicals in the store room. These time limits will vary depending on the stability of the chemical under consideration, but in general should not exceed four years. If a chemical is used rarely, or in small volumes, it should be purchased in small volumes. For chemicals such as solvents that are used frequently and in large volumes, a first-in first-out rotation of stock should be employed. Certain materials such as Picric Acid and Peroxide forming chemicals present a special hazard of explosion and cannot be stored for periods longer than outlined in Attachment O.

c-6 Annual Inventory and Inspection. The facility Safety Manager and/or Industrial Hygienist will conduct an annual inventory and inspection of chemical storage facilities during hazardous surveillance rounds. At that time, any containers which are improperly labeled, corroded, beyond their expiration date, or otherwise being stored in an unsafe manner will be disposed of. In addition, the annual inventory will include an inspection of shelving, cabinets, containers, and of the storage facilities in general.

c-7 Spill Kits. Acid neutralization, base neutralization, and flammable solvent spill kits will be located in the immediate vicinity of the storage rooms for use in case of bottle breakage or other accidental spills. Spill kits will be sufficient to neutralize at least a one gallon spill. In the event of a spill, the material should be absorbed using the supplied spill kit and the appropriate person should be contacted. As noted in the safety and fire protection regulations, each department is

responsible for spill cleanup within their department and should designate a person to coordinate spill cleanup efforts. Spill kits will be located in the immediate vicinity of the storage rooms.

c-8 Waste Storage: Rooms designated for chemical storage are not to be used for storage of waste materials. Hazardous waste generated by all of the Ann Arbor Campus work stations will be stored in Building #1W, Room #AB-37c until final disposal is accomplished. Hazardous waste generated by the Toledo CBOC work stations will initially be stored on site at the Toledo CBOC in Rm #3. Each work section/shop will designate a competent person to coordinate the transfer of hazardous material wastes from points of generation to the waste storage room. This transfer will be coordinated with the Industrial Hygiene/Safety Office. Wastes will be handled according to procedures in this manual.

c-9 Emergency Equipment: The following safety devices will be located in, or just outside, chemical storage rooms.

a. Fire extinguishers rated for Class A, B, and C fires.

b. Fire Blanket

c. Emergency eye wash

c-10 Additional References: The following sources may be consulted for more information

a. NFPA-99 - Health Care Facilities

b. NFPA-45 - Fire Protection for Laboratories Using Chemicals

CARCINOGEN

d-1 General: Safe practices for use and handling of hazardous chemicals should be strictly followed for all carcinogens. Laboratory personnel must be aware that while these chemicals are extremely hazardous, they usually possess no warning properties. High exposures may therefore occur without the knowledge of the exposed individual. The level of protection necessary is somewhat dependent on the specific material in use and conditions of use. Professional judgment may be called for in determining levels of protection required.

d-2 Restrictions on Carcinogen Use: As specified in the VA Safety Management Program, Policy S-3, the use of certain carcinogens is prohibited except as approved by the VA Committee on Safety and Health. Each researcher wishing to use a prohibited compound must seek approval as described in the above referenced memorandum. Prohibited materials include:

a. Mixtures containing 1% or more by weight:

   2-Acetylaminofluorene
   Acrylonitrile
   3, 3-Dichlorobenzidine (and its salts)
   Chromite Ore
   4-Dimethylaminoazobenzene
   Alpha-Naphthylamine
   N-Nitrosodimethylamine
   Beta-Propiolactone
   4,4-Methylene (bis) 2-Chloroaniline
   Ethyleneimine
   Asbestos

b. Mixtures containing 0.1% or more by weight:

   Ethylene dibromide
   4-Aminodiphenyl
   Benzidine (and its salts)
   4-Nitrobiphenyl
   Beta-Naphthalamine
   Bis-Chloromethyl Ether
   Methyl Chloromethyl Ether

d-3 Other Suspect Carcinogens: A large number of other laboratory chemicals and drugs are known or suspect carcinogens. Materials included on the HAZCOM list of carcinogens will be considered as carcinogens in this policy. In addition, if a chemical or drug is considered a

suspect carcinogen by the manufacturer, it will be treated as a known carcinogen.

d-4 Safe Use and Handling of Carcinogens: Carcinogenic agents will be handled according to applicable federal regulations (Federal Register Volume 39, No-20, Part III, Tuesday, January 20, 1974). In addition NIH guidelines, from publication No. 81.2385, 1981, will be followed. These guidelines are outlined below.

a. Work Areas. Work with carcinogens will be confined to clearly marked areas of the laboratory. Access to carcinogen areas will be restricted to those employees who must enter for work related activities, and to those who have received training in carcinogen use. Areas of carcinogen use within a lab will be clearly delineated and marked and warning signs will be displayed on the door. Any equipment such as fume hoods, glove boxes, or analytical instruments used with carcinogens, will be marked as possible sources of exposure.

b. Use of Personal Protective Equipment. Personnel work with carcinogens will use the following protective equipment.

(1) Laboratory coats or coveralls that completely protect street clothing. Garments may be disposable or washable, but if washable must be laundered separately from other clothing. Garments must be changed each day and whenever contamination is known to have occurred.

(2) Disposable gloves are to be worn at all times. They are to be replaced whenever contaminated or removed for any reason.

(3) Eye protection of splash proof design is to be worn at all times.

c. Handling Procedures.

(1) Containment is required for work involving the use of volatile carcinogens or for work that may generate aerosols or dust. Aerosol generating procedures include grinding, blending, centrifugation, and vacuum filtration. Containments may be achieved by working in a fume hood, a biological safety cabinet, or glove box equipped with a fan.

(2) Instruments used with volatile carcinogens, or those that may generate an aerosol, must be equipped with local exhaust ventilation or be used in a fume hood. Contaminated equipment is to be cleaned before further use.

(3) Special equipment may be called for in the use of carcinogens. Fume hoods and glove boxes used with carcinogens should be equipped with activated charcoal and high efficiency particulate air (HEPA) filters. Any vacuum lines used with carcinogens should be equipped with HEPA filters. Vacuum pumps should be designated for carcinogenic use and

vented into a hood.

(4) Pipetting must never be done by mouth. All pipettes are to be operated by mechanical devices.

(5) All work areas are to be covered with plastic backed absorbent lab mat, which is changed each day.

d. Housekeeping Procedures.

(1) Avoid dusting or use of dry mops since these activities tend to stir up settled dusts. Clean work areas instead with wet mops and a damp cloth.

(2) Workers are to wash their hands immediately after any skin contact with a carcinogen and when they leave the work area.

(3) Contaminated materials are to be sealed in a plastic bag marked as containing carcinogens. Bags are to be disposed of in a designated receptacle.

(4) Liquid wastes containing carcinogens are to be stored in waste disposal jars marked as containing carcinogens. The jars should also be labeled with the name of the specific carcinogen.

(5) Glassware and equipment contaminated with carcinogens should be segregated and washed separately from other equipment. Special care is called for in order to prevent spread of the contamination.

(6) Carcinogens should be stored in designated areas of the laboratory which will be clearly marked. An inventory of all carcinogens will be maintained in each lab.

(7) Carcinogens will be transported only in durable containers to prevent spills and breakage.

(8) The safety office is to be notified immediately of spills of carcinogenic materials. Clean-up will be conducted only with proper protective equipment. In case of a spill of a volatile carcinogen, the room should be evacuated and closed off. Safety personnel will enter only with proper, NIOSH approved, respirators.

(9) No eating, drinking, or smoking is allowed in areas of carcinogen use. Storage of food or eating utensils is also prohibited.

b. Training. All personnel involved in use of carcinogens will be familiar with VA safety

policy. In addition each person will receive training in each of the following areas:

(1) Sources of exposure
(2) Adverse health effects
(3) Laboratory practices and exposure controls
(4) Use and purpose of environmental and/or medical monitoring
(5) Their responsibilities for safe use of carcinogens.

c. Monitoring. The Safety Manager or Industrial Hygienist will have the responsibility to conduct inspections of carcinogen work areas, and to conduct industrial hygiene monitoring as deemed necessary by the Industrial Hygienist.

d. Use of Carcinogens in Animal Experimentation. Animal experimentation involving carcinogens requires special precautions. Careful planning must be included for animal care, dosage preparation, exposure regimes, and waste management. Control of contaminated feed, feces, urine, and bedding must be achieved and may require special equipment and training. Health and safety precautions for exposure of animals to carcinogens must be developed with the cooperation of safety office personnel.

d-5 Registration of Carcinogen Use: Laboratories using or wishing to use carcinogens in research will fill in a carcinogen use sheet and file it with the safety office. These forms are available at the safety office and are of the type used at NIH laboratories. A sample form is included in this policy as Appendix C.

COMPRESSED GAS

e-1 General: Cylinders of compressed gas present a dual chemical and physical hazard. The extreme pressures contained in these cylinders create the potential for explosion if the cylinder is overheated or damaged. The large volume of gas contained in a cylinder also creates a hazard, even if the particular gas is normally considered non-hazardous. Leaks or releases of toxic or flammable gases, such as ammonia or acetylene, present an obvious hazard. Less obvious, but equally dangerous, is the possibility of asphyxiation due to displacement of oxygen in inert gases including nitrogen, argon, or carbon dioxide. Increased oxygen levels create an extreme fire hazard and must also be avoided.

e-2 Labeling Requirements:

a. Cylinder Labels. The following information must be stenciled or stamped on the cylinder.

(1) Contents of the cylinder.

(2) Waning of toxic, corrosive, or flammable properties. Labels that can be readily removed, color coding, and labeling of the cylinder cap are not sufficient.

b. Cylinder Storage:

(1) Compressed gas cylinders are to be secured with a clamp and chain or strap at all times. This requirement applies to empty cylinders as well as full ones.

(2) In order to protect values, the cylinder cap is to be kept on all cylinders when they are not in use.

(3) Cylinders are to be stored only in designated areas on the loading dock. Due to the danger of slow leaks and gas accumulation, cylinders must not be stored in confined spaces.

(4) The cylinder storage area is to be segregated into the following four areas:

(a) Oxidizers

(b) Flammables

(c) Toxics

(d) Empty cylinders

e-3 Transport of Cylinders:

a. Cylinders, including empty ones, are to be moved only while strapped onto a cylinder hand cart or dolly. Never roll or drag cylinders.

b. Cylinder caps must be in place whenever cylinders are transported.

e-4 Equipment Requirements:

a. Regulators. Regulators are equipped with fittings that match cylinders for which they are approved. Under no circumstances are fittings to be altered. Corrosion resistant regulators are required for corrosive gases such as ammonia, chlorine, and sulfur dioxide. Carbon Dioxide approved regulators are required for Carbon Dioxide use. All regulators should be equipped with a spring loaded pressure relief valve. If toxic, corrosive, or flammable gas is in use, this pressure relief must be vented to a hood or other exhaust system.

b. Pressurized Lines. Pressurized lines must be constructed of an approved, thick- walled, reinforced material. Tygon and similar plastic tubing are inadequate for most uses. Lines must not be run across floors, over heat sources, or near open flames.

c. Connectors. Thread type and size on pressurized gas cylinders is standardized to prevent mixing of incompatible gases. Only standard approved valves and fittings are to be used.

e-5 Safe Use of Compressed Gas:

a. Shatterproof safety glasses, goggles, or a face shield are required whenever working with pressurized gas cylinders. This is especially important when making connections or adjusting valves.

b. Cylinders are to be placed so that the valves are readily accessible at all times.

c. The main cylinder valve is never to be opened without an approved regulator in place.

d. The cylinder valve is to be shut off when the gas is not in use. Do not rely on the regulator valve to stop flow completely.

e. Cylinders returned as empty should still contain some residual pressure. This residual pressure should be no less than 25 psi. This will insure humid air does not enter the cylinder resulting in corrosion of the interior.

f. The main cylinder valve rarely, if ever, needs to be opened all the way. The valve should be opened only as far as necessary.

g. Pliers or other non-approved tools are not to be used on valves or fittings.

h. Smoking is prohibited in areas where flammable gases or oxygen are in use.

i. Emergency response procedures must be developed by departments using highly toxic gases such as ammonia or hydrogen sulfide.

e-6 Ethylene Oxide and Nitrous Oxide. Ethylene oxide and nitrous oxide present special hazards and will be handled and used according to specific procedures described in Attachments H and I.

DISPOSAL OF HAZARDOUS WASTES

f-1 General: Disposal of chemical waste will be in accordance with federal, state, and local regulations. Specifically, disposal practices will be in compliance with RCRA and with local ordinances regarding disposal of materials through the sewer system. VAAAHS is currently a small quantity generator.

f-2 Segregation of Wastes:

a. Proper storage and disposal of laboratory wastes require segregation into compatibility groups. Each laboratory will be required to segregate their wastes into at least the following eight categories:

(1) Organic Acids
(2) Mineral Acids
(3) Bases
(4) Nonhalogenated Organics
(5) Halogenated Organics
(6) Mercury
(7) Waste oils (pump oil etc.)
(8) Radioactive Materials

b. Each laboratory will maintain clearly marked waste containers indicating the category of waste they hold. Wastes will be stored in these containers and will be transferred to the designated hazardous waste storage room (Bldg #1W Rm #AB-37c). One or two gallon jugs are considered suitable and will be provided by the department generating the waste. Each jug should be labeled with the date of first use.

f-3 Waste Pickup: Hazardous waste materials generated at the Toledo CBOC will be disposed of through our hazardous waste contract and should be left in the generating department. Waste chemical materials generated at Ann Arbor Campus work stations will be picked up and transported to the hazardous waste storage room (Bldg #1W Rm #AB-37c) at least weekly. It will be the responsibility of the head of each department to designate a trained person to coordinate the transfer in a manner that will minimize the possibility of spills or leakage. Whenever possible, containers should be moved in carts. Glass bottles must be carried in protective bottle carriers provided by the department generating the waste.

f-4 Labeling and Record Keeping: At the time of waste pickup, each container must be labeled with the following information:

a. The words "Hazardous Waste"

b. Room Number
c. Principal investigators name
d. Date
e. Major constituents

f-5 Packaging, Labeling, and Manifesting for Shipment: Packaging of waste into approved drums for shipment, labeling of the drums, and manifesting for transportation will be done by the disposal company, as called for in the disposal contract. It will be the responsibility of the Safety Manager or Industrial Hygienist to confirm that all procedures are conducted according to the specifications of the contract, and in accordance with state, federal, and local regulations. The Safety Manager or Industrial Hygienist is required to verify the accuracy of the shipping manifest.

f-6 Drain Disposal of Chemicals:

a. Drain disposal of chemicals is limited by local ordinances and by the potential danger of corrosion, fires, explosion, and generation of toxic fumes. It is important that employees be aware that drains from the different locations are interconnected, and that dangerous reactions can occur when wastes from different lab mix.

b. The quantities of waste that can be disposed of at any one time will be limited to a few grams or a few hundred milliliters of solution. Disposal of material down the drain is to include flushing with at least a 100 fold excess of water.

f-7 Policies Regarding Disposal of Specific Chemicals:

a. Disposal of wastes will be done according to federal, state, and local regulations. Disposal of wastes through the sewer system is regulated according to city ordinances.

b. Acids.

(1) Most acids may be neutralized and flushed down the drain with a 100 fold excess of water. Neutralization should be to pH 7 to 8 with a sodium carbonate solution. Neutralization can be monitored with pH paper, methyl red/thymol blue, or universal indicator. Note that drain disposal of some acids, even after neutralization may be inappropriate due to their anion content. For example, dichromic acid should never be poured down the drain.

(2) Care must be exercised in conducting the neutralization reaction since heat is produced and an uncontrolled reaction may become violent. Personnel conducting the neutralization must wear proper protective equipment including a lab coat or apron, gloves, and eye protection.

c. Bases. Bases may generally be neutralized and flushed down the drain with a 100 fold excess of water. Neutralization should be to a pH of 7 to 8, and can be accomplished with sodium bisulfite. Note that drain disposal of some bases, even after neutralization may be inappropriate due to their cation content. (See list at the end of the attachment if there is any question. As with acid neutralization, care must be used in neutralization of bases. See the previous section for precautions.)

d. Halogenated Organics. Halogenated organics such as chloroform and carbon tetrachloride are not suitable for drain disposal. These materials must be stored in waste disposal jugs for removal by the contracted waste disposal company.

e. Nonhalogenated Organics.

(1) Some nonhalogenated organics that are highly soluble, nonreactive, of low toxicity, and low volatility may be disposed as dilute solutions through the sewer system. Those that do not meet these guidelines must be saved for disposal by the contractor.

(2) Generally if 100 mg of the substance is soluble in 3 ml of water, then drain disposal is permissible. This criterion excludes hydrocarbons, nitro compounds, mercaptan, and oxygenated compounds with more than five carbons.

f. The National Academy of Sciences has developed the following list as a guide to materials that can be disposed of through the sewer system. If a material is not on the list, it should be saved for removal by the contractor.

(1) Alcohols. Alkanediols with less than 8 carbons, t-amyl alcohol, glycerol, sugars and sugar alcohols, alkoxyalkanols with less than 7 carbons.

(2) Aldehydes. Aliphatic aldehydes with less than 5 carbons.

(3) Amides. $RCONH_2$ and RCONHR with less than 5 carbons, $RCONR_2$ with less than 11 carbons.

(4) Amines. Aliphatic amines and diamines with less than 7 carbons, benzylamine, pyridine.

(5) Carboxylic Acid. Alkanoic, alkanedioic, and hydroxyalkanoic acids with less than 6 carbons. Aminoalkanoic acids with less than 7 carbon atoms, ammonium, sodium, and potassium salts of the above classes with less than 21 carbon atoms.

(6) Esters. Esters with less than 5 carbons, isopropyl acetate.

(7) Ethers. Tetrahydrofuran, dioxane, dioxolane.

(8) Ketones. Ketones with less than 6 carbons.

(9) Nitriles. Acetonitrile, propionitrile.

(10) Sulfonic Acids. Sodium or potassium salts.

g. Inorganics. Small amounts of lox toxicity inorganics may be flushed down the drain as dilute solutions. If large amounts are to be disposed of, or if solutions are of high concentration, the salts may be precipitated out and separated from the fluid. The collected precipitate must then be disposed of with the hazardous waste, while the fluid may be flushed down the drain.

h. Small amounts of the following anions and cations may be disposed of down the drain after pH neutralization if needed.

CATIONS	ANIONS
Aluminum	Bisulfite
Calcium	Borate
Copper	Bromide
Iron	Carbonate
Hydrogen	Chloride
Potassium	Hydroxide
Lithium	Iodine
Magnesium	Oxide
Sodium	Phosphate
Strontium	Sulfate
Tin	Sulfite
Zinc	Thiocyanate
Zirconium	

i. Cyanides and Sulfides. Cyanide and sulfide waste must be handled with special care due to the possibility of toxic gas production. Waste cyanides must be stored in a bottle designated exclusively for these materials. It is important to keep cyanide and sulfide wastes away from acids. They should not be disposed of down the drain due to the danger of toxic gas production in pipes. Save sulfide and cyanide waste in tightly sealed containers for proper disposal.

j. Universal Wastes. Batteries (dry cell & lead-acid), pesticides, and devices containing elemental mercury are to be disposed of through the contracted waste disposal company. They

should be placed in the hazardous waste storage room (Building 1W, Rm AB-37c) dated and labeled as “Universal Waste.”

HAZARD COMMUNICATION PROGRAM

Part 1 - General

g-1 General: All employees have a "right to know" the chemicals they are working with that constitute a health hazard when used without special precautions and controls.

g-2 Procedure:

a. Labels and Other Forms of Warning.

(1) The medical center will never accept any chemical which is not labeled, tagged, or marked with the following information:

(a) Identify of chemical(s)
(b) Appropriate hazard warnings
(c) Name and address of the chemical manufacturer, importer, or other responsible party.

(2) No one will ever remove or deface existing labels on incoming containers of chemicals unless the container is immediately marked with the required information.

(3) The labels and/or other forms of warning are to be legible in English and prominently displaced on the container, or readily available in the work area throughout each work shift.

(4) In-house labels should contain information as outlined above in paragraph (1).

b. Material Safety Data Sheets (MSDS): There will be a MSDS on every substance which, when used without special precautions and controls, will constitute a health hazard to employees.

(1) The MSDS will be essentially similar to form OSHA-174 which notes who makes the product, its hazardous ingredients, physical/chemical characteristics, fire/explosion hazard data, reactivity data, health hazard data, precautions for safe handling, and use and control measures.

(2) Every time a substance is ordered that does not have a MSDS on file, VA Form 2237 will indicate the approving official is requesting two MSDS Forms be sent to the medical center on the substance when delivered.

(3) The MSDS will be placed in a binder in the work area so they are readily accessible during each work shift to all employees. Missing MSDSs can be found via a link on the facility's homepage. The Industrial Hygienist and Ambulatory Care Triage Area will maintain a

master set of all MSDS made available to them as well.

(1) MSDS must be reviewed every two years by the using department to keep the list up to date.

(2) When a hazardous chemical arrives without a MSDS on site, the Chief, Acquisition and Materiel Management, must notify the Industrial Hygienist. The Industrial Hygienist will make the decision on whether the chemical should be delivered to the using department. If an exception is allowed, the user will consult with the Industrial Hygienist on the safe use of the chemical. If an exception is not granted, the chemical will be returned to the vendor. The decision to allow an exception must not exceed the next workday.

i. Employee Information and Training: Employees will be provided with information and training on hazardous chemicals in their work area at the time of their initial assignment and whenever a hew hazard is introduced into their work area.

(1) Employee information will include:

(a) The requirements of this chapter.
(b) Any operations in their work area where hazardous chemicals are present.
(c) The location and availability of the written hazard communication program, including the chemical inventory, and material safety data sheets required by this attachment.

(2) Employee training will include:

(a) Methods and observations used to detect the presence or release of a hazardous chemical into the work area.
(b) The physical and health hazards of the chemicals in the work area.
(c) The controls employees must take to protect themselves from chemical hazards, e.g., personal protective equipment, appropriate work practices, emergency procedures, etc.

g-3 Responsibilities:

a. Industrial Hygienist:

(1) Compiling a master set of MSDS for himself and the Triage Area.

(2) Employee information as outlined.

b. Supervisory Personnel.

(1) Ensure all containers are labeled, tagged, or marked as outlined.

(2) See that MSDS are available to all their employees during each work shift.

(3) Employee training as outlined.

(4) Retrieving MSDS via the VAAAHS Homepage under the Misc Documentation Section (left hand side of the page).

c. Acquisition and Materiel Management. To ensure the MSDS is provided by the manufacturer when ordered by the using department.

Part 2 - List of Hazardous Chemicals which have a MSDS

See either of the master sets in Building 3, Room 107 or the triage area.

Part 3 - Informing the Employees of the Hazards Associated with Non-Routine Tasks

Non-routine tasks are only done with and under the supervision of supervisors knowledgeable in the health risks involved. They will have informed and trained employees on the safe work practices associated with this non-routine task.

Part 4 - Informing Contractors of Hazardous Chemicals to Which Their Employees May Be Exposed

Contractors will refer to the medical center's hazard communication program.

Part 5 - Informing Employees of Contractors Hazardous Chemicals To Which They May Be Exposed

Employees can request MSDS for contractors' chemicals, through the Industrial Hygienist.

Additional References:

a. OSHA: Material Safety Data Sheet, Cincinnati, Ohio, Government Printing Office, 1977
b. National Safety News. 131(1): 66-67 (1983)
c. DM&S Circular 00-86-21, dated June 16, 1986
d. DM&S Circular 00-86-21 Supplement #1,dated August 6, 1987
e. VHA Circular 10-91-108, dated September 20, 1991

ETHYLENE OXIDE

h-1 General: Ethylene oxide, used in the sterilization of materials that cannot be autoclaved, presents a number of hazards to both the user and to other hospital personnel. The following hazards are to be considered in the use of this material.

a. Toxicity. Studies of exposed workers have shown that ethylene oxide can produce cancer, genetic damage, and neurological disease. In addition it is both a reproductive hazard and causes allergic reactions in some people. Despite its toxicity, ethylene oxide has poor warning properties and individuals may be unaware of exposure.

b. Fire Hazard. Ethylene oxide gas is highly flammable and explosive. It is easily ignited by sparks or flame, and must not be used in the presence of an ignition source. Mixtures of ethylene oxide, such as that used in the large sterilizer, are less hazardous but still must be handled with care.

c. Pressure Hazards. Cylinders and canisters of ethylene oxide are pressurized and must be handled according to safe practices for pressurized gas cylinders. See Chapter 5 of the hazardous material policy for safety information regarding compressed gas.

Use of ethylene oxide will be in accordance with accepted safety practices and state, federal and local laws. OSHA regulations require an extensive safety and health program if exposures above the action level of 0.5 ppm are possible. Monitoring done by Industrial Hygiene consultants for the VA indicate that current exposures are well below that level. Despite the documented low levels of exposure, the following program which includes training, monitoring, and an option for medical supervision, will be followed.

h-2 Monitoring:

a. Baseline surveys. The eight hour TWA exposures have been found to be below the VA Recommended Exposure Limit (VA REL) of 0.5 ppm and the Excursion Limit (EL) of 5 ppm. Further baseline studies will be conducted if the SPD monitoring program indicates an increase in exposure levels, or if a change is made in the sterilization process.

b. Monitoring. SPD will conduct an on going program of monitoring employees who work in the area of ethylene oxide use. An employee is to be monitored, using a passive dosimeter, at least once a week. The day of the week on which each employee is monitored should rotate so that over several months each employee will have been monitored at least once on each day of the week. Alternately, all monitoring may be conducted on days of anticipated highest exposures. Records of weekly monitoring will be maintained in SPD and with the Industrial Hygienist. Each monitored employee is required to be notified of the results within 15 working

days.

EL monitoring will be conducted annually. Monitoring for the EL will be done when removing a load from the sterilizer.

a. Area Alarm – There are two alarm set points. An intermittent horn will sound at 2 ppm and a constant horn will sound at 5 ppm.

b. Leak Testing - Leak tests of all lines and the doors are to be made during normal operation on a semiannual basis. Connectors and valves are to be tested by the General Repair Shop whenever maintenance is performed. These tests can be made with a liquid leak detector (e.g., water/soap solution or other suitable leak detection fluid). Records of all leak tests are to be maintained in SPD. Any leaks are to be reported to Facilities Operations Section.

h-3 Training: The Safety Manager and/or Industrial Hygienist will provide training and educational materials to the Chief of SPD or a representative who will be responsible for training of employees. Pre-assignment and annual training will include instruction in the following areas:

a. Requirements of the OSHA ethylene oxide standard.

b. Operations utilizing ethylene oxide in their area.

c. Location and availability of copies of the OSHA standard and policy.

d. Availability of medical surveillance for employees who may have been exposed at or above the VA REL of 0.5 ppm.

e. Methods and observations that may be used to detect ethylene oxide in the work area.

f. The physical and health hazards of ethylene oxide including symptoms of exposure.

g. The measures employees can take to prevent or minimize their exposure to ethylene oxide.

h. Details of the VA hazard communication program, including the labeling requirements and availability of information regarding ethylene oxide hazards and use.

h-4 Labeling:

a. Areas where ethylene oxide is used, and doorways leading to those areas will be posted with signs bearing the following warning:

DANGER
ETHYLENE OXIDE
CANCER HAZARD AND REPRODUCTIVE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE
CLOTHING MAY BE REQUIRED
TO BE WORN IN THIS AREA

b. Ethylene oxide tanks and storage cabinets will also be labeled with the following warning:

CAUTION
ETHYLENE OXIDE
CANCER AND REPRODUCTIVE HAZARD

AVOID BREATHING FUMES
DO NOT EXPOSE TO FLAME
OR IGNITION SOURCES

c. Emergency response procedures are to be posted at the entrance to SPD as described in section

d. No smoking signs should also be posted.

h-5 Receiving and Storage: Ethylene oxide canisters are to be stored only in PD. They should be brought directly to SPD.

h-6 Personal Protective Equipment(PPE): The facility will provide workers with all necessary protective equipment to ensure their safety. PPE will include, but may not be limited to, the following:

a. Respirators approved for ethylene oxide by NIOSH (TC-14G-134). Air canisters should be discarded when the color indicator changes from yellow (safe) to green-blue (unsafe). Use of respiratory protection is required when SPD personal monitoring results have been shown to exceed the VA REL or EL. Respirators will also be used in the following circumstances:

(1) In work operations, such as maintenance and repair activities, or other activities for

which engineering and work practice controls are not feasible.

(2) In emergencies.

(a) Protective, impermeable clothing. Protective clothing must completely cover street clothing including shoes and is to be replaced if it becomes contaminated.

(b) Gloves of an impermeable material are to be used whenever there is a chance of exposure to liquid ethylene oxide or solutions containing ethylene oxide.

(c) Splash proof goggles must be provided and worn whenever there is chance of exposure to liquid ethylene oxide or ethylene oxide containing solutions. Goggles must also be worn whenever pressurized lines or fittings are being worked on.

All personal protective equipment will be selected and provided in accordance with OSHA regulations, 29 CFR 1901.132 and 1910.133. Respirator selection and use will be in compliance with 29 CFR 1910.134 and 30 CFR Part 11.

The Industrial Hygienist and/or Safety Specialist will be responsible to ensure that PPE is used during the following events:

1 During spills or emergencies.

2 During maintenance and repair.

3 Whenever nonroutine exposures might be expected to occur.

h-7 Spill or Leak Response:

a. In the event of an ethylene oxide spill or leak, the following steps will be taken:

(1) All employees are to evacuate the area immediately.

(2) Notify Safety and Industrial Hygiene at extensions 55418 and 55417.

(3) Notify Police on weekends or evenings.

(4) Entry into the contaminated area will only be done with one person (Industrial Hygienist) in and another (Safety Specialist) out.

(5) Re-entry into the contaminated area is prohibited until clearance is given by the Safety Specialist or Industrial Hygienist.

(6) All overexposed personnel are to be seen by a physician.

(7) An accident report is to be filed with the Safety Specialist if there is an overexposure.

(8) Clean up will be conducted by workers equipped with air supplied respirators and other proper protective equipment.

b. In the event that the exhaust alarm sounds, no EtO loads are to be processed. If a load is in cycle, the following emergency steps will be taken:

(1) All employees are to evacuate the area immediately.

(2) Notify the Electric/HVAC Shop (pager 525, phone 55428).

(3) Notify Safety and Industrial Hygiene, phone 55418 and 55417.

(4) Entry into the contaminated area will only be done with one person (Industrial Hygienist) in and another (Safety Specialist) out.

(5) Notify Police on weekends or evenings.

(6) Re-entry into the area is prohibited until clearance is given by the Safety Specialist or Industrial Hygienist.

(7) All overexposed personnel are to be seen by a physician.

EMERGENCY RESPONSE PROCEDURES AND PHONE NUMBERS OF RESPONSE PERSONNEL ARE TO BE POSTED AT THE DOOR OF SPD.

h-8 Record Keeping: As required by OSHA regulations, the following records will be maintained for 30 years. Records will be maintained by SPD and will be available to the safety office.

a. Records of baseline surveys of exposure to ethylene oxide.

b. Monitoring records for all personal dosimeter monitoring conducted by SPD. These will include:

(1) The date of measurement.
(2) The operation involving exposure which is being monitored.
(3) Sampling and analytical methods used.
(4) Records of calibration or evidence of analytical accuracy.
(5) Number of samples taken, duration of sampling, and results of analysis.
(6) Type of protective devices worn, if any.
(7) Name and exposure levels of monitored employees.
(8) Name of person responsible for conducting the analysis.

c. Records of leaks or spills will be maintained by Facilities Management and include at least the following information:

(1) Date of incident.
(2) Estimated amount of material spilled or leaked.
(3) Names of exposed personnel.
(4) Cause of the spill.
(5) Any medical consequences.

d. Medical records will be maintained for any employee who participates in the medical surveillance program.

h-9 Medical Surveillance: In accordance with OSHA regulations, a medical surveillance program will be made available to any employee exposed above the VA REL for 30 days or more per year. Medical exams will meet OSHA requirements.

ANESTHETIC GAS

i-1 General: Waste anesthetic gases have been shown to present a number of health hazards to exposed personnel. Primary among the adverse effects are an increased frequency of spontaneous abortions and an increased incidence of congenital malformations among children of exposed women and the wives of exposed men. A number of other health problems including cancer, liver, and kidney disease have also been associated with exposure to waste anesthetic gases. Moderate exposure levels have also been shown to cause decreased performance on tests involving audiovisual tasks. Higher levels of exposure are both an acute health hazard and a fire hazard.

i-2 Permissible Exposure Limits: The federal government has not yet issued a legally enforceable limit on exposure to waste anesthetic gases. The National Institute of Occupational Safety and Health (OSHA) however, has recommended that Nitrous Oxide levels be limited to an average of 25 ppm during the time of anesthetic administration. In addition it has been recommended that the use of halogenated anesthetics be controlled such that no worker is exposed to levels over 2 ppm. Levels of halogenated anesthetics are difficult to assess, however it can be assumed that they will be below 2 ppm if nitrous oxide levels are kept below 25 ppm.

It will be medical center policy to strive to attain the lowest level of worker exposure to nitrous oxide possible. Average levels are not to exceed 25 ppm during anesthetic administration.

i-3 Monitoring Programs: Compliance with the 25 ppm exposure limit for nitrous oxide will be insured through a regular monitoring program, which will include the following components:

a. A baseline survey documenting current exposure levels.

b. Quarterly monitoring of exposed personnel to insure that exposure levels have not changed significantly.

c. In the event that future regulatory actions mandate the use of audible alarms during anesthesia procedures, such alarms will be installed. Alarms will be operational at all times of anesthetic use in order to warn personnel of gas leaks or accidental releases. Such alarms should be set to sound if nitrous oxide levels exceed 50 ppm.

i-4 Maintenance and Leak Testing: Proper maintenance and inspection of equipment used in the administration of anesthesia is an important part of the health and safety program. Inspections will include, but may not be limited to the following:

a. A visual inspection of all equipment for cracks, tears, or other possible sources of leaks is to be made after each cleaning.

b. Low pressure leak tests, as described in the NIOSH Publication "Criteria for a Recommended Standard for Exposure to Waste Anesthetic Gases and Vapors", are to be made before each use. Leaks must be less than 100 ml/minute at 30 cm water pressure.

c. High pressure leak tests as described in the NIOSH publication referenced above are to be conducted on a quarterly basis.

d. Additional information on testing of equipment for leaks may be obtained from the NIOSH publication "Development and Evaluation of Methods for the Elimination of Waste Anesthetic Gases and Vapors in Hospitals" (GPO Order No. 1733-00061, Superintendent of Documents, U.S. Government Printing Office, Washington D.C., 20402).

i-5 Work Practices: Proper work practices are perhaps the most important part of any program designed to minimize exposure to waste anesthetic gases. It has been estimated that in some cases proper work practices can reduce exposures by as much as 90%. Proper work practices will include, but are not limited to, the following:

a. Waste gas disposal systems will be connected and tested prior to beginning administration of anesthetics.

b. Vaporizers will be filled in a well ventilated area and in a manner to minimize spillage.

c. Vaporizers will be turned off when not in use.

d. All leaks detected by leak tests or nitrous oxide detector systems, will be repaired before the equipment is used again.

e. Anesthetic flow will not be started before necessary for the induction of anesthesia.

f. When the breathing circuit is disconnected from the patient, the flow meters will be turned off, or the Y piece sealed.

g. The breathing bag will be emptied into the scavenging system before it is disconnected.

i-6 Training: The chief of each department is then responsible for training of employees. Training will be provided before assignment and on annual basis thereafter. Training will include at least the following:

a. A presentation of VA Policy on anesthetic gases.

b. Information regarding the availability of NIOSH documents and other relevant safety and health information.

c. Information regarding the health hazards associated with occupational exposure to nitrous oxide.

d. Information regarding results of the monitoring program.

e. A summary of methods that are being used to minimize exposures.

i-7 Medical Monitoring: A medical monitoring program will be made available to all potentially exposed employees. The program will include, but not be limited to, the following:

a. Comprehensive pre-placement occupational and medical histories with special attention to outcomes of pregnancies of the employee or the employee's spouse. Histories will be updated annually.

b. Pre-placement and annual physical examinations of exposed employees. Employees will be advised of the potential adverse effects of exposure to waste anesthetic gases.

c. Employees will be advised of the potential adverse effects of exposure to waste anesthetic gases.

d. Any adverse outcomes of pregnancies of the employee, or the employee's spouse, will be documented as part of the employee's medical record.

e. Medical records will be maintained for 20 years following termination of employment.

i-8 Labeling and Posting: Containers of volatile and gaseous anesthetic agents will be clearly labeled with the warning shown below. Areas adjacent to rooms where anesthesia is used will be similarly posted.

(NAME OF AGENT)
CAUTION: HARMFUL IF INHALED CONTINUOUSLY
USE ONLY WITH ADEQUATE
VENTILATION AND/OR SCAVENGING SYSTEM
KEEP AWAY FROM HEAT, SPARKS, OR OPEN FLAME

i-9 Waste Disposal: Waste anesthesia is to be disposed of in accordance with policies described in Attachment F. Nitrous oxide gas may be vented directly to the outside air. Liquid waste will be collected in jars labeled with the contents, date, and responsible department, and stored in the

hazardous waste storage room (Bldg #1W Rm #AB-43) until the day of waste pickup.

SPECIAL POLICIES

j-1 General: Some materials that are used regularly at this facility present unusual or exceptional hazards. Use of these materials is regulated under both the general hazardous materials policies and by special policies developed during consideration of the particular hazards. The following materials are regulated under special policies found in the following sections:

a. Mercury

b. Picric Acid

c. Formaldehyde

d. Calcium Hypochlorite

e. Cytotoxic Drugs

f. Radioactive Materials

g. Disposal of Biohazardous Fluids

j-2 Mercury Policies:

a. General. Mercury, and compounds containing mercury, present a significant hazard by inhalation or absorption through the skin. Chronic exposures to relatively low levels of mercury vapor are associated with a number of neurological problems. In addition mercury is a major environmental pollutant and must be disposed of properly.

b. Permissible Exposure Limits.

(1) OSHA ceiling limit: 0.1 mg/m3
(2) NIOSH recommendation: 0.05 mg/m3
(3) ACGIH recommendation: 0.05 mg/m3

c. Personal Protective Equipment. Standard safe laboratory procedures should be followed when handling mercury. Due to its ability to penetrate skin, plastic or rubber gloves should always be worn. In addition, impervious protective clothing, such as an apron or disposable chemical resistant lab coat is called for. Mercury contaminated clothing is especially hazardous and should be removed as soon as possible.

d. Work Practices.

(1) Use Mercury only in a well ventilated area, preferably in a hood.
(2) Wash hands immediately after each use.
(3) Smoking and eating in areas of mercury use are prohibited.
(4) Contact lens should not be worn while using mercury.
(5) Containers of mercury are to be kept tightly sealed to prevent escape of vapors.

Spill Procedures: (See Policy Memorandum S-13, Mercury Spill Decontamination.)

e. Monitoring. Mercury vapor monitoring will be conducted in all areas of mercury use on an annual basis. In addition, monitoring will be conducted following any spill. Mercury monitoring will be conducted under the supervision of the facility industrial hygienist.

f. First Aid.

(1) Skin. Wash with soap and water. If irritation persists, seek medical attention.

(2) Eyes. Flush with water. Seek medical attention.

(3) Ingestion. If the victim is conscious, give large amounts of water and induce vomiting. Seek medical attention.

g. Disposal: Elemental mercury is not to be poured down the drain. Save used mercury in a waste disposal jar for removal in accordance with policies described in Chapter 6.

j-3 Picric Acid Policies:

a. General. Picric Acid, when it is dry, is a shock and heat sensitive explosive. Bottles of solid material are shipped containing 10-12% water and must not be allowed to dry. The chemical is also safe while in solution.

b. Storage.

(1) A maximum of 2 bottles will be stored at this facility at any given time. These bottles will be stored in the common equipment room in research.

(2) Each bottle must be clearly labeled. The information that must be included on the

label will follow the format outlined below:

PICRIC ACID
Original date of Purchase
Dates of each inspection, and water addition
Expiration date
Name of Purchaser

The effective date of expiration occurs two years from date of purchase.

(3) Any picric acid purchased by an entity other than the VA should not be utilized in this facility.

(4) Picric acid bottles will be checked for water content on a semiannual basis. This check will be made by the designated hazardous materials program coordinator of that department. Water will be added as necessary. Before opening, the bottle should be inspected and if the material appears to have dried out, or crystals have formed around the lid, DO NOT OPEN IT. Call the Safety Officer or Industrial Hygienist.

(5) There will not be any situation in which any liquid containing picric acid is to be disposed of via the laboratory drains. Mixture with certain substances can cause explosions within the pipes as well as toxic emissions.

(6) The compound is extremely sensitive to shock and heat, causing explosions. DO NOT shake or heat bottles containing picric acid.

(7) Contact the Industrial Hygienist, extension 5417 for disposal.

(8) A new supply will not be purchased until it has been confirmed that the current supply is nearly exhausted.

(9) Picric acid is not to be stored in any bottle other than the one it is shipped in. Bottle caps containing metal may react with picric acid to form highly explosive compounds.

c. Handling and Personal Protection of Workers.

(1) All general lab safety practices such as not eating, drinking, or smoking are to be followed.

(2) Any worker using the substance will be required to use proper protective clothing. This will include impervious apron or lab coat, gloves, dust and splash proof goggles, and other

appropriate clothing required to prevent skin contact with solid picric acid or liquids containing it.

(3) If the clothing of an employee becomes contaminated with picric acid, the employee should change into uncontaminated clothing as soon as possible.

(4) Clothing which may become contaminated should be placed in a closed container(s) for storage until it can be discarded or until provisions can be made to remove the substance from the clothing. If the clothing is to be laundered or otherwise cleaned, the person performing the operation should be informed of picric acid's hazardous properties.

(5) Non-impervious clothing which becomes contaminated should be removed immediately and not re-worn until the substance is removed from the clothing.

d. Sanitation Procedures: Workers subject to skin contact with solid picric acid should wash any areas of the body which may have contacted picric acid immediately following contact, and at the end of each work day.

e. Spill Procedures:

(1) In the case of an accidental spill, only persons wearing the proper protective clothing will be allowed to enter the immediate area.

(2) In the case of a picric acid spill the following procedures should be adhered to:

(a) Evacuate unnecessary personnel.
(b) Immediately notify the Safety Office at extensions 55417 or 55418.
(c) Remove all ignition sources from the area.
(d) Ventilate the area of the spill area.
(e) Attempt to reclaim spilled material; however, do not sweep or burn unless this process is supervised by explosive experts.

j-4 Disposal Procedures: Proper disposal of dry picric acid can only be performed by explosive experts. Solutions containing picric acid may also be hazardous if poured down the drain or allowed to come in contact with metals.

a. DO NOT pour any substance containing picric acid down the lab drains. It has the potential of causing explosions within the pipes.
b. All used picric acid should be collected and stored in a closed container for proper disposal. Do not store waste in containers with metal or metal containing caps.

c. To arrange for disposal, contact the Safety Office, 55417 or 55418.

j-5 Formaldehyde Policies:

a. General.

(1) Formaldehyde is a colorless pungent gas found most often as an aqueous solution called formalin (37% or less formaldehyde) or as a solid called paraformaldehyde. Formaldehyde is very irritating to the eyes, skin, and respiratory system. It is very toxic by ingestion or inhalation. It also induces allergic reactions which may progress to asthma.

(2) Formaldehyde is a suspect carcinogen and exposure should be minimized whenever possible. Formaldehyde is highly flammable. Gas released by paraformaldehyde or formalin may ignite on contact with flame or sparks.

b. Handling and Use. Due to its carcinogenic potential, formaldehyde will be used in accordance with carcinogen policies. The minimum requirements are outlined below. See also, the carcinogen policy Attachment D.

(1) Protective Equipment.

(a) Laboratory coats or aprons are required to protect street clothes. Once a lab coat has been exposed to formaldehyde it should be laundered before it is used again. Disposable garments may be more useful than washable ones.

(b) Gloves are to be worn at all times when working with formaldehyde.

(c) Splash-proof goggles are to be worn at all times.

(d) Formaldehyde is to be used only in a laboratory fume hood or with other adequate ventilation.

(2) Labeling and Training.

(a) All formaldehyde use and storage areas are to be marked as described in the carcinogen policy.

(b) Containers of formaldehyde must be labeled as containing a possible carcinogen.

(c) Personnel using formaldehyde will be trained in the hazards of its use and will be familiar with the VA carcinogen policy.

(3) Inspection and Monitoring: Any operation in which formaldehyde is used on a regular basis will be reviewed by the Industrial Hygienist. If significant exposures are possible, environmental monitoring will be conducted to assess whether or not exposure is in excess of the Permissible Exposure Limit of 0.75 ppm or the Short Term Exposure Limit of 2 ppm.

j-6 Calcium Hypochlorite Policies:

a. Synonyms.
Calcium Oxchloride (incorrect name)
Bleaching Powder
Chlorinated Lime

b. General. Calcium hypochlorite is a powerful oxidizing and bleaching agent. It is toxic and presents a fire hazard on contact with combustible or organic materials. It also reacts with water or alcohol to release highly toxic fumes.

c. Toxicity. High via oral or inhalation routes. Powder is a severe irritant of skin, eyes, and mucus membranes. Fumes released on contact with water or alcohol or on heating are extremely toxic.

d. Fire-Explosion Hazard. Moderate to high. May ignite acids or organic materials on contact. Explosive if in contact with carbon tetrachloride (CCl_4).

e. Handling Precautions. Wear rubber gloves, use in a hood, wear eye protection, wear apron or lab coat.

f. Incompatibilities. Water, alcohols, carbon tetrachloride, reducing agents, combustible organics.

g. Hazard Potential. Great. If contact with carbon tetrachloride occurs, an explosion may result. If heating or contact with water or alcohol occurs, evacuate the area and contact the Safety Office, extension 5417 or 5418.

j-7 Cytotoxic Drug Policies

a. General: The use and disposal of cytotoxic drugs is regulated in a manner to minimize the exposure of hospital employees to these materials. Proper procedures for their use are described in Policy Memorandum 119-6, Hazardous Drug Safety & Health Plan: Preparation,

Administration and Disposal of Cytotoxic Agents.

b. Disposal: Disposal of cytotoxic drugs will be in accordance with JCAHO guidelines and Federal and State regulations. All material contaminated with these agents will be segregated and marked as cytotoxic. These materials must be incinerated at a temperature of at least 1832 degrees Fahrenheit. Incineration is conducted by a contracted disposal company.

j-8 Radioactive Materials Policy:

a. General: Radioactive materials are considered a special class of hazardous materials, and are to be handled in accordance with both the general hazardous materials policy and special radiation policy referenced below.

b. Disposal: The method of disposal of radioactive waste will be dependent on both the particular isotope that is present, and on the level of radiation. If the waste contains only Carbon-14 and Tritium, and the total activity is less than .05 microcuries per gram, then the material may be disposed of as chemical waste. The decision about which materials will be disposed of as chemical waste and which will be disposed of as radiation waste will be made by the Radiation Safety Officer in accordance with the facility radioactive materials permit issued to the Department of Veterans Affairs by the Nuclear Regulatory Commission (NRC) and in accordance with NRC regulations.

c. Radiation Safety Office Policy: The following policy has been developed by the Radiation Safety Office: Policy Memorandum S-1, Radiation Safety Committee and the ALARA Program.

j-9 Disposal of Biohazardous Fluids:

a. Purpose: The purpose of this memorandum is to define which biologic fluids are infectious and thus hazardous and to outline their proper disposal.

b. Policy: According to the CDC in "Morbidity & Mortality Weekly Report" of 6/24/88, hazardous biologic fluids are the following: blood, body fluids (CSF, pleural, peritoneal, synovial) and any other fluid which bathes internal organs. Nonhazardous fluids are sweat, tears, saliva, nasal secretions, sputum, vomitus, urine, and fecal material. Several different containers are used to hold these fluids. Glass vacuum bottles are used to extract and hold peritoneal fluid; large suction bags are used in the operating room to hold fluids encountered during operative procedures; smaller suction bags are used in the SICU/MICU areas to hold both hazardous and nonhazardous fluids. Pleurovacs are used for pleural fluid. Finally, hard plastic suction containers are used on the general nursing units to hold gastric and pulmonary secretions. The handling of these fluids should be aimed at minimizing the risk of exposure to those handling

them.

c. Procedures: In general the method of disposal of fluids is based on the hazard involved in the fluid itself and the design of the container, which may require special handling to prevent leakage.

(1) Peritoneal Fluid Bottles: The fluid is hazardous because it is a fluid bathing internal organs. The containers are glass, not designed for emptying without generating aerosols of hazardous fluid. Best disposal method is incineration of the intact bottle.

(a) The bottles will be distributed to wards by SPD.

(b) After the paracentesis is complete, Patient Care personnel place the bottles in an 18 gallon sharps container.

(c) The sharps containers will eventually be removed from the ward by Facilities Maintenance.

(d) The sharps containers will be placed on the infectious waste trailer.

(2) Operating Room Suction Canisters: The fluid is hazardous and contains both blood and body fluids. The containers are heavy plastic but may leak if the container is handled roughly. These units are not designed to be emptied. Because of the fluids involved and the design of the container, the best disposal is incineration of the intact container.

(a) Once filled, the tubing is removed and caps are used to seal the unit.

(b) The filled units are then collected and placed in red bagged lined boxes located at either end of the O.R. suites.

(c) The units are packaged and moved to the infectious waste truck by Facilities Maintenance personnel, in a manner which will minimize handling.

(3) MICU/SICU Suction Canisters: The fluid is typically not hazardous, but on occasion can have blood in the unit. The canisters differ from those in the operating room in that they do not have a cap. A loop of tubing is used to seal the unit. Units are not designed for emptying. The best disposal is incineration of the intact container.

(a) Once filled, the tubing is secured, thus sealing the unit.

(b) The filled units are then collected in red bags in specific areas of each unit for

removal.

(c) The bags are boxed and moved to the infectious waste truck by Facilities Maintenance personnel, in a manner which will minimize handling.

(4) Pleurovac Containers. Fluid is hazardous because it bathes internal organs. The container is not designed for emptying. The best method of disposal is incineration of the intact container.

(a) Once treatment is completed the tubing is doubled-knotted to seal the unit.

(b) The container is placed in a red bag and the bag taped closed.

(c) The bag is boxed and taken to the dock by Facilities Maintenance along with other red-bagged trash.

(5) General Medical Units Suction Canisters - Fluid is not hazardous unless visibly contaminated with blood. The container is hard plastic and designed to be emptied. Once filled, the contents are measured and then disposed of in the dirty utility sink. The container is reusable. After suction is discontinued, the container is emptied into the dirty utility sink and then disposed of in the red bag trash.

(6) Drug Return by Patients: Drugs will not be accepted from sources outside of VAAAHS. Anyone attempting to return drugs will be given a copy of Washtenaw County's pamphlet entitled, "Prescription Drug and Personal Care Product Disposal". Additionally, Policy Memorandum 119-9, "Drug or Product Recall and Return" will be followed.

MEDICAL/INFECTIOUS WASTE MANAGEMENT PLAN

k-1 General: Infectious waste materials may present a hazard to both employees and patients. Hospital policy on the handling of infectious material will be in accordance with the Joint Commission, Environmental Protection Agency, and Centers for Disease Control and Prevention recommendations. For those areas in which these agencies do not agree, the most conservative guidelines will be followed.

k-2 Responsibilities:

a. The Infection Control Committee will develop policies for the handling and disposal of infectious material.

b. All employees are responsible for following proper procedures for handling infectious waste as described in this policy and as required by the Infection Control Committee and its manual.

c. The Industrial Hygienist, Joseph Jurasek, is the individual responsible for the overall management of infectious waste.

k-3 Infectious Waste Definition: Any hospital waste that can reasonably be expected to be contaminated with organisms that could cause infection is to be handled as infectious waste. A certain amount of professional judgment is called for in deciding whether a material is infectious; however, the following materials should always be considered as infectious.

a. Blood and Blood Products
b. Sharps (syringes, blades, needles, etc.)
c. Pathological Waste
d. Non-autoclaved laboratory waste
e. Other biological materials, such as animal carcasses and bedding

k-4 Segregation of Wastes: Infectious wastes will be segregated from noninfectious waste at the point of generation. All infectious waste is to be disposed of in red bags. Objects capable of producing injury, such as sharps, will be disposed of in sharps containers. Under no circumstance are red bags to be used for disposal of noninfectious wastes.

a. Red bags generated at the Ann Arbor campus will be placed in UN or DOT approved containers. Those containers will be placed on a trailer parked at the dock adjacent to Bldg# 1E Rm# CB-21 until shipment.

b. Red bags generated at the Toledo, Flint and Jackson CBOCs will be placed in UN or

DOT approved containers. Those containers will be stored on site until shipment.

c. Sharps containers generated at the Ann Arbor campus, with the exception of those generated in Chemo and Radiation procedures, will be placed in UN or DOT approved shipping racks. Those racks will be placed in Bldg#1 W Rm. #B-700 until shipment.

k-5 Disposal of Waste:

a. All bags of infectious waste are to be disposed of by incineration at a contracted facility. If microbiologic infectious waste, which has been autoclaved, are mixed with general waste, it should be placed inside another bag of the type used for noninfectious waste to indicate that it is no longer infectious.

b. All bags of infectious waste generated at the VAAAHS will be shipped directly by Stericycle in Warren, Ohio for incineration at their facility. Ash from the waste is shipped to Carbon Limestone Landfill in Lowellville, Ohio.

c. All sharps containers generated, with the exception of those generated in Chemo and Radiation procedures, at the Ann Arbor Campus, will be shipped directly by Stericycle for treatment (autoclaving and shredding) at their facility in Sturtevant, Wisconsin. The treated waste is then landfilled at Metro Landfill and Recycling Franklin, Wisconsin.

k-6 Sharps Return by Patients: Sharps will not be accepted from sources outside of VAAAHS. Anyone attempting to return sharps will be given a copy of EPA's pamphlet entitled, "Disposal Tips for Home Healthcare".

SPILL CONTROL PLAN

l-1 General: Unplanned releases of toxic or hazardous chemicals may threaten the health and well being of hospital employees, patients, and visitors, as well as the surrounding community. It is the responsibility of all hospital personnel to recognize potential hazards and to be familiar with the proper actions to be taken in response to a spill or other accident.

l-2 Responsibilities:

a. The Industrial Hygienist and the Safety Committee are responsible for the development and implementation of a spill response program.

b. The Industrial Hygienist is responsible for training the chief of each department or the chief's representative in the proper responses to a spill or other emergency.

c. The chief of each department or the chief's representative is responsible for training employees in their department.

d. The Industrial Hygienist is responsible for coordinating the in-house spill response team and for providing communication with local police and/or fire (HazMat) officials.

e. All hospital employees are responsible for notifying their supervisors of potentially hazardous conditions.

l-3 Policies for Pre-Emergency Planning:

a. An emergency response team will include, but may not be limited to:

(1) Industrial Hygienist
(2) Radiation Safety Officer
(3) Safety Manager

b. Spill kits are located in the warehouse and throughout PALMS and Research Service. Spill kit training will be conducted for all employees on a pre-assignment basis by their supervisor. Additional training will be offered upon request through the Safety Office.

c. The emergency response team will only be called if a spill occurs which cannot be handled with an ordinary spill kit. The team will decide whether or not a HazMat team will be called in.

d. The fire department is to be contacted and informed of potential hazards in the facility.

l-4 General Procedures for Spill Response:

a. Clear the area of unnecessary personnel.

b. Determine whether the spill can be handled with an on-site spill kit.

(1) If the spill can be cleaned up with a spill kit, initiate clean up.
(2) If the spill cannot be handled with a spill kit, call extension 53333 for assistance.

c. The response team will then decide whether or not to contact HazMat officials.

CHEMICAL HYGIENE PLAN

m-1 General: This plan is responsible for protecting employees from health hazards associated with the use of hazardous chemicals in a laboratory setting. That is primarily achieved by ensuring that employee exposure to chemical substances are always kept below Permissible Exposure Limits (PELs) as set by OSHA.

m-2 Procedure:

a. Standard Operating Procedures: (SOPs) must be adhered to at all times. Those SOPs are basically Medical Center Policy Memorandum S-2 in its entirety.

b. Control Measures:

(1) Criteria for the implementation of controls will include (but will not be limited to):

(a) Identity of chemical substance.
(b) Work task
(c) Duration of exposure.

(2) Priority of controls will be as follows:

(a) Engineering
(b) Substitution
(c) Isolation
(d) Administration
(e) Housekeeping
(f) Personal Protective Equipment

c. Hoods: All fume hoods, biological safety cabinets, and clean benches will have their face velocities checked annually. This is to assure that the average face velocity meets the manufacturer's specifications. Chemo, research, TB and iodination biological safety cabinets will be certified semi-annually. If any of the above mentioned hoods fail, they will be taken out of service until they are repaired.

d. Employee Information and Training: Will be in accordance with the OSHA Lab Standard (29 CFR 1910.1450(f)(3) & (4)).

e. Activities which require prior approval:

(1) Flammable anesthetic gases - require approval by the VISN Industrial Hygienist.

(2) Work with chemicals of a high chronic toxicity will be accomplished according to Attachment D of this policy and pages 47-50 of Prudent Practices for Handling Hazardous Chemicals in Laboratories. A copy of "Prudent Practices" is available for review in the Industrial Hygiene Office.

f. Medical Consultation and Examinations: Will be handled as outlined in Medical Center Policy Memorandum S-12, Medical Surveillance, and Medical Center Policy Memorandum S-3, Appendix G, Safety Management Program. Follow-up exams will be provided under the following circumstances:

(1) Whenever an employee develops signs or symptoms associated with a hazardous substance which they were working with.

(2) Whenever an event (spill, leak, explosion etc.) takes place that results in the likelihood of a hazardous exposure.

g. Chemical Hygiene Officers:

(1) Pathology & Laboratory Medicine Service – Asst. Chemistry Supervisor

(2) Research Service – Program Assistant

(3) Dental Service- Dental Hygienist

(4) Nuclear Medicine Service- Nuclear Medicine Technologist Supervisor

h. Additional Employee Protection:

(1) No food or drink is allowed in any lab.

(2) Fume Hoods and other engineering controls should be used when indicated on a MSDS.

(3) All chemical or infectious wastes will be disposed of in a manner consistent with Attachments F, J, and K of this policy.

(4) Decontamination will occur as outlined on the MSDS.

m-3 Responsibilities:

a. Industrial Hygienist

(1) Instituting proper control measures.

(2) Assuring that all fume hoods have been certified.

b. Supervisory Personnel

(1) Notifying affected employees to the location and availability of the Chemical Hygiene Plan.

(2) Notifying affected employees of the availability of 29 CFR 191.1450 (Occupation Exposure to Hazardous Chemicals in Laboratories Standard).

m-4 Additional References:

a. 29 CFR 1910.1450

b. IL 142-91-002 dated January 28, 1991

c. Prudent Practices for Handling Hazardous Chemicals in Laboratories, National Research Council, 1981.

d. VHA Handbook 1200.8 dated June 7, 2002

CARCINOGENS (SUSPECT & CONFIRMED PER ACGIH)
USED BY RESEARCH PER CHEMICAL INVENTORY OF SEPTEMBER 2008

CONFIRMED HUMAN CARCINOGENS	SUSPECTED HUMAN CARCINOGENS
	ACRYLONITRILE
	BENZENE
	CARBON TETRACHLORIDE
	FORMALDEHYDE

CARCINOGENS (SUSPECT & CONFIRMED PER ACGIH)
USED BY PATHOLOGY & LABORATORY MEDICINE SERVICE
PER CHEMICAL INVENTORY OF SEPTEMBER 2008

CONFIRMED HUMAN CARCINOGENS	SUSPECTED HUMAN CARCINOGENS
	FORMALDEHYDE

REPORTING OF ENVIRONMENTAL INCIDENTS (SPILLS, RELEASES, DISCHARGES)

n-1 General: These reporting procedures describe who and when an outside agency (local, state or federal) should be contacted following an environmental incident and by whom.

n-2 Procedure: Depending on the type of release, the following procedures will be followed:

a. Underground Storage Tanks:

(1) The Department of Natural Resources (DNR) will be contacted within 24 hours of a confirmed release at (517) 373-7660.

(2) The Industrial Hygienist will make this notification.

b. Air Use Permits (Incinerator & ETO):

(1) The DEQ will be contacted by 9:00 am the next working day at (517) 373-7080 when a violation of the permit occurs.

(2) Within 10 days a written report on the incident will be sent to the DEQ District Supervisor.

(3) The Industrial Hygienist will make these notifications.

c. Spills into Navigable Waters:

(1) From which oil or a hazardous substance is discharged greater than a reportable quantity.

(2) Should be reported immediately to the U. S. Coast Guard at
(313) 568-9580 - 8:00 am to 4:30 pm
(313) 568-9524 - 4:30 pm to 8:00 am

(3) The Industrial Hygienist will make this notification

d. Requirements under CERCLA and SARA Title III

(1) See diagram page 60.

(2) The Industrial Hygienist will make this notification.

n-3 Responsibilities:

a. Industrial Hygienist: Is responsible for notifying as outlined in this chapter.

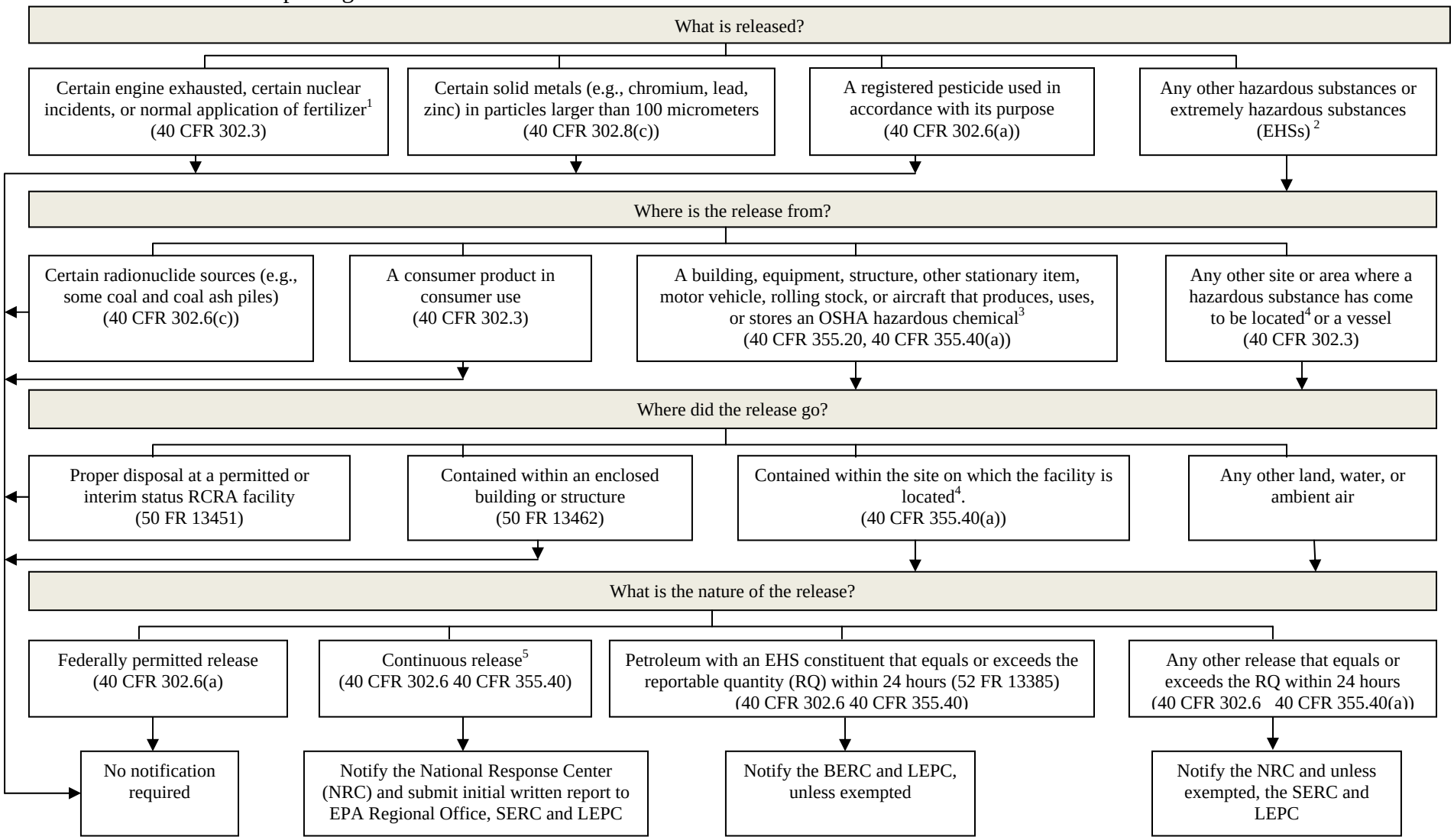
b. Supervisory Personnel: Are responsible for notifying the Industrial Hygienist when the above mentioned type of incidents occur.

n-4 Additional References:

a. Michigan Public Act 478 of 1988
b. Michigan Public Act 348 of 1965
c. 33 U.S.C. 1321 (b)(5)
d. 40 CFR 355
e. CERCLA of 1988

n-5 Flowchart for Reporting Releases of Hazardous Substances Under CERCLA Section (Attached).

Flowchart for Reporting Releases of Hazardous Substances Under CERCLA Section 103 and SARA Title III Section 304



1. Other than these exemptions, a release is broadly defined to include any spilling, soaking, emitting, or discharging into the environment.
2. For a list of CERCLA hazardous substances, see 40 CFR Part 302, Table 302.4; hazardous substances do not include petroleum (unless otherwise listed)
3. Hazardous chemicals are substances defined in the OSHA regulations (29 CFR 19101200(c)), excluding the five exceptions in SARA Title III section 311 (e).
4. Such a release is from a facility as defined by CERCLA only and, therefore, reporting is not required to a State Emergency Response Commission (SERC) or Local Emergency Planning Committee (LEPC) under SARA Title III.
5. Such a release is exempted from reporting to a SERC or LEPC.
6. Any statistically significant increase in a continuous release must be reported to the NRC, SERC, and LEPC.

PEROXIDE FORMING COMPOUNDS

o-1 General: To establish policy and procedures for managing peroxide forming compounds in the Ann Arbor VA Health Care Systems.

o-2 Procedure:

a. General—Certain classes of compounds are capable of forming peroxide during storage. Peroxides in general and organic peroxides in particular are low intensity explosives that are extremely hazardous due to their sensitivity to shock, friction, sparks, and other ignition sources. Many also react violently with strong oxidizers and reducers. In addition to their explosive properties, contamination of some organics with peroxides can initiate violent polymerization reactions.

b. Peroxide Forming Materials—The following materials are capable of forming hazardous peroxides during storage. Peroxide formation is accelerated by exposure to air and light; however, even unopened containers may contain explosive levels of peroxides.

(1) CLASS A—High hazard in storage:

Isopropyl Ether
Divinyl Acetylene
Vinylidene Chloride
Potassium Metal
Sodium Amide

(2) CLASS B—Moderate hazard in storage, high hazard in concentration:

Diethyl Ether
Tetrahydrofuran
Dioxane
Decahydronaphthalene
Ethylene Glycol
Dimethyl Ether
Vinyl Ethers
Acetal
Dicyclopentadiene
Diacetylene
Methyl Acetylene
Tetrahydronaphthalene]
Cyclohexene

(3) CLASS C—Moderate hazard, violent polymerization is possible:

Methyl Methacrylate
Styrene
Acrylic Acid
Acrylonitrile
Butadiene
Tetrafluorethylene
Chlorotrifluoroethylene
Vinyl Acetylene
Vinyl Acetate
Vinyl Chloride
Vinyl Pyridine
Chloroprene

c. Storage:

(1) Purchase and storage will be restricted to the minimum amounts needed.

(2) Ethers will be purchased in the smallest volumes available in order to minimize the amount exposed to air during storage.

(3) Friction, grinding, and impact must be minimized. Glass bottles with screw cap lids or glass stoppers will not be used for storage. Polyethylene bottles with screw cap lids are acceptable.

(4) Peroxides and peroxide forming materials are to be stored in cool dark areas, but must not be allowed to freeze or precipitate because these forms are extremely shock sensitive.

(5) Updated, open containers of ether are not to be used and will be disposed of. In addition, any peroxide forming chemical containing solid particles, or found to have undergone a change in any physical property, must not be used.

(6) Class A compounds may be stored for three months after opening. Class B and C compounds may be stored for up to one year. Opened containers of ethyl ether must not be stored more than one month.

d. Labeling –Each container is to be labeled with the purchase date, the opening date, dates of testing for peroxide content, and the principal investigator's name. Laboratory tape can be used for labeling.

e. Use of Peroxide Forming Chemicals:

(7) Do not return unused portion to the can.

(8) Do not distill or allow vaporizing if peroxides may be present.

(9) Do not use near open flame.

(10) Metal spatulas should be avoided with organics containing peroxides because they may catalyze explosive decomposition; wood or ceramic should be used instead.

f. Testing for Peroxide Formation—Peroxide-forming chemicals will be tested for peroxide content according to the following schedule:

(1) Tests are required when a new container is opened.

(2) Test before any use that involves heating, or procedures that might cause vaporization of solvent. Peroxides are less volatile than solvents and will become concentrated if solvent is allowed to vaporize. It is especially important not to distill peroxide containing solvents.

(3) Open containers of chemicals in Class A above will be tested for peroxide contamination on a monthly basis. Date of testing and the result is to be noted on the container.

(4) Peroxide forming chemicals in Classes B and C above will be testing every three months. Test date and result is to be noted on the container.

g. Peroxide Test Procedures:

(1) The purchaser of the material is responsible for testing. Untested or unlabeled material will be disposed of.

(2) Peroxide content of the chemicals listed above can be determined by any of three methods. The two wet methods as described below are more sensitive and reliable than test strips, but the strips are inexpensive, easy to use, and adequate in terms of performance. Test strips are available from most chemical supply companies.

(3) Wet Test Methods

(a) Prepare a slightly acidic solution of KI, sulfuric acid, and starch indicator. Add 1 ml of Iodine solution to 10 ml of the solvent being tested and shake. A blue color indicates the presence of peroxides.

(b) Prepare a 0.1% solution of sodium dichromate. Add 1 ml of dichromate solution and one drop of dilute sulfuric acid (.01N) to 10 ml of the solvent being tested and shake. A blue color indicates peroxides are present.

o-3 Responsibilities:

a. The Industrial Hygienist will be available for consultation regarding policy and procedures, and will arrange for transportation and disposal of used, unacceptable, untested or unlabeled materials,

b. Service Chiefs will be responsible for proper use and storage of peroxide forming compounds in their respective areas. They will also be responsible for identifying these chemicals and reporting their presence and quantities to the Industrial Hygienist annually through the Chemical Inventory.

HAZCOM LISTING
(29 CFR 1910.1200)

Acetaldehyde
Acetic acid
Acetic anhydride
Acetone
Acetonitrile
2-Acetylaminofluorene
Acetylene

Allyl alcohol
Allyl chloride
Allyl glycidyl ether
Allyl propyl disulfide
alpha-Alumina
Aluminum alkyls (NOC)
Aluminum metal
Aluminum Pyro powders
Aluminum salts, soluble
4-Aminodiphenyl
2-Aminopyridine
Amitrole
Ammonia
Ammonium chloride
Ammonium sulfamate
Amosite asbestos
Amyl acetate
Aniline
Aniline homologs
o-Anisidine
p-Anisidine
Antimony
Antimony compounds
Argon
Arsenic
Arsenic compounds, organic
Arsenic compounds, soluble
Arsenic trioxide
Arsine
Asbestos, NOS
Asphalt fumes
Aspirin
Atrazine
Azinphos-methyl

Barium compounds, soluble
Barium sulfate
Benomyl
Benzene
1,3-Benzenedimethanamine
Benzidine

Acetylene tetrabromide
Acetylene tetrachloride
Acrolein
Acrylamide
Acrylic acid
Acrylonitrile
Aldrin

Benzo(a)pyrene
Benzoquinone
Benzoyl peroxide
Benzyl chloride
Beryllium
Beryllium compounds
Biphenyl-Phenyl ether mixture
Bismuth telluride
Borates, tetra, sodium salts
Boron oxide
Boron tribromide
Boron trifluoride
Bromacil
Bromine
Bromine pentafluoride
Bromochloromethane
Bromoform
Bromotrifluoromethane
Butadiene
Butane
2-Butoxyethanol
Butyl acetate
Butyl acrylate
Butyl alcohol
Butylamine
Butylated hydroxytoluene
tert-Butyl chromate
n-Butyl glycidyl ether
n-Butyl lactate
Butyl mercaptan
Butyl methyl ketone
o-sec-Butylphenol
p-tert-Butyltoluene

Cadmium
Cadmium oxide
Cadmium salts
Calcium cyanamide
Calcium hydroxide
Calcium silicate
Camphor

Caprolactam
Captafol
Captan
Carbaryl
Carbofuran
Carbon black
Carbon dioxide
Carbon disulfide
Carbon monoxide
Carbon tetrabromide
Carbon tetrachloride
Carbonyl fluoride
Catechol
Caustic potash
Caustic soda
Cesium hydroxide
Chlordane
Chlorinated diphenyl oxide
Chlorine
Chlorine dioxide
Chlorine trifluoride
Chloroacetaldehyde
Chloroacetophenone
Chloroacetyl chloride
Chlorobenzene
Chlorodifluoromethane
Chlorodiphenyls
bis(Chloroethyl) ether
Chloroform
bis(Chloromethyl) ether
Chloromethyl methyl ether
1-Chloro-1-nitropropane
Chloropentafluoroethane
Chloropicrin
Chloroprene
o-Chlorostyrene
o-Chlorotoluene
Chlorpyrifos
Chromates
Chromic acid
Chromite ore processing
Chromous compounds
Chromic compounds
Chromium(VI) compounds
Chromium metal
Chromium oxychloride
Chrysene
Chrysotile asbestos
Clopidol
Coal
Coal tar
Cobalt carbonyl
Cobalt hydrocarbonyl
Cobalt metal
Coke oven emissions
Copper metal
Cotton, raw
Cresol, all isomers
Cristobalite (silica)
Crocidolite asbestos
Crotonaldehyde
Crufomate
Cumene
Cyanamide
Cyanides
Cyanogen
Cyanogen chloride
Cyclohexane
Cyclohexanol
Cyclohexanone
Cyclohexene
Cyclohexylamine
Cyclonite
1,3-Cyclopentadiene
Cyclopentane
Cyhexatin
2,4-D
DDT
Decaborane
Demeton
Diacetone alcohol
Diatomaceous earth

Diazinon
Diazomethane
Diborane
1,2-Dibromo-3-chloropropane
Dibromodifluoromethane
2-(dibutylamino)ethanol
Dibutyl phosphate
Dibutyl phthalate
Dichloroacetylene
o-Dichlorobenzene
p-Dichlorobenzene
3,3'-Dichlorobenzidine
Dichlorodifluoromethane
1,3-Dichloro-5,5-dimethylhydantoin
1,1-Dichloroethane
1,2-Dichloroethylene
Dichlorofluoromethane
1,1-Dichloro-1-nitroethane
Dichloropropene
2,2-Dichloropropionic acid
1,2-Dichloro-1,1,2,2-tetrafluoroethane
Dichlorvos
Dicrotophos
Dicyclopentadiene
Dieldrin
Diethanolamine
Diethylamine
Diethylaminoethanol
Diethylene triamine
Diethyl ketone
Diethyl phthalate
Diglycidyl ether
Diisobutyl ketone
Diisopropylamine
Dimethyl acetamide
Dimethylamine
4-Dimethylaminoazobenzene
Dimethylaniline
Dimethyl carbamoyl chloride
Dimethylformamide
1,1-Dimethylhydrazine
Dimethylnitrosoamine
Dimethylphthalate
Dimethyl sulfate
Dinitolmide
Dinitrobenzene
4,6-Dinitro-o-cresol
2,4-Dinitrotoluene
Dioctyl phthalate
Dioxane
Dioxathion
Diphenyl
Diphenylamine
4,4'-Diphenylmethane diisocyanate
Dipropylene glycol monomethyl ether
Dipropyl ketone
Diquat
Disulfoton
Diuron
Divinyl benzene

Emery
Endosulfan
Endrin
Epichlorohydrin
EPN
Ethane
Ethanolamine
Ethion
Ethyl acetate
Ethyl acrylate
Ethyl alcohol
Ethylamine
Ethyl amyl ketone
Ethyl benzene
Ethyl bromide
Ethyl butyl ketone
Ethyl chloride
Ethylene
Ethylene chlorohydrin
Ethylenediamine

Ethylene dibromide
Ethylene dichloride
Ethylene glycol
Ethylene glycol dinitrate
Ethylene glycol monoethyl ether
Ethylene glycol monoethyl ether acetate
Ethylene glycol monoisopropyl ether
Ethylene glycol monomethyl ether
Ethyleneimine
Ethylene oxide
Ethyl ether
Ethyl formate
Ethylidene norbornene
Ethyl mercaptan
N-Ethylmorpholine
Ethyl silicate

Fensulfothion
Fenthion
Ferbam
Ferrocene
Ferrovanadium
Fibrous glass
Fluorides
Fluorine
Fonofos
Formaldehyde
Formamide
Formic acid
Furfural
Furfuryl alcohol

Gasoline
Germane
Glutaraldehyde
Glycerin
Glycidol
Graphite
Gypsum

Hafnium
Helium
Heptachlor
Heptane
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachloronaphthalene
Hexafluoroacetone
Hexamethyl phosphoramide
Hexane
sec-Hexyl acetate
Hexylene glycol
Hydrazine
Hydrocyanic acid
Hydrogen
Hydrogenated terphenyls
Hydrogen bromide
Hydrogen chloride
Hydrogen cyanide
Hydrogen fluoride
Hydrogen peroxide
Hydrogen selenide
Hydrogen sulfide
Hydroquinone
Hydroquinone monomethyl ether
2-Hydroxypropyl acrylate

Indene
Indium
Indium compounds
Iodine
Iodoform
Iron oxide
Iron pentacarbonyl
Iron salts, soluble
Isoamyl acetate
Isoamyl alcohol
Isobutyl acetate
Isobutyl alcohol
Isooctyl alcohol
Isophorone

Isophorone diisocyanate
Isophthalonitrile
Isopropyl acetate
Isopropyl alcohol
Isopropylamine
N-Isopropylaniline
Isopropyl ether
Isopropyl glycidyl ether

Kaolin
Ketene

Lead arsenate
Lead chromate
Lead
Lead, inorganics
Lime
Limestone
Lindane
Lithium hydride
LPG

Magnesia
Magnesium carbonate
Malathion
Maleic anhydride
Manganese compounds
Manganese cyclopentadienyl tricarbonyl
Manganese
Manganese tetroxide
MAPP
Marble
Mercury, alkyl compounds
Mercury, aryl compounds
Mercury, inorganic compounds
Mercury, metallic
Mesityl oxide
Methacrylic acid
Methacrylonitrile
Methane

Metbomyl
Methoxychlor
Methyl acetate
Methyl acetylene
Methyl acrylate
Methylacrylonitrile
Methylal
Methyl alcohol
Methylamine
Methyl amyl alcohol
Methyl n-amyl ketone
N-Methyl aniline
Methyl bromide
Methyl carbamic acid, o-isopropoxyphenyl ester
Methyl chloride
Methyl 2-cyanoacrylate
Methylcyclohexane
Methylcyclohexanol
o-Methylcyclohexanone
Methylcyclopentadienyl manganese tricarbonyl
Methyl demeton
Methylene bisphenyl isocyanate
Methylene chloride
4,4'-Methylene bis(2-chloroaniline)
Methylene bis(4-cyclohexylisocyanate)
4,4-Methylenedianiline
Methyl ethyl ketone
Methyl ethyl ketone peroxide
Methyl formate
Methyl hydrazine
Methyl iodide
Methyl isoamyl ketone
Methyl isobutyl ketone
Methyl isocyanate
Methyl isopropyl ketone
Methyl mercaptan
Methyl methacrylate
Methyl parathion

Methyl propyl ketone
Methyl silicate
alpha-Methyl styrene
Metribuzin
Mevinphos*
Mica
Mineral oil
Mineral wool fiber
Molybdenum compounds
Monocrotophos
Morpholine

Naled
Naphtha
Naphthalene
alpha-Naphthylamine
beta-Naphthylamine
alpha-Naphthyl thiourea
Neon
Nickel carbonyl
Nickel metal
Nickel, soluble compounds
Nickel sulfide roasting
Nicotine
Nitrapyrin
Nitric acid
Nitric oxide
p-Nitroaniline
Nitrobenzene
4-Nitrobiphenyl
p-Nitrochlorobenzene
Nitroethane
Nitrogen dioxide
Nitrogen trifluoride
Nitroglycerine
Nitromethane
Nitropropane
N-Nitrosodimethylamine
3-Nitrotoluene
Nonane

OCBM
Octachloronaphthalene
Octane
Osmium tetroxide
Oxalic acid
Oxygen difluoride
Ozone

Paper fiber
Paraffin wax
Paraquat
Parathion
PCBs
Pentaborane
Pentachloronaphthalene
Pentachlorophenol
Pentaerythritol
Pentane
Perchloroethylene
Perchloromethyl mercaptan
Perchloryl fluoride
Perlite
Phenol
Phenothiazine
p-Phenylene diamine
Phenyl glycidyl ether
Phenylhydrazine
Phenyl mercaptan
N-Phenyl-beta-naphthylamine
Phenylphosphine
Phorate
Phosgene
Phosphine
Phosphoric acid
Phosphorus, yellow or white
Phosphorus oxychloride
Phosphorus pentachloride
Phosphorus pentasulfide
Phosphorus trichloride
Phthalic anhydride
Picloram

Picric acid
Pindone
Piperazine dihydrochloride
Plaster of Paris
Platinum metal
Platinum, soluble salts
Portland cement
Potassium cyanide
Propane
Propane sultone
Propargyl alcohol
beta-Propiolactone
Propionic acid
Propoxur
n-Propyl acetate
Propyl alcohol
Propylene
Propylene dichloride
Propylene glycol dinitrate
Propylene glycol monomethyl ether
Propyleneimine
Propylene oxide
n-Propyl nitrate
Proteolytic enzymes
Pyrethrum
Pyridine

Quartz dust

Resorcinol
Rhodium metal
Rhodium compounds
Rosin
Rosin core solder pyrolysis products
Rotenone, commercial
Rubber solvent, naphtha
Rutile

Selenium compounds
Sesone
Silane
Silica, amorphous
Silica gel
Silicon
Silicon carbide
Silver metal
Silver, soluble compounds
Soapstone
Sodium azide
Sodium bisulfite
Sodium fluoroacetate
Sodium metabisulfite
Stannic oxide
Stannous oxide
Starch
Stibine
Stoddard solvent
Strychnine
Styrene
Sucrose
Sulfotep
Sulfur dioxide
Sulfur hexafluoride
Sulfuric acid
Sulfur monochloride
Sulfur pentafluoride
Sulfur tetrafluoride
Sulfuryl fluoride
Sulprofos

2,4,5-T
Talc
Tantalum
Teflon® decomposition products
Tellurium
Tellurium compounds
Tellurium hexafluoride
Temephos
TEPP
Terphenyls
1,1,1,2-Tetrachloro-2,2-difluoroethane

1,1,2,2-Tetrachloro-1,2-difluoroethane
Tetrachloronaphthalene
Tetraethyl lead
Tetrahydrofuran
Tetramethyl lead
Tetramethyl succinonitrile
Tetramethylthiuram disulfide
Tetranitromethane
Tetrasodium pyrophosphate
Tetryl
Thallium, soluble compounds
4,4'-Thiobis(6-tert-butyl-m-cresol)
Thioglycolic acid
Thiram
Tin metal
Tin compounds
Tin oxide
titanium dioxide
TNT
o-Tolidine
Toluene
Toluene diisocyanate
o-Toluidine
p-Toluidine
Toxaphene
Tremolite
Tributyl phosphate
Trichloroacetic acid
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Trichlorofluoromethane
Trichloronaphthalene
1,2,3-Trichloropropane
1,1,2-Trichloro-1,2,2-trifluoroethane
Tricresyl phosphate
Tridymite (silica)
Triethylamine
Trimellitic anhydride
Trimethylamine
Trimethyl benzene
Trimethyl phosphite
Triphenyl amine
Triphenyl phosphate
Tripoli (silica)
Tungsten compounds
Turpentine

Uranium compounds

Valeraldehyde
Vanadium pentoxide
Vegetable oils
Vinyl acetate
Vinyl bromide
Vinyl chloride
Vinyl cyclohexene dioxide
Vinylidene chloride
Vinyl toluene

Warfarin
Welding fumes
Wood dusts

Xylene
Xylidine

Yttrium

Zinc chloride
Zinc chromate
Zinc oxide
Zinc stearate
Zirconium compounds

[*Comment:* For the convenience of the regulated community the primary hazardous properties of these materials have been indicated by the letters T (Toxicity), and R (Reactivity). Absence of a letter indicates that the compound only is listed for acute toxicity.]

These wastes and their corresponding EPA Hazardous Waste Numbers are:

Hazardous waste No.	Substance
P023	Acetaldehyde, chloro-
P002	Acetamide, N-(aminothioxomethyl)-
P057	Acetamide, 2-fluoro-
P058	Acetic acid, fluoro-, sodium salt
P066	Acetimidic acid, N-[(methylcarbamoyl)oxy]thio-, methyl ester
P001	3-(alpha-Acetonylbenzyl)-4-hydroxycoumarin and salts, when present at concentrations greater than 0.3%
P002	1-Acetyl-2-thiourea
P003	Acrolein
P070	Aldicarb
P004	Aldrin
P005	Allyl alcohol
P006	Aluminum phosphide
P007	5-(Aminomethyl)-3-isoxazolol
P008	4-Aminopyridine
P009	Ammonium picrate (R)
P119	Ammonium vanadate
P010	Arsenic acid
P012	Arsenic (III) oxide
P011	Arsenic (V) oxide
P011	Arsenic pentoxide
P012	Arsenic trioxide
P038	Arsine, diethyl-
P054	Aziridine
P013	Barium cyanide
P024	Benzenamine, 4-chloro-
P077	Benzenamine, 4-nitro-
P028	Benzene, (chloromethyl)-
P042	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-
P014	Benzenethiol
P028	Benzyl chloride
P015	Beryllium dust
P016	Bis(chloromethyl) ether
P017	Bromoacetone
P018	Brucine
P021	Calcium cyanide
P123	Camphene, octachloro-
P103	Carbamimidoselenoic acid
P022	Carbon bisulfide
P022	Carbon disulfide
P095	Carbonyl chloride
P033	Chlorine cyanide
P023	Chloroacetaldehyde
P024	p-Chloroaniline
P026	1-(o-Chlorophenyl)thiourea
P027	3-Chloropropionitrile
P029	Copper cyanides

Hazardous waste No.	Substance
P030	Cyanides (soluble cyanide salts), not elsewhere specified
P031	Cyanogen
P033	Cyanogen chloride
P036	Dichlorophenylarsine
P037	Dieldrin
P038	Diethylarsine
P039	O,O-Diethyl S-[2-(ethylthio)ethyl] phosphorodithioate
P041	Diethyl-p-nitrophenyl phosphate
P040	O,O-Diethyl O-pyrazinyl phosphorothioate
P043	Diisopropyl fluorophosphate
P044	Dimethoate
P045	3,3-Dimethyl-1-(methylthio)-2-butanone, O-[(methylamino)carbonyl] oxime
P071	O,O-Dimethyl O-p-nitrophenyl phosphorothioate
P082	Dimethylnitrosamine
P046	alpha, alpha-Dimethylphenethylamine
P047	4,6-Dinitro-o-cresol and salts
P034	4,6-Dinitro-o-cyclohexylphenol
P048	2,4-Dinitrophenol
P020	Dinoseb
P085	Diphosphoramide, octamethyl-
P039	Disulfoton
P049	2,4-Dithiobiuret
P109	Dithiopyrophosphoric acid, tetraethyl ester
P050	Endosulfan
P088	Endothall
P051	Endrin
P042	Epinephrine
P046	Ethanamine, 1,1-dimethyl-2-phenyl-
P084	Ethanamine, N-methyl-N-nitroso-
P101	Ethyl cyanide
P054	Ethyleneimine
P097	Famphur
P056	Fluorine
P057	Fluoroacetamide
P058	Fluoroacetic acid, sodium salt
P065	Fulminic acid, mercury(II) salt (R,T)
P059	Heptachlor
P051	1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,endo-1,4:5,8-dimethanonaphthalene
P037	1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,exo-1,4:5,8-dimethanonaphthalene
P060	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-endo, endo-dimethanonaphthalene
P004	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-endo,exo-dimethanonaphthalene
P060	Hexachlorohexahydro-exo,exo-dimethanonaphthalene
P062	Hexaethyl tetraphosphate
P116	Hydrazinecarbothioamide
P068	Hydrazine, methyl-
P063	Hydrocyanic acid
P063	Hydrogen cyanide
P096	Hydrogen phosphide
P064	Isocyanic acid, methyl ester
P007	3(2H)-Isoxazolone, 5-(aminomethyl)-
P092	Mercury, (acetato-O)phenyl-
P065	Mercury fulminate (R,T)
P016	Methane, oxybis[chloro-
P112	Methane, tetranitro- (R)
P118	Methanethiol, trichloro-
P059	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P066	Methomyl
P067	2-Methylaziridine
P068	Methyl hydrazine
P064	Methyl isocyanate
P069	2-Methyllactonitrile
P071	Methyl parathion
P072	alpha-Naphthylthiourea
P073	Nickel carbonyl
P074	Nickel cyanide
P074	Nickel(II) cyanide
P073	Nickel tetracarbonyl
P075	Nicotine and salts
P076	Nitric oxide
P077	p-Nitroaniline
P078	Nitrogen dioxide
P076	Nitrogen(II) oxide
P078	Nitrogen(IV) oxide
P081	Nitroglycerine (R)
P082	N-Nitrosodimethylamine
P084	N-Nitrosomethylvinylamine
P050	5-Norbornene-2,3-dimethanol, 1,4,5,6,7,7-hexachloro, cyclic sulfite
P085	Octamethylpyrophosphoramide
P087	Osmium oxide
P087	Osmium tetroxide
P088	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P089	Parathion
P034	Phenol, 2-cyclohexyl-4,6-dinitro-
P048	Phenol, 2,4-dinitro-
P047	Phenol, 2,4-dinitro-6-methyl-
P020	Phenol, 2,4-dinitro-6-(1-methylpropyl)-
P009	Phenol, 2,4,6-trinitro-, ammonium salt (R)
P036	Phenyl dichloroarsine
P092	Phenylmercuric acetate
P093	N-Phenylthiourea
P094	Phorate
P095	Phosgene
P096	Phosphine
P041	Phosphoric acid, diethyl p-nitrophenyl ester
P044	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl]ester
P043	Phosphorofluoric acid, bis(1-methylethyl)-ester
P094	Phosphorothioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P089	Phosphorothioic acid, O,O-diethyl O-(p-nitrophenyl) ester
P040	Phosphorothioic acid, O,O-diethyl O- pyrazinyl ester
P097	Phosphorothioic acid, O,O-dimethyl O-[p-[(dimethylamino)-sulfonyl]phenyl]ester
P110	Plumbane, tetraethyl-
P098	Potassium cyanide
P099	Potassium silver cyanide
P070	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime
P101	Propanenitrile
P027	Propanenitrile, 3-chloro-
P069	Propanenitrile, 2-hydroxy-2-methyl-
P081	1,2,3-Propanetriol, trinitrate- (R)
P017	2-Propanone, 1-bromo-
P102	Propargyl alcohol
P003	2-Propenal
P005	2-Propen-1-ol
P067	1,2-Propylenimine
P102	2-Propyn-1-ol
P008	4-Pyridinamine
P075	Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts
P111	Pyrophosphoric acid, tetraethyl ester
P103	Selenourea
P104	Silver cyanide
P105	Sodium azide

Hazardous waste No.	Substance
P106	Sodium cyanide
P107	Strontium sulfide
P108	Strychnidin-10-one, and salts
P018	Strychnidin-10-one, 2,3-dimethoxy-
P108	Strychnine and salts
P115	Sulfuric acid, thallium(I) salt
P109	Tetraethyldithiopyrophosphate
P110	Tetraethyl lead
P111	Tetraethylpyrophosphate
P112	Tetranitromethane (R)
P062	Tetraphosphoric acid, hexaethyl ester
P113	Thallic oxide
P113	Thallium(III) oxide
P114	Thallium(I) selenite
P115	Thallium(I) sulfate
P045	Thiofanox
P049	Thioimidodicarbonic diamide
P014	Thiophenol
P116	Thiosemicarbazide
P026	Thiourea, (2-chlorophenyl)-
P072	Thiourea, 1-naphthalenyl-
P093	Thiourea, phenyl-
P123	Toxaphene
P118	Trichloromethanethiol
P119	Vanadic acid, ammonium salt
P120	Vanadium pentoxide
P120	Vanadium(V) oxide
P001	Warfarin, when present at concentrations greater than 0.3%
P121	Zinc cyanide
P122	Zinc phosphide (R,T)
P122	Zinc phosphide, when present at concentrations greater than 10%

[*Comment:* For the convenience of the regulated community, the primary hazardous properties of these materials have been indicated by the letters T (Toxicity), R (Reactivity), I (Ignitability) and C (Corrosivity). Absence of a letter indicates that the compound is only listed for toxicity.]

These wastes and their corresponding EPA Hazardous Waste Numbers are:

Hazardous Waste No.	Substance
U001	Acetaldehyde (I)
U034	Acetaldehyde, trichloro-
U187	Acetamide, N-(4-ethoxyphenyl)-
U005	Acetamide, N-9H-fluoren-2-yl-
U112	Acetic acid, ethyl ester (I)
U144	Acetic acid, lead salt
U214	Acetic acid, thallium(I) salt
U002	Acetone (I)
U003	Acetonitrile (I,T)
U248	3-(alpha-Acetonylbenzyl)-4-hydroxycoumarin and salts, when present at concentrations of 0.3% or less
U004	Acetophenone
U005	2-Acetylaminofluorene
U006	Acetyl chloride (C,R,T)
U007	Acrylamide
U008	Acrylic acid (I)
U009	Acrylonitrile
U150	Alanine, 3-[p-bis(2-chloroethyl)amino]phenyl-, L-
U011	Amitrole
U012	Aniline (I,T)
U014	Auramine
U015	Azaserine
U010	Azirino(2',3':3,4)pyrrolo(1,2-a)indole-4,7-dione, 6-amino-8-[((aminocarbonyl) oxy)methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-,
U157	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U016	Benz[c]acridine
U016	3,4-Benzacridine
U017	Benzal chloride
U018	Benz[a]anthracene
U018	1,2-Benzanthracene
U094	1,2-Benzanthracene, 7,12-dimethyl-
U012	Benzenamine (I,T)
U014	Benzenamine, 4,4'-carbonimidoylbis[N,N-dimethyl-
U049	Benzenamine, 4-chloro-2-methyl-
U093	Benzenamine, N,N'-dimethyl-4-phenylazo-
U158	Benzenamine, 4,4'-methylenebis(2-chloro-
U222	Benzenamine, 2-methyl-, hydrochloride
U181	Benzenamine, 2-methyl-5-nitro
U019	Benzene (I,T)
U038	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy, ethyl ester
U030	Benzene, 1-bromo-4-phenoxy-
U037	Benzene, chloro-
U190	1,2-Benzenedicarboxylic acid anhydride
U028	1,2-Benzenedicarboxylic acid, [bis(2-ethylhexyl)] ester
U069	1,2-Benzenedicarboxylic acid, dibutyl ester
U088	1,2-Benzenedicarboxylic acid, diethyl ester
U102	1,2-Benzenedicarboxylic acid, dimethyl ester
U107	1,2-Benzenedicarboxylic acid, di-n-octyl ester
U070	Benzene, 1,2-dichloro-
U071	Benzene, 1,3-dichloro-
U072	Benzene, 1,4-dichloro-
U017	Benzene, (dichloromethyl)-
U223	Benzene, 1,3-diisocyanatomethyl- (R,T)
U239	Benzene, dimethyl- (I,T)
U201	1,3-Benzenediol
U127	Benzene, hexachloro-
U056	Benzene, hexahydro- (I)
U188	Benzene, hydroxy-
U220	Benzene, methyl-
U105	Benzene, 1-methyl-1-2,4-dinitro-
U106	Benzene, 1-methyl-2,6-dinitro-
U203	Benzene, 1,2-methylenedioxy-4-allyl-
U141	Benzene, 1,2-methylenedioxy-4-propenyl-
U090	Benzene, 1,2-methylenedioxy-4-propyl-
U055	Benzene, (1-methylethyl)- (I)
U169	Benzene, nitro- (I,T)
U183	Benzene, pentachloro-
U185	Benzene, pentachloro-nitro-
U020	Benzenesulfonic acid chloride (C,R)
U020	Benzenesulfonyl chloride (C,R)
U207	Benzene, 1,2,4,5-tetrachloro-
U023	Benzene, (trichloromethyl)-(C,R,T)

Hazardous Waste No.	Substance
0234	Benzene, 1,3,5-trinitro- (R,T)
U021	Benzidine
U202	1,2-Benzisothiazolin-3-one, 1,1-dioxide
U120	Benzo[j,k]fluorene
U022	Benzo[a]pyrene
U022	3,4-Benzopyrene
U197	p-Benzoquinone
U023	Benzotrichloride (C,R,T)
U050	1,2-Benzphenanthrene
U085	2,2'-Bioxirane (I,T)
U021	[1,1'-Biphenyl]-4,4'-diamine
U073	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-
U091	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-
U095	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-
U024	Bis(2-chloroethoxy) methane
U027	Bis(2-chloroisopropyl) ether
U244	Bis(dimethylthiocarbamoyl) disulfide
U028	Bis(2-ethylhexyl) phthalate
U246	Bromine cyanide
U225	Bromoform
U030	4-Bromophenyl phenyl ether
U128	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-
U172	1-Butanamine, N-butyl-N-nitroso-
U035	Butanoic acid, 4-[Bis(2-chloroethyl)amino] benzene-
U031	1-Butanol (I)
U159	2-Butanone (I,T)
U160	2-Butanone peroxide (R,T)
U053	2-Butenal
U074	2-Butene, 1,4-dichloro- (I,T)
U031	n-Butyl alcohol (I)
U136	Cacodylic acid
U032	Calcium chromate
U238	Carbamic acid, ethyl ester
U178	Carbamic acid, methylnitroso-, ethyl ester
U176	Carbamide, N-ethyl-N-nitroso-
U177	Carbamide, N-methyl-N-nitroso-
U219	Carbamide, thio-
U097	Carbamoyl chloride, dimethyl-
U215	Carbonic acid, dithallium(I) salt
U156	Carbonochloridic acid, methyl ester (I,T)
U033	Carbon oxyfluoride (R,T)
U211	Carbon tetrachloride
U033	Carbonyl fluoride (R,T)
U034	Chloral
U035	Chlorambucil
U036	Chlordane, technical
U026	Chlornaphazine
U037	Chlorobenzene
U039	4-Chloro-m-cresol
U041	1-Chloro-2,3-epoxypropane
U042	2-Chloroethyl vinyl ether
U044	Chloroform
U046	Chloromethyl methyl ether
U047	beta-Chloronaphthalene
U048	o-Chlorophenol
U049	4-Chloro-o-toluidine, hydrochloride
U032	Chromic acid, calcium salt
U050	Chrysene
U051	Creosote
U052	Cresols
U052	Cresylic acid
U053	Crotonaldehyde
U055	Cumene (I)
U246	Cyanogen bromide
U197	1,4-Cyclohexadienedione
U056	Cyclohexane (I)
U057	Cyclohexanone (I)
U130	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexa- chloro-
U058	Cyclophosphamide
U240	2,4-D, salts and esters
U059	Daunomycin

Hazardous Waste No.	Substance
U060	DDD
U061	DDT
U142	Decachlorooctahydro-1,3,4-metheno-2H-cyclobuta[c,d]-pentalen-2-one
U062	Diallate
U133	Diamine (R,T)
U221	Diaminotoluene
U063	Dibenz[a,h]anthracene
U063	1,2:5,6-Dibenzanthracene
U064	1,2:7,8-Dibenzopyrene
U064	Dibenz[a,i]pyrene
U066	1,2-Dibromo-3-chloropropane
U069	Dibutyl phthalate
U062	S-(2,3-Dichloroallyl) diisopropylthiocarbamate
U070	o-Dichlorobenzene
U071	m-Dichlorobenzene
U072	p-Dichlorobenzene
U073	3,3'-Dichlorobenzidine
U074	1,4-Dichloro-2-butene (I,T)
U075	Dichlorodifluoromethane
U192	3,5-Dichloro-N-(1,1-dimethyl-2-propynyl) benzamide
U060	Dichloro diphenyl dichloroethane
U061	Dichloro diphenyl trichloroethane
U078	1,1-Dichloroethylene
U079	1,2-Dichloroethylene
U025	Dichloroethyl ether
U081	2,4-Dichlorophenol
U082	2,6-Dichlorophenol
U240	2,4-Dichlorophenoxyacetic acid, salts and esters
U083	1,2-Dichloropropane
U084	1,3-Dichloropropene
U085	1,2:3,4-Diepoxybutane (I,T)
U108	1,4-Diethylene dioxide
U086	N,N-Diethylhydrazine
U087	O,O-Diethyl-S-methyl-dithiophosphate
U088	Diethyl phthalate
U089	Diethylstilbestrol
U148	1,2-Dihydro-3,6-pyradizinedione
U090	Dihydrosafrole
U091	3,3'-Dimethoxybenzidine
U092	Dimethylamine (I)
U093	Dimethylaminoazobenzene
U094	7,12-Dimethylbenz[a]anthracene
U095	3,3'-Dimethylbenzidine
U096	alpha,alpha-Dimethylbenzylhydroperoxide (R)
U097	Dimethylcarbamoyl chloride
U098	1,1-Dimethylhydrazine
U099	1,2-Dimethylhydrazine
U101	2,4-Dimethylphenol
U102	Dimethyl phthalate
U103	Dimethyl sulfate
U105	2,4-Dinitrotoluene
U106	2,6-Dinitrotoluene
U107	Di-n-octyl phthalate
U108	1,4-Dioxane
U109	1,2- Diphenylhydrazine
U110	Dipropylamine (I)
U111	Di-N-propylnitrosamine
U001	Ethanal (I)
U174	Ethanamine, N-ethyl-N-nitroso-
U067	Ethane, 1,2-dibromo-
U076	Ethane, 1,1-dichloro-
U077	Ethane, 1,2-dichloro-
U114	1,2-Ethanediylbiscarbamodithioic acid
U131	Ethane, 1,1,1,2,2,2-hexachloro-
U024	Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-
U003	Ethanenitrile (I, T)
U117	Ethane,1,1'-oxybis- (I)
U025	Ethane, 1,1'-oxybis[2-chloro-
U184	Ethane, pentachloro-

Hazardous Waste No.	Substance
U206	Ethane, 1,1,1,2-tetrachloro-
U209	Ethane, 1,1,2,2-tetrachloro-
U218	Ethanethioamide
U247	Ethane, 1,1,1,-trichloro-2,2-bis(p-methoxyphenyl).
U227	Ethane, 1,1,2-trichloro-
U043	Ethene, chloro-
U042	Ethene, 2-chloroethoxy-
U078	Ethene, 1,1-dichloro-
U079	Ethene, trans-1,2-dichloro-
U210	Ethene, 1,1,2,2-tetrachloro-
U173	Ethanol, 2,2'-(nitrosoimino)bis-
U004	Ethanone, 1-phenyl-
U006	Ethanoyl chloride (C,R,T)
U112	Ethyl acetate (I)
U113	Ethyl acrylate (I)
U238	Ethyl carbamate (urethan)
U038	Ethyl 4,4'-dichlorobenzilate
U114	Ethylenebis(dithiocarbamic acid)
U067	Ethylene dibromide
U077	Ethylene dichloride
U115	Ethylene oxide (I,T)
U116	Ethylene thiourea
U117	Ethyl ether (I)
U076	Ethylidene dichloride
U118	Ethylmethacrylate
U119	Ethyl methanesulfonate
U139	Ferric dextran
U120	Fluoranthene
U122	Formaldehyde
U123	Formic acid (C,T)
U124	Furan (I)
U125	2-Furancarboxaldehyde (I)
U147	2,5-Furandione
U213	Furan, tetrahydro- (I)
U125	Furfural (I)
U124	Furfuran (I)
U206	D-Glucopyranose, 2-deoxy-2(3-methyl-3-nitrosoureido)-
U126	Glycidylaldehyde
U163	Guanidine, N-nitroso-N-methyl-N'nitro-
U127	Hexachlorobenzene
U128	Hexachlorobutadiene
U129	Hexachlorocyclohexane (gamma isomer)
U130	Hexachlorocyclopentadiene
U131	Hexachloroethane
U132	Hexachlorophene
U243	Hexachloropropene
U133	Hydrazine (R,T)
U086	Hydrazine, 1,2-diethyl-
U098	Hydrazine, 1,1-dimethyl-
U099	Hydrazine, 1,2-dimethyl-
U109	Hydrazine, 1,2-diphenyl-
U134	Hydrofluoric acid (C,T)
U134	Hydrogen fluoride (C,T)
U135	Hydrogen sulfide
U096	Hydroperoxide, 1-methyl-1-phenylethyl- (R)
U136	Hydroxydimethylarsine oxide
U116	2-Imidazolidinethione
U137	Indeno[1,2,3-cd]pyrene
U139	Iron dextran
U140	Isobutyl alcohol (I,T)
U141	Isosafrole
U142	Kepone
U143	Lasiocarpine
U144	Lead acetate
U145	Lead phosphate
U146	Lead subacetate
U129	Lindane
U147	Maleic anhydride
U148	Maleic hydrazide
U149	Malononitrile
U150	Melphalan
U151	Mercury
U152	Methacrylonitrile (I,T)
U092	Methanamine, N-methyl- (I)
U029	Methane, bromo-
U045	Methane, chloro- (I,T)
U046	Methane, chloromethoxy-
U068	Methane, dibromo-
U080	Methane, dichloro-
U075	Methane, dichlorodifluoro-
U138	Methane, iodo-
U119	Methanesulfonic acid, ethyl ester
U211	Methane, tetrachloro-
U121	Methane, trichlorofluoro-
U153	Methanethiol (I,T)
U225	Methane, tribromo-
U044	Methane, trichloro-
U121	Methane, trichlorofluoro-
U123	Methanoic acid (C,T)
U036	4,7-Methanoindan, 1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-
U154	Methanol (I)
U155	Methapyrilene
U247	Methoxychlor.
U154	Methyl alcohol (I)
U029	Methyl bromide
U186	1-Methylbutadiene (I)
U045	Methyl chloride (I,T)
U156	Methyl chlorocarbonate (I,T)
U226	Methylchloroform
U157	3-Methylcholanthrene
U158	4,4'-Methylenebis(2-chloroaniline)
U132	2,2'-Methylenebis(3,4,6-trichlorophenol)
U068	Methylene bromide
U080	Methylene chloride
U122	Methylene oxide
U159	Methyl ethyl ketone (I,T)
U160	Methyl ethyl ketone peroxide (R,T)
U138	Methyl iodide
U161	Methyl isobutyl ketone (I)
U162	Methyl methacrylate (I,T)
U163	N-Methyl-N'-nitro-N-nitrosoguanidine
U161	4-Methyl-2-pentanone (I)
U164	Methylthiouracil
U010	Mitomycin C
U059	5,12-Naphthacenedione, (8S-cis)-8-acetyl-10-[(3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-
U165	Naphthalene
U047	Naphthalene, 2-chloro-
U166	1,4-Naphthalenedione
U236	2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl-[1,1'-biphenyl]-4,4'diyl)]-bis(azo)bis(5-amino-4-hydroxy)-, tetrasodium salt
U166	1,4,Naphthaquinone
U167	1-Naphthylamine
U168	2-Naphthylamine
U167	alpha-Naphthylamine
U168	beta-Naphthylamine
U026	2-Naphthylamine, N,N'-bis(2-chloromethyl)-
U169	Nitrobenzene (I,T)
U170	p-Nitrophenol
U171	2-Nitropropane (I)
U172	N-Nitrosodi-n-butylamine
U173	N-Nitrosodiethanolamine
U174	N-Nitrosodiethylamine
U111	N-Nitroso-N-propylamine
U176	N-Nitroso-N-ethylurea
U177	N-Nitroso-N-methylurea
U178	N-Nitroso-N-methylurethane

Hazardous Waste No.	Substance
U179	N-Nitrosopiperidine
U180	N-Nitrosopyrrolidine
U181	5-Nitro-o-toluidine
U193	1,2-Oxathiolane, 2,2-dioxide
U058	2H-1,3,2-Oxazaphosphorine, 2-[bis(2-chloroethyl)amino]tetrahydro-, oxide 2-
U115	Oxirane (I,T)
U041	Oxirane, 2-(chloromethyl)-
U182	Paraldehyde
U183	Pentachlorobenzene
U184	Pentachloroethane
U185	Pentachloronitrobenzene
See F027	Pentachlorophenol
U186	1,3-Pentadiene (I)
U187	Phenacetin
U188	Phenol
U048	Phenol, 2-chloro-
U039	Phenol, 4-chloro-3-methyl-
U081	Phenol, 2,4-dichloro-
U082	Phenol, 2,6-dichloro-
U101	Phenol, 2,4-dimethyl-
U170	Phenol, 4-nitro-
See F027	Phenol, pentachloro-
Do	Phenol, 2,3,4,6-tetrachloro-
Do	Phenol, 2,4,5-trichloro-
Do	Phenol, 2,4,6-trichloro-
U137	1,10-(1,2-phenylene)pyrene
U145	Phosphoric acid, Lead salt
U087	Phosphorodithioic acid, O,O-diethyl-, S-methyl-ester
U189	Phosphorous sulfide (R)
U190	Phthalic anhydride
U191	2-Picoline
U192	Pronamide
U194	1-Propanamine (I,T)
U110	1-Propanamine, N-propyl- (I)
U066	Propane, 1,2-dibromo-3-chloro-
U149	Propanedinitrile
U171	Propane, 2-nitro- (I)
U027	Propane, 2,2'-oxybis[2-chloro-
U193	1,3-Propane sultone
U235	1-Propanol, 2,3-dibromo-, phosphate (3:1)
U126	1-Propanol, 2,3-epoxy-
U140	1-Propanol, 2-methyl- (I,T)
U002	2-Propanone (I)
U007	2-Propenamide
U084	Propene, 1,3-dichloro-
U243	1-Propene, 1,1,2,3,3,3-hexachloro-
U009	2-Propenenitrile
U152	2-Propenenitrile, 2-methyl- (I,T)
U008	2-Propenoic acid (I)
U113	2-Propenoic acid, ethyl ester (I)
U118	2-Propenoic acid, 2-methyl-, ethyl ester
U162	2-Propenoic acid, 2-methyl-, methyl ester (I,T)
See F027	Propionic acid, 2-(2,4,5-trichlorophenoxy)-
U194	n-Propylamine (I,T)
U083	Propylene dichloride
U196	Pyridine
U155	Pyridine, 2-[(2-(dimethylamino)-2-thenylamino]-
U179	Pyridine, hexahydro-N-nitroso-
U191	Pyridine, 2-methyl-
U164	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U180	Pyrrole, tetrahydro-N-nitroso-
U200	Reserpine
U201	Resorcinol
U202	Saccharin and salts
U203	Safrole
U204	Selenious acid
U204	Selenium dioxide
U205	Selenium disulfide (R,T)
U015	L-Serine, diazoacetate (ester)
See F027	Silvex
U089	4,4'-Stilbenediol, alpha,alpha'-diethyl-
U206	Streptozotocin
U135	Sulfur hydride
U103	Sulfuric acid, dimethyl ester
U189	Sulfur phosphide (R)
U205	Sulfur selenide (R,T)
See F027	2,4,5-T
U207	1,2,4,5-Tetrachlorobenzene
U208	1,1,1,2-Tetrachloroethane
U209	1,1,2,2-Tetrachloroethane
U210	Tetrachloroethylene
See F027	2,3,4,6-Tetrachlorophenol
U213	Tetrahydrofuran (I)
U214	Thallium(I) acetate
U215	Thallium(I) carbonate
U216	Thallium(I) chloride
U217	Thallium(I) nitrate
U218	Thioacetamide
U153	Thiomethanol (I,T)
U219	Thiourea
U244	Thiram
U220	Toluene
U221	Toluenediamine
U223	Toluene diisocyanate (R,T)
U222	O-Toluidine hydrochloride
U011	1H-1,2,4-Triazol-3-amine
U226	1,1,1-Trichloroethane
U227	1,1,2-Trichloroethane
U228	Trichloroethene
U228	Trichloroethylene
U121	Trichloromonofluoromethane
See F027	2,4,5-Trichlorophenol
Do	2,4,6-Trichlorophenol
Do	2,4,5-Trichlorophenoxyacetic acid
U234	sym-Trinitrobenzene (R,T)
U182	1,3,5-Trioxane, 2,4,5-trimethyl-
U235	Tris(2,3-dibromopropyl) phosphate
U236	Trypan blue
U237	Uracil, 5[bis(2-chloromethyl)amino]-
U237	Uracil mustard
U043	Vinyl chloride
U248	Warfarin, when present at concentrations of 0.3% or less
U239	Xylene (I)
U200	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxy-benzoyl)oxy]-, methyl ester
U249	Zinc phosphide, when present at concentrations of 10% or less.

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Generic:		
F001	The following spent halogenated solvents used in degreasing: tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; and sludges from the recovery of these solvents in degreasing operations.	(T)
F002	The following spent halogenated solvents: tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, and trichlorofluoromethane; and the still bottoms from the recovery of these solvents.	(T)
F003	The following spent non-halogenated solvents: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; and the still bottoms from the recovery of these solvents.	(I)
F004	The following spent non-halogenated solvents: cresols and cresylic acid, and nitrobenzene; and the still bottoms from the recovery of these solvents.	(T)
F005	The following spent non-halogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, and pyridine; and the still bottoms from the recovery of these solvents.	(I, T)
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.	(T)
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum	(T)
F007	Spent cyanide plating bath solutions from electroplating operations	(R, T)
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.	(R, T)
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.	(R, T)
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.	(R, T)
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.	(R, T)
F012	Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.	(T)
F024	Wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes from the production of chlorinated aliphatic hydrocarbons, having carbon content from one to five, utilizing free radical catalyzed processes. (This listing does not include light ends, spent filters and filter aids, spent desiccants, wastewater, wastewater treatment sludges, spent catalysts, and wastes listed in § 261.32.).	(T)
F020	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of Hexachlorophene from highly purified 2,4,5-trichlorophenol.).	(H)
F021	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.	(H)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
FO22	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.	(H)
FO23	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of Hexachlorophene from highly purified 2,4,5-trichlorophenol.).	(H)
FO26	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.	(H)
FO27	Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing Hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component.).	(H)
FO28	Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. FO20, FO21, FO22, FO23, FO26, and FO27.	(T)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
F007	Spent cyanide plating bath solutions from electroplating operations (except for precious metals electroplating spent cyanide plating bath solutions).	(R, T)
F008	Plating bath sludges from the bottom of plating baths from electroplating operations where cyanides are used in the process (except for precious metals electroplating plating bath sludges).	(R, T)
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process (except for precious metals electroplating spent stripping and cleaning bath solutions).	(R, T)
F010	Quenching bath sludge from oil baths from metal heat treating operations where cyanides are used in the process (except for precious metals heat-treating quenching bath sludges).	(R, T)
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations (except for precious metals heat treating spent cyanide solutions from salt bath pot cleaning).	(R, T)
F012	Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process (except for precious metals heat treating quenching wastewater treatment sludges).	(T)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Wood preservation: K001	Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.	(T)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Inorganic pigments:		
K002	Wastewater treatment sludge from the production of chrome yellow and orange pigments.	(T)
K003	Wastewater treatment sludge from the production of molybdate orange pigments	(T)
K004	Wastewater treatment sludge from the production of zinc yellow pigments	(T)
K005	Wastewater treatment sludge from the production of chrome green pigments	(T)
K006	Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated).	(T)
K007	Wastewater treatment sludge from the production of iron blue pigments	(T)
K008	Oven residue from the production of chrome oxide green pigments	(T)
Organic chemicals:		
K009	Distillation bottoms from the production of acetaldehyde from ethylene	(T)
K010	Distillation side cuts from the production of acetaldehyde from ethylene	(T)
K011	Bottom stream from the wastewater stripper in the production of acrylonitrile	(R, T)
K013	Bottom stream from the acetonitrile column in the production of acrylonitrile	(R, T)
K014	Bottoms from the acetonitrile purification column in the production of acrylonitrile	(T)
K015	Still bottoms from the distillation of benzyl chloride	(T)
K016	Heavy ends or distillation residues from the production of carbon tetrachloride	(T)
K017	Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin.	(T)
K018	Heavy ends from the fractionation column in ethyl chloride production	(T)
K019	Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production.	(T)
K020	Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.	(T)
K021	Aqueous spent antimony catalyst waste from fluoromethanes production	(T)
K022	Distillation bottom tars from the production of phenol/acetone from cumene	(T)
K023	Distillation light ends from the production of phthalic anhydride from naphthalene	(T)
K024	Distillation bottoms from the production of phthalic anhydride from naphthalene	(T)
K093	Distillation light ends from the production of phthalic anhydride from ortho-xylene	(T)
K094	Distillation bottoms from the production of phthalic anhydride from ortho-xylene	(T)
K025	Distillation bottoms from the production of nitrobenzene by the nitration of benzene	(T)
K026	Stripping still tails from the production of methy ethyl pyridines	(T)
K027	Centrifuge and distillation residues from toluene diisocyanate production	(R, T)
K028	Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.	(T)
K029	Waste from the product steam stripper in the production of 1,1,1-trichloroethane	(T)
K095	Distillation bottoms from the production of 1,1,1-trichloroethane	(T)
K096	Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.	(T)
K030	Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene.	(T)
K083	Distillation bottoms from aniline production	(T)
K103	Process residues from aniline extraction from the production of aniline	(T)
K104	Combined wastewater streams generated from nitrobenzene/aniline production	(T)
K085	Distillation or fractionation column bottoms from the production of chlorobenzenes	(T)
K105	Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes.	(T)
Inorganic chemicals:		
K071	Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used.	(T)
K073	Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production.	(T)
K106	Wastewater treatment sludge from the mercury cell process in chlorine production	(T)
Pesticides:		
K031	By-product salts generated in the production of MSMA and cacodylic acid	(T)
K032	Wastewater treatment sludge from the production of chlordane	(T)
K033	Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.	(T)
K034	Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane.	(T)
K097	Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane.	(T)
K035	Wastewater treatment sludges generated in the production of creosote	(T)
K036	Still bottoms from toluene reclamation distillation in the production of disulfoton	(T)
K037	Wastewater treatment sludges from the production of disulfoton	(T)
K038	Wastewater from the washing and stripping of phorate production	(T)
K039	Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate.	(T)
K040	Wastewater treatment sludge from the production of phorate	(T)
K041	Wastewater treatment sludge from the production of toxaphene	(T)
K098	Untreated process wastewater from the production of toxaphene	(T)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
K042	Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T.	(T)
K043	2,6-Dichlorophenol waste from the production of 2,4-D	(T)
K099	Untreated wastewater from the production of 2,4-D	(T)
Explosives:		
K044	Wastewater treatment sludges from the manufacturing and processing of explosives	(R)
K045	Spent carbon from the treatment of wastewater containing explosives	(R)
K046	Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.	(T)
K047	Pink/red water from TNT operations	(R)
Petroleum refining:		
K048	Dissolved air flotation (DAF) float from the petroleum refining industry	(T)
K049	Slop oil emulsion solids from the petroleum refining industry	(T)
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry	(T)
K051	API separator sludge from the petroleum refining industry	(T)
K052	Tank bottoms (leaded) from the petroleum refining industry	(T)
Iron and steel:		
K061	Emission control dust/sludge from the primary production of steel in electric furnaces.	(T)
K062	Spent pickle liquor from steel finishing operations	(C, T)
Secondary lead:		
K069	Emission control dust/sludge from secondary lead smelting	(T)
K100	Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.	(T)
Veterinary pharmaceuticals:		
K084	Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	(T)
K101	Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	(T)
K102	Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	(T)
Ink formulation: K086	Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead.	(T)
Coking:		
K060	Ammonia still lime sludge from coking operations	(T)
K087	Decanter tank tar sludge from coking operations	(T)

Request for Special Use of a Chemical Carcinogen

Date of Request _____

Principal Investigator _____

_____

Service _____

Building - Room _____

Phone _____

CARCINOGEN TO BE USED

Name _____ CAS No. _____

Synonyms _____

Location of Use _____

Use Condition _____

Location of Storage _____

Period/Frequency of Use _____

Quantity to be Procured _____

PERSONNEL PROPOSED FOR THIS PROJECT

_____

_____

_____

EXPERIMENTAL PROCEDURES

Briefly describe the procedures that will involve the use of this carcinogen.

_____

_____

_____

_____

_____

CONTROL PROCEDURES

Describe any additional controls not specified in the VA Guidelines for the Laboratory Use of Chemical Carcinogens that will be employed to protect the individuals participating in this research.

DECONTAMINATION AND DISPOSAL

Decontamination Procedures (surfaces, materials, instruments, equipment, etc.):

Disposal Procedures (wastes and unused stock):

EMERGENCY PROCEDURES

In the event of overt personnel exposure (inhalation, ingestion, inoculation):