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INTRODUCTION

This plan was drafted based on the following assumptions:

1. State and federal law governs the handling and disposal of hazardous materials; Montana Tech must comply with these regulations.

2. Funds and manpower to deal with disposal of hazardous materials are limited.

3. Montana Tech needs to find the most cost-effective strategy to create a system that encourages research and academics while at the same time ensures that hazardous materials are handled safely and disposed of in accordance with the regulations.

4. Other laws, such as worker and community right-to-know legislation, should be addressed as an integral part of the hazardous materials management plan because the safe handling and use of hazardous materials requires the complete knowledge of these materials.

5. The plan will be reviewed and updated annually to reflect changes in local, state and federal laws.

6. While the Montana Tech Office of Environmental, Health and Safety will have primary responsibility for overseeing this plan; successful implementation of the plan rests largely with campus departments, laboratories, shops and their employees.

TRACKING HAZARDOUS MATERIALS

Title III of the Superfund Amendments and Re-authorization Act (SARA) of 1986, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), requires any facility that stores any Extremely Hazardous Substance in a quantity that exceeds the threshold planning quantity (TPQ) to appoint an emergency coordinator and notify the State Emergency Response Commission (SERC) that they are subject to the provisions of this law. There are over 1,100 chemicals on the CERCLA/SARA List -- some have TPQ's as low as 10 pounds. EPCRA requires each affected facility to keep an up to date inventory of all chemicals stored on site and to make it available to the Local Emergency Planning Committee (LEPC) and the local fire department. Spills or releases of hazardous substances in excess of the reportable quantity (RQ) must be reported to the appropriate authorities. Some RQ's are as low as one pound.

OSHA's Hazard Communication Standard/Globally Harmonized System for Classification and Labeling of Chemicals, also known as the "worker right-to-know" standard, requires each employer to provide information to employees regarding chemical hazards in the workplace and to keep an inventory of chemicals in each work place. This information is provided by labels and safety data sheets (SDSs) and is conveyed to the employee through proper training.

In order to stay in compliance with these regulations, Montana Tech must maintain an inventory of all chemicals and hazardous substances stored and used on campus. The Office of Environmental, Health and Safety (EH&S) will maintain a computer inventory of all chemicals on campus. A software package, the Vertere Inventory Management (VIMS) system, currently holds an inventory of most chemicals stored on campus. This inventory must be kept up to date; therefore, individuals purchasing or acquiring chemicals for use on campus must **notify EH&S or the designated person in their department (the chemical acquisition manager or CAM) prior to ordering or bringing on campus any new chemicals or hazardous materials**. This procedure will:

- allow EH&S or the designated departmental person to check the VIMS inventory to see if the chemical is already in stock at another location on campus in order to eliminate duplicate purchases and encourage the cost effective sharing of chemicals. (Some individuals may choose not to share, and they will not be forced to do so. However, it is in the best interest of this institution to minimize the amount of hazardous materials on site.)
- promote cost savings by purchasing common chemicals in bulk quantities for the entire campus;
- provide chemical users and purchasing agents with shared information on the cost, quality, and availability of products supplied by various vendors;
- allow EH&S to track each chemical brought on campus and assure compliance with the SARA annual reporting requirements;
- permit EH&S or the CAM to make certain that an SDS for each newly purchased or acquired chemical is received and made available to employees, thus assuring compliance with the Hazard Communication Standard;
- allow EH&S to provide emergency responders with reliable information during a spill or release episode and ensure accurate release reporting to the proper authorities;
- hold each chemical purchaser/user accountable for the proper use, storage, and disposal of chemicals;

- minimize the generation of waste and unknowns; and
- prompt chemical users to properly dispose of wastes through EH&S.

The Chemical Acquisition Manager will be notified when a chemical or hazardous material is needed and will check to see if the chemical is available on campus. The CAM will also check to see if the chemical is on the "P-List" or "acute hazardous waste" list. If the chemical appears on the list, an attempt should be made to find a less hazardous substitute. When the chemical arrives on campus, the CAM will place a Montana Tech bar code label on the chemical container(s), and all relevant information (chemical name, quantity, owner, location, etc.) will be logged into the campus VIMS system. The CAM will ensure that a Safety Data Sheet is placed in the SDS book for the receiving department or lab.

The SDS should provide complete information on the product including the necessary safe handling procedures. The SDS will also provide valuable information for determining the proper waste category of any unused chemical. Montana Tech must ensure that SDSs are available for each material on campus. Each employee must be trained in hazard communications and have access to a list of chemicals used in their work area and an SDS for each chemical on this list. This practice is a direct link with OSHA's worker right-to-know requirements and is a good waste management practice.

When a chemical container is empty, the user will notify the CAM of the bar code number on the container, and the container will be logged as consumed on the VIMS system. Identification of an abandoned chemical will be simplified by tracing the bar code number. Likewise, if the chemical user declares the chemical as a waste, the container and its contents will be tracked by the bar code number. EH&S will then properly redistribute, recycle, neutralize or dispose of any unused chemicals.

An annual inventory is conducted for each department using bar code numbers on each container. The computerized inventory is updated, and the new list is provided to the LEPC and the local fire department as required by EPCRA.

CHEMICAL HYGIENE AND HAZARD COMMUNICATION STANDARDS

Under the Occupational Safety and Health Administration's (OSHA's) Occupational Exposure to Hazardous Chemicals in Laboratories Standard (29 CFR 1910.1450), a Chemical Hygiene Plan (CHP) is in place in all labs on campus. The CHP is the heart of the standard that covers most industrial, clinical and academic labs. Each laboratory must comply with the standard if it uses containers small enough for one person to handle and doesn't produce large amounts of chemical substances for commercial use. The standard also applies to labs that use a variety of chemical procedures or a variety of hazardous chemicals in relatively small amounts, but does not produce chemicals for consumers.

The Montana Tech Chemical Hygiene Plan includes written steps that outline how employees will be protected from overexposure to hazardous chemicals. The Environmental Health and Safety Director is designated as the chemical hygiene officer (CHO). The CHO must ensure the plan is adequate and that everyone understands and follows it. Training is the key element, and employees must understand which chemicals are dangerous, how chemicals affect them, how much and what kind of exposure is harmful, how to protect themselves from overexposure, what to do if they are overexposed, decontamination procedures, the correct way to dispose of hazardous chemicals, use and maintenance of fume hoods and other protective equipment, and which operations require prior approval.

In addition to training, the CHP includes a provision for medical attention for employees whenever:

1. an event takes place such as a leak, a spill or an explosion that might overexpose employees to a hazardous chemical;
2. an employee shows symptoms of overexposure to a hazardous chemical; or
3. tests indicate a dangerous level of a hazardous chemical in the laboratory atmosphere.

Training must be provided BEFORE a new employee starts working with hazardous materials, and whenever a new chemical is introduced into the lab. Training must be documented, and records of this training must be kept. The Office of Environmental, Health and Safety will maintain the training records for each individual department. In addition to training and recordkeeping for employees, all safety equipment, including fume hoods, safety showers and eyewash stations, must be inspected and tested every 6 months with each inspection documented. This requirement is designed to avert situations such as an employee pulling the chain on an emergency shower and breaking off the handle because it hasn't been used or tested in years.

STORAGE OF CHEMICALS

Chemicals, particularly acids, should not be stored under sinks because these chemicals cause rapid deterioration of cabinets and piping under the sink. The purchase of acid storage cabinets or plastic tubs with tight-fitting lids to segregate acids from bases is recommended. In areas where flammable materials are stored,

NFPA (National Fire Protection Association) approved flammable storage cabinets should be installed and used. As a general rule, chemical storage inside a fume hood should be limited.

EXHAUST/FUME HOODS

Exhaust hoods are to be routinely inspected at least once every six months by lab personnel or EH&S and maintained by Physical Facilities as needed. Each department is responsible for maintaining a log of what chemicals are used in a given fume hood. Each time a new or different chemical is used in a fume hood, the chemical must be listed on the log. The information should include the person's name and chemical(s) they are using. If a chemical already appears on the log, it does not have to be entered again unless a different person is using it.

Maintenance personnel must be informed about potential hazards they may face. Based on information in the logs, if the potential for exposure to hazardous conditions is high, the department will be responsible for funding an outside contractor to perform maintenance on the hood. When a maintenance request is sent to Physical Facilities, all chemicals and apparatus will be removed from the hood area to ensure that maintenance workers have a safe work environment. If any special precautions or personal protective equipment are necessary due to the nature of chemicals or other residue inside the hood, the Office of Environmental, Health and Safety should be notified for confirmation of safe work practices and to supply the necessary PPE and/or environmental monitoring. When a lab director identifies the need to replace an aging hood, that department is responsible for budgeting for this capital expense.

WASTE COLLECTION AT SATELLITE LOCATIONS

Large generators and small generators of hazardous waste may accumulate up to 55 gallons of hazardous waste or one quart of acutely hazardous waste (p-listed) [found at 40 CFR 261.33(e)] in containers at or near any point of generation without a permit and without being subject to the time and waste quantity limits or the accumulation requirements of 40 CFR 262.34 of this rule, provided the generator complies with the following from 40 CFR 265.

171. If a container holding hazardous waste is not in good condition, or if it begins to leak, the owner must transfer the hazardous waste to a container in good condition.

172. The owner must use a container made of or lined with materials that will not react with, and are otherwise compatible with, the hazardous waste to be stored.

173. A container holding hazardous waste must always be closed during storage, except when it is necessary to add or remove waste. The container must not be opened, handled, or stored in a manner that may rupture the container or cause it to leak.

The owner must mark the containers either with the words "HAZARDOUS WASTE" or "ACUTELY HAZARDOUS WASTE", as applicable, or with other words that identify the contents of the containers.

EH&S must prepare and maintain a log book or similar documentation, which lists the hazardous wastes it has generated for each calendar month by date, EPA hazardous waste number and quantity. The log must be current and contain monthly data for at least 11 consecutive calendar months, if appropriate. The log must also note which of the listed wastes have been removed from accumulation for either on-site or off-site treatment, storage, or disposal.

The intent of this rule is to ensure that Montana Tech handles its wastes appropriately based on the volume produced in any one month. Tech generally does not exceed the normal hazardous waste limits for a small quantity generator, but has exceeded the limit of one kilogram of acutely hazardous waste in a given month, which then puts Montana Tech into the large quantity generator status.

Each lab is required to log the volume and concentration of each addition of chemical waste to a waste container. Containers of wastes that are not hazardous by law should be labeled simply "waste" followed by the chemical name or chemical class. This procedure is intended to ensure that all containers in the lab have their contents properly and clearly labeled. Hazardous wastes must be clearly labeled as such. The more information available as to the contents of hazardous waste containers, the better. Wastes should be segregated whenever possible. For guidelines on waste segregation, see the following section.

PACKAGING AND LABELING OF WASTES FOR COLLECTION BY EH&S

Labeling is required of **all** chemical containers except when chemicals are transferred to portable containers by employees for their immediate use. The chemicals in the portable containers must be used up during the day or before the employee leaves the lab.

The following requirements are to ensure compliance with the law, minimize the generation of unknowns, and reduce the costs for analysis and final disposal of wastes:

1. Waste containers must be labeled clearly with the words "HAZARDOUS WASTE" or "ACUTE HAZARDOUS WASTE" as appropriate, or the substance name with the word "waste" (such as: "waste toluene"). IN ALL CASES, LABEL THE CONTENTS OF THE CONTAINER WITH THE CHEMICAL NAME OR MIXTURE AND ANY CONTAMINANTS.

2. Contents of each waste container must be known and listed on the label, including the concentration of each chemical/contaminant. This information is paramount for a waste containing any of the toxic contaminants listed in Table 1 of 40 CFR 261.24, "Maximum Concentration of Contaminants for the Toxicity Characteristic." Table 1 is shown on page 21. If the concentration of a toxic contaminant in the waste exceeds the "Regulatory Level" (in mg/l) listed in this table, then the waste is a hazardous waste. The characteristic of toxicity is determined using the "Toxicity Characteristic Leaching Procedure" (TCLP) method. The TCLP test reflects only the leachable quantity of the contaminant. The total amount of contaminant in the waste should also be listed.

3. Always use a sturdy receptacle to contain your waste. If possible, keep wastes in their original container. Plastic milk jugs and soda bottles or containers without lids are not acceptable. EH&S will try to provide an appropriate waste container if you don't have one. Containers that will not react with the contents should always be used (i.e., don't put acids in metal cans). Optimize the container size with the amount of waste (i.e., don't place 20 g or 20 ml of waste in a 2.5 liter bottle).

4. Leave two inches of head space in liquid containers. Do not fill bottles to the top.

5. Segregate SOLOVENT wastes into three separate containers:

    a. Halogenated (i.e. chloroform).
    b. Water miscible, non-halogenated (i.e. acetone, alcohols)
    c. Non-water miscible, non-halogenated (i.e. hexane)

6. Do not mix inorganic wastes with organic wastes

7. Do not mix heavy-metal wastes with organic wastes

8. **NEVER** mix mercury compounds with ANY other wastes.

9. Segregate acid waste from base waste unless you are neutralizing the material. Do not mix either acids or bases with solvents.

10. Do not accept wastes from outside parties for disposal through Montana Tech.

11. All containers of hazardous waste must be dated on the day that EH&S is notified of the requests for the pickup. This date will be the accumulation start time. Hazardous wastes in excess of 55 gallons or acutely hazardous wastes in excess of one kilogram from satellite accumulation sites must be dated and transported to the EH&S Hazardous Waste Storage Area within three days from the time the material is generated.

GUIDELINES FOR THE COLLECTION OF HAZARDOUS MATERIALS FOR DISPOSAL BY EH&S

Telephone or email the Office of Environmental, Health and Safety (496-4463; mcameron@mtech.edu) to arrange for the collection of hazardous waste or of chemicals that are no longer wanted. Be prepared to give your name, phone number, department, and the type, quantity and location of the waste(s). EH&S will collect wastes on campus as soon as possible after notification.

A meeting will be arranged to help you sort useful materials from waste materials, if needed. Materials that may be useful to someone else on campus will go to the chemical storage area. Chemicals having no use will be declared wastes. All wastes must be listed on a "Montana Tech Hazardous Materials Manifest" form. Information entered on the manifest will include:

1. The manifest number (assigned by EH&S);
2. The item number;
3. Complete description of waste or chemical name;
4. Estimated concentration of each contaminant if known (i.e., chromium, 10 PPM);
5. Estimated volume or weight of waste (in mL, liters, or g, kg);
6. Size and type of container (i.e. 2.5 liter glass bottle);
7. The EPA hazard waste number(s) (assigned by EHS);
8. The cabinet number in which the container is stored in the hazardous waste storage room; (completed by EH&S)
9. The accumulation start date; and
10. The shipping date.

EH&S can assist you with completing the manifest and making out the labels. Waste containers will be placed in a plastic bucket or tub for transport to the storage area. Whenever possible, transport will take place when classes are out and weather conditions are favorable. Special arrangements will be made for large or heavy loads of waste. All containers will be labeled with a "Montana Tech Hazardous Waste Label" either before or after they are moved to the hazardous waste storage area.

Upon arrival at the storage facility, wastes will be logged into the waste inventory to comply with the time and quantity accumulation limits. Hazardous waste in solid form will be separated for lab packs, and liquids will be either poured into drums for bulk shipment or separated into lab packs. The Hazardous Waste Storage Area is located in Room 03 in the basement of the Chemistry/Biology Building.

GENERATOR STATUS

A "***large generator***" is one who generates:

- greater than 1 kilogram (2.2 pounds) of acute hazardous waste;
- greater than 100 kilograms (220 pounds) of any residue, contaminated soil, waste or other debris resulting from a discharge into or on any land or water of acute hazardous waste; or
- greater than 1000 kilograms (2200 pounds) of hazardous waste in any calendar month.

A "**small generator**" is one who generates between 100 kilograms (220 pounds) and 1,000 kilograms (2,200 pounds) of hazardous waste in any calendar month. A small generator cannot exceed 1 kilogram (2.2 pounds) of acute hazardous waste.

A "***conditionally exempt small quantity generator***" or "conditionally exempt generator" is one who generates no more than 100 kilograms (220 pounds) of hazardous waste in a calendar month. If a conditionally exempt small quantity generator accumulates more than 1000 kilograms (2,200 pounds) of hazardous waste at any time, all of those wastes are subject to regulation as if they were generated and accumulated by a small generator.

Large generators may accumulate hazardous waste on-site for up to 90 days without a permit, regardless of the quantity of hazardous waste accumulated. For a generator who is classified as a large generator by virtue of their accumulation of acute hazardous waste, the 90 day period for accumulation of the acute hazardous waste begins at any time when these accumulated wastes meet the applicable limits described above.

If the total amount of hazardous waste accumulated on-site does not exceed 6,000 kilograms (13,200 pounds), small generators may accumulate hazardous waste for up to 180 days. However, if the waste must be transported a distance of greater than 200 miles to a designated facility, waste can be accumulated up to 270 days without a permit.

Since the nearest designated facility is greater than 200 miles from Butte, Montana, Montana Tech may store their hazardous waste for up to 270 days without a permit as long as the accumulation limits for a small quantity generator are not exceeded.

Contract waste vendors charge a "trip fee" each time Montana Tech ships hazardous waste. They also charge by the lab pack drum, regardless of the number of containers within each drum. Therefore, Montana Tech should attempt to operate as a "conditionally exempt small quantity generator" or a "small quantity generator" and accumulate wastes up to 270 days to limit trip fees.

DISPOSAL COSTS

Most disposal costs will be paid out of the Office of Environmental, Health and Safety budget with the exception of containers of unknown materials which enter the waste stream. In a past example, a one-liter container of unknown material cost over $800 to analyze and identify before it could be properly disposed. **EH&S will NOT accept unknowns for free disposal.** Unknown materials will be accepted with the understanding that the department or research program responsible for the unknown will be billed for the testing necessary to characterize the waste. However, the generator may independently make arrangements to have the material analyzed. This policy is necessary to ensure that the costs of analyses do not overrun the disposal budget and that those who generate the unknowns bear the financial burden for failure to follow the hazard communications program and/or the chemical hygiene plan.

Proposals for research grants must contain funding provisions for disposal of any hazardous wastes generated during that project. The projects will be billed for any hazardous waste disposal.

POLICY ON DISPOSAL OF CHEMICALS BY MEANS OTHER THAN SHIPMENT OR DONATION

Waste to the Butte Silver Bow County Landfill:

Only non-hazardous solid wastes are accepted for disposal at the Butte Silver Bow (BSB) County Landfill. The BSB County Landfill will not accept liquids or solutions of chemicals. Disposal of small quantities of organic or biochemicals that are equivalent to food products or food additives are allowed. The Safety Data Sheet (SDS) for each product often provides guidance on disposal practices. Many of the chemicals that have historically gone in the dumpster are now considered a "special waste" by BSB. Any inert empty chemical container may be thrown in the trash after it has been emptied and rinsed; however, be sure to notify the CAM or EH&S of the bar code number on the container so the VIMS System can be updated. If the container held an acute hazardous chemical (listed in 40 CFR 261.33), it is considered to be empty if:

a) The container or inner liner has been triple rinsed using a solvent capable of removing the commercial chemical product or manufacturing chemical intermediate;

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

c) In the case of a container, the inner liner that prevented contact of the commercial chemical product or manufacturing chemical intermediate with the container, has been removed.

If you are not sure if the material you are disposing of is a “non hazardous solid waste” or if the container meets the definition of “empty,” call EH&S for guidance.

With proper prior notification, the BSB Landfill will accept asbestos-containing material, drained non-PCB items, and some non-hazardous biological wastes. EH&S can assist you with taking the proper steps for the disposal of these items.

Sink Drain to the Butte Silver Bow County Metro Sewer Treatment Plant:

Wastewater resulting from laboratory operations containing toxic (T) wastes identified in 40 CFR 261.24, provided that the annualized average flow of laboratory wastewater does not exceed 1% of total wastewater flow into the headworks of the facility's wastewater treatment or pretreatment system, or provided the wastes combined annualized average concentration does not exceed one part per million in the headworks of the facility's wastewater treatment or pretreatment facility...." are exempt from regulation provided that the wastes go to a state or federally permitted treatment facility.” 40 CFR 261.4 further excludes from regulation "domestic sewage and any mixture of domestic sewage and other wastes that passes through a sewer system to a publicly owned treatment works for treatment. Domestic sewage means untreated sanitary wastes that pass through a sewer system."

If Montana Tech exceeds the 1% laboratory wastewater limit or the one part per million hazardous waste discharge into the city sewer system in any one month, Tech must notify Butte Silver Bow Metro Sewer, the EPA regional waste management director and the state Solid and Hazardous Waste Bureau of the constituents discharged, the approximate mass and concentration. In the event any amount of acute hazardous waste is disposed of via Metro Sewer, the same notification is required.

The Montana Tech Chemical Hygiene Plan, Appendices F and G, contain further guidelines for disposal of chemicals. Contact EH&S if you need assistance.

Sink Drain Disposal Guidelines:

General Prohibitions

Gasoline, benzene, ethers, carbides, xylene, perchlorates, oils and naphtha or any halogenated solvents or other like substance must be collected for hazardous waste disposal by means other than the sink drain. Any chemical that is an acute hazardous waste as found on the "P-list" or any non-water miscible, flammable or explosive chemical shall not be disposed of in the city sewer except in de minimis amounts. For purposes of this section, de minimis is defined as the residue left in a container after the container is emptied by normal means such as pouring or pumping. Under no circumstances should a de minimis or residue amount of the above materials exceed 10 ml at any one time. The intent of this section is to preclude dumping a number of small containers of these materials in an attempt to avoid generating a waste. Instead, every effort should be made to reasonably collect these materials for shipment as a hazardous waste. The allowance of de minimis amounts enables us to wash containers that have held prohibited waste without regard to the minimal contents left in them.

Acids and Bases

Acids and bases should be neutralized to a pH above 2.0 or below 12.5 whenever possible. Materials with a pH outside the above limits are legally defined as a hazardous waste. However, it is advisable to neutralize them to a pH between 4 and 10 to avoid corrosion of pipes. After pH adjustment, acids and bases may be disposed of in the sink drain. Extremely small amounts of concentrated acid or base may be poured directly into the drain with copious amounts of water. Before doing this, make sure that a reaction leading to splash or excess fumes will not occur.

Aqueous Metals Solutions

Due to the high concentration of metals in the native soils and storm water runoff, Butte Silver Bow Metro Sewer has difficulty meeting the discharge standards for all metals. Therefore, Metro Sewer has requested that aqueous metals solutions not be disposed of down the sink drain. Instead these solutions must be treated and/or packaged as a lab pack wastes.

Alcohols, Acetones and Non-stench Aldehydes

Alcohols, acetones and other water-miscible materials may be disposed of in the sink drain provided they are diluted by least 20 to 1 with water at the time of disposal. This procedure is necessary to insure that a flammable or explosive atmosphere is not generated.

Liquid Nutrient Solutions

Liquid nutrient solutions may be disposed of in the sink drain.

Carcinogenic, Mutagenic, or Other BioHazardous Chemicals

These materials may go into the drain after they are deactivated in some way or, if a threshold limit value (TLV) is provided by the manufacturer, diluted below the TLV. The Safety Data Sheet for each specific product should list the TLV and should provide guidance on disposal requirements.

Evaporation into the Atmosphere:

Evaporation of chemicals is NOT an approved method of disposal. Evaporation is often a major route of loss of a chemical in its normal use or application; however, in these situations, prudent practices should be used to ensure personnel and environmental protection.

Consumption in a Normal Use or Application:

Some chemicals, when used in a normal and accepted manner, are consumed in a way that does not provide a retrievable product or waste. The above policies are not intended to restrict this normal consumption unless there is an obvious personnel or environmental hazard.

WASTE MINIMIZATION

The Resource Conservation and Recovery Act requires that each generator of hazardous waste have a waste minimization plan in effect before wastes are shipped from the site. Each department shall be responsible, with help from the Office of Environmental, Health and Safety, to develop a waste minimization plan and to reduce the generation of hazardous wastes to a level as low as possible. Any capital investments needed for extra equipment such as small stills, a change in the types of chemicals for experiments, or a conversion to micro scale equipment should be planned for in each department's budget.

In June of 1990, the EPA published the ***GUIDES TO POLLUTION PREVENTION IN RESEARCH AND EDUCATIONAL INSTITUTIONS***. Many of the recommendations have already been discussed, but the following should be included in each waste minimization plan:

1. Appoint and train one person from each department to oversee the hazardous materials management plan and right-to-know.

2. Eliminate the need for chromic acid washing of glassware, either by using disposable plastic glassware or cleaning glassware with specialty detergents.

3. Purchase laboratory chemicals, paints and other maintenance chemicals in the minimum quantity required. This will reduce generation of surplus materials requiring disposal.

4. Establish a tracking system for listed chemicals from purchase to disposal. This will reduce duplicate purchases and minimize the waste generated from old, partially used containers that age on laboratory shelves. Montana Tech's Vertere Inventory Management System (VIMS) will improve inventory control. Each chemical container is labeled with a unique bar code label to allow for efficient tracking.

5. Encourage and promote sharing of bulk and surplus chemicals.

6. Provide routine audits for each laboratory, focusing on unusable reagent accumulation and unlabeled containers.

7. Increase the amount of in-lab destruction of waste chemicals. Many toxic and corrosive waste chemicals can be converted to non-hazardous chemicals via simple chemical treatment methods. The Chemical Hygiene Plan, Appendices F and G have some guidelines for waste destruction. EH&S also has several reference books available and can provide guidance on waste destruction. Waste destruction should be the final step for each experiment conducted on campus. If destruction methods are unavailable, then waste disposal should be your final step.

8. Increase the use of instrumentation (versus chemical experimentation) in undergraduate course work.

LIST OF ATTACHMENTS

I. MONTANA TECH OF THE UNIVERSITY OF MONTANA "Large Quantity Generator -- Preparedness and Prevention Plan, Contingency Plan and Emergency Procedures"

II. TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) LIST

III. LIST OF CHEMICALS WHICH MUST BE CHECKED BY CHEMICAL ACQUISITION MANAGERS PRIOR TO ACQUIRING CHEMICALS

ATTACHMENT I

MONTANA TECH OF THE UNIVERSITY OF MONTANA
Large Quantity Generator
Preparedness and Prevention Plan
and
Contingency Plan and Emergency Procedures

This plan is intended to meet the requirements of ARM 17.54.421 *Requirements for Accumulation of Wastes and Accumulation in Satellite Locations.* The ARM incorporates 40 CFR 265.16 and Subparts C and D. The above EPA standards have been used as the guides in development of this plan for:

Facility: Montana Tech
Address: 1300 West Park Street
City: Butte **State:** Montana **Zip:** 59701
Telephone: 406-496-4463
Location of Hazardous Waste Storage Facility: Chemistry/Biology Building, Room 03B

EPA Generator #: MTD119730208

Emergency Coordinator: Marilyn Cameron, Director of Environmental, Health and Safety
Office Telephone: 496-4463 **Home Telephone:** 494-8080 **Cell:** 490-8893
Office Location: Chemistry/Biology Building, Room 003

Emergency Equipment - all emergency PPE and spill containment/clean-up material is located in the Chemistry/Biology Building, room 003:

PPE	**Spill Containment/Clean-up Material**
Full face Respirators, size S, M, L	Absorbent Spill Booms (5)
Various Respirator Cartridges	Absorbent Pads (various shapes and sizes)
Tyvek Coveralls - chemical resistant suits	Tool Kit with Brass Utensils
Acid Resistant Coveralls	Drum Patching Material
Surgical Non-latex gloves	Floor Dry
Chemical/Acid Resistant Rubber Gloves	Mercury Vacuum, HEPA vacuum
Steel-toed Rubber Boots (2)	Mercury Spill Kit
Hardhats	Mercury Vapor Suppressant Powder
Splash goggles	ABC Dry Chemical Fire Extinguisher
Protective Eye WearDrums (various types and sizes)	
Ear Plugs	Duct Tape and Caution Ribbon
First Aid Kit	Shovels, brooms, and buckets

LOCAL, STATE AND FEDERAL EMERGENCY RESPONSE CONTACTS

ORGANIZATION	CONTACT & LOCATION	PHONE
EMERGENCY		**911**
Medical		
AMBULANCE (non-emergency #)	A-1 Ambulance 445 Centennial Ave.	9-723-3132
HOSPITAL	St. James Community Hospital 400 South Clark	9-723-2500
Butte-Silver Bow	Mercury St. and Idaho St.	
FIRE DEPARTMENT	Jeff Miller – Fire Services Director	9-497-6483
SHERIFF DEPARTMENT	Ed Lester - Sheriff	9-497-1120
OFFICE OF EMER MANAGEMENT	Dan Dennehy, Coordinator	9-497-6295
Montana Tech		
Security		496-4357 or HELP
Office of Environmental, Health and Safety	Marilyn Cameron - Director	496-4463 490-8893 (c)
State of Montana		
Dept. of Environmental Quality	SHW Specialist	8-1-406-444-1435
Highway Patrol	Wynne Ave. and Lowell Ave.	9-494-3233
Disaster and Emergency Services	Helena	8-1-406-444-6911 or 9-1-800-426-9440
Federal		
Environmental Protection Agency Federal Building	Helena	8-1-406-449-5432
Environmental Protection Agency	Region VIII, Denver, CO Emergency Number	8-1-800-227-8917 8-1-303-293-1723
U.S. Coast Guard	National Response Center	8-1-800-424-8802
HOT LINES		
Poison Control		8-1-800-222-1222
CHEMTREC (for chemical spill assistance)		8-1-800-424-9300

PREPAREDNESS AND PREVENTION

Maintenance and Operation of Facility

Montana Tech's hazardous waste and hazardous materials operations must minimize the possibility of a spill, fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste, hazardous waste constituents or hazardous materials to any environmental media (air, soil, surface water, sewer system) that could threaten human health or the environment.

Required Equipment

For each location at Montana Tech where hazardous materials are stored or utilized and where hazardous wastes are stored should at a minimum have:

a) An internal communications or alarm system capable of providing immediate emergency instruction to facility personnel. At Montana Tech, each building has a fire alarm that will serve as the internal communications system to notify building occupants of an emergency and the need for evacuation.

b) A device such as a telephone or cell phone (immediately available at the scene of operations) or a hand-held two-way radio, capable of summoning emergency assistance. In shop or lab work areas, a telephone will normally be used to call Montana Tech Security or the Office of Environmental, Health and Safety (EH&S) to initiate the Contingency Plan and Emergency Procedures. Also, both Security (24 hours/day) and EH&S (during normal work hours) monitor the two-way radio system used by facilities personnel and both can respond to a distress call over the radio.

c) Portable fire extinguishers, fire control equipment (including special extinguishing equipment, such as that using foam, inert gas or dry chemicals as necessary), spill control equipment, and decontamination equipment; and

d) Water at adequate volume and pressure to supply water hose streams, or foam producing equipment, or automatic sprinklers, or water spray systems.

A combination of (c) and (d) above are strategically located throughout the Montana Tech Campus and are readily available for use during an emergency response.

Testing and Maintenance of Equipment

All facility communications or fire alarm systems, fire protection equipment, spill control equipment and decontamination equipment, where required, must be tested and maintained as necessary to assure its proper operation in time of emergency.

The communications systems (telephones and radios) are serviced as needed by the Computer Services and Telecommunications Department at Montana Tech and the local telephone company. The fire alarms and extinguishing equipment are routinely inspected by Physical Facilities personnel, and serviced annually by a qualified

contractor. Spill control and clean up material and equipment are maintained by EH&S and appropriate departments on campus.

Access to Communications or Alarm Systems

Whenever hazardous waste is being poured, mixed, spread, or otherwise handled, all personnel involved in the operation must have immediate access to an internal alarm or emergency communication device, either directly or through visual or voice contact with another employee.

EH&S personnel will carry a two-way radio, cellular phone, or have immediate access to a phone while conducting hazardous waste operations or transporting hazardous waste on campus. Others handling hazardous materials should always work in pairs whenever possible and have some means of two-way communication available to summon emergency assistance.

Required Aisle Space

Adequate aisle space shall be provided to allow for the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment required for an emergency response at each lab or facility at Montana Tech. The amount of clear space required at each location shall correspond with the amount of hazardous material or waste at each location. In laboratories and shops having minimal material on hand, normal access will be provided.

Arrangements with Local Authorities

Montana Tech must attempt to make the following arrangements, as appropriate, for the types of waste handled at Tech, for the potential need for the services of these organizations:

1. Arrangements to familiarize police, fire departments, and emergency response teams with the layout of the facility, properties of hazardous waste handled at the facility and associated hazards, places where facility personnel would normally be working, entrances to roads inside the facility, and possible evacuation routes:

   The Local Emergency Planning Committee and the Butte Silver Bow Fire Department will be provided with a campus map of Montana Tech and plans for each building showing the quantity and location of hazardous materials. In most areas, individuals will be normally working between 7:00 am and 5:00 pm. Entrances and routes for emergency vehicles will be evaluated annually and evacuation routes will be outlined.

2. Where more than one police and or fire department might respond to an emergency, agreements designating primary emergency authority to a specific police and a specific fire department, and agreements with any others to provide support to the primary emergency authority:

Montana Tech is covered by Butte Silver Bow (BSB) Police and Fire Departments. Either department can be dispatched by calling 911 or at the request of Campus Security or the Emergency Coordinator. The BSB Police will assist Campus Security staff with scene control including ingress and egress and evacuation if needed. The BSB Fire Department will be the primary emergency authority with the ranking on-scene firefighter designated as the Incident Commander. The Big Butte Volunteer Fire Squad may be called on to provide assistance to the BSB Fire Department in the event of a large spill or accident.

3. Agreements with State emergency response teams, emergency response contractors, and equipment suppliers:

   No state response team exists, and as such, no agreement exists between Montana Tech and a state response team. In the event of a spill beyond the capabilities of EH&S staff and the BSB Fire Department, Olympus Technical Services from Helena, Montana will be summoned. Clean-up will be conducted under the direction of the EH&S Director, the BSB Fire Department, the BSB County Health Department and/or the Montana Solid and Hazardous Waste Bureau as appropriate.

4. Arrangements to familiarize local hospitals with the properties of hazardous waste handled at the facility and the types of injuries or illnesses which could result from fires, explosions, or releases at the facility.

   Since there are hundreds of chemicals used on the Montana Tech Campus, St. James Healthcare will receive information related to medical treatment for any substance to which Montana Tech or emergency response personnel have been exposed. This information will be provided from the Safety Data Sheet (SDS) and/or other technical literature. CHEMTREC and Poison Control hotlines will also be referenced for medical treatment information if such an incident occurs.

Hazardous Materials Spill or Leak

In the event of a hazardous materials spill or leak, the following should be notified in descending order until one of them is reached:

Marilyn Cameron	4463 (office)	494-8080 (home)	490-8893 (cell)
Julie Hart	4792 (office)	723-6704 (home)	490-3799 (cell)
Theresa Stack	4871 (office)	842-5742 (home)	451-1749 (cell)

If one of the above coordinators cannot be reached, call 911 and activate the emergency response unit **if** it appears that life, health, property or the environment are in imminent jeopardy and sealing off the area will not suffice.

Reporting a Spill

All spills must be reported using the **Montana Tech Chemical Spill form**. IMMEDIATELY report spills to EH&S if:

1. Spills may threaten life, health, property or the environment;

2. Trained people and/or proper clean-up equipment are not available within the lab or work area; and

3. Spill involves mercury. **All** mercury incidents must be reported.

Before calling and reporting a release of chemical, radioactive or biohazardous material, the reporter should consider the following:

Personal Exposure: If the spill or release may cause personal injury to yourself or others, evacuate the area immediately.

Containment: Without risking your personal safety, first try to stop the source of the spill or leak, then try to contain the spilled substance to keep it from spreading -- especially into floor drains.

Prevent access: If others might be harmed by entering the area, prevent access to the area.

Assessment: If you can do so without exposing yourself, determine the type of material spilled and the approximate quantity of material spilled.

Injuries: If serious injuries are involved, immediately call 911 to get help on the way. Try to determine the type and extent of injuries and provide any assistance you are capable of giving.

Spill Information that Will Be Requested by EH&S on the Spill Report Form:

1. Your name
2. Location on campus
3. Phone number from which you are placing the call*
4. Identity of material spilled or released
5. Estimated quantity of material spilled or released
6. Hazards of the material (if known)
7. Extent of the spill or release
8. Type and extent of any injuries, if applicable
9. Time of day at which the spill occurred

If you reach the EH&S voice mail, try calling the cell phone number (490-8893). If you still can't reach EH&S, please leave a detailed message including all of the above information. Call Julie Hart or Theresa Stack if necessary (p.20).

ATTACHMENT II

MAXIMUM CONCENTRATION OF CONTAMINANTS FOR THE TOXICITY CHARACTERISTIC

EPA#	Contaminant	CAS No.	Regulatory Level (mg/l)
D004	Arsenic	7440-39-3	5.0
D005	Barium	7440-39-3	100.0
D018	Benzene	71-43-2	0.5
D006	Cadmium	7440-43-9	1.0
D019	Carbon tetrachloride	56-23-5	0.5
D020	Chlordane	57-74-9	0.03
D021	Chlorobenzene	108-90-7	100.0
D022	Chloroform	67-66-3	6.0
D007	Chromium	7440-47-3	5.0
D023	o-Cresol	95-48-7	200.0
D024	m-Cresol	108-39-4	200.0
D025	p-Cresol	106-44-5	200.0
D026	Cresol		200.0
D016	2,4-D	94-75-7	10.0
D027	1,4-Dichlorobenzene	106-46-7	7.5
D028	1,2-Dichloroethane	107-06-2	0.5
D029	1,1-Dichloroethylene	75-35-4	0.7
D030	2,4-Dinitrotoluene	121-14-2	0.13
D012	Endrin	72-20-8	0.02
D031	Heptachlor (and its epoxide)	76-44-8	0.008
D032	Hexachlorobenzene	118-74-1	0.13
D033	Hexachlorobutadiene	87-68-3	0.5
D034	Hexachloroethane	67-72-1	3.0
D008	Lead	7439-92-1	5.0
D013	Lindane	58-89-9	0.4
D009	Mercury	7439-97-6	0.2
D014	Methoxychlor	72-43-5	10.0
D035	Methyl ethyl ketone	78-93-3	200.0
D036	Nitrobenzene	98-95-3	2.0
D037	Pentrachlorophenol	87-86-5	100.0
D038	Pyridine	110-86-1	35.0
D010	Selenium	7782-49-2	1.0
DOll	Silver	7440-22-4	5.0
D039	Tetrachloroethylene	127-18-4	0.7
D015	Toxaphene	8001-35-2	0.5
D040	Trichloroethylene	79-01-6	0.5
D041	2,4,5-Trichlorophenol	95-95-4	400.0
D042	2,4,6-Trichlorophenol	88-06-2	2.0
D017	2,4,5-TP (Silvex)	93-72-1	1.0
D043	Vinyl chloride	75-01-4	0.2

ATTACHMENT III

LIST OF CHEMICALS THAT MUST BE CHECKED BY CHEMICAL ACQUISITION MANAGERS (CAMs) PRIOR TO ACQUIRING CHEMICALS

This list includes materials that become "acutely hazardous wastes" (P-List) under the Environmental Protection Agency (EPA) and State of Montana disposal regulations. Montana Tech has expanded the original list to include synonyms. Acutely hazardous wastes are derived from materials that are extremely hazardous to humans and the environment according to EPA and, therefore, are strictly regulated. Because of this, Montana Tech attempts to substitute less hazardous materials when possible. The chemical acquisition managers (CAMs) must check this list whenever a chemical is being acquired whether through a purchase or acceptance of a gift. If the material appears on this list, the proposed user is asked to consider a less hazardous chemical if one is available and will serve the same purpose.

The storage limit for acute hazardous wastes is 1 kg (2.2 lbs.); once this storage quantity has been exceeded, Montana Tech must ship all wastes in accumulation off campus within 90 days. Therefore, users must be aware that they are using a material from the list and be aware of the hazards and restrictions. After a container that has held one of these materials has been emptied by conventional means (i.e., poured or pumped empty), it must be triple rinsed before the container is discarded. The residual material is not considered a hazardous waste but rather de minimis.

(acetoxymercuri)benzene
1-(4'-hydroxy-3'-coumarinyl)-1-phenyl-3-butanone
1-(o-Chlorophenyl)thiourea
1-1-(3,4-dihydroxyphenyl)-2-methylaminoethanol
1-Acetyl-2-thiorea
1-adrenalin
1-amino-4-chlorobenzene
1-amino-4-nitrobenzene
1-bromo-2-propanone
1-methyl hydrazine
1-phenyl-2-thiourea
1-phenylthiourea
1-propen-3-ol
1-propenol-3
1-propyne-3-ol
10,11-dimethystrychnine
1080
1,1-dimethyl-2-phenylethanamine
1,2-Benzenediol, 4-(1-hydroxy-2-(methylamino)ethyl)-
1,2-propyleneimine
1,2,3-propanetriol, trinitrate
1,2,3-propanetriyl nitrate
1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-dimethanonaphthalene
1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-endo,exo-
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
1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-endo,endo-
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

2-(ethylthio)-ethanethiol S-ester with O,o-diethyl phosphorothioate
2-chloro-1-ethanal
2-chloroacetaldehyde monomer
2-hydroxy-2-methylpropionitrile
2-methyl-2-(methylthio)propionaldehyde oxime
2-methyl-2-(methylthio)propionaldehyde-0-(methylcarbamoyl) oxime
2-methyl-2-(methylthio)propanal-0-((methylamino)carbonyl)oxime
2-methylazacyclopropane
2-Methylaziridine
2-methylethylenimine
2-Methyllactonitrile
2-methylthio-acetaldehyde-O-(methylcarbamoyl)-oxim(German)
2-phenyl-tert-butylamine
2-propen-1-ol
2-propen-1-one
2-propenal
2-propenyl alcohol
2-propyn-1-ol
2-propynyl alcohol
2,3-dimethoxystrychnine
2,4-dinitro-6-cyclohexylphenol
2,4-Dinitrophenol
2,4-Dinitrophenol
2,4-Dithiobiuret
2,4,6-trinitro-ammonium salt
3(2H)-Isoxazoione, 5-(aminomethyl)-
3-(1'-phenyl-2'-acetylethyl)-4-hydroxycoumarin
3-(alpha-Acetonylbenzl)-4-hydrocoumarin and salts, conc. > .3%
3-(alpha-phenyl-beta-acetylethyl)-4-hydroxycoumarin
3-chloropropanenitrile
3-chloropropanonitrile
3-Chloropropionitrile
3-hydroxypropene
3-propynol
3-thiabutan-2-one
3-thiosemicarbazide
3,3-Dimethyl-1-(methylthio)-2-butanone, O-[(methylamino)carbonyl] oxime
3,4-dihydroxy-alpha-((methylamino)methyl)benzyl alcohol
4-aAminopyridine
4-chloroaniline
4-chlorobenzeneamine
4-chlorophenylamine
4-hydroxy-3-(3-oxo-1-phenylbutyl)-2H-1-benzopyran-2-one
4-nitraniline
4-nitrobenzenamine
4-Pyridinamine
4,6-Dinitro-o-cresol and salts
4,6-dinitro-o-cyclohexylphenol
4,6-Dinitro-o-cyclohexylphenol
5-(Aminomethyl)-3-isoxazolol
5-Norbornene-2,3-dimethanol,1,4,5,6,7,7-hexachloro, cyclic sulfite
6-cyclohexyl-2,4-dinitrophenol
7-Oxabicyclo[2,2,1]heptane-2,3-dicarboxylic acid
Acetaldehyde, chloro-
Acetamide, N-(aminothioxomethyl)-
Acetamide, 2-fluoro-
acetic acid, phenylmercury deriv.
Acetic acid, fluoro-, sodium salt
Acetimidic acid, N-[(methylcarbamoyl)oxy]thio-, methyl ester

acetone cyanohydrin (DOT)
acetonyl bromide
acetyl methyl bromide
acquinite
acraaldehyde
Acrolein
acrylaldehyde
acrylic aldehyde
adenodis
adnephrine
adrenal
adrenalin-medihaler
adrenamine
adrenan
adrenapax
adrenasol
adrenatrate
adrenohorma
adrenutol
adrine
AIP
al-phos
aldecarb
Aldicarb
aldrex
aldrex 30
Aldrin
aldrite
aldrosol
allyl aldehyde
allyl al
Allyl alcohol
allylic alcohol
alpha, alpha-dimethylphenethylamine
alpha, alpha-dimethylbenzeethanamine
alpha, alpha-dimethyl-beta-phenylethanamine
alpha-chlorotoluene
alpha-hydroxyisobutyronitrile
alpha-Napthylthiorea
alpha-phenylthiourea
altox
aluminum monophosphide
Aluminum phosphide
ambush
aminoethylene
ammonium metavanadate (DOT)
Ammonium picrate (R)
Ammonium vanadate
anginine
aqualine
arsenate
arsenic acid anhydride
arsenic trioxide
arsenic pentoxide
arsenic sesquioxide
arsenic oxide
arsenic acid
arsenic trihydride
arsenic hydride

Arsenic (V) oxide
Arsenic acid
Arsenic (lll) oxide
arseniuretted hydrogen
arsenous acid anhydride
arsenous oxide
arsenous oxide anhydride
arsenous hydride
arsenous anhydride
Arsine, diethyl
asmatane mist
asthma meter mist
astmahalin
athrombine-K
azacyclopropane
azide
azirane
Aziridine
azium
azofix red GG salt
azoic diazo component 37
b-chloropropionitrile
balmadren
barium dicyanide
Barium cyanide
BCME
BCME
Benzenamine, 4-nitro-
Benzenamine, 4-chloro-
Benzene, (chloromethyl)
Benzenethiol
benzyl chloride
Benzyl chloride (see Benzene, chloromethyl)
bernarenin
beryllium
Beryllium dust
beryllium-9
biocide
biorenine
Bis(chlormethyl)ether
bis(chloromethyl)ether
bis-cme
BIS-CME
bladan
blasting gelatin
blue-ox
bosmin
brevirenin
bromo methyl methyl ketone
bromo-2-propanone
Bromoacetone
bronkaid mist
brucine alkaloid
Brucine
brumin
C.F.S.
C.I. developer 17
C.I. 37035
C.I. 77938

Calcium cyanide
calcyanide
Camphene, octachloro-
Carbamimidoselenoic acid
carbanolate
carbon oxychloride
carbon disulfide
carbon nitride
carbon nitride ion
carbon sulfide
Carbon bisulfide
carbonic dichloride
carbonyl chloride
Carbonyl chloride
celphide
celphos
celphos
chelafrin
chinorta
chlorcyan
Chlorine cyanide
chloro(chloromethoxy)methane
chloro(chloromethoxy)methane
chlorocyan
chloroformyl chloride
chlorophenylmethane
compound 118
compound 42
compuond no. 1080
Copper cyanides
corax
corisol
coumadin
coumafene
crolean
crude arsenic
CSF-giftweizen
cupricin
cuprous cyanide
cyanide anion
cyanide of potassium
cyanide of sodium
Cyanides (soluble cyanide salts)
cyanobrik
cyanoethane
cyanogas
cyanogen gas
cyanogen chloride
Cyanogen
cyanogran
cymag
d-con
delicia
delicia
desiccant L-10
dethmore
detia gas ex-B
detia gas ex-B
developer P

DFP
diarsenic pentoxide
diarsenic trioxide
diazo fast red GG
dichlordimethyl ether (DOT)
dichlordimethylaether(German)
dichlorodimethyl ether (DOT)
dichloromethyl ether
dichloromethyl ether
Dichlorophenylarsine
dicyanogen
Dieldrin
diethyl paraoxon
Diethyl-p-nitrophenyl phosphate
diethyl-S-(2-ethioethyl)thiophosphate
Diethylarsine
diflupyl
diflurophate
dihydro-1H-aziridine
dihydroazirene
diisopropoxyphosphoryl fluoride
diisopropyl fluorophophonate
diisopropyl fluorophosphate
diisopropyl phosphorofluoridate
diisopropyl phosphofluoridate
Diisopropyl fluorophosphate
diisopropylfluorophosphoric acid ester
dimethanonaphthalene
dimethanonaphthalene
Dimethoate
dimethoxy strychnine (DOT)
dimethyl-1,1'-dichloroether
dimethyl-1,1'-dichloroether
dimethylenimine
Dimethylnitrosamine
dimethylnitrosoamine
dinex
dinitro-o-cyclohexylphenol
dinitrocyclohexylphenol
dinitrocyclohexylphenol
Dinoseb
diphosgene
Diphosphoramide, octamethyl
Disufoton
dithallium trioxide
dithallium sulfate
dithallium(1+)sulfate
dithiocarbonic anhydride
Dithiopyrophosphoric acid, tetraethyl ester
DMN
DMNA
DN dust No.12
DN dry mix No.1
DNOCHP
dowspray 17
drenamist
drinox
dry mix No.1
duromine

dyflos
dylephrin
dyspne-inhal
E 600
eastern states duocide
eccothal
EI
Endosulfan
Endothall
Endrin
ENT 27,093
ENT 15,949
ENT 50,324
ENT 16,087
ENT 157
ENT 24,042
epifrin
epinephran
epitrate
esphygmogenina
ester 25
ethanedinitrile
Ethenamine, N-methyl-N-nitroso
ether cyanatus
ethyl p-nitrophenyl ehtylphosphate
ethyl paraoxon
ethyl tetraphosphate
Ethyl cyanide
ethylene aldehyde
ethylene imine, inhibited (DOT)
ethylenimine
ethylimine
ethynylcarbinol
ethynylmethanol
eticol
exadrin
explosive D
Famphur
fast red 2G salt
fast red base GG
floropryl
fluophosphoric acid, diisopropyl ester
Fluorine
fluoroacetamide
Fluoroacetamide
fluoroacetic acid amide
Fluoroacetic acid, sodium salt
fluorodiisopropyl phosphate
fluoroethanoic acid
fluorokil 100
fluoropryl
fluostigmine
fosfakol
fulminate of mercury
Fulminic acid, mercury (ll) salt (R,T)
fumitoxin
fussol
glonoin
glucinum

glycerol, nitric acid triester
glycerol trinitrate
glyceryl trinitrate
glyceryl nitrate
glycirenan
granutox
GTN
haemostasin
HC 2072
hektalin
hemisine
hemostasin
Heptachlor
HET
HETP
hexachlorohexahydro-endo-exo-dimethanonaphthalene
Hexachlorohexahydro-exo,exo-dimethanonaphthalene
Hexaethyl tetraphosphate
HHDN
HTP
Hydrazine, methyl
Hydrazinecarbothioamide
hydrazomethane
hydrocyanic ether
hydrocyanic acid, potassium salt
hydrocyanic acid, sodium salt
Hydrocyanic acid
hydrogen arsenide
hydrogen cyanide
Hydrogen phosphide
hypernephrin
hyporenin
intranefrin
iso-cyanatomethane
Isocyanic acid, methyl ester
isocyanide
isodemeton
isofluorophate
isopropyl phosphoro fluoridate
isopropyl fluophosphate
kazoe
kidoline
kilrat
klavi kordal
kumader
lannate
levorenin
lipopill
liqua-tox
lonamin
lyophrin
M7-giftkoerner
magnacide H
medihaler-epi
megatox
mercuriphenyl acetate
mercury fulminate
Mercury, (acetate-O)phenyl-
mesomile

metanephrin
Methane, oxybis(chloro)
Methane, tetranitro- (R)
Methanethiol, trichloro-
methomyl
methyl N[(methylamino)carbonyl)oxy) ethanimido]
methyl O-(methylcarbamoyl)
methyl isocyanate
methyl-N-[metylcarbamoyl)oxy] thioacetimidate
methylethylenimine
methylhydrazine
methyllarterenol
methylvinylnitrosoamine
MG 18570
MG 18370
mintacol
miotisal A
miotisal
mirapront
MMH
monobromoacetone
monochloroacetaldehyde
monofluoroacetamide
monomethyl hydrazine
mous-con
mucidrina
MVNA
myocon
myosthenine
mytrate
N-aminothiorea
N-methyl-N-nitroso-ethenylamine
N-methyl-N-nitrosomethanamine
N-methyl-N-nitrosovinylamine
N-nitrosodimethylamine
N-nitrosomethylvinylamine
N-Phenylthiourea
N-[[(methylamino)carbonyl]oxy]ethanimidothioc acid, methyl ester
naphtoelan red GG base
navron
NCI-00044
NCI-C02017
NCI-C02039
NCI-C04591
NCI-C06360
NCI-C06462
NCI-C08640
NCI-C54988
NCI-C55947
NCI-C60219
NCI-C60786
NCI-CC55947
NDMA
neoglaucit
nephridine
NG
nickel tetracarbonyl
Nickel cyanide
Nickel carbonyl

Nicotine and salts
nieraline
niglycon
niong
nitrazol CF extra
Nitric oxide
nitriloacetonitrile
nitrine-TDC
nitrito
nitro-span
nitrogen peroxide, liquid (DOT)
nitrogen monoxide
Nitrogen (II) oxide
Nitrogen (1V) oxide
Nitrogen dioxide
Nitroglycerin (R)
nitroglycerol
nitroglyn
nitrol
nitrolingual
nitrolowe
nitronet
Nitrong
nitrosodimethylamine
nitrostat
NK-843
NMVA
N,N-Dimethylnitrosamine
NSC 8819
NSC 3072
NTG
nudrin
obeline picrate
octalene seedrin
Octamethylpyrophosphoramide
OMS-771
O,O'-diisopropyl phosphoryl fluoride
O,o-diethyl S[2-(ethylthio)ethyl]phosphorothiolate
O,O-diethyl O-p-nitrophenyl phosphate
O,O-diethyl phosphoric acid O-p-nitropheyl ester
O,O-Diethyl S[2-(ethylthio)ethyl] phosphoro-dithioate
O,O-Diethyl O-pyrazinyl phosphorothioate
O,O-diethyl-ethylthiomethyl-phosphorodithioate
O,O-diethyl-S-(2-ehthioehtyl)phosphorothioate
O,O-diethyl-S-ethyl-2-ethylmercaptophosphorothiolate
O,O-diethyl-S-ethylmercaptomethyl dithiophosphonate
O,O-diethyl-S-ethylthiomethyl thiothionophosphate
O,O-diethyl-S-ethylthiomethyl dithiophosphonate
O,O-diisopropyl fluorophosphate
O,O-Dimethyl O-p-nitrophenyl phosphorothioate
orthoarsenic acid
orvinylcarbinol
osium tetroxide
Osium oxide
osium(VIII)oxide
osmic acid
oxalic acid dinitrile
oxalonitrile
oxalyl cyanide

oxybis (chloromethane)
oxyparathion
p-aminonitrobenzene
p-chloraniline
p-Chloroaniline
p-nitraniline
p-nitroaniline
p-nitrophenyl diethylphosphate
p-nitrophenylamine
paranephrin
paranitroaniline solid (DOT)
paraoxon
paraoxone
Parathion
paroxon
perglottal
pestox 101
PF-3
phenol
Phenol, 2,4-dinitro-6-methyl-
Phenol, 2-cyclohexyl-4,6-dinitro-
Phenol, 2,4,6-trinitro-, ammonium salt (R)
Phenol, 2,4-dinitro-6-(1-methylpropyl)-
phenomercuric acetate
phentermine
phenyl mercaptan
phenyl dichloroarsine (DOT)
phenylarsinedichloride
phenylarsonous dichloride
phenylcarbamide
phenylmercuric acetate
phenylmercury acetate
Phorate
phorate-10G
phosgene
phosphacol
phosphine
phosphoric acid, diethyl 4-nitrophenyl ester
Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl]ester
phosphorofluoridic acid, diisopropyl ester
Phosphorofluoroic acid, bis(1-methylethyl)-ester
Phosphorothioic acid, O,O-dimethyl O-[p-((dimethylamino)-sulfonyl)phenyl)ester
Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
Phosphorothioic acid, O,O-diethyl O-(p-nitrophenyl) ester
phosphorous trihydride
phostoxin
phosvin
picratol
picric acid ammonium salt
Plumbane, tetraethyl-
PNA
po-systox
Potassium cyanide
Potassium silver cyanide
primatene mist
prop-2-en-1-al
propanenitrile
Propanenitrile, 2-hydroxy-2-methyl
Propargyl alcohol

propen-1-ol-3
propenol
propenyl alcohol
propionic nitrile
propiononitrile
propylene aldehyde
propylene imine, inhibited (DOT)
prothromadin
prussic acid
prussite
PTC
PTU
Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts
Pyrophosphoric acid, tetraethyl ester
rampart
ratbane 1080
rattengiftkonserve
red 2G base
renagladin
renaleptine
renalina
renoform
renostyptin
rodex
rumetan
S-methyl-N-[(methylcarbamoyl)oxy] thioacetimidate
scurenaline
Selenourea
shell undrautted A
shinnippon fast red GG base
Silver cyanide
sindrenina
SK-106N
slimicide
SN 46
sodium fluoacetic acid
sodium fluoacetate
sodium flouroacetate
sodium monofluoroacetate
Sodium azide
Sodium cyanide
soladren
solfarin
soluglacit
soup
sphygmogenin
strontium sulphide
strontium monosulfide
Strontium sulfide
strychnine
Strychnine, 2,3-dimethoxy-
Strychnine-10-one, and salts
strychnos
stryptirenal
sulfuric acid, dithallium(1+)salt(8Cl, 9Cl)
Sulfuric acid, thallium(l) salt
sulphocarbonic anhydride
supracapsulin
supradin

supranephrane
supranephrine
supranol
suprarenin
suprel
surenin
susphrine
sympathin I
T-1703
takamina
TEL
temic
temik G10
tetraethyl lead
Tetraethyldithiopyrophosphate
Tetranitromethane (R)
Tetraphosphoric acid, hexaethyl ester
Thallic oxide
thallium (3+) oxide
thallium sesquioxide
thallium oxide
thallium peroxide
thallium(1)sulfate (2:1)
Thallium(I) selenite
thallium(III) oxide
thimet
thioacetohydroxamate
thioate
thiocarbamylhydrazine
Thiofanox
thiol systox
thioldemeton
Thiomidodicarbonic diamide
thiophenol
thiosemicarbazide
Thiourea, (2-chlorophenyl)-
Thiourea, phenyl-
Thiourea, 1-naphthalenyl-
timet
TL 869
TL 337
TL 69
TL466
TNG
TNM
TNM
tokamina
tolyl chloride
tonogen
Toxaphene
Trichloromethanethiol
trinitrin

trinitroglycerin
trinitroglycerol
TS 219
TSC
U 6324
U-3886
UC-21149
USAF XR-19
USAF RH-8
USAF EK-1275
USAF EK-1569
vanadic acid, ammonium salt
vanadic anhydride
vanadium dust and fume
Vanadium pentoxide
vanadium(V) oxide
vaponefrin
vasoconstrictor
vasodrine
vasoton
vasotonin
vegfru
vergfru foratox
vinylcarbinol
warfarin
weed drench
weeviltox
white arsenic
wilpo
yanock
yasoknock
zinc dicyanide
Zinc phosphide
Zinc cyanide
zinc-tox
zotox
ZP