

Chemical Hygiene Plan



COLLEGE
of IDAHO



Version	Date Approved	Revisions by	Revision Notes
1.0		Debbie Conner	New campus Chemical Hygiene Plan replaces previous plan revised 11/2001
1.2	6/15/2017	Debbie Conner	Added fluorescent bulb disposal policy, amended dress code for labs to not include shorts and student lab safety training occurring biennial (every two years)
2.0	6/12/2019	Debbie Conner	p. 18 and p. 19 added asterisk (*) for chemicals in list that were in our current inventory system as of 6/12/2019
			p. 50 took out references to CiSPro inventory program which is no longer used

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INTRODUCTION

The purpose of the College of Idaho Chemical Hygiene Plan is to establish uniform, safe and efficient practices in the laboratories and to assist in the safety instruction of new laboratory employees. The contents of the manual are general in nature and specific problems should be referred to the Chemical Hygiene Officer. Additional specifics are included in Section VIII.

It is the policy of the College of Idaho to do all that is reasonable to prevent injury to persons and damage to property and to protect the employees, facility, patients, the environment, and the public from injury, fire or other damage. In order to achieve these goals the college has instituted a comprehensive safety program. The administration urges the active cooperation and commitment of all departments and employees. Ongoing dialogue and feedback is encouraged. College of Idaho supports this program in its promotion of employee safety and health. Aspects of the overall safety program include:

- ! Safety policies and procedures
- ! Incident reporting and investigation
- ! Emergency preparedness
- ! Hazardous materials and hazardous waste management programs
- ! Fire protection
- ! Safety education and training

These facets of the facility safety program are also incorporated by reference into the Chemical Hygiene Plan.

The employees who work with chemicals bear the primary responsibility for safety on the job, not only for themselves but also for fellow employees. They must obey all safety rules; they must report unsafe conditions to the laboratory supervisor or Chemical Hygiene Officer and if they are not certain about proper safety procedures, they must consult their supervisors.

The attitude of the employee is the key to employee and environmental safety. If he/she is interested and willing to follow the simple safety rules outlined in this manual, there will be little chance of injury or damage from material being handled in the laboratory.

The college administration expects that all laboratory staff will live up to the spirit and intent of this manual and make their laboratory a safer and better place to work.

PART ONE

PERSONNEL RESPONSIBILITIES

Part One - Personnel Responsibilities

College of Idaho has established a chain of command to handle specific safety responsibilities within the facility. The College of Idaho, in conjunction with individual professors, holds primary responsibility for developing and maintaining a safe working environment for laboratory workers.

The responsibilities of various staff positions are described below.

A. ALL LABORATORY STAFF (professors/students)

All laboratory staff are expected to obey the safety rules and to report all unsafe conditions and all accidents. Each person working with or around chemicals, having been properly trained, is responsible for remaining aware of the hazards associated with these chemicals and handling them in a safe manner. If there is any doubt as to the specific hazards or a material or to the proper method of handling, the employee is expected to ask his or her laboratory supervisor or the Chemical Hygiene Officer for the appropriate information.

B. CHEMICAL HYGIENE OFFICER

1. Provide assistance, information, or instruction to workers regarding safety issues, identification of hazards or potential hazards, and ensure that adequate supervision is provided.
2. Ensure workers comply with the Occupational Health and Safety Act and that they carry out all prescribed safety measures and procedures.
3. In addition to posting a copy of the Occupational Health and Safety Act poster in a conspicuous place in each location, post a copy of any OSHA inspection reports and responses to orders issued.
4. Ensure that all equipment, whether leased, rented or owned outright is maintained in good condition.
5. Ensure proper facilities, equipment, protective devices or services are provided and maintained in good order for safe handling, storage and disposal of chemicals and biological materials or wastes.
6. Maintain a list of all hazardous materials used in the lab or verify Safety Data Sheets are available for all chemical compounds used.
7. Ensure compliance with legislative requirements regarding dangerous drugs, radioactive isotopes, hazardous chemicals or reagents, biological materials or wastes.
8. Ensure workers are familiar with the Chemical Hygiene Plan and comply

with all its requirements.

9. Enforce proper procedures in chemical handling, storage, dispensing and transportation within the lab and any bulk chemical storage rooms, as appropriate.
10. Ensure all new employees are properly trained, adequately supervised and familiarized with all aspects of lab safety.
11. Be involved in clean up of significant lab chemical spills and ensure proper procedures and precautions are carried out. Carry out all required reporting of spills or releases.
12. Ensure that waste is disposed of in an appropriate manner.

C. CHIEF EXECUTIVE OFFICER

1. Under the OSHA Laboratory Standard, the President(s) of the college has ultimate responsibility for the implementation of this plan, and must, with other administrators, provide continuing support for institutional chemical hygiene.

PART TWO

RULES FOR SAFE PRACTICE

A. GENERAL SAFETY

1. Fundamental Rules

- a) Do not eat, drink, smoke or apply cosmetics in the laboratory.
- b) Do not put any objects, i.e., pencils, fingers, swabs, etc. in the mouth, ears or nose.
- c) Do not bring food into the laboratory.
- d) Mouth pipetting is forbidden.
- e) Keep your lab coat buttoned while working in the laboratory. When leaving the laboratory remove your coat and wash your hands. Lab coats or aprons should not be worn outside of the lab or work area and must be changed at least once a week (sooner, if soiled).
- f) Cover all cuts, abrasions, open sores and bruises with waterproof tape or disposable gloves and report all injuries to your supervisor.
- g) When working with flammables and around flames no synthetic fabrics are to be worn.
- h) Read all labels and warning signs.
- i) Hair should be tied back, if shoulder length or longer.
- j) Keep the work area tidy and free of unnecessary equipment and materials.
- k) Shoes with open toe or open heel are prohibited in all areas. Low heeled, rubber soled shoes constructed of solid material are required.
- l) Do only authorized work; no horseplay should take place in the laboratory.
- m) Clean up all spills and leakages immediately. See instructions for specific spills.
- n) All electrical equipment should be grounded and kept in good condition.
- o) Keep all corridors, doorways and emergency exits free from hazards and accessible.
- p) Acquaint yourself with local procedures in case of fire, accident, explosion or other emergency, by learning the layout of your building and the location of the emergency exits, telephones, fire fighting equipment (and how it works) and first aid equipment.
- q) Eye protection must be worn when handling materials that may splash.

WARNING:

Employees who wear contact lenses should be aware that fumes from concentrated acids and solvents can cause eye irritation and damage to lenses. Should eye irritation occur, remove lenses immediately and rinse eyes with clean water.

- r) Appropriate gloves are recommended when handling any chemicals.

Be sure that gloves are resistant to the particular material being handled. Excellent resource for determination (http://ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf)

- s) When it is not practical to wear gloves, extra care should be taken to avoid exposure.
- t) Gloves should not be worn in the halls and should be taken off when using computers (personal or shared lab computers) and cell phones to eliminate contamination risks.
- u) Report all injuries, spills, and other releases of hazardous materials to the instructor, CHO and Campus Safety.
- v) All chemicals are to be transported in a chemical resistant secondary container when transporting between labs.
- w) No working alone in the lab without PRIOR authorization from laboratory supervisor. Laboratory supervisors must be aware of equipment being used as well as procedure being done. No new techniques or use of equipment not previously done should be conducted, (this includes any scale up procedures). In the event an individual is working alone laboratory supervisor must be contacted (phone call, text, or email) when individual arrives to the lab and again when leaving the lab. Campus safety must also be notified via phone (X 5151) so periodic checks can be made. Laboratory supervisors may choose to impose stricter policies in individual labs (ex. Asking individual to check in at specific time intervals).

2. Fire Regulations and Extinguishers

Equipment required for a normal Laboratory includes:

- a) Fire extinguishers - Five lbs., dry chemical type (at least 10BC rating) suitable for class ABC fires except in areas containing machinery with integrated circuits. These areas should have a Halon type extinguisher. Placement should be at the exit of each room, or as required permanently attached to a wall, cupboard or similar. There should be approximately one extinguisher located every 30 feet with discretion used in sharing between one or more rooms. The above outline is provided only as a general guide. Please refer to 29 CFR 1910.157 and/or Fire Prevention Code regulations to verify compliance with requirements.
- b) Fire blankets - Should be available in areas containing open flames, flammable liquids, flammable gases and corrosive chemicals rated as fire hazards. Blankets should be located at exits or adjacent to fire extinguishers and should be permanently attached to the wall. Travel routes should be free from obstruction and travel distance no greater than 70 feet.

- c) Flammable storage cabinets - for storage of flammable or combustible liquids only. Do not store corrosive materials in these cabinets.

3. Lighting and Noise Levels

- a) Lighting - it is essential that each work area have sufficient lighting.
- b) Noise levels - should not exceed those recommended by OSHA, generally 85 db.

If the noise level is in excess of the standard, efforts must be made to reduce the level. (Possible solutions are: enclosing noisy equipment, acoustical treatment of walls or ceiling, vibration damping of noisy machines, replacing metal to metal contact with synthetic material to material contact).

4. Electrical and Thermal Equipment

a) Electrical Equipment

- 1) Always read the instructions before attempting to assemble apparatus or to operate it.
- 2) All equipment must be U.L. approved and have three prong plugs.
- 3) Do not use cords with worn insulation. Replace connections immediately when there is any sign of thinning insulation.
- 4) Make sure the wire is dry before plugging it into any circuit.
- 5) Electrical units which are to be operated in an area where flammable vapors may be present should be explosion proof.
- 6) Disconnect all electrical equipment before servicing. Electrical service supply should be well grounded with adequate circuit protection.
- 7) Bench tops made of conducting material e.g. (stainless steel) should be grounded.
- 8) No connections to the main service lines should be made by anyone but a licensed electrician.

- 9) Multiple adapters which can lead to overloading and bad connections should never be used.
- 10) Fuses or circuit breakers of the correct rating should be used on all equipment at all times but "ground" connections must never be fused.
- 11) Labs should have sufficient outlets, suitably spaced to allow for convenient connection of each item of electrical equipment likely to be used at one time.

The following signals are indicative of electrical hazards and should be corrected if found:

- 1) Shock received when touching any part of electrical equipment.
- 2) Power receptacles which are the non-grounded type (two wire instead of three wire) or are cracked or do not hold the plug securely.
- 3) Power plugs having only two prongs which are connected to a receptacle through a "cheater" (grounding plug to non-grounded receptacle adapter) or have bent or broken pins.
- 4) Power cords which are frayed, burned, nicked, cracked, or otherwise damaged or are so short that they require an extension cord. Power cords having lengths in excess of the distance between the equipment and the electrical outlet must be neatly coiled. Power cords running across the floor where personnel must walk.
- 5) Equipment which is dirty or shows evidence of fluid spillages or has been obviously damaged.
- 6) Multiple electrical equipment attached to an adaptor.
- 7) Electrical noise shown on meter readings, scope patterns and strip chart recorder traces making them difficult or impossible to read.
- 8) Wet or moist surfaces on electrical equipment.

b. Thermal Equipment

- 1) Heating baths - be sure the thermoregulator works properly. Waterbaths must be checked daily for temperatures and

water level.

- 2) Autoclaves/ovens - avoid steam and heat burns by being familiar with good operating techniques.

c. Outlets

Should be checked for grounding using a circuit tester every four (4) months, by the CHO, as part of routine laboratory inspection.

NOTE: **Electrical Shock** - Turn off electricity first. If the patient is not breathing, begin artificial CPR immediately and then phone for emergency assistance.

5. Centrifuges

Centrifuges should be securely anchored either by strong suction cups or wheel brakes and should be located where vibration will not cause items to fall off nearby shelves.

Any centrifuge that does not have an interlocking device to prevent:

- a) The lid from being opened while the centrifuge is still in motion and;
- b) The head from spinning while the lid is open.

Must have a sign affixed to it or near it stating:

"DO NOT OPEN LID WHILE CENTRIFUGE HEAD IS IN MOTION"

"DO NOT START CENTRIFUGE WHILE LID IS OPEN"

Centrifuges are dangerous unless operated correctly, therefore, these procedures should be strictly followed:

a) Balancing

Accessories and contents should be carefully balanced and the load distributed symmetrically around the head before starting. Containers should be the right size for swing out heads, buckets must always be properly seated in the heads and rubber pads must always be in place in the buckets.

b) Starting and Stopping

The lid must be closed before use and kept closed until the head has stopped rotating. Changes in speed should be made gradually so as not to destroy the motor and the maximum speed recommended must not be exceeded. The centrifuge must be stopped by turning the speed control knob (rheostat) to zero.

c) Breakage

When a breakage occurs, at least 10 minutes (preferably 30) should be allowed for aerosols and droplets to settle before clean-up is attempted. If practical, the buckets, broken tube(s) and contents, trunnions and head should be autoclaved or immersed in Lysol for 10 minutes. Decontaminate the inside of the bowl with Lysol, allowing 10 minutes for disinfection, rinse with water and allow to dry, then reassemble for use. Disposable gloves and respirator should be worn for clean-up procedure.

Daily cleaning of the inside of the centrifuge bucket with Lysol is recommended. Immediate clean up of any blood spattered inside the centrifuge is a must. The unit should be unplugged before cleaning to avoid electrical shock.

6. Pipetting

Mouth pipetting is prohibited. The use of safety bulbs and other mechanical pipettors is mandatory.

A disposable wipe should be used to remove excess fluids from the tip of a pipette. Fluid should not be drawn up to the top of the pipette. Contents should be expelled gently down the wall of the receptacle to avoid splashing and aerosol formation. Soiled pipettes should never be placed on benches but placed into appropriate receptacles for later disposal.

B. CHEMICAL PROPERTIES AND DEFINITIONS

1. Flammable Liquids

Since flammable liquids can be found in most laboratories, knowledge of the properties of flammable liquids is important for all laboratory personnel. Flammable liquids are volatile and it is the vapor of these flammable chemicals, not the liquid, which ignites and burns. The vapors are often heavier than air and tend to settle on the floor and to flow down stairways, air ducts, elevator shafts, etc. Frequently, ignition of this vapor trail with its resultant flashback can occur at some distance from the source of the vapor. Common sources of ignition are electrical equipment, open flames, hot surfaces, cigarettes and static electricity, etc. Since flammable liquids such as carbon disulfide are immiscible in and denser than water, they can settle in the bottom of drains, e.g. the U section of a sink drain, and be ignited not only by the above sources of ignition, but also by certain chemicals such as perchloric and nitric acid.

Certain flammable solvents such as ethyl ether, isopropyl ether, dioxane,

tetrahydrofuran will form peroxides which explode if allowed to concentrate by evaporation or by distillation. Improper handling of most flammable liquids can lead to health hazards - skin reactions and inhalation illnesses.

The meaning of certain words should be understood by everyone who works with flammable chemicals.

- a) Flammable liquid is a liquid which has a flash point of less than 37.8°C, e.g. acetone, ethyl alcohol and xylene.
- b) Combustible Liquid has a flash point equal to or greater than 37.8° C but not exceeding 93.3° C, e.g. fuel oil, kerosene and varsol.
- c) Flash point is the temperature at which a liquid gives off vapors sufficient to form an ignitable mixture with the air near the surface of the liquid. For example, the flash points of acetone, diethyl ether and xylene are approximately -15°C, -45°C and 24°C respectively. A good source for flash point information is NFPA 325M (National Fire Protection Association, Batterymarch Park, Quincy, MA).
- d) Ignition temperature is the temperature to which a mixture must be raised to initiate combustion. Only a small part of a flammable vapor-air mixture need be heated to the ignition temperature to result in self-sustained combustion. A static electric spark lasting only a fraction of a second is sufficient. Some organic solvents have dangerously low ignition temperatures, e.g. diethyl ether 185°C; carbon disulfide 100°C, etc.

A type B portable fire extinguisher is the extinguisher of choice for putting out fires involving flammable solvents. The discharge should be directed at the base of the fire, but care must be exercised not to spread the burning flammable liquid.

2. Corrosive Chemicals

Concentrated acids and bases must be added to water to minimize the possibility that the heat of reaction will cause eruption of the corrosive. **Never add water to a concentrated acid or base as the water will layer on the top of the more densely concentrated acid or base.** The extreme heat produced may boil and project the upper layer. Since the fumes of concentrated corrosives can cause severe external and internal burns, these solutions should be handled in a fumehood with the employees wearing rubber gloves, rubber apron and safety glasses. If a

spill occurs, **neutralize spills of concentrated acid with dry sodium carbonate or bicarbonate, and neutralize spills of concentrated alkali with citric or boric acid.** Keep a supply on hand.

Drips of acids or alkalis on the sides of containers are best cleaned off with paper towels. Plastic stoppers are better than glass stoppers for glass bottles holding an alkaline solution. Alkalis tend to bind glass to glass making it sometimes impossible to remove a glass stopper. For safe transportation of corrosives, protective packaging should be used. When a corrosive chemical is to be disposed of, it should first be neutralized before being flushed down the drain with large volumes of water. Disposal must be in compliance with waste disposal policies as well as state and local regulations.

3. Explosive Chemicals

Ethyl ether, isopropyl ether, dioxane, tetrahydrofuran, etc. will react with atmospheric oxygen to form unstable peroxides which may detonate when concentrated by evaporation or by distillation. For this reason, the above chemicals should be purchased in the smallest practical size. The time limits for keeping opened containers of the above ethers are one week for uninhibited grades and three to six months for inhibited grades. To do this effectively, the dates of receipt, of opening and of proposed disposal must be clearly written on the container. The presence of ether peroxides should be tested in newly opened containers and periodically in opened containers. A convenient way of testing is to use an ether peroxide Quant paper strip.

Picric acid should always be purchased and stored in water. Dried out picric acid is a more sensitive explosive than T.N.T. Since dried picric acid is extremely dangerous, e.g. shock or heat will explode it, the Chemical Hygiene Officer and/or Lab Supervisor must be contacted if any picric acid is discovered to be dried out.

4. Toxic Chemicals

Toxic chemicals are used in the laboratory at College of Idaho. It is best to review the Safety Data Sheet prior to handling new chemicals introduced to the laboratory. For additional information, consult the Chemical Hygiene Officer or Laboratory Supervisor for special details concerning materials suspected of being toxic

5. Compressed Gases

A compressed gas is defined as a gas having pressure in the container of 40 psi or greater at 70°C. Also any flammable liquid having a Reid vapor pressure exceeding 40 psi at 38°C is classified as a compressed gas. The regulations define the minimum pressure but not the maximum pressure in a cylinder which can be above 6000 psi for non-condensable gases.

The gas pressure within a cylinder depends on its physical state. For example, "permanent" gases exert a pressure proportional to the amount of gas in the cylinder; while gases which are liquified in the cylinder e.g. carbon dioxide, propane, ammonia, etc., exert vapor pressure as long as liquid remains.

C. GENERAL HANDLING AND STORAGE

1. Flammable Chemicals

- a) NO SMOKING
- b) Know the location of and the proper use of each type of fire extinguisher in your area.
- c) Flammable liquids must not be stored in domestic type refrigerators. An explosion may result.
- d) Flammable liquids in glass are best stored in approved storage cabinets. They should never be stored with oxidizing agents, e.g., nitric, perchloric and sulfuric acids. Safety cans should be used whenever possible but should not be subjected to extreme changes in pressure or temperature. If there is any sign of a vapor or liquid leak, transfer the liquid to another approved container.
- e) After opening of container, flammable liquids in excess of 4 liters must be stored in safety cans or safety cabinets. One liter glass bottles or smaller should be used when contamination from the safety can may interfere with clinical results. Safety cans with a spring-action cover have five important functions:
 1. Pressure relief valve;
 2. To prevent leakage or spillage if the can is dropped;
 3. To minimize vapor escape;
 4. To prevent a fire from entering a safety can; and
 5. To smother a fire inside the safety can.

Normally this cover should prevent leakage of a liquid when the safety can is inverted. Safety cans should not be stored in closed compartments which are subject to extreme changes in pressure or in temperature. The pressure release feature of a safety can may cause flammable vapors to leak into the closed compartment. The purpose of the flame arrester is to prevent propagation of a flame into a safety can and ignition of the vapors inside the can.

- f) The glass bottles should never be more than 75% full, leaving a vapor space of 25% for expansion.

- g) Static electricity is generated when liquids, especially flammable liquids, move in contact with other materials, e.g. pouring, pumping, etc. If the static electric charge becomes sufficiently great, a spark can occur from one metal container to the other container and ignite the vapor air mixture. Good wire to metal electrical contacts must be made. The purpose of the bonding is to minimize the potential differences between the dispensing drum and the safety can; grounding is to minimize the potential differences between the containers and the ground.
- h) 500 ml is the maximum recommended volume of any type of flammable liquid which should be stored on a laboratory shelf.
- i) All containers must be well labeled.
- j) Flammable liquids should never be heated with an open flame, hot plate or un-insulated resistance heater. The preferred sources of heating are a heating mantle, steam bath or hot water bath.
- k) When shaking flammable liquids in closed containers, e.g. separatory funnels, release the pressure frequently or the stopper may be forced out and the worker will be sprayed with the chemical.
- l) All spills must be cleaned up immediately.
- m) Flammable liquids must not be exposed to potential sources of ignition, e.g. electric motors, Bunsen burner flames, bacticinerators, etc.
- n) When dispensing flammable liquids (metal to metal), the dispensing container and safety can must be well grounded and bonded.
- o) OSHA approved fumehoods with explosion-proof fans should be used where possible when handling volatile substances, i.e. for organic solvent extractions.
- p) Keep inventory control of all flammable chemicals in the laboratory and storage areas.
- q) The maximum amount of flammable liquid that may be stored at any one time in a location is 235 liters. Liquids may be stored in vented UL approved safety cabinets or in sealed containers of no more than 23 liter capacity each.
(Sealed means closed by a lid or other device from which no liquid will escape at normal room temperature and which has not been opened since it has been filled and sealed by the supplier).

2. Corrosive Chemicals

- a) Before transporting a carboy of acid or base, check to make certain the neck of the bottle is not broken.
- b) Never store strong acids with bases or either of the two with flammable liquids or oxidizing chemicals. Perchloric acid should be stored by itself. Keep sealed when not in use. Corrosive chemicals are best stored in special ventilated cabinets.
- c) On-site storage of corrosives should be limited in quantity.
- d) All acid or alkali solutions must be clearly labeled. Glass containers storing alkaline solutions should have plastic rather than glass

- stoppers as alkali tends to bind glass.
- e) Strong acids or bases should be handled in fumehoods with glass partitions lowered to provide protection to hands and face. Bottles should be placed in a sink with absorbent cloth or towel covering the neck when opening.
 - f) Safety glasses, rubber aprons or lab coats, and rubber gloves are necessary when handling concentrated acids or alkalis.
 - g) Never add water to acids or alkalis; always add a concentrated acid or base to water, a small portion at a time. Using moist paper towels, clean off any acid or alkali drips remaining on the outside of a container. Pour with container below eye level to avoid eye injury and with label up to avoid drips contaminating the label.
 - h) Neutralize spills of concentrated acid with sodium carbonate or bicarbonate and neutralize spills of concentrated alkali with boric acid.
 - i) Ensure all glassware used to hold corrosive chemicals is well rinsed with water before sending to washup.

ACID AND ALKALI BURNS - The burned areas must be washed with large volumes of water, for a period of five times longer than is necessary to stop the burning sensation. The area must then be covered with sterile dressing and then aluminum foil or plastic wrap to prevent exposure to air. No ointments, creams, baking soda or other substances should be applied. Severe burns should be examined by a physician. An incident report shall be filed with Campus Safety.

3. Explosive Chemicals

a) Ethers

Ethyl Ether is a highly volatile and flammable solvent requiring special storage and disposal procedures. With exposure to air, peroxides will form. When the peroxides are concentrated by evaporation of the ether, an explosion will occur. Isopropyl ether and other ethers also form peroxides readily. The following precautions must be adhered to:

- i) Ethyl Ether is preferably obtained in metal cans, and stored in safety containers as opposed to glass bottles.
- ii) All opened bottles must be dated when opened and expiration date sealed.
- iii) "Inhibited" grades, i.e. containing small amounts of water or alcohol, can be used longer (no more than 6 months) than the pure "non-inhibited" grade which must be disposed of within a few weeks following exposure to air. The latter often contains butylated hydroxytoluene.
- iv) It is not advisable to leave a container around with very little ether left in it. Such containers must be promptly disposed of to minimize the risk of explosion. Empty containers will be

- v) picked up by College of Idaho's hazardous waste contractor. Store all ether cans in a cool place and away from direct heat and sunlight. Explosion proof refrigerators only may be used.
- vi) Stabilization of peroxidized ether:
 - aa. To the container add approximately 100 ml of a 5% ferrous sulfate solution for each liter of ether. For smaller volumes adjust the amount accordingly, i.e. 1 ml 5% ferrous sulfate solution for each 10 ml ether.
 - bb. Mix (do not shake)

4. Toxic Chemicals and Unknown Toxicity

If there is any uncertainty about the hazards of a chemical, contact the Chemical Hygiene Officer or Laboratory Supervisor.

Of special interest are:

a) Azide Solutions

Sodium azide is a preservative commonly used in many in vitro diagnostic products. Continual discharge of wastes into drains can bathe the drain pipeline with solutions of sodium azide. Over a period of time, the azide reacts with copper, lead, brass or solder in the plumbing system to form an accumulation of lead and/or copper azide. Both of these compounds are extremely explosive. Solutions containing sodium azide should be discharged down drains with copious amounts of running water. Regular cleaning of the drains should be effected with a strong caustic (NaOH, KOH or Draino) to prevent sodium azide build-up.

b) Cyanide

Avoid contact of cyanide solutions with acids. Acids react with cyanides to produce hydrocyanic acid (prussic acid) vapor which is potentially lethal. Rapidly flowing water must be used when discharging such poisons into drains.

c) Mercury

Mercury is extremely toxic. Every laboratory should do a mercury assessment and include in as part of their Chemical Hygiene Plan. Mercury should be stored in plastic, air-tight containers, away from direct heat or sunlight, and at as low an ambient temperature as possible.

Contact the Lab Supervisor and/or Chemical Hygiene Officer if a spill occurs for proper clean up procedures.

5. Carcinogenic Chemicals

Currently regulated by OSHA as carcinogenic:

2-Acetylaminofluorene

Acrylonitrile

4-Aminodiphenyl
Benzene*
Bis-chloromethyl ether
3,3'-Dichlorobenzidine (+ salts)
Ethylene oxide*
Inorganic arsenic*
a- Naphthylamine*
4-Nitrobiphenyl
B-Propiolactone

Asbestos
Benzidine
1,2-Dibromo-3-chloropropane
4-Dimethylaminoazobenzene
Ethyleneimine
Methyl chloromethyl ether
b- Naphthylamine
N-Nitrosodimethylamine
Vinyl chloride

Other recognized carcinogens:

Analgesics with Phenacetin*
Myleran
Chromium and certain compounds*
Cyclophosphamide
Melphalan
Mustard gas

Azathioprine
Chlorambucil
Conjugated estrogens
Diethylstilbestrol
PUVA
Thorium dioxide

Suspected carcinogens:

Adriamycin
2-Aminoanthraquinone
1-Amino-2-methylantraquinone
Amitrole
o-Anisidine hydrochloride
Beryllium and some compounds
1,3 Butadiene
Carbon tetrachloride
Chlorinated paraffins
CCNU
4-Chloro-o-phenylenediamine
p-Cresidine
Dacarbazine
2,4-Diaminoanisole sulfate
1,2-Dibromo-3-chloropropane
1,4-Dichlorobenzene*
3,3'-dichlorobenzidine HCL
Methylene chloride*
Diepoxybutane
Diethyl sulfate
3,3'-Dimethoxybenzidine
Dimethylcarbamoyl chloride
Dimethyl sulfate*
1,4-Dioxane
Direct blue 6
Estrogens (not conjugated)

Afltoxins
o-Aminoazotoluene
Benzotrichloride
Bischloroethyl nitrosourea
Cadmium and some compounds*
Chlorendic acid
Chloroform*
3-Chloro-2-methylpropene
C.I. Basic red 9 mono HCL
Cupferron
DDT
2,4 Diaminotoluene
1,2 Dibromoethane
3,3'-dichlorobenzidine
1,2-Dichloroethane *
1,3-Dichloropropene
Di(2-ethylhexyl)phthalate
Diglycidyl resorcinol ether
3,3'-Dimethylbenzidine
1,1-Dimethylhydrazine
Dimethylvinyl chloride
Direct black 38
Epichlorohydrin*
Ethyl acrylate

Ethylene oxide*
Formaldehyde gas

Ethylene thiourea
Hexachlorobenzene

Items with an asterisk (*) are found within College of Idaho's inventory system.

Carcinogenic materials should always be handled with care. Use protective equipment such as gloves when handling, and avoid breathing vapors.

6. Compressed Gases

- a) The cylinder contents must be clearly identifiable.
- b) Cylinders must be handled carefully and not rolled, slid or dropped; large cylinders should be transported on a wheeled cart; do not lift a cylinder by its cap.
- c) Cylinders must always be securely fastened whether in storage, transit or use.
- d) The cylinder valves must not be tampered with. Never force connections or use homemade adapters. Use only approved equipment. Never repair or alter cylinders, valves or safety relief devices.
- e) Compressed gas cylinders should only be used with a regulator. Close the cylinder valve when the compressed gas is not being used.
- f) When a compressed gas cylinder is "empty", turn off the cylinder valve and label the cylinder as "empty". Store separately from full cylinders. Current cylinder status tags must be attached to the tank at all times.
- g) Compressed gas cylinders should be stored in well ventilated areas away from ignition sources, heat, flame and flammable chemicals. Cylinders should never be artificially cooled. Cylinders must never be placed where they can become part of an electrical circuit.
- h) Never completely empty a compressed gas cylinder.
- i) Empty gas cylinders must never be refilled on laboratory premises. Never attempt to mix gases in cylinders.
- j) If a gas cylinder leaks, close the valve and clearly identify the cylinder as unusable and hazardous. Remove the cylinder outdoors to a well ventilated location away from possible sources of ignition if the gas is flammable. Contact the supplier.
- k) The protective caps should be kept on the cylinders at all times except when the cylinders are in active use.
- l) Avoid using a wrench on valves equipped with handwheels. Never hammer a valve to open or to close it.
- m) Use only soapy water to check for gas leaks.
- n) It is best not to store cylinders containing flammable gases with oxygen cylinders. They should be separated by a minimum of 20 feet.
- o) Hydrogen should be handled with care as it ignites easily.
- p) Compressed air tanks should have an air pressure of less than 30 pounds per square inch. Never use to clean clothing or parts of the body.
- q) Small propane fuel tanks when exhausted are not to be refilled and should be disposed of according to the facility hazardous waste disposal plan.

7. Fluorescent bulbs and compact fluorescent lamps (CFL)

- a) Fluorescent lamps and similar bulbs contain mercury vapor and are regulated by the EPA as universal waste.
- b) Maintenance shall collect this material and place in general collection area to be disposed of per EPA regulations
- c) Care should be taken to not break bulbs but if one does get broken care should be taken to clean area in a way as not to form dust.

D. GENERAL HANDLING OF SPILLS

All spills should be promptly evaluated to determine the following:

- 1. What is the material, and what are the hazards?
- 2. Does the employee have the ability to handle the problem?
- 3. Is there a risk to other employees?

For any spill, regardless of its size or type of chemical involved, first alert fellow employees and visitors that a spill has occurred. If it is determined that extreme danger is present due to flammability and/or noxious fumes, evacuate all personnel from the affected area. Secure the area if necessary.

Before attempting to contain or clean up a chemical spill, determine the appropriate level of protective equipment and put it on! Appropriate protection might include safety goggles, apron, gloves, and/or respiratory protection. Next, determine the appropriate method of handling by reviewing the Material Safety Data Sheet, label, or other source of information.

Spillages of organic solvents, acids or alkali are effectively cleaned up with "Spill Control Pillows". These pillows contain highly absorptive silica which is capable of retaining up to 1 liter of liquid. Be aware that these pillows do not reduce the toxicity or flammability hazard of the material - they are to absorb the material and prevent further spreading. Strong oxidizing acids will destroy the pillow fabric. Some chemicals will have to be neutralized or diluted before they can be absorbed onto the pillow.

Clean Up Procedure

- a) Initiate any appropriate action to prevent a larger problem.
If the liquid is flammable, all sources of ignition (electrical, open flame) must be shut off. To reduce irritant vapors the area of the spill should be well ventilated.
- b) Alert all staff to avoid area of spill.
- c) Wear protective clothing when cleaning up spill (chemical resistant gloves, eye protection, respirator, etc. based on the specific hazards of the material).
- d) Determine the volume of the spill. For each liter of liquid spilled use one Spill Control Pillow. Large spills with flowing liquid should be diked to

- prevent further spread. Small spills (under 100 ml) can be easily handled with absorbent paper towels and copious rinsing with water.
- e) Clean-up. Press the pillow into the spill and allow absorptive action of the silica to absorb the spill. Do not use a "wiping" action to clean-up the spill.
 - f) Disposal. Spill Control Pillows cannot be re-used or used to clean up spills of different solvent as violent chemical reactions can occur. Used pillows should be containerized, labeled, and held for disposal.
 - g) Decontamination. Rinse the area with water and dry. Check yourself to determine whether or not you have spilled any chemical on yourself or your clothing. If so, discard clothing or clean as appropriate. After the area is clean and fumes have dissipated, evacuated personnel may return to the room and normal operations may resume.

Note the following special precautions:

- a) Acid and Alkalis
Spill Control Pillows do not neutralize acid or alkali. It is important to first neutralize acid spills with dry sodium carbonate (or bicarbonate). Neutralize alkali spills with boric acid. Add until bubbling ceases. Flush with copious amounts of water.
- b) Organic Solvents
As the Spill Control Pillow does not eliminate the fire hazard associated with organic solvents it is recommended that the Pillows be placed in a fume hood until they can be properly containerized prior to disposal.
- c) Mercury
Accidental spills of mercury must be cleaned up immediately to prevent toxic vapors from entering the air and to prevent contamination of surface or water systems by large or microscopic droplets. If traces of mercury are left in laboratories as the result of mercury spills, worker health can be affected over a period of time. In areas of spills, mercury vapor in the air can exceed 20 mg/m³ (T.L.V. is 0.05 mg/m³) depending on the conditions in the lab and the amount spilled.

It is recommended that each department with equipment containing mercury stock a Mercury Spill Control Kit. In addition, all other locations should stock Mercury Absorbent Sponges to handle small spills.

The Mercury Spill Control Kit contains:

- i) A hand operated suction pump to pick up large quantities of mercury.
- ii) Mercury absorbent sponges for swabbing up small particles from benches, floors and other smooth surfaces.
- iii) An absorbent powder that reacts with mercury to form a harmless amalgam. This powder is suited for collecting mercury from rugs, crevices and other poorly accessible areas. If additional supply is needed, it can be made by mixing equal parts of zinc powder and

- sulfur powder.
- iv) Protective eye glasses.
- v) Plastic, disposal bag.

Large Spills (> 1/2 lb.)

Wear protective plastic gloves, respirator and chemical resistant clothing. Use the suction pump to pick up puddles and droplets of mercury. For efficient operation of the pump, keep the reservoir at about the same level as the spill. The stainless steel adapter tube is useful for picking up mercury droplets in crevices. Transfer all mercury in the reservoir to a plastic container with a screw cap. Seal tightly and label "Waste Mercury".

After removal of large mercury droplets with the suction pump, use either the sponges or the powder to complete clean-up (see below).

Small Spills

On flat surfaces use the mercury absorbent sponges. Dampen the sponge and slowly wipe the contaminated area. Allow for complete absorption of all free mercury. Return the used sponge in its plastic bag, seal tightly and label "Mercury Waste". Waste material should be held for disposal according to the facility Waste Disposal Plan. For spills that are difficult to access, sprinkle the contaminated area with a fine layer of the mercury absorbent powder. Overlay the powder with wet paper towels to moisten the powder. Allow 10 to 15 minutes for the mercury to react with the powder and form an amalgam. As the amalgam lowers the vapor pressure of mercury, it can then be cleaned up by conventional means (eg. a vacuum cleaner) and disposed with the routine waste.

E. CHEMICAL EXPOSURES

CHEMICAL BURNS

If you witness or are made aware of an accident where an individual receives a chemical burn:

1. Remove the individual from contact as promptly and completely as possible. Contaminated clothing should be removed immediately.
2. Campus Safety (X 5151) as well as the Supervisor should be contacted immediately.
3. The affected area should be flushed with water by emergency shower, face flush, or whatever means is quickly available. If the individual is wearing safety goggles, do not remove them until the face area has been flushed. When chemical is splashed in the eyes, the lids should be forcibly held apart so that the entire surface of the eye is flushed.
4. Do not use neutralizing agents, buffering agents, or chemical

- antidotes.
5. When the affected area has been flushed extensively, the employee should be taken to the emergency unit.

CHEMICAL INHALATION

When an individual inhales chemical gases, vapors, fumes, or mists and exhibits any symptoms of adverse exposure:

1. Remove the victim from exposure immediately. If located in a confined space or the chemical is irritating, a gas mask or Scott Air Pack should be used in the rescue. DO NOT ATTEMPT TO USE THIS EQUIPMENT UNLESS YOU HAVE BEEN TRAINED IN ITS PROPER USE. Inform the Safety Team immediately if assistance is required. Dial 911 for emergency assistance.
2. Dilute the concentration of the material in air by opening windows and nearby laboratory hoods.
3. Keep the victim warm and lying down.
4. **If the victim has stopped breathing**, begin artificial respiration. CPR (CARDIOPULMONARY RESUSCITATION) SHOULD ONLY BE ADMINISTERED BY CERTIFIED PERSONNEL. Select someone to dial **911 for an ambulance**.
5. Contact Campus Safety (X5151) and the Supervisory immediately.
6. If the victim has **not** stopped breathing, they should be taken to the Emergency Unit for additional medical treatment. If a stretcher is needed, call **911**.
7. The source of the chemical gas or vapor should be cut off. Depending on the type of chemical, respiratory protection equipment may be required.

F. WASTE DISPOSAL PLAN

BASIS

It is the policy of the College of Idaho to comply with all federal, state, and local regulations regarding the proper storage, handling, labeling, transportation, and disposal of all regulated wastes, including hazardous (chemical), infectious, and radiological materials. The College of Idaho Hazardous Waste Management Plan is administered by the Chemical Hygiene Officer. The plan addresses the management of chemical and residual wastes, and is incorporated by reference into this Chemical Hygiene Plan. Specific aspects of the plan as they affect waste management generated by the laboratory are summarized in this section.

The College of Idaho is committed to safe and responsible management of hazardous waste, not only because failure to do so can result in civil and criminal penalties, but because the college endeavors to be a good citizen with respect to the local and global environment. The purpose of this plan is to provide information and guidance to the college community with regard to hazardous waste.

Since excess chemicals usually become hazardous waste, the best way to reduce this problem is to only purchase what is needed. It is also a prudent idea to replace lab exercises that produce hazardous waste with ones that teach the same principles but produce less hazardous waste.

SCOPE AND RESPONSIBILITY

Waste is used to define any material which is unwanted or unusable. **Hazardous waste** is defined below.

It is the duty of all who generate hazardous waste to ensure that all hazardous waste is handled in a manner that is safe, environmentally friendly and complies with all local, state and federal regulations. This is meant to include wastes that are not, by statute, hazardous but which, if carelessly discarded, could possibly cause harm to the environment.

To avoid the possibility that a hazardous waste may be erroneously considered harmless, this definition is given as a guideline:

A WASTE IS HAZARDOUS IF IT HAS THE PROPERTY OF IGNITABILITY, CORROSIVITY, IS TOXIC OR REACTIVE OR IS INFECTIOUS.

Keep in mind this is an attempt to simplify definitions and that these are brief definitions and do not cover all possible cases.

- Ignitability refers to a liquid whose flash point is below 140F, a solid that can ignite by friction, absorption of water or that burns vigorously when ignited, or is an oxidizer.
- A substance is corrosive if its pH is 2 or less or 12.5 or greater. Waste considered hazardous only because of these criteria may be neutralized by qualified personnel and sewer.
- Toxic materials are those containing certain heavy metals or certain organic constituents. These abound in most laboratories.
- A reactive substance is one that is unstable or explosive, will react violently with air or water or will release toxic gas when heated, burned or when mixed with another material.

The EPA has listed certain chemicals which have previously been designated hazardous. Of interest to us would be those whose prefix is either K, U, or P. (see CFR 261).

Infectious waste includes organisms, or substances derived from organisms, that pose a threat to (primarily) human health. This can include medical waste, samples of microorganisms, including recombinant organisms, viruses or toxins (from biological sources) that can impact human health. It can also include substances harmful to animals. Certain viruses or infectious agents are tightly controlled. Care needs to be taken to ensure that these harmful agents are not released into nature.

Facilities will be responsible for disposal of expended fluorescent lights.

Other departments that produce waste that may be hazardous should contact the Chemical Hygiene Officer to determine the best procedure to deal with it.

III. WASTE ACCUMULATION

Every area that produces hazardous waste must have a satellite accumulation site. A satellite accumulation area is a safe location that has a sign indicating that it is an area for accumulating hazardous waste. Except in certain cases the area must be used only as a collection place for hazardous materials until they are removed to the main hazardous waste storage area. It must be at or near the point where the hazardous waste is generated and be easily controlled and easily visually inspected. This area should have good ventilation and, where possible, secondary containment in case the primary container leaks.

Each faculty member who has a research lab is responsible for the satellite accumulation area for his/her lab. In addition, someone from that department should be appointed to oversee the accumulation area and provide assistance in determining proper operation of the satellite accumulation site. This person need not be an expert but will act as a liaison to the hazardous waste coordinator.

All care should be taken to eliminate waste in the most environmentally way possible in accordance with procedures and principles accepted as good chemical practice; i.e., neutralization, evaporation, precipitation & recovery of heavy metals; and distillation and reuse of solvents. In addition it is imperative to remind and monitor all involved to keep the hoods free of any permanent or semi-permanent storage, that glassware or chemical containers should not be stored near or in sinks, and that all chemical containers be properly labeled as previously described in this document. Furthermore, it is imperative that chemical glassware be promptly cleaned.

Recovery of Chemicals

Stockroom floor drains are plugged to prevent spills from entry into the city wastewater stream. It is forbidden to discharge solutions or organic solvents into sink or other drains without the express permission of the chemistry faculty; i.e., it is the responsibility of the faculty to ensure that only non-dangerous fluids be discharged into building drains, and that both teaching assistants and students be advised and constantly reminded of proper disposal practices.

Recovery and Disposal of chemicals should be done in accordance with procedures and principles accepted as good chemical practice; i.e., neutralization, evaporation, precipitation & recovery of heavy metals; and distillation and reuse of solvents. In addition it is imperative to remind and monitor all involved to keep the hoods free of any permanent or semi-permanent storage, that glassware or chemical containers should not be stored near or in sinks, and that all chemical containers be properly labeled as previously described in this document. Furthermore, it is imperative that chemical glassware be promptly cleaned.

It is the responsibility of the professor involved to give specific directions to both teaching assistants and students for proper disposal of chemicals for each experiment. Ordinarily, text based experiments include proper guidelines for satisfactory disposal. In addition the Professor in charge will maintain a written record of supplementary disposal directions in a course notebook. Signs must be placed in sink areas reminding students and those responsible to perform proper disposal methods. All containers are to be identified and labeled, working surfaces are to be clear and cleaned at the end of each day, and chemicals placed in their assigned storage areas. Spills are to be cleaned-up using containment, cleanup and ultimate disposition as described by the professor in charge.

Chemical waste

Containers and labeling

Containers must be compatible with the substances they are to contain. Glass is preferred but plastic bottles as well as steel cans are acceptable in some cases. No waste container may have a capacity of more than five gallons without specific permission from the Chemical Hygiene Officer. Never use beakers, flasks, pop bottles, etc. Containers for accumulating hazardous waste must be labeled with the words "Hazardous Waste" and there must be available a list of the contents of the container (and the approximate concentration or amount of the hazardous substance), either on the label. Complete names must be used on this list, not chemical formulae or initials. All other labels on the containers must be removed or obliterated. If the identity of a waste is not known, the department producing that waste will bear the cost, if any, of having the waste analyzed.

Except when waste is being added, the containers should be closed. When a container is full, the 'fill' date commences and the container must be removed to the main accumulation area by contacting the Chemical Hygiene Officer (x 5215).

Where lab wastes are mixtures of different chemicals the containers should be in a fume hood or ventilated cabinet. When wastes are mixtures of chemicals it is not advisable to tightly cap the containers, since there could be pressure build-up. Care must be taken to make sure that wastes that get mixed are not incompatible. In any case, do not completely fill the waste container. Leave room for expansion. It is never wise to mix non-hazardous waste with hazardous waste. This only results in a larger volume of hazardous waste.

Empty containers (including centrifuge tubes) that previously held hazardous substances are legally not hazardous waste once the contents have been removed by ordinary means. Emptying and bulking the contents of the centrifuge tubes is the responsibility of the lab that generated them. They should not be included with the actual hazardous waste. Although empty containers are not hazardous waste, they should be cleaned as thoroughly as possible before depositing in the trash bins. Containers may be reused for waste as long as there are no incompatibility issues. If a container previously held a "P" class it is not legally considered empty until it has been rinsed three times with solvent capable of removing the contents. This rinse solvent is then considered hazardous waste.

Waste removal

Once a container is full (not over 75%), contact the hazardous waste coordinator and arrange to deliver it to the main hazardous waste storage area. As a small quantity generator, College of Idaho may accumulate up to 220 pounds of hazardous waste per month but no more than 2.2 pounds of acutely hazardous waste for an indefinite period. Once either limit is reached it must be removed within ninety days. This main storage

area will be inspected every week and the conditions will be reported on a form kept in the hazardous waste storage area.

Biological waste

Microorganisms from biological research and other lab exercises will be collected in satellite collection areas. Cultures in liquid will be destroyed using bleach and discarded down a sink drain. Cultures in gels will be collected in autoclavable bags. When these bags are full they will be autoclaved. After autoclaving the gels may be discarded in normal trash. Implements used in these processes will be autoclaved before reuse or disposal.

Dead animals and animal parts will be collected in labeled sealable bags and frozen until being removed by a company that is licensed to handle medical waste.

Other waste

Unwanted paint and paint related materials will be sent to a recycling center when possible. Otherwise it must be considered by the shop as hazardous waste.

Parts cleaning solvent will be handled by a company licensed to recycle or dispose of it.

Used motor oil will be taken to a facility that collects used oil.

Photographic process waste will either be treated or sent out for disposal by a reputable waste removal company. After removal of silver the liquid waste may be sewered.

If a department has a current contract for removal of certain wastes, they may be removed from the satellite accumulation area without being taken to the main storage location.

Non-hazardous waste may be discarded in a sink drain. However, this practice should only be done with small quantities of materials. Final determination of whether a material is hazardous waste will be made by the Chemical Hygiene Officer.

While not strictly hazardous waste, broken glass and sharp implements must be discarded in appropriate containers that have warning labels and not placed in general trash where they would pose a danger to housekeeping personnel.

EMERGENCIES

In the event of any emergency – fire, spill, etc. - notification should be sent to campus safety at X5151. Safety will then contact the appropriate civil agencies, if necessary, and inform Chemical Hygiene Officer.

POSTSCRIPT

Everyone should also consider that the manufacturing process using raw materials often generates more waste, than does manufacturing using recycled materials. Even though the waste is produced at a remote site everyone should conserve and recycle as much as possible.

TO BE POSTED

**College of Idaho
Safety and Health Rules**

- 1) Authorized persons only are permitted in the laboratory. All visitors must register and must be accompanied by a responsible employee.**
- 2) Approved eye protection must be worn by all persons in laboratories at all times. Visitor's spectacles will be available for use by those not having suitable glasses.**
- 3) Persons handling corrosive or highly toxic substances must wear gloves impervious to the material.**
- 4) Laboratory coats or aprons are furnished to employees/students and are to be worn whenever doing laboratory work.**
- 5) Good personal hygiene shall be practiced at all times. Chemicals, samples, solvents, biologicals or other hazardous materials contacted by the hands or other parts of the body must be washed off immediately. Safety showers shall be used in case of major chemical contact.**
- 6) Smoking is not permitted in the laboratories.**
- 7) No eating or drinking can be permitted in laboratories. Never use laboratory glassware for food or beverage.**
- 8) Long hair must be tied up or worn under a cap.**
- 9) Wearing of jewelry is discouraged. Rings can be damaged and can lead to irritation from chemicals retained under them.**
- 10) Employees shall do no laboratory work while alone in the building, except with specific approval of their supervisors.**
- 11) Horseplay and practical joking are not permitted.**

- 12) All driving on company business must be within legal limits and in conformance with all applicable regulations. Defensive driving should be practiced at all times.**
- 13) All injuries, no matter how slight, must be reported to the laboratory supervisor.**
- 14) Know your nearest escape route for use in an emergency. Be familiar with fire and evacuation alarms.**
- 15) Know where your nearest extinguisher is located. Be sure you know how to use it.**
- 16) Know where your nearest safety shower and eye wash fountains are located. Be sure you know how to use them.**
- 17) Wipe up spills on bench or floor promptly. Correct other hazards or report them to your supervisor.**
- 18) Label all containers for positive identification. Add hazard warnings when contents are flammable, corrosive, toxic, radioactive, etc.**
- 19) Maintain complete, valid records of all samples, reagents, analyses and results. Protect records from damage or loss.**
- 20) Handle glassware carefully to avoid injury. Discard broken glassware into the designated container.**
- 21) Avoid pressure or vacuum in glassware unless it is specifically designated for the conditions.**
- 22) Use autoclaves, steam sterilizers and other pressurized equipment strictly according to written procedure. Safety relief devices and controls must function properly.**
- 23) Gas cylinders must be secured with a strap or chain when being stored, used, or transported. Adapters between cylinder valves and regulators may not be used. Caps must protect valves when cylinder are not in use.**
- 24) Use the hood for all operations involving toxic or flammable materials. Verify hoods are tested for flow rate at least twice per year. The face velocity should range between 100 and 200 feet per minute.**
- 25) Flammable materials (flashpoint 100°F or less) are best kept in safety cans. Glass bottles when preferred for purity, must be kept in a flammable liquids cabinet, OSHA regulations limit the size of glass bottles for flammables.**
- 26) Use syringes in accordance with proper procedures. Do not use excessive**

force on a syringe. Dispose of syringes and needles in sharps container.

- 27) Dispose of all samples and test materials in accordance with the facility waste disposal plan. Avoid putting hazardous materials into the sewer unless instructed to do so. Avoid purchasing excess materials that will have to be disposed of.**
- 28) All electrical equipment must be grounded by a ground fault interrupter. Equipment or cords with poor insulation or base terminals must be repaired before reuse. Extension cords are prohibited. All wiring is to be done by a qualified electrician.**
- 29) Learn how to lift properly to avoid back injury. Get help for heavy loads.**
- 30) Only long pants are to be worn in the lab areas—No shorts are allowed under any circumstances during lab assigned time. Long pants only in lab research designated areas.**
- 31) Students shall attend safety training prior to their first scheduled lab at College of Idaho (this includes transfer students with previous lab experience). Refresher training shall be completed every other year for students.**
 - Research students will receive training EVERY year they are doing research regardless if they are in INBRE, under Murdock scholarship, internship or independent research. This training will include comprehensive videos, general training and students must pass test with 100% before lab work can be started or continued.**

PART THREE

INFORMATION AND TRAINING

Introduction

Safe operation of the laboratory is largely contingent upon personnel awareness and knowledge. These skills apply to the ability of employees to obtain information and use it in the performance of their duties. It applies to familiarity with procedures as well as the hazards of chemicals and equipment in the laboratory.

The OSHA Lab Standard requires the laboratory to provide information and training to verify employees are aware of the hazards of chemicals present in their work areas. Information is to be provided at the time of an employee's initial assignment to a work area and prior to assignments involving exposures to chemicals they have not worked with before. Refresher training is to be provided on a schedule determined by the Chemical Hygiene Officer.

Training/ Information Program Outline

The following information is provided on exposure to hazardous chemicals in the laboratory:

- ! Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory
- ! Permissible exposure limits or other recommended exposure limits
- ! Location of safety data sheets (SDS') and other available reference material on hazards, safe handling, storage and disposal of the hazardous chemicals used in the laboratory

The following information is included in the required training program:

- ! Physical and health hazards of chemicals in the work area
- ! Measures that employees can take to protect themselves from these hazards, including specific procedures such as work practices, personal protective equipment to be used, and emergency procedures
- ! Methods and observations that may be used to detect the presence or release of hazardous chemicals

All employees/students will receive this training prior to working in the laboratory. Any employees/students transferred from other work areas to the laboratory will also receive training. Biennial (every other year) refresher training will also be provided and must be completed before employees/students are to begin the first assigned laboratory class for the affected semester. Training will be implemented through a combination lecture/audio-visual presentation format to be done the first week of classes during the Fall and Spring semesters as well as during the first week of INBRE research. Those attending INBRE or other summer research must do annual training as there is a greater likelihood that student would be working alone in the labs. Summer research training will occur the first day of the INBRE research timeline.

The College of Idaho Chemical Hygiene Training Program is administered by the CHO.

Laboratory Supervisors are expected to inform the CHO when new chemicals are introduced to the laboratory and when job changes are instituted requiring additional training for employees.

CRITERIA FOR CONTROL MEASURES

Criteria for determining what control measures are needed to assure safe handling of hazardous materials in the laboratory include the following:

- ! Description of operations that must be conducted within laboratory hoods or with enclosure or exhaust ventilation
- ! Description of specific handling practices
- ! Description of personal protective equipment to be used
- ! Air monitoring to determine exposure levels and establish respiratory protection requirements

In particular, control measures for the handling of extremely hazardous chemicals must be described. For example, highly toxic materials may require special protective measures. Several sources are used for making these determinations. Following is a list of sources which are available to all laboratory employees:

"Threshold Limit Values and Biological Exposure Indices", American Conference of Governmental Industrial Hygienists, Cincinnati, OH. (1990 or later edition).

"Right to Know Pocket Guide for Laboratory Employees", Genium Publishing, Schenectady, NY, 1991.

"Condensed Chemical Dictionary", Van Nostrand & Reinhold, NY, NY. (11th or later edition).

SPECIFIC HANDLING PRACTICES

All employees are urged to follow the general safety rules regarding the handling of chemicals and chemical containers. These rules are referenced in Section 2.

PERSONAL PROTECTIVE EQUIPMENT

Most personal protective clothing and equipment is provided by the laboratory to employees and visitors when and where this is necessary. It is the responsibility of each employee and student to be certain that the appropriate clothing is worn as necessary. The most fundamental piece of personal protective clothing is provided by each employee for his/her own use. This is the normal clothing worn in the laboratory. Clothing should be worn to minimize skin surfaces available for direct contact through splashing. Therefore, all employees, as well as students, should wear long sleeve and long legged clothing (pants) or long lab coats or

aprons and oxford style shoes or sneakers. Avoid short sleeve shirts, short trousers, or skirts, and open-toed shoes or sandals. Shorts should not be worn in working labs at any time- long pants only. Additional personal protective gear available includes:

Eye Wear

Gloves

Aprons and/or lab coats

Respirators (as needed per protocol or specific chemical use determined via SDS of that chemical)

RESPIRATORY PROTECTION PROGRAM

College of Idaho has implemented a respiratory protection program. This policy covers the inspection, repair, cleaning, and storage of respirators, as well as the required training program. All employees who wear respirators must receive a medical evaluation prior to initial use and on an annual basis.

HOUSEKEEPING

General housekeeping is an integral part of chemical hygiene and good safety practice. A clean work area is much safer than a cluttered or dirty one. Some appropriate housekeeping measures include:

- ! Keep all aisles, hallways and stairs clear of all chemicals.
- ! Keep all work areas, especially work benches, clear of all clutter and obstructions.
- ! All working surfaces and floors should be cleaned regularly.
- ! Access to emergency equipment, showers, eyewashes and exits should never be blocked.
- ! Wastes should be kept in the appropriate containers and labeled promptly and properly.
- ! Laboratory staff should be considerate and aware of housekeeping staff. The typical housekeeping staff is not properly trained in the handling of chemicals and should not face situations where they must make decisions regarding the proper handling or storage of chemicals. Therefore, all chemicals should be placed in proper storage areas by the end of each workday; all spills should be promptly cleaned up with arrangements made for waste disposal; and all chemicals should be properly labeled.

AIR MONITORING

College of Idaho has established an Air Quality Monitoring Program to ensure a safe work environment for all employees. This program is summarized below.

Personnel Responsibilities

All **laboratory supervisors** are responsible for the following:

- ! Knowledge of applicable air quality regulations applicable to their department
- ! Informing employees of the hazards associated with chemicals used in the department, providing information on known air quality, and advising employees of air monitoring performed
- ! Reporting suspected air quality problems to the Chemical Hygiene Officer
- ! Maintain air quality standards as required and implement corrective action as necessary

All **employees** are responsible for the following:

- ! Reporting suspected air quality problems
- ! Follow policies and procedures designed to maintain air quality, such as replacing lids on containers and working in fume hoods
- ! Correctly use and maintain personal protective equipment

The **Chemical Hygiene Officer** is responsible for the following:

- ! Assist laboratory supervisors in determining air monitoring requirements in each workplace
- ! Arrange for air monitoring if necessary
- ! Ensure air monitoring meets regulatory requirements and implement corrective action as required
- ! Review results with professors

PART FIVE

LABORATORY VENTILATION

Laboratory ventilation is a key factor in controlling employee exposure to hazardous substances. Ventilation is provided in two ways: through the facility's heating and air conditioning system, and through fume hoods utilized in the laboratory. OSHA defines a fume hood as a "device located in the laboratory which is enclosed on five sides with a moveable sash or fixed particle enclosure on the remaining side. It is constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory. It allows chemical manipulation to be conducted in the enclosure without insertion of any part of the body other than the hand and arm. Walk-in hoods with adjustable sashes meet the above requirements if the sashes are adjusted during use so that the airflow and the exhaust of air contaminants are not compromised and employees do not work inside the enclosure during the release of airborne toxic substances."

Following are additional requirements applying to fume hoods in the laboratory:

Ventilation will not be obstructed or modified except by qualified mechanical engineers. Ventilation in areas where noxious fumes or flammable liquids are handled should provide a minimum of six air changes per hour. Ventilation in areas where fungal, mycobacterial, or viral specimens are handled should provide a negative air pressure with respect to the rest of the laboratory.

Fume hoods are used for the safe handling of noxious, corrosive, or volatile chemicals. Fume hoods are not to be used as a substitute for Biological Safety Cabinets (laminar flow hoods). The following policies concerning fume hoods in the laboratory will apply:

Construction: No fume hoods constructed of flammable materials will be permitted in the laboratory.

Toxic fumes: Whenever toxic substances, corrosive aerosols, carcinogens, mutagens or teratogens are handled in a fume hood, the minimum face velocity must be 100 cubic feet per minute (fpm). For hoods not meeting this requirement, the velocity may be increased by lowering the sash. If the velocity cannot be increased, the hood may not be used for the aforementioned materials. For effective use, materials should be handled at least six inches away from the hood opening.

Inspection: All hoods will be inspected at least annually by a qualified, contracted engineer. Anytime a fume hood's air handling system is altered or serviced, the hood must be inspected before being placed in service. Any new fume hoods installed must be inspected by the contracted engineer before being placed in service. Inspected hoods shall have a sign affixed to them stating the inspection interval, last inspection date, average face velocity, location of the fan that serves the hood, and the inspector's name and dated initials.

PART SIX

PRIOR APPROVAL FOR USE OF SPECIAL HANDLING CHEMICALS

The OSHA Laboratory Standard requires that if a particular laboratory operation, procedure, or activity requires prior approval from the employer or any supervisor, the circumstances and the approval procedure must be described in the plan.

Following are operations requiring prior approval from the Chemical Hygiene Officer:

Explosive or highly reactive materials

Radio-isotopes

PART SEVEN

MEDICAL PROGRAM

The OSHA Laboratory Standard requires the Chemical Hygiene Plan to describe the conditions under which the employer is required to provide laboratory employees who work with hazardous chemicals the opportunity to receive medical attention and any follow-up examinations which the examining physician determines to be necessary. The three conditions under which medical consultation and medical examinations must be provided without cost, without loss of pay, and at a reasonable time and place are as follows:

- ! Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory
- ! Whenever an event takes place in the work area such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure
- ! Whenever exposure monitoring reveals an exposure level routinely above the permissible exposure limit (PEL) or action level for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements.
- ! All instances should be reported to Campus Safety (x5151)

Safety Data Sheets, labels, and various reference materials describe potential signs and symptoms of exposure to chemicals. Following is a partial summary of symptoms or signs which are indicative of overexposure to hazardous materials:

Abdominal cramps	fingers)
Alopecia (loss of hair)	Atrophy (reduction in size or function of body)
Amenorrhea (stoppage of menstruation)	Blindness
Amnesia	Blurred vision
Analgesia (loss of sensitivity to pain)	Bradycardia (slow heart beat)
Anesthesia (loss of feeling)	Bronchitis
Angina pectoris (chest pain)	Burn (tissue damage)
Anorexia (loss of appetite)	Cancer (abnormal tissue growth)
Anosmia (loss of sense of smell)	Cataracts
Anuria (lack of urination)	Changes in body/breath odor
Anxiety	Cheilitis (inflammation of the lips)
Aphasia (inability to talk coherently)	Chemical pneumonitis (inflammation of the lungs)
Apnea (breathing temporarily stopped)	Chills
Areflexia (loss of reflexes)	Chloracne (reddish skin rash)
Argyria (blue colored tissue from silver)	Chorea (jerky uncontrolled movements of limbs)
Arrhythmia (irregular heartbeat)	Colic (abdominal pain due to intestinal gas)
Arthralgia (joint pain)	Collapse
Asphyxia (suffocation)	Coma
Asthenia (loss of strength or energy)	Confusion
Asthma (difficulty in breathing)	Conjunctivitis (inflamed and reddened
Ataxia (inability to walk straight)	
Athetosis (slow writhing movements of	

eyes)
 Constipation
 Coughing blood
 Cyanosis (blue to purple skin color)
 Dark urine
 Dehydration (excessive loss of body water)
 Delirium (mental confusion)
 Dental erosion
 Depression, mental
 Dermatitis (inflamed and reddened skin)
 Diaphoresis (profuse perspiration)
 Diarrhea
 Disequilibrium (inability to maintain balance)
 Disordered gait (change in walking pattern)
 Dizziness
 Drooling
 Drowsiness
 Dysarthria (difficulty in speaking clearly)
 Dysosmia (impaired sense of smell)
 Dysphagia (difficulty in swallowing)
 Dyspnea (difficulty in breathing)
 Dysuria (painful or difficult urination)
 Eczema (itching and burning skin)
 Edema (fluid retention, swelling)
 Emaciation (extreme low weight)
 Embolism (obstruction of a blood vessel)
 Emphysema (difficulty breathing)
 Epistaxis (nosebleed)
 Erythema (reddened skin)
 Euphoria (exaggerated feeling of well-being)
 Fasciculation (muscle twitching under skin)
 Fainting
 Fatigue
 Fever
 Fibrillation (rapid muscle contractions)
 Fluorosis (darkening of the teeth)
 Footdrop (dragging of the foot while walking)
 Frostbite
 Gangrene (tissue death)

Convulsions
 Coughing
 Gasping (difficulty catching breath)
 Gastroenteritis (inflammation of the stomach and intestine)
 Giddiness (dizziness, silliness)
 Glossitis (tongue swelling)
 Halitosis (foul-smelling breath)
 Hallucination
 Headache
 Hematuria (blood in the urine)
 Hemiparesis (paralysis of one side of the body)
 Hemorrhage (bleeding)
 Hyperemia (congestion of blood in a body part)
 Hyperkinesis (excess activity or motion)
 Hyperpigmentation (excessive coloring of the skin)
 Hyperthermia (elevated body temperature)
 Hyperventilation (sudden rapid breathing)
 Hypocalcemia (calcium deficiency of the blood)
 Hypothermia (lowered body temperature)
 Hypoxia (insufficient oxygen)
 Icterus (tissue discoloration)
 Impotence (loss of sexual ability)
 Incoordination
 Inflammation (swelling, redness)
 Inflexibility (rigidity, inability to move)
 Insomnia (inability to obtain normal sleep)
 Interstitial fibrosis (scarring of the lungs)
 Involuntary defecation
 Involuntary urination
 Iridocyclitis (inflammation of the iris)
 Irritability
 Itch
 Jaundice (yellow discoloration of skin or eyes)
 Keratosis (horny growths on skin)
 Lacrimation (excessive eye tearing)
 Lassitude (sense of weariness)

Lesion (injury to tissue)
 Lethargy (sluggish feeling)
 Lightheadedness (dizziness)
 Lipid granuloma (inflamed lung tissue)
 Lipid pneumonia (from aspiration of oily materials)
 Myotonia (temporary muscle rigidity and spasm)
 Narcosis (stupor or uncontrolled sleeping)
 Nasal ulceration (perforation of nasal tissue)
 Nausea
 Necrosis (localized death of tissue)
 Neoplasm (abnormal tissue growth)
 Nephrotoxic (poisonous to the kidney)
 Nervousness
 Neuritis (inflammation of the nerves)
 Nocturia (excessive urination at nighttime)
 Numbness
 Ochronosis (dark spots on skin)
 Oliguria (decreased urination)
 Opisthotonos (spasms with body arched from head to heels)
 Oxide pox (dermatitis from oxide contact)
 Pallor
 Palpitations (forceful heartbeat)
 Paralysis
 Paresthesias (abnormal tingling)
 Paroxysmal (sudden recurrence of disease)
 Perforation (opening through a tissue)
 Pharyngitis (sore throat)
 Phlebitis (swollen, painful vein)
 Photophobia (inability to tolerate light)
 Photosensitization (allergic reaction to light)
 Phototoxicity (irritant reaction to light)
 Pneumoconiosis (material particles in the respiratory track)
 Prostration (marked loss of strength)
 Proteinuria (presence of protein in the urine)
 Ptosis (drooping of upper eyelid)
 Pulmonary edema (fluid in the lungs)
 Pyorrhea (swollen, bleeding gums)

Malnutrition
 Melena (black tarry vomit or stools)
 Menstrual changes
 Metallic taste
 Miosis (pupil contraction)
 Miscarriage
 Pyuria (pus in urine)
 Respiratory distress
 Rhinorrhea (excessive nasal discharge)
 Salivation (discharge of saliva)
 Scotoma (blind spot in field of sight)
 Seizure
 Sensitization (allergic reaction)
 Shock (depression of all bodily functions)
 Siderosis (lung and tissue damage from iron particles)
 Silicosis (lung condition from silica dusts)
 Spasms
 Stomatitis (swelling of the mouth lining)
 Strabismus (lack of coordinated eye movement, crossed eyes)
 Sweating (excessive moisture on skin)
 Swelling (of tissues)
 Tachycardia (abnormal rapid heartbeat)
 Tachypnea (increased respiratory rate)
 Tetany (intermittent muscle spasms)
 Tick (skin twitch)
 Tinnitus (ringing in the ears)
 Tracheobronchitis (coughing, difficulty breathing)
 Tremors (shaking, trembling)
 Tumor (swelling or growth)
 Ulceration (tissue destruction)
 Urticaria (skin eruption)
 Vertigo (feeling of whirling motion)
 Vesiculation (blisters)
 Vomiting
 Wheezing
 Wrist drop (inability to extend hand at wrist)

PART EIGHT

CHEMICAL INVENTORIES

A current chemical inventory list is kept electronically online at MSDSonline.com.

Chemical inventories are used to ensure compliance with storage limits and fire regulations and can be used in an emergency to identify potential hazards for emergency response operations.

All chemicals delivered for any lab (research or teaching) must be initially delivered to the chemical stockroom to be entered into the inventory system. Each item will have a QR label put on to help improve inventory procedure both in time to inventory and accuracy. The chemical item will be checked for SDS sheets and that it appears in the MSDSonline system as well. If it is a chemical paid for and used for INBRE the principal investigator will be marked as person responsible for chemical in their labs.

The chemical inventory list should be reviewed prior to ordering new chemicals and only the minimum quantities of chemicals necessary for the research should be purchased. As new chemicals are added to the inventory, both current systems must be used to ensure accurate inventory of chemicals as well as compliance for SDS.

Where practical, each chemical should be dated so that expired chemicals can be easily identified for disposal.

Inventory will be conducted in each laboratory and chemical stockroom areas laboratory frequently (at least annually) to avoid overcrowding with materials that are no longer useful and note the items that should be replaced, have deteriorated, or show container deterioration. Obtained inventory should be referenced with MSDSonline programs to ensure inventory is as accurate as possible. Any items taken out of inventory will be noted and catalogued for review as needed to ensure compliance.

Compromised items should be discarded as chemical waste. Indications for disposal include:

- Cloudiness in liquids
- Color change
- Evidence of liquids in solids, or solids in liquids
- "Puddling" of material around outside of containers
- Pressure build-up within containers
- Obvious deterioration of containers

After each inventory period a complete list of chemicals and room inventories should be provided to the Caldwell Fire Department for their reference in the event it is needed for any emergency incident.

APPENDICES

Appendix A

GUIDES TO HUMAN TOXICITY

Inhalation TCLo	Effect
>10,000 ppm	Non-toxic
200-10,000 ppm	Practically toxic
200-2,000 ppm	Slightly toxic
20-200 ppm	Moderately toxic
< 20 ppm	Highly toxic

LD50	Effect	Example	Dose (70 kg human)
>15,000 mg/kg	Relatively harmless	Ethanol	➤ 1 quart
5,000-15,000 gm/kg	Practically non-toxic	Salt	1 pt – 1 qt
500-5,000 mg/kg	Slightly toxic	Morphine	1 oz- 1 pt
50-500 mg/kg	Moderately toxic	DDT	1 teaspoon- 1 oz.
1-30 mg/kg	Highly toxic	Parathion	7 drops-1 tsp.
< 1 mg/kg	Extremely toxic	Botulinum toxic	< 7 drops

Chemical Compatibility Charts

When certain hazardous chemicals are stored or mixed together, violent reactions may occur because the chemicals are incompatible. Classes of incompatible chemicals should be segregated from each other during storage, according to hazard class. Use the following general guidelines for hazard class storage:

- Flammable/combustible liquids and organic acids
- Flammable Solids
- Mineral Acids
- Caustics
- Oxidizers
- Perchloric Acid
- Compressed Gases

Before mixing any chemicals, refer to this partial list, the chemical SDS or call chemical hygiene officer to verify compatibility:

Chemical	Incompatible Chemical
Acetic Acid	Aldehyde, bases, carbonates, hydroxides, metals, oxidizers, peroxides, phosphates, xylene
Acetylene	Halogens (chlorine, fluorine, etc.), mercury, potassium, oxidizers, silver
Acetone	Acids, amines, oxidizers, plastics
Alkali and Alkaline earth metals	Acids, chromium, ethylene, halogens, hydrogen, mercury, nitrogen, oxidizers, plastics, sodium chloride, sulfur
Ammonia	Acids, aldehydes, amides, halogens, heavy metals, oxidizers, plastics, sulfur
Ammonium Nitrate	Acids, alkalis, chloride salts, combustible materials, metals, organic materials, phosphorous, reducing agents, urea
Aniline	Acids, aluminum, dibenzoyl peroxide, oxidizers, plastics
Azides	Acids, heavy metals, oxidizers
Bromine	Acetaldehyde, alcohols, alkalis, amines, combustible materials, ethylene, fluorine, hydrogen, ketones (acetone, carbonyls, etc.), metals, sulfur
Calcium Oxide	Acids, ethanol, fluorine, organic materials
Carbon (Activated)	Alkali metals, calcium hypochlorite, halogens, oxidizers
Carbon Tetrachloride	Benzoyl peroxide, ethylene, fluorine, metals, oxygen, plastics, silanes
Chlorates	Powdered metals, sulfur, finely divided organic or combustible materials

Chromic Acid	Acetone, alcohols, alkalis, ammonia, bases
Chromium Trioxide	Benzene, combustible materials, hydrocarbons, metals, organic materials, phosphorous, plastics
Chlorine	Alcohols, ammonia, benzene, combustible materials, flammable compounds (hydrazine), hydrocarbons (acetylene, ethylene, etc.), hydrogen peroxide, iodine, metals, nitrogen, oxygen, sodium hydroxide
Chlorine Dioxide	Hydrogen, mercury, organic materials, phosphorous, potassium hydroxide, sulfur
Copper	Calcium, hydrocarbons, oxidizers
Hydroperoxide	Reducing agents
Cyanides	Acids, alkaloids, aluminum, iodine, oxidizers, strong bases
Flammable Liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Fluorine	Alcohols, aldehydes, ammonia, combustible materials, halocarbons, halogens, hydrocarbons, ketones, metals, organic acids
Hydrocarbons (ex. Butane, propane, benzene, turpentine, etc.)	Acids, bases, oxidizers, plastics
Hydrofluoric acid	Metals, organic materials, plastics, silica (glass), (anhydrous) sodium
Hydrogen peroxide	Acetaldehyde, acetic acid, acetone, alcohols, carboxylic acid, combustible materials, metals, nitric acid, organic compounds, phosphorous, sulfuric acid, sodium, aniline
Hydrogen sulfide	Acetaldehyde, metals, oxidizers, sodium
Hypochlorites	Acids, activated carbon
Iodine	Acetaldehyde, acetylene, ammonia, metals, sodium
Mercury	Acetylene, aluminum, amines, ammonia, calcium, fulminic acid, lithium, oxidizers, sodium
Nitrates	Acids, nitrites, metals, sulfur, sulfuric acid
Nitric acid	Acetic acid, acetonitrile, alcohols, amines, (concentrated) ammonia, aniline, bases, benzene, cumene, formic acid, ketones, metals, organic materials, plastics, sodium, toluene
Oxalic acid	Oxidizers, silver, sodium chlorite
Oxygen	Acetaldehyde, secondary alcohols, alkalis and alkalines, ammonia, carbon monoxide, combustible materials, ethers, flammable

	materials, hydrocarbons, metals, phosphorous, polymers
Perchloric Acid	Acetic acid, alcohols, aniline, combustible materials, dehydrating agents, ethyl benzene, hydriotic acid, hydrochloric acid, iodides, ketones, organic material, oxidizers, pyridine
Phosphorus (white)	Oxygen (pure and in air), alkalis
Potassium	Acetylene, acids, alcohols, halogens, hydrazine, mercury, oxidizers, selenium, sulfur
Potassium chlorate	Acids, ammonia, combustible materials, fluorine, hydrocarbons, metals, organic materials, sugars
Potassium perchlorate (also see chlorates)	Alcohols, combustible materials, fluorine, hydrazine, metals, organic matter, reducing agents, sulfuric acid
Potassium permanganate	Benzaldehyde, ethylene glycol, glycerol, sulfuric acid
Silver	Acetylene, ammonia, oxidizers, ozonides, peroxyformic acid
Sodium	Acids, hydrazine, metals, oxidizers, water
Sodium nitrate	Acetic anhydride, acids, metals, organic matter, peroxyformic acid, reducing agents
Sodium peroxide	Acetic acid, benzene, hydrogen sulfide metals, oxidizers, peroxyformic acid, phosphorous, reducers, sugar, water
Sulfides	Acids
Sulfuric acid	Potassium chlorates, potassium perchlorate, potassium permanganate

Appendix C

Common Laboratory Corrosives

Organic Acids	Inorganic Bases
Acetic Anhydride	Ammonium hydroxide
Acetyl bromide	Ammonium sulfide
Acetyl Chloride	Calcium hydride
Benzoyl Bromide	Calcium oxide
Benzoyl Chloride	Hydrazine
Benzyl Bromide	Potassium hydroxide
Benzyl Chloride	Sodium hydride
Butyric Acid	Sodium hydroxide
Chloroacetic Acid	Inorganic acids
Chloroacetyl Chloride	Bromine pentafluoride
Chlorotrimethylsilane	Chlorosulfonic acid
Dichlorodimethylsilane	Chromerge™
Dimethyl Sulfate	Hydriotic acid
Formic Acid	Hydrobromic acid
Glacial Acetic acid	Hydrochloric acid
Methyl Chloroformate	Hydrofluoric acid
Oxalic Acid	Nitric acid
Phenol	No-chromix™
Propionic acid	Perchloric acid
Propionyl bromide	Phosphoric acid
Propionyl chloride	Phosphorus pentachloride
Salicylic acid	Phosphorus pentoxide
Trichloroacetic acid	Phosphorous tribromide
Organic bases	Phosphorous trichloride
Ethylenediamine	Sulfuric acid
Ethylamine	Sulfuryl chloride
Hexamethylenediamine	Thionyl chloride
Hydroxylamine	Tin bromide
Phenylhydrazine	Tin chloride
Piperazine	Titanium tetrachloride
Tetramethyammonium hydroxide	Acid Salts
Tetramethylethylenediamine	Aluminum trichloride
Trimethylamine	Ammonium bifluoride
Trimethylamine aq. Soln.	Antimony trichloride
Elements	Calcium fluoride
Bromine (liquid)	Sodium bisulfate
Chlorine (gas)	Sodium fluoride
Fluorine (gas)	
Iodine (crystal)	
Phosphorous	

Appendix D

CONVERSION CHARTS

METRIC/ENGLISH

TEMPERATURE

From C to F $F = 1.8 \times C + 32$
From F to C $C = 0.556 \times F - 17.8$

VOLUME

1 ml	= 0.0338 fluid ounces	1 oz	= 29.573 ml
1 liter	= 2.1134 pints	1 pint	= 473.166 ml
1 liter	= 1.0567 quarts	1 quart	= 946.332 ml
1 cc	= 0.06102 cubic inches	1 ci	= 16.3872 cc

WEIGHT

1 gram = 0.03527 ounces
1 oz = 28.3495 g
1 kilogram = 35.274 ounces
1 oz = 0.0283 kg

Appendix E

Code of Federal Regulations- K listed chemicals

Title 40 - Protection of Environment

Volume: 27 Date: 2012-07-01 Original Date: 2012-07-01 Title: Section 261.32 - Hazardous wastes from specific sources. Context: Title 40 - Protection of Environment. CHAPTER I - ENVIRONMENTAL PROTECTION AGENCY (CONTINUED). SUBCHAPTER I - SOLID WASTES (CONTINUED). PART 261 - IDENTIFICATION AND LISTING OF HAZARDOUS WASTE. Subpart D - Lists of Hazardous Wastes.

§ 261.32 Hazardous wastes from specific sources.(a)The following solid wastes are listed hazardous wastes from specific sources unless they are excluded under §§ 260.20 and 260.22 and listed in appendix IX.

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)
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)
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)
K030	Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene	(T)
K083	Distillation bottoms from aniline production	(T)
K085	Distillation or fractionation column bottoms from the production of chlorobenzenes	(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)
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)
K103	Process residues from aniline extraction from the production of aniline	(T)
K104	Combined wastewater streams generated from nitrobenzene/aniline production	(T)
K105	Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes	(T)
K107	Column bottoms from product separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides	(C,T)
K108	Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides	(I,T)
K109	Spent filter cartridges from product purification from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides	(T)

K110	Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides	(T)
K111	Product washwaters from the production of dinitrotoluene via nitration of toluene	(C,T)
K112	Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene	(T)
K113	Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene	(T)
K114	Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene	(T)
K115	Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene	(T)
K116	Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine	(T)
K117	Wastewater from the reactor vent gas scrubber in the production of ethylene dibromide via bromination of ethene	(T)
K118	Spent adsorbent solids from purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene	(T)
K136	Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene	(T)
K149	Distillation bottoms from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups, (This waste does not include still bottoms from the distillation of benzyl chloride.)	(T)
K150	Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups	(T)
K151	Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of wastewaters from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups	(T)

K156	Organic waste (including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decantates) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.)	(T)
K157	Wastewaters (including scrubber waters, condenser waters, washwaters, and separation waters) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.)	(T)
K158	Bag house dusts and filter/separation solids from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.)	(T)
K159	Organics from the treatment of thiocarbamate wastes	(T)
K161	Purification solids (including filtration, evaporation, and centrifugation solids), bag house dust and floor sweepings from the production of dithiocarbamate acids and their salts. (This listing does not include K125 or K126.)	(R,T)
K174	Wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer (including sludges that result from commingled ethylene dichloride or vinyl chloride monomer wastewater and other wastewater), unless the sludges meet the following conditions: (i) they are disposed of in a subtitle C or non-hazardous landfill licensed or permitted by the state or federal government; (ii) they are not otherwise placed on the land prior to final disposal; and (iii) the generator maintains documentation demonstrating that the waste was either disposed of in an on-site landfill or consigned to a transporter or disposal facility that provided a written commitment to dispose of the waste in an off-site landfill. Respondents in any action brought to enforce the requirements of subtitle C must, upon a showing by the government that the respondent managed wastewater treatment sludges from the production of vinyl chloride monomer or ethylene dichloride, demonstrate that they meet the terms of the exclusion set forth above. In doing so, they must provide appropriate documentation (e.g., contracts between the generator and the landfill owner/operator, invoices documenting delivery of waste to landfill, etc.) that the terms of the exclusion were met	(T)
K175	Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process	(T)
K181	Nonwastewaters from the production of dyes and/or pigments (including nonwastewaters commingled at the point of generation with nonwastewaters from other processes) that, at the point of generation, contain mass loadings of any of the constituents identified in paragraph (c) of this section that are equal to or greater than the corresponding paragraph (c) levels, as determined on a calendar year basis. These wastes will not be hazardous if the nonwastewaters are: (i) disposed in a Subtitle D landfill unit subject to the design criteria in § 258.40, (ii) disposed in a Subtitle C landfill unit subject to either § 264.301 or § 265.301, (iii) disposed in other Subtitle D landfill units that meet the design criteria in § 258.40, § 264.301, or § 265.301, or (iv) treated in a combustion unit that is permitted under Subtitle C, or an onsite combustion unit that is permitted under the Clean Air Act. For the purposes of this listing, dyes and/or pigments production is defined in paragraph (b)(1) of this section. Paragraph (d) of this section describes the process for demonstrating that a facility's nonwastewaters are not K181. This listing does not apply to wastes that are otherwise identified as hazardous under §§ 261.21-261.24 and 261.31-261.33 at the point of generation. Also, the listing does not apply to wastes generated before any annual mass loading limit is met	(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)
K176	Baghouse filters from the production of antimony oxide, including filters from the production of intermediates (e.g., antimony metal or crude antimony oxide)	(E)
K177	Slag from the production of antimony oxide that is speculatively accumulated or disposed, including slag from the production of intermediates (e.g., antimony metal or crude antimony oxide)	(T)
K178	Residues from manufacturing and manufacturing-site storage of ferric chloride from acids formed during the production of titanium dioxide using the chloride-ilmenite process	(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)
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)
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)
K097	Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane	(T)
K098	Untreated process wastewater from the production of toxaphene	(T)
K099	Untreated wastewater from the production of 2,4-D	(T)
K123	Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salt	(T)
K124	Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts	(C, T)
K125	Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts	(T)
K126	Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylenebisdithiocarbamic acid and its salts	(T)
K131	Wastewater from the reactor and spent sulfuric acid from the acid dryer from the production of methyl bromide	(C, T)
K132	Spent absorbent and wastewater separator solids from the production of methyl bromide	(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)
K169	Crude oil storage tank sediment from petroleum refining operations	(T)
K170	Clarified slurry oil tank sediment and/or in-line filter/separation solids from petroleum refining operations	(T)
K171	Spent Hydrotreating catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (this listing does not include inert support media)	(I,T)
K172	Spent Hydrotreating catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (this listing does not include inert support media)	(I,T)
Iron and steel:		
K061	Emission control dust/sludge from the primary production of steel in electric furnaces	(T)
K062	Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC	(C,T)

	Codes 331 and 332)	
Primary aluminum:		
K088	Spent potliners from primary aluminum reduction	(T)
Secondary lead:		
K069	Emission control dust/sludge from secondary lead smelting. (Note: This listing is stayed administratively for sludge generated from secondary acid scrubber systems. The stay will remain in effect until further administrative action is taken. If EPA takes further action effecting this stay, EPA will publish a notice of the action in the Federal Register)	(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)
K141	Process residues from the recovery of coal tar, including, but not limited to, collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludges from coking operations)	(T)
K142	Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal	(T)
K143	Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal	(T)
K144	Wastewater sump residues from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal	(T)
K145	Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal	(T)
K147	Tar storage tank residues from coal tar refining	(T)
K148	Residues from coal tar distillation, including but not limited to, still bottoms	(T)

(b) *Listing Specific Definitions:* (1) For the purposes of the K181 listing, dyes and/or pigments production is defined to include manufacture of the following product classes: dyes, pigments, or FDA certified colors that are classified as azo, triarylmethane, perylene or anthraquinone classes. Azo products include azo, monoazo, diazo, triazo, polyazo, azoic, benzidine, and pyrazolone products. Triarylmethane products include both triarylmethane and triphenylmethane products. Wastes that are not generated at a dyes and/or pigments manufacturing site, such as wastes from the offsite use, formulation, and packaging of dyes and/or pigments, are not included in the K181 listing.(c) *K181 Listing Levels.* Nonwastewaters containing constituents in amounts equal to or exceeding the following levels during any calendar year are subject to the K181 listing, unless the conditions in the K181 listing are met.

Constituent	Chemicalabstracts No.	Mass levels(kg/yr)
Aniline	62-53-3	9,300

o-Anisidine	90-04-0	110
4-Chloroaniline	106-47-8	4,800
p-Cresidine	120-71-8	660
2,4-Dimethylaniline	95-68-1	100
1,2-Phenylenediamine	95-54-5	710
1,3-Phenylenediamine	108-45-2	1,200

(d) *Procedures for demonstrating that dyes and/or pigment nonwastewaters are not K181.* The procedures described in paragraphs (d)(1)-(d)(3) and (d)(5) of this section establish when nonwastewaters from the production of dyes/pigments would not be hazardous (these procedures apply to wastes that are not disposed in landfill units or treated in combustion units as specified in paragraph (a) of this section). If the nonwastewaters are disposed in landfill units or treated in combustion units as described in paragraph (a) of this section, then the nonwastewaters are not hazardous. In order to demonstrate that it is meeting the landfill disposal or combustion conditions contained in the K181 listing description, the generator must maintain documentation as described in paragraph (d)(4) of this section.

(1) *Determination based on no K181 constituents.* Generators that have knowledge (e.g., knowledge of constituents in wastes based on prior sampling and analysis data and/or information about raw materials used, production processes used, and reaction and degradation products formed) that their wastes contain none of the K181 constituents (see paragraph (c) of this section) can use their knowledge to determine that their waste is not K181. The generator must document the basis for all such determinations on an annual basis and keep each annual documentation for three years.

(2) *Determination for generated quantities of 1,000 MT/yr or less for wastes that contain K181 constituents.* If the total annual quantity of dyes and/or pigment nonwastewaters generated is 1,000 metric tons or less, the generator can use knowledge of the wastes (e.g., knowledge of constituents in wastes based on prior analytical data and/or information about raw materials used, production processes used, and reaction and degradation products formed) to conclude that annual mass loadings for the K181 constituents are below the listing levels of paragraph (c) of this section. To make this determination, the generator must:

- (i) Each year document the basis for determining that the annual quantity of nonwastewaters expected to be generated will be less than 1,000 metric tons.
- (ii) Track the actual quantity of nonwastewaters generated from January 1 through December 31 of each year. If, at any time within the year, the actual waste quantity exceeds 1,000 metric tons, the generator must comply with the requirements of paragraph (d)(3) of this section for the remainder of the year.
- (iii) Keep a running total of the K181 constituent mass loadings over the course of the calendar year.
- (iv) Keep the following records on site for the three most recent calendar years in which the hazardous waste determinations are made:
 - (A) The quantity of dyes and/or pigment nonwastewaters generated.
 - (B) The relevant process information used.
 - (C) The calculations performed to determine annual total mass loadings for each K181 constituent in the nonwastewaters during the year.

(3) *Determination for generated quantities greater than 1,000 MT/yr for wastes that contain K181 constituents.* If the total annual quantity of dyes and/or pigment nonwastewaters generated is greater than 1,000 metric tons, the generator must perform all of the steps described in paragraphs ((d)(3)(i)-(d)(3)(xi) of this section) in order to make a determination that its waste is not K181.

- (i) Determine which K181 constituents (see paragraph (c) of this section) are reasonably expected to be present in the wastes based on knowledge of the wastes (e.g., based on prior sampling and analysis data and/or information about raw materials used, production processes used, and reaction and degradation

products formed).(ii) If 1,2-phenylenediamine is present in the wastes, the generator can use either knowledge or sampling and analysis procedures to determine the level of this constituent in the wastes. For determinations based on use of knowledge, the generator must comply with the procedures for using knowledge described in paragraph (d)(2) of this section and keep the records described in paragraph (d)(2)(iv) of this section. For determinations based on sampling and analysis, the generator must comply with the sampling and analysis and recordkeeping requirements described below in this section.(iii) Develop a waste sampling and analysis plan (or modify an existing plan) to collect and analyze representative waste samples for the K181 constituents reasonably expected to be present in the wastes. At a minimum, the plan must include:(A) A discussion of the number of samples needed to characterize the wastes fully;(B) The planned sample collection method to obtain representative waste samples;(C) A discussion of how the sampling plan accounts for potential temporal and spatial variability of the wastes.(D) A detailed description of the test methods to be used, including sample preparation, clean up (if necessary), and determinative methods.(iv) Collect and analyze samples in accordance with the waste sampling and analysis plan.(A) The sampling and analysis must be unbiased, precise, and representative of the wastes.(B) The analytical measurements must be sufficiently sensitive, accurate and precise to support any claim that the constituent mass loadings are below the listing levels of paragraph (c) of this section.(v) Record the analytical results.(vi) Record the waste quantity represented by the sampling and analysis results.(vii) Calculate constituent-specific mass loadings (product of concentrations and waste quantity).(viii) Keep a running total of the K181 constituent mass loadings over the course of the calendar year.(ix) Determine whether the mass of any of the K181 constituents listed in paragraph (c) of this section generated between January 1 and December 31 of any year is below the K181 listing levels.(x) Keep the following records on site for the three most recent calendar years in which the hazardous waste determinations are made:(A) The sampling and analysis plan.(B) The sampling and analysis results (including QA/QC data)(C) The quantity of dyes and/or pigment nonwastewaters generated.(D) The calculations performed to determine annual mass loadings.(xi) Nonhazardous waste determinations must be conducted annually to verify that the wastes remain nonhazardous.(A) The annual testing requirements are suspended after three consecutive successful annual demonstrations that the wastes are nonhazardous. The generator can then use knowledge of the wastes to support subsequent annual determinations.(B) The annual testing requirements are reinstated if the manufacturing or waste treatment processes generating the wastes are significantly altered, resulting in an increase of the potential for the wastes to exceed the listing levels.(C) If the annual testing requirements are suspended, the generator must keep records of the process knowledge information used to support a nonhazardous determination. If testing is reinstated, a description of the process change must be retained.(4) *Recordkeeping for the landfill disposal and combustion exemptions.* For the purposes of meeting the landfill disposal and combustion condition set out in the K181 listing description, the generator must maintain on site for three years documentation demonstrating that each shipment of waste was received by a landfill unit that is subject to or meets the landfill design standards set out in the listing description, or was treated in combustion units as specified in the listing description.(5) *Waste holding and handling.* During the interim period, from the point of generation to completion of the hazardous waste determination, the generator is responsible for storing the wastes appropriately. If the wastes are determined to be hazardous and the generator has not complied with the subtitle C requirements during the interim period, the generator could be subject to an enforcement action for improper management.

[46 FR 4618, Jan. 16,
1981]

Appendix F

Code of Federal Regulations

P and U listed Chemicals

Title 40 - Protection of Environment

Volume: 27 Date: 2012-07-01 Original Date: 2012-07-01 Title: Section 261.33 - Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof. Context: Title 40 - Protection of Environment. CHAPTER I - ENVIRONMENTAL PROTECTION AGENCY (CONTINUED). SUBCHAPTER I - SOLID WASTES (CONTINUED). PART 261 - IDENTIFICATION AND LISTING OF HAZARDOUS WASTE. Subpart D - Lists of Hazardous Wastes.

§ 261.33 Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof. The following materials or items are hazardous wastes if and when they are discarded or intended to be discarded as described in § 261.2(a)(2)(i), when they are mixed with waste oil or used oil or other material and applied to the land for dust suppression or road treatment, when they are otherwise applied to the land in lieu of their original intended use or when they are contained in products that are applied to the land in lieu of their original intended use, or when, in lieu of their original intended use, they are produced for use as (or as a component of) a fuel, distributed for use as a fuel, or burned as a fuel. (a) Any commercial chemical product, or manufacturing chemical intermediate having the generic name listed in paragraph (e) or (f) of this section. (b) Any off-specification commercial chemical product or manufacturing chemical intermediate which, if it met specifications, would have the generic name listed in paragraph (e) or (f) of this section. (c) Any residue remaining in a container or in an inner liner removed from a container that has held any commercial chemical product or manufacturing chemical intermediate having the generic name listed in paragraphs (e) or (f) of this section, unless the container is empty as defined in § 261.7(b) of this chapter. [COMMENT: UNLESS THE RESIDUE IS BEING BENEFICIALLY USED OR REUSED, OR LEGITIMATELY RECYCLED OR RECLAIMED; OR BEING ACCUMULATED, STORED, TRANSPORTED OR TREATED PRIOR TO SUCH USE, RE-USE, RECYCLING OR RECLAMATION, EPA CONSIDERS THE RESIDUE TO BE INTENDED FOR DISCARD, AND THUS, A HAZARDOUS WASTE. AN EXAMPLE OF A LEGITIMATE RE-USE OF THE RESIDUE WOULD BE WHERE THE RESIDUE REMAINS IN THE CONTAINER AND THE CONTAINER IS USED TO HOLD THE SAME COMMERCIAL CHEMICAL PRODUCT OR MANUFACTURING CHEMICAL INTERMEDIATE IT PREVIOUSLY HELD. AN EXAMPLE OF THE DISCARD OF THE RESIDUE WOULD BE WHERE THE DRUM IS SENT TO A DRUM RECONDITIONER WHO RECONDITIONS THE DRUM BUT DISCARDS THE RESIDUE.] (d) Any residue or contaminated soil, water or other debris resulting from the cleanup of a spill into or on any land or water of any commercial chemical product or manufacturing chemical intermediate having the generic name listed in paragraph (e) or (f) of this section, or any residue or contaminated soil, water or other debris resulting from the cleanup of a spill, into or on any land or water, of any off-specification chemical product and manufacturing chemical intermediate which, if it met specifications, would have the generic name listed in paragraph (e) or (f) of this section. [COMMENT: THE PHRASE "COMMERCIAL CHEMICAL PRODUCT OR MANUFACTURING CHEMICAL INTERMEDIATE HAVING THE GENERIC NAME LISTED IN ..." REFERS TO A CHEMICAL SUBSTANCE WHICH IS MANUFACTURED OR FORMULATED FOR COMMERCIAL OR MANUFACTURING USE WHICH CONSISTS OF THE COMMERCIAL PURE GRADE OF THE CHEMICAL, ANY TECHNICAL GRADES OF THE CHEMICAL THAT ARE PRODUCED OR MARKETED, AND ALL FORMULATIONS IN WHICH THE CHEMICAL IS THE SOLE ACTIVE INGREDIENT. IT DOES NOT REFER TO A MATERIAL, SUCH AS A MANUFACTURING PROCESS WASTE, THAT CONTAINS ANY OF THE SUBSTANCES LISTED IN PARAGRAPH (E) OR (F). WHERE A MANUFACTURING PROCESS WASTE IS DEEMED TO BE A HAZARDOUS WASTE BECAUSE IT CONTAINS A SUBSTANCE LISTED IN PARAGRAPH (E) OR (F), SUCH WASTE WILL BE LISTED IN EITHER § 261.31 OR § 261.32 OR WILL BE IDENTIFIED AS A HAZARDOUS WASTE BY THE CHARACTERISTICS SET FORTH IN SUBPART C OF THIS PART.] (e) The commercial chemical products, manufacturing chemical intermediates or off-specification commercial chemical products or manufacturing chemical intermediates referred to in paragraphs (a) through (d) of this section, are identified as acute hazardous wastes (H) and are subject to the small quantity exclusion defined in § 261.5(e). [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. WASTES ARE FIRST LISTED IN ALPHABETICAL ORDER BY SUBSTANCE AND THEN LISTED AGAIN IN NUMERICAL ORDER BY HAZARDOUS WASTE NUMBER.] These wastes and their corresponding EPA Hazardous Waste Numbers are:

Hazardous waste No.	Chemical abstracts No.	Substance
P023	107-20-0	Acetaldehyde, chloro-

P002	591-08-2	Acetamide, N-(aminothioxomethyl)-
P057	640-19-7	Acetamide, 2-fluoro-
P058	62-74-8	Acetic acid, fluoro-, sodium salt
P002	591-08-2	1-Acetyl-2-thiourea
P003	107-02-8	Acrolein
P070	116-06-3	Aldicarb
P203	1646-88-4	Aldicarb sulfone.
P004	309-00-2	Aldrin
P005	107-18-6	Allyl alcohol
P006	20859-73-8	Aluminum phosphide (R,T)
P007	2763-96-4	5-(Aminomethyl)-3-isoxazolol
P008	504-24-5	4-Aminopyridine
P009	131-74-8	Ammonium picrate (R)
P119	7803-55-6	Ammonium vanadate
P099	506-61-6	Argentate(1-), bis(cyano-C)-, potassium
P010	7778-39-4	Arsenic acid H_3AsO_4
P012	1327-53-3	Arsenic oxide As_2O_3
P011	1303-28-2	Arsenic oxide As_2O_5
P011	1303-28-2	Arsenic pentoxide
P012	1327-53-3	Arsenic trioxide
P038	692-42-2	Arsine, diethyl-
P036	696-28-6	Arsonous dichloride, phenyl-
P054	151-56-4	Aziridine

P067	75-55-8	Aziridine, 2-methyl-
P013	542-62-1	Barium cyanide
P024	106-47-8	Benzenamine, 4-chloro-
P077	100-01-6	Benzenamine, 4-nitro-
P028	100-44-7	Benzene, (chloromethyl)-
P042	51-43-4	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)-
P046	122-09-8	Benzeneethanamine, alpha,alpha-dimethyl-
P014	108-98-5	Benzenethiol
P127	1563-66-2	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, methylcarbamate.
P188	57-64-7	Benzoic acid, 2-hydroxy-, compd. with (3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl methylcarbamate ester (1:1).
P001	1 81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations greater than 0.3%
P028	100-44-7	Benzyl chloride
P015	7440-41-7	Beryllium powder
P017	598-31-2	Bromoacetone
P018	357-57-3	Brucine
P045	39196-18-4	2-Butanone, 3,3-dimethyl-1-(methylthio)-,O-[(methylamino)carbonyl] oxime
P021	592-01-8	Calcium cyanide

P021	592-01-8	Calcium cyanide Ca(CN) ₂
P189	55285-14-8	Carbamic acid, [(dibutylamino)- thio]methyl-, 2,3-dihydro-2,2-dimethyl- 7-benzofuranyl ester.
P191	644-64-4	Carbamic acid, dimethyl-, 1-[(dimethyl-amino)carbonyl]- 5-methyl-1H- pyrazol-3-yl ester.
P192	119-38-0	Carbamic acid, dimethyl-, 3-methyl-1- (1-methylethyl)-1H- pyrazol-5-yl ester.
P190	1129-41-5	Carbamic acid, methyl-, 3-methylphenyl ester.

P127	1563-66-2	Carbofuran.
P022	75-15-0	Carbon disulfide
P095	75-44-5	Carbonic dichloride
P189	55285-14-8	Carbosulfan.
P023	107-20-0	Chloroacetaldehyde
P024	106-47-8	p-Chloroaniline
P026	5344-82-1	1-(o-Chlorophenyl)thiourea
P027	542-76-7	3-Chloropropionitrile
P029	544-92-3	Copper cyanide
P029	544-92-3	Copper cyanide Cu(CN)
P202	64-00-6	m-Cumenyl methylcarbamate.
P030		Cyanides (soluble cyanide salts), not otherwise specified
P031	460-19-5	Cyanogen
P033	506-77-4	Cyanogen chloride
P033	506-77-4	Cyanogen chloride (CN)Cl
P034	131-89-5	2-Cyclohexyl-4,6-dinitrophenol
P016	542-88-1	Dichloromethyl ether
P036	696-28-6	Dichlorophenylarsine
P037	60-57-1	Dieldrin
P038	692-42-2	Diethylarsine
P041	311-45-5	Diethyl-p-nitrophenyl phosphate
P040	297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate
P043	55-91-4	Diisopropylfluorophosphate (DFP)

P004	309-00-2	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa- chloro-1,4,4a,5,8,8a,-hexahydro-, (1alpha,4alpha,4abeta,5alpha,8alpha,8abeta)-
P060	465-73-6	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa- chloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5beta,8beta,8abeta)-
P037	60-57-1	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1alpha,2beta,2aalpha,3beta,6beta,6aalpha,7beta, 7aalpha)-
P051	1 72-20-8	2,7:3,6-Dimethanonaphth [2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1alpha,2beta,2abeta,3alpha,6alpha,6abeta,7beta, 7aalpha)-, & metabolites
P044	60-51-5	Dimethoate
P046	122-09-8	alpha,alpha-Dimethylphenethylamine
P191	644-64-4	Dimetilan.
P047	1 534-52-1	4,6-Dinitro-o-cresol, & salts
P048	51-28-5	2,4-Dinitrophenol
P020	88-85-7	Dinoseb
P085	152-16-9	Diphosphoramide, octamethyl-
P111	107-49-3	Diphosphoric acid, tetraethyl ester
P039	298-04-4	Disulfoton
P049	541-53-7	Dithiobiuret
P185	26419-73-8	1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-, O- [(methylamino)- carbonyl]oxime.
P050	115-29-7	Endosulfan
P088	145-73-3	Endothall
P051	72-20-8	Endrin
P051	72-20-8	Endrin, & metabolites
P042	51-43-4	Epinephrine
P031	460-19-5	Ethanedinitrile

P194	23135-22-0	Ethanimidothioic acid, 2-(dimethylamino)-N-[[[(methylamino) carbonyl]oxy]-2-oxo-, methyl ester.
P066	16752-77-5	Ethanimidothioic acid,N-[[[(methylamino)carbonyl]oxy]-, methyl ester
P101	107-12-0	Ethyl cyanide
P054	151-56-4	Ethyleneimine
P097	52-85-7	Famphur
P056	7782-41-4	Fluorine
P057	640-19-7	Fluoroacetamide
P058	62-74-8	Fluoroacetic acid, sodium salt
P198	23422-53-9	Formetanate hydrochloride.
P197	17702-57-7	Formparanate.
P065	628-86-4	Fulminic acid, mercury(2+) salt (R,T)
P059	76-44-8	Heptachlor
P062	757-58-4	Hexaethyl tetraphosphate
P116	79-19-6	Hydrazinecarbothioamide
P068	60-34-4	Hydrazine, methyl-
P063	74-90-8	Hydrocyanic acid
P063	74-90-8	Hydrogen cyanide
P096	7803-51-2	Hydrogen phosphide
P060	465-73-6	Isodrin
P192	119-38-0	Isolan.
P202	64-00-6	3-Isopropylphenyl N-methylcarbamate.
P007	2763-96-4	3(2H)-Isoxazolone, 5-(aminomethyl)-

P196	15339-36-3	Manganese, bis(dimethylcarbamodithioato-S,S')-,
P196	15339-36-3	Manganese dimethyldithiocarbamate.
P092	62-38-4	Mercury, (acetato-O)phenyl-
P065	628-86-4	Mercury fulminate (R,T)
P082	62-75-9	Methanamine, N-methyl-N-nitroso-
P064	624-83-9	Methane, isocyanato-
P016	542-88-1	Methane, oxybis[chloro-
P112	509-14-8	Methane, tetranitro- (R)
P118	75-70-7	Methanethiol, trichloro-
P198	23422-53-9	Methanimidamide, N,N-dimethyl-N'-[3-[[[(methylamino)-carbonyl]oxy]phenyl]-, monohydrochloride.
P197	17702-57-7	Methanimidamide, N,N-dimethyl-N'-[2-methyl-4-[[[(methylamino)carbonyl]oxy]phenyl]-
P050	115-29-7	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide
P059	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P199	2032-65-7	Methiocarb.
P066	16752-77-5	Methomyl
P068	60-34-4	Methyl hydrazine
P064	624-83-9	Methyl isocyanate
P069	75-86-5	2-Methylactonitrile
P071	298-00-0	Methyl parathion
P190	1129-41-5	Metolcarb.
P128	315-8-4	Mexacarbate.
P072	86-88-4	alpha-Naphthylthiourea
P073	13463-39-3	Nickel carbonyl

P073	13463-39-3	Nickel carbonyl Ni(CO) ₄ , (T-4)-
P074	557-19-7	Nickel cyanide
P074	557-19-7	Nickel cyanide Ni(CN) ₂
P075	1 54-11-5	Nicotine, & salts
P076	10102-43-9	Nitric oxide
P077	100-01-6	p-Nitroaniline
P078	10102-44-0	Nitrogen dioxide
P076	10102-43-9	Nitrogen oxide NO
P078	10102-44-0	Nitrogen oxide NO ₂
P081	55-63-0	Nitroglycerine (R)
P082	62-75-9	N-Nitrosodimethylamine
P084	4549-40-0	N-Nitrosomethylvinylamine
P085	152-16-9	Octamethylpyrophosphoramide
P087	20816-12-0	Osmium oxide OsO ₄ , (T-4)-
P087	20816-12-0	Osmium tetroxide
P088	145-73-3	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P194	23135-22-0	Oxamyl.
P089	56-38-2	Parathion
P034	131-89-5	Phenol, 2-cyclohexyl-4,6-dinitro-
P048	51-28-5	Phenol, 2,4-dinitro-
P047	1 534-52-1	Phenol, 2-methyl-4,6-dinitro-, & salts
P020	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P009	131-74-8	Phenol, 2,4,6-trinitro-, ammonium salt (R)

P128	315-18-4	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester).
P199	2032-65-7	Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate
P202	64-00-6	Phenol, 3-(1-methylethyl)-, methyl carbamate.
P201	2631-37-0	Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate.
P092	62-38-4	Phenylmercury acetate
P093	103-85-5	Phenylthiourea
P094	298-02-2	Phorate
P095	75-44-5	Phosgene
P096	7803-51-2	Phosphine
P041	311-45-5	Phosphoric acid, diethyl 4-nitrophenyl ester
P039	298-04-4	Phosphorodithioic acid, O,O-diethylS-[2-(ethylthio)ethyl] ester
P094	298-02-2	Phosphorodithioic acid, O,O-diethylS-[(ethylthio)methyl] ester
P044	60-51-5	Phosphorodithioic acid, O,O-dimethyl S-[2-(methyl-amino)-2-oxoethyl] ester
P043	55-91-4	Phosphorofluoridic acid, bis(1-methylethyl) ester
P089	56-38-2	Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester
P040	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P097	52-85-7	Phosphorothioic acid,O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester
P071	298-00-0	Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester
P204	57-47-6	Physostigmine.
P188	57-64-7	Physostigmine salicylate.
P110	78-00-2	Plumbane, tetraethyl-
P098	151-50-8	Potassium cyanide

P098	151-50-8	Potassium cyanide K(CN)
P099	506-61-6	Potassium silver cyanide
P201	2631-37-0	Promecarb
P070	116-06-3	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime
P203	1646-88-4	Propanal, 2-methyl-2-(methyl-sulfonyl)-, O-[(methylamino)carbonyl] oxime.
P101	107-12-0	Propanenitrile
P027	542-76-7	Propanenitrile, 3-chloro-
P069	75-86-5	Propanenitrile, 2-hydroxy-2-methyl-
P081	55-63-0	1,2,3-Propanetriol, trinitrate (R)
P017	598-31-2	2-Propanone, 1-bromo-
P102	107-19-7	Propargyl alcohol
P003	107-02-8	2-Propenal
P005	107-18-6	2-Propen-1-ol
P067	75-55-8	1,2-Propylenimine
P102	107-19-7	2-Propyn-1-ol
P008	504-24-5	4-Pyridinamine
P075	1 54-11-5	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts
P204	57-47-6	Pyrrolo[2,3-b]indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-,methylcarbamate (ester), (3aS-cis)-.
P114	12039-52-0	Selenious acid, dithallium(1+) salt
P103	630-10-4	Selenourea
P104	506-64-9	Silver cyanide
P104	506-64-9	Silver cyanide Ag(CN)
P105	26628-22-8	Sodium azide

P106	143-33-9	Sodium cyanide
P106	143-33-9	Sodium cyanide Na(CN)
P108	1 57-24-9	Strychnidin-10-one, & salts
P018	357-57-3	Strychnidin-10-one, 2,3-dimethoxy-
P108	1 57-24-9	Strychnine, & salts
P115	7446-18-6	Sulfuric acid, dithallium(1+) salt
P109	3689-24-5	Tetraethyldithiopyrophosphate
P110	78-00-2	Tetraethyl lead
P111	107-49-3	Tetraethyl pyrophosphate
P112	509-14-8	Tetranitromethane (R)
P062	757-58-4	Tetraphosphoric acid, hexaethyl ester
P113	1314-32-5	Thallic oxide
P113	1314-32-5	Thallium oxide Tl_2O_3
P114	12039-52-0	Thallium(I) selenite
P115	7446-18-6	Thallium(I) sulfate
P109	3689-24-5	Thiodiphosphoric acid, tetraethyl ester
P045	39196-18-4	Thiofanox
P049	541-53-7	Thioimidodicarbonic diamide $[(H_2N)C(S)]_2NH$
P014	108-98-5	Thiophenol
P116	79-19-6	Thiosemicarbazide
P026	5344-82-1	Thiourea, (2-chlorophenyl)-
P072	86-88-4	Thiourea, 1-naphthalenyl-
P093	103-85-5	Thiourea, phenyl-

P185	26419-73-8	Tirpate.
P123	8001-35-2	Toxaphene
P118	75-70-7	Trichloromethanethiol
P119	7803-55-6	Vanadic acid, ammonium salt
P120	1314-62-1	Vanadium oxide V_2O_5
P120	1314-62-1	Vanadium pentoxide
P084	4549-40-0	Vinylamine, N-methyl-N-nitroso-
P001	1 81-81-2	Warfarin, & salts, when present at concentrations greater than 0.3%
P205	137-30-4	Zinc, bis(dimethylcarbamodithioato-S,S')-,
P121	557-21-1	Zinc cyanide
P121	557-21-1	Zinc cyanide $Zn(CN)_2$
P122	1314-84-7	Zinc phosphide Zn_3P_2 , when present at concentrations greater than 10% (R,T)
P205	137-30-4	Ziram.
P001	1 81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations greater than 0.3%
P001	1 81-81-2	Warfarin, & salts, when present at concentrations greater than 0.3%
P002	591-08-2	Acetamide, -(aminothioxomethyl)-
P002	591-08-2	1-Acetyl-2-thiourea
P003	107-02-8	Acrolein
P003	107-02-8	2-Propenal
P004	309-00-2	Aldrin
P004	309-00-2	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa-chloro-1,4,4a,5,8,8a,-hexahydro-, (1alpha,4alpha,4abeta,5alpha,8alpha,8abeta)-
P005	107-18-6	Allyl alcohol

P005	107-18-6	2-Propen-1-ol
P006	20859-73-8	Aluminum phosphide (R,T)
P007	2763-96-4	5-(Aminomethyl)-3-isoxazolol
P007	2763-96-4	3(2H)-Isoxazolone, 5-(aminomethyl)-
P008	504-24-5	4-Aminopyridine
P008	504-24-5	4-Pyridinamine
P009	131-74-8	Ammonium picrate (R)
P009	131-74-8	Phenol, 2,4,6-trinitro-, ammonium salt (R)
P010	7778-39-4	Arsenic acid H ₃ AsO ₄
P011	1303-28-2	Arsenic oxide As ₂ O ₅
P011	1303-28-2	Arsenic pentoxide
P012	1327-53-3	Arsenic oxide As ₂ O ₃
P012	1327-53-3	Arsenic trioxide
P013	542-62-1	Barium cyanide
P014	108-98-5	Benzenethiol
P014	108-98-5	Thiophenol
P015	7440-41-7	Beryllium powder
P016	542-88-1	Dichloromethyl ether
P016	542-88-1	Methane, oxybis[chloro-
P017	598-31-2	Bromoacetone
P017	598-31-2	2-Propanone, 1-bromo-
P018	357-57-3	Brucine
P018	357-57-3	Strychnidin-10-one, 2,3-dimethoxy-

P020	88-85-7	Dinoseb
P020	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P021	592-01-8	Calcium cyanide
P021	592-01-8	Calcium cyanide $\text{Ca}(\text{CN})_2$
P022	75-15-0	Carbon disulfide
P023	107-20-0	Acetaldehyde, chloro-
P023	107-20-0	Chloroacetaldehyde
P024	106-47-8	Benzenamine, 4-chloro-
P024	106-47-8	p-Chloroaniline
P026	5344-82-1	1-(o-Chlorophenyl)thiourea
P026	5344-82-1	Thiourea, (2-chlorophenyl)-
P027	542-76-7	3-Chloropropionitrile
P027	542-76-7	Propanenitrile, 3-chloro-
P028	100-44-7	Benzene, (chloromethyl)-
P028	100-44-7	Benzyl chloride
P029	544-92-3	Copper cyanide
P029	544-92-3	Copper cyanide $\text{Cu}(\text{CN})$
P030		Cyanides (soluble cyanide salts), not otherwise specified
P031	460-19-5	Cyanogen
P031	460-19-5	Ethanedinitrile
P033	506-77-4	Cyanogen chloride
P033	506-77-4	Cyanogen chloride $(\text{CN})\text{Cl}$
P034	131-89-5	2-Cyclohexyl-4,6-dinitrophenol

P034	131-89-5	Phenol, 2-cyclohexyl-4,6-dinitro-
P036	696-28-6	Arsonous dichloride, phenyl-
P036	696-28-6	Dichlorophenylarsine
P037	60-57-1	Dieldrin
P037	60-57-1	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2aalpha,3beta,6beta,6aalpha,7beta, 7aalpha)-
P038	692-42-2	Arsine, diethyl-
P038	692-42-2	Diethylarsine
P039	298-04-4	Disulfoton
P039	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester
P040	297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate
P040	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P041	311-45-5	Diethyl-p-nitrophenyl phosphate
P041	311-45-5	Phosphoric acid, diethyl 4-nitrophenyl ester
P042	51-43-4	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)-
P042	51-43-4	Epinephrine
P043	55-91-4	Diisopropylfluorophosphate (DFP)
P043	55-91-4	Phosphorofluoridic acid, bis(1-methylethyl) ester
P044	60-51-5	Dimethoate
P044	60-51-5	Phosphorodithioic acid, O,O-dimethyl S-[2-(methyl amino)-2-oxoethyl] ester
P045	39196-18-4	2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[(methylamino)carbonyl] oxime
P045	39196-18-4	Thiofanox
P046	122-09-8	Benzeneethanamine, alpha,alpha-dimethyl-

P046	122-09-8	alpha,alpha-Dimethylphenethylamine
P047	1 534-52-1	4,6-Dinitro-o-cresol, & salts
P047	1 534-52-1	Phenol, 2-methyl-4,6-dinitro-, & salts
P048	51-28-5	2,4-Dinitrophenol
P048	51-28-5	Phenol, 2,4-dinitro-
P049	541-53-7	Dithiobiuret
P049	541-53-7	Thioimidodicarbonic diamide [(H ₂ N)C(S)] ₂ NH
P050	115-29-7	Endosulfan
P050	115-29-7	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide
P051	1 72-20-8	2,7:3,6-Dimethanonaphth [2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2abeta,3alpha,6alpha,6abeta,7beta, 7aalpha)-, & metabolites
P051	72-20-8	Endrin
P051	72-20-8	Endrin, & metabolites
P054	151-56-4	Aziridine
P054	151-56-4	Ethyleneimine
P056	7782-41-4	Fluorine
P057	640-19-7	Acetamide, 2-fluoro-
P057	640-19-7	Fluoroacetamide
P058	62-74-8	Acetic acid, fluoro-, sodium salt
P058	62-74-8	Fluoroacetic acid, sodium salt
P059	76-44-8	Heptachlor
P059	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P060	465-73-6	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa-chloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5beta,8beta,8abeta)-

P060	465-73-6	Isodrin
P062	757-58-4	Hexaethyl tetraphosphate
P062	757-58-4	Tetraphosphoric acid, hexaethyl ester
P063	74-90-8	Hydrocyanic acid
P063	74-90-8	Hydrogen cyanide
P064	624-83-9	Methane, isocyanato-
P064	624-83-9	Methyl isocyanate
P065	628-86-4	Fulminic acid, mercury(2+) salt (R,T)
P065	628-86-4	Mercury fulminate (R,T)
P066	16752-77-5	Ethanimidothioic acid, N-[[[(methylamino)carbonyl]oxy]-, methyl ester
P066	16752-77-5	Methomyl
P067	75-55-8	Aziridine, 2-methyl-
P067	75-55-8	1,2-Propylenimine
P068	60-34-4	Hydrazine, methyl-
P068	60-34-4	Methyl hydrazine
P069	75-86-5	2-Methylactonitrile
P069	75-86-5	Propanenitrile, 2-hydroxy-2-methyl-
P070	116-06-3	Aldicarb
P070	116-06-3	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime
P071	298-00-0	Methyl parathion
P071	298-00-0	Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester
P072	86-88-4	alpha-Naphthylthiourea
P072	86-88-4	Thiourea, 1-naphthalenyl-

P073	13463-39-3	Nickel carbonyl
P073	13463-39-3	Nickel carbonyl Ni(CO) ₄ , (T-4)-
P074	557-19-7	Nickel cyanide
P074	557-19-7	Nickel cyanide Ni(CN) ₂
P075	1 54-11-5	Nicotine, & salts
P075	1 54-11-5	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts
P076	10102-43-9	Nitric oxide
P076	10102-43-9	Nitrogen oxide NO
P077	100-01-6	Benzenamine, 4-nitro-
P077	100-01-6	p-Nitroaniline
P078	10102-44-0	Nitrogen dioxide
P078	10102-44-0	Nitrogen oxide NO ₂
P081	55-63-0	Nitroglycerine (R)
P081	55-63-0	1,2,3-Propanetriol, trinitrate (R)
P082	62-75-9	Methanamine, -methyl-N-nitroso-
P082	62-75-9	N-Nitrosodimethylamine
P084	4549-40-0	N-Nitrosomethylvinylamine
P084	4549-40-0	Vinylamine, -methyl-N-nitroso-
P085	152-16-9	Diphosphoramidate, octamethyl-
P085	152-16-9	Octamethylpyrophosphoramidate
P087	20816-12-0	Osmium oxide OsO ₄ , (T-4)-
P087	20816-12-0	Osmium tetroxide

P088	145-73-3	Endothall
P088	145-73-3	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P089	56-38-2	Parathion
P089	56-38-2	Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester
P092	62-38-4	Mercury, (acetato-O)phenyl-
P092	62-38-4	Phenylmercury acetate
P093	103-85-5	Phenylthiourea
P093	103-85-5	Thiourea, phenyl-
P094	298-02-2	Phorate
P094	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P095	75-44-5	Carbonic dichloride
P095	75-44-5	Phosgene
P096	7803-51-2	Hydrogen phosphide
P096	7803-51-2	Phosphine
P097	52-85-7	Famphur
P097	52-85-7	Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester
P098	151-50-8	Potassium cyanide
P098	151-50-8	Potassium cyanide K(CN)
P099	506-61-6	Argentate(1-), bis(cyano-C)-, potassium
P099	506-61-6	Potassium silver cyanide
P101	107-12-0	Ethyl cyanide
P101	107-12-0	Propanenitrile
P102	107-19-7	Propargyl alcohol

P102	107-19-7	2-Propyn-1-ol
P103	630-10-4	Selenourea
P104	506-64-9	Silver cyanide
P104	506-64-9	Silver cyanide Ag(CN)
P105	26628-22-8	Sodium azide
P106	143-33-9	Sodium cyanide
P106	143-33-9	Sodium cyanide Na(CN)
P108	1 157-24-9	Strychnidin-10-one, & salts
P108	1 157-24-9	Strychnine, & salts
P109	3689-24-5	Tetraethyldithiopyrophosphate
P109	3689-24-5	Thiodiphosphoric acid, tetraethyl ester
P110	78-00-2	Plumbane, tetraethyl-
P110	78-00-2	Tetraethyl lead
P111	107-49-3	Diphosphoric acid, tetraethyl ester
P111	107-49-3	Tetraethyl pyrophosphate
P112	509-14-8	Methane, tetranitro-(R)
P112	509-14-8	Tetranitromethane (R)
P113	1314-32-5	Thallic oxide
P113	1314-32-5	Thallium oxide $Tl_2 O_3$
P114	12039-52-0	Selenious acid, dithallium(1+) salt
P114	12039-52-0	Tetraethyldithiopyrophosphate
P115	7446-18-6	Thiodiphosphoric acid, tetraethyl ester
P115	7446-18-6	Plumbane, tetraethyl-

P116	79-19-6	Tetraethyl lead
P116	79-19-6	Thiosemicarbazide
P118	75-70-7	Methanethiol, trichloro-
P118	75-70-7	Trichloromethanethiol
P119	7803-55-6	Ammonium vanadate
P119	7803-55-6	Vanadic acid, ammonium salt
P120	1314-62-1	Vanadium oxide V ₂ O ₅
P120	1314-62-1	Vanadium pentoxide
P121	557-21-1	Zinc cyanide
P121	557-21-1	Zinc cyanide Zn(CN) ₂
P122	1314-84-7	Zinc phosphide Zn ₃ P ₂ , when present at concentrations greater than 10% (R,T)
P123	8001-35-2	Toxaphene
P127	1563-66-2	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, methylcarbamate.
P127	1563-66-2	Carbofuran
P128	315-8-4	Mexacarbate
P128	315-18-4	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester)
P185	26419-73-8	1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-, O-[(methylamino)-carbonyl]oxime.
P185	26419-73-8	Tirpate
P188	57-64-7	Benzoic acid, 2-hydroxy-, compd. with (3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl methylcarbamate ester (1:1)
P188	57-64-7	Physostigmine salicylate
P189	55285-14-8	Carbamic acid, [(dibutylamino)-thio]methyl-, 2,3-dihydro-2,2-dimethyl-7-benzofuranyl ester
P189	55285-14-8	Carbosulfan

P190	1129-41-5	Carbamic acid, methyl-, 3-methylphenyl ester
P190	1129-41-5	Metolcarb
P191	644-64-4	Carbamic acid, dimethyl-, 1-[(dimethyl-amino)carbonyl]-5-methyl-1H-pyrazol-3-yl ester
P191	644-64-4	Dimetilan
P192	119-38-0	Carbamic acid, dimethyl-, 3-methyl-1-(1-methylethyl)-1H-pyrazol-5-yl ester
P192	119-38-0	Isolan
P194	23135-22-0	Ethanimidthioic acid, 2-(dimethylamino)-N-[[[(methylamino) carbonyl]oxy]-2-oxo-, methyl ester
P194	23135-22-0	Oxamyl
P196	15339-36-3	Manganese, bis(dimethylcarbamodithioato-S,S')-,
P196	15339-36-3	Manganese dimethyldithiocarbamate
P197	17702-57-7	Formparanate
P197	17702-57-7	Methanimidamide, N,N-dimethyl-N'-[2-methyl-4-[[[(methylamino)carbonyl]oxy]phenyl]-
P198	23422-53-9	Formetanate hydrochloride
P198	23422-53-9	Methanimidamide, N,N-dimethyl-N'-[3-[[[(methylamino)-carbonyl]oxy]phenyl]-monohydrochloride
P199	2032-65-7	Methiocarb
P199	2032-65-7	Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate
P201	2631-37-0	Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate
P201	2631-37-0	Promecarb
P202	64-00-6	m-Cumenyl methylcarbamate
P202	64-00-6	3-Isopropylphenyl N-methylcarbamate
P202	64-00-6	Phenol, 3-(1-methylethyl)-, methyl carbamate
P203	1646-88-4	Aldicarb sulfone

P203	1646-88-4	Propanal, 2-methyl-2-(methyl-sulfonyl)-, O-[(methylamino)carbonyl] oxime
P204	57-47-6	Physostigmine
P204	57-47-6	Pyrrolo[2,3-b]indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-, methylcarbamate (ester), (3aS-cis)-
P205	137-30-4	Zinc, bis(dimethylcarbamodithioato-S,S')-,
P205	137-30-4	Ziram

1 CAS Number given for parent compound only.

(f) The commercial chemical products, manufacturing chemical inter-mediate, or off-specification commercial chemical products referred to in paragraphs (a) through (d) of this section, are identified as toxic wastes (T), unless otherwise designated and are subject to the small quantity generator exclusion defined in § 261.5 (a) and (g). [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. WASTES ARE FIRST LISTED IN ALPHABETICAL ORDER BY SUBSTANCE AND THEN LISTED AGAIN IN NUMERICAL ORDER BY HAZARDOUS WASTE NUMBER.] These wastes and their corresponding EPA Hazardous Waste Numbers are:

Hazardous waste No.	Chemical abstracts No.	Substance
U394	30558-43-1	A2213.
U001	75-07-0	Acetaldehyde (I)
U034	75-87-6	Acetaldehyde, trichloro-
U187	62-44-2	Acetamide, N-(4-ethoxyphenyl)-
U005	53-96-3	Acetamide, N-9H-fluoren-2-yl-
U240	1 94-75-7	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters
U112	141-78-6	Acetic acid ethyl ester (I)
U144	301-04-2	Acetic acid, lead(2+) salt
U214	563-68-8	Acetic acid, thallium(1+) salt
see F027	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-
U002	67-64-1	Acetone (I)
U003	75-05-8	Acetonitrile (I,T)

U004	98-86-2	Acetophenone
U005	53-96-3	2-Acetylaminofluorene
U006	75-36-5	Acetyl chloride (C,R,T)
U007	79-06-1	Acrylamide
U008	79-10-7	Acrylic acid (I)
U009	107-13-1	Acrylonitrile
U011	61-82-5	Amitrole
U012	62-53-3	Aniline (I,T)
U136	75-60-5	Arsinic acid, dimethyl-
U014	492-80-8	Auramine
U015	115-02-6	Azaserine
U010	50-07-7	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-, [1aS-(1aalpha, 8beta,8aalp ha,8balp ha)]-
U280	101-27-9	Barban.
U278	22781-23-3	Bendiocarb.
U364	22961-82-6	Bendiocarb phenol.
U271	17804-35-2	Benomyl.
U157	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U016	225-51-4	Benz[c]acridine
U017	98-87-3	Benzal chloride
U192	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-
U018	56-55-3	Benz[a]anthracene
U094	57-97-6	Benz[a]anthracene, 7,12-dimethyl-

U012	62-53-3	Benzenamine (I,T)
U014	492-80-8	Benzenamine, 4,4'-carbonimidoylbis[N,N-dimethyl-
U049	3165-93-3	Benzenamine, 4-chloro-2-methyl-, hydrochloride
U093	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-
U328	95-53-4	Benzenamine, 2-methyl-
U353	106-49-0	Benzenamine, 4-methyl-
U158	101-14-4	Benzenamine, 4,4'-methylenebis[2-chloro-
U222	636-21-5	Benzenamine, 2-methyl-, hydrochloride
U181	99-55-8	Benzenamine, 2-methyl-5-nitro-
U019	71-43-2	Benzene (I,T)
U038	510-15-6	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester
U030	101-55-3	Benzene, 1-bromo-4-phenoxy-
U035	305-03-3	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-
U037	108-90-7	Benzene, chloro-
U221	25376-45-8	Benzenediamine, ar-methyl-
U028	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester
U069	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester
U088	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester
U102	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester
U107	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester
U070	95-50-1	Benzene, 1,2-dichloro-
U071	541-73-1	Benzene, 1,3-dichloro-
U072	106-46-7	Benzene, 1,4-dichloro-

U060	72-54-8	Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro-
U017	98-87-3	Benzene, (dichloromethyl)-
U223	26471-62-5	Benzene, 1,3-diisocyanatomethyl- (R,T)
U239	1330-20-7	Benzene, dimethyl- (I)
U201	108-46-3	1,3-Benzenediol
U127	118-74-1	Benzene, hexachloro-
U056	110-82-7	Benzene, hexahydro- (I)
U220	108-88-3	Benzene, methyl-
U105	121-14-2	Benzene, 1-methyl-2,4-dinitro-
U106	606-20-2	Benzene, 2-methyl-1,3-dinitro-
U055	98-82-8	Benzene, (1-methylethyl)- (I)
U169	98-95-3	Benzene, nitro-
U183	608-93-5	Benzene, pentachloro-
U185	82-68-8	Benzene, pentachloronitro-
U020	98-09-9	Benzenesulfonic acid chloride (C,R)
U020	98-09-9	Benzenesulfonyl chloride (C,R)
U207	95-94-3	Benzene, 1,2,4,5-tetrachloro-
U061	50-29-3	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-
U247	72-43-5	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4- methoxy-
U023	98-07-7	Benzene, (trichloromethyl)-
U234	99-35-4	Benzene, 1,3,5-trinitro-
U021	92-87-5	Benzidine
U278	22781-23-3	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate.

U364	22961-82-6	1,3-Benzodioxol-4-ol, 2,2-dimethyl-,
U203	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-
U141	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-
U367	1563-38-8	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-
U090	94-58-6	1,3-Benzodioxole, 5-propyl-
U064	189-55-9	Benzo[rst]pentaphene
U248	181-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations of 0.3% or less
U022	50-32-8	Benzo[a]pyrene
U197	106-51-4	p-Benzoquinone
U023	98-07-7	Benzotrichloride (C,R,T)
U085	1464-53-5	2,2'-Bioxirane
U021	92-87-5	[1,1'-Biphenyl]-4,4'-diamine
U073	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-
U091	119-90-4	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-
U095	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-
U225	75-25-2	Bromoform
U030	101-55-3	4-Bromophenyl phenyl ether
U128	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-
U172	924-16-3	1-Butanamine, N-butyl-N-nitroso-
U031	71-36-3	1-Butanol (I)
U159	78-93-3	2-Butanone (I,T)
U160	1338-23-4	2-Butanone, peroxide (R,T)

U053	4170-30-3	2-Butenal
U074	764-41-0	2-Butene, 1,4-dichloro- (I,T)
U143	303-34-4	2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z),7(2S*,3R*),7aalpha]]-
U031	71-36-3	n-Butyl alcohol (I)
U136	75-60-5	Cacodylic acid
U032	13765-19-0	Calcium chromate
U372	10605-21-7	Carbamic acid, 1H-benzimidazol-2-yl, methyl ester.
U271	17804-35-2	Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2-yl]-, methyl ester.
U280	101-27-9	Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester.
U238	51-79-6	Carbamic acid, ethyl ester
U178	615-53-2	Carbamic acid, methylnitroso-, ethyl ester
U373	122-42-9	Carbamic acid, phenyl-, 1-methylethyl ester.
U409	23564-05-8	Carbamic acid, [1,2-phenylenebis(iminocarbonothioyl)]bis-, dimethyl ester.
U097	79-44-7	Carbamic chloride, dimethyl-
U389	2303-17-5	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3,3-trichloro-2-propenyl) ester.
U387	52888-80-9	Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester.
U114	1 111-54-6	Carbamodithioic acid, 1,2-ethanediybis-,salts & esters
U062	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-di-chloro-2-propenyl) ester
U279	63-25-2	Carbaryl.
U372	10605-21-7	Carbendazim.
U367	1563-38-8	Carbofuran phenol.
U215	6533-73-9	Carbonic acid, dithallium(1+) salt

U033	353-50-4	Carbonic difluoride
U156	79-22-1	Carbonochloridic acid, methyl ester (I,T)
U033	353-50-4	Carbon oxyfluoride (R,T)
U211	56-23-5	Carbon tetrachloride
U034	75-87-6	Chloral
U035	305-03-3	Chlorambucil
U036	57-74-9	Chlordane, alpha & gamma isomers
U026	494-03-1	Chlornaphazin
U037	108-90-7	Chlorobenzene
U038	510-15-6	Chlorobenzilate
U039	59-50-7	p-Chloro-m-cresol
U042	110-75-8	2-Chloroethyl vinyl ether
U044	67-66-3	Chloroform
U046	107-30-2	Chloromethyl methyl ether
U047	91-58-7	beta-Chloronaphthalene
U048	95-57-8	o-Chlorophenol
U049	3165-93-3	4-Chloro-o-toluidine, hydrochloride
U032	13765-19-0	Chromic acid H ₂ CrO ₄ , calcium salt
U050	218-01-9	Chrysene
U051		Creosote
U052	1319-77-3	Cresol (Cresylic acid)
U053	4170-30-3	Crotonaldehyde
U055	98-82-8	Cumene (I)

U246	506-68-3	Cyanogen bromide (CN)Br
U197	106-51-4	2,5-Cyclohexadiene-1,4-dione
U056	110-82-7	Cyclohexane (I)
U129	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-,(1alpha,2alpha,3beta,4alpha,5alpha,6beta)-
U057	108-94-1	Cyclohexanone (I)
U130	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-
U058	50-18-0	Cyclophosphamide
U240	1 94-75-7	2,4-D, salts & esters
U059	20830-81-3	Daunomycin
U060	72-54-8	DDD
U061	50-29-3	DDT

U062	2303-16-4	Diallate
U063	53-70-3	Dibenz[a,h]anthracene
U064	189-55-9	Dibenzo[a,i]pyrene
U066	96-12-8	1,2-Dibromo-3-chloropropane
U069	84-74-2	Dibutyl phthalate
U070	95-50-1	o-Dichlorobenzene
U071	541-73-1	m-Dichlorobenzene
U072	106-46-7	p-Dichlorobenzene
U073	91-94-1	3,3'-Dichlorobenzidine
U074	764-41-0	1,4-Dichloro-2-butene (I,T)
U075	75-71-8	Dichlorodifluoromethane

U078	75-35-4	1,1-Dichloroethylene
U079	156-60-5	1,2-Dichloroethylene
U025	111-44-4	Dichloroethyl ether
U027	108-60-1	Dichloroisopropyl ether
U024	111-91-1	Dichloromethoxy ethane
U081	120-83-2	2,4-Dichlorophenol
U082	87-65-0	2,6-Dichlorophenol
U084	542-75-6	1,3-Dichloropropene
U085	1464-53-5	1,2:3,4-Diepoxybutane (I,T)
U108	123-91-1	1,4-Diethyleneoxide
U028	117-81-7	Diethylhexyl phthalate
U395	5952-26-1	Diethylene glycol, dicarbamate.
U086	1615-80-1	N,N'-Diethylhydrazine
U087	3288-58-2	O,O-Diethyl S-methyl dithiophosphate
U088	84-66-2	Diethyl phthalate
U089	56-53-1	Diethylstilbesterol
U090	94-58-6	Dihydrosafrole
U091	119-90-4	3,3'-Dimethoxybenzidine
U092	124-40-3	Dimethylamine (I)
U093	60-11-7	p-Dimethylaminoazobenzene
U094	57-97-6	7,12-Dimethylbenz[a]anthracene
U095	119-93-7	3,3'-Dimethylbenzidine
U096	80-15-9	alpha,alpha-Dimethylbenzylhydroperoxide (R)

U097	79-44-7	Dimethylcarbamoyl chloride
U098	57-14-7	1,1-Dimethylhydrazine
U099	540-73-8	1,2-Dimethylhydrazine
U101	105-67-9	2,4-Dimethylphenol
U102	131-11-3	Dimethyl phthalate
U103	77-78-1	Dimethyl sulfate
U105	121-14-2	2,4-Dinitrotoluene
U106	606-20-2	2,6-Dinitrotoluene
U107	117-84-0	Di-n-octyl phthalate
U108	123-91-1	1,4-Dioxane
U109	122-66-7	1,2-Diphenylhydrazine
U110	142-84-7	Dipropylamine (I)
U111	621-64-7	Di-n-propylnitrosamine
U041	106-89-8	Epichlorohydrin
U001	75-07-0	Ethanal (I)
U404	121-44-8	Ethanamine, N,N-diethyl-
U174	55-18-5	Ethanamine, N-ethyl-N-nitroso-
U155	91-80-5	1,2-Ethanediamine, N,N-dimethyl-N'-(2-pyridinyl)-N'-(2-thienylmethyl)-
U067	106-93-4	Ethane, 1,2-dibromo-
U076	75-34-3	Ethane, 1,1-dichloro-
U077	107-06-2	Ethane, 1,2-dichloro-
U131	67-72-1	Ethane, hexachloro-
U024	111-91-1	Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-

U117	60-29-7	Ethane, 1,1'-oxybis-(I)
U025	111-44-4	Ethane, 1,1'-oxybis[2-chloro-
U184	76-01-7	Ethane, pentachloro-
U208	630-20-6	Ethane, 1,1,1,2-tetrachloro-
U209	79-34-5	Ethane, 1,1,2,2-tetrachloro-
U218	62-55-5	Ethanethioamide
U226	71-55-6	Ethane, 1,1,1-trichloro-
U227	79-00-5	Ethane, 1,1,2-trichloro-
U410	59669-26-0	Ethanimidothioic acid, N,N'- [thiobis(methylimino)carbonyloxy]]bis-, dimethyl ester
U394	30558-43-1	Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester.
U359	110-80-5	Ethanol, 2-ethoxy-
U173	1116-54-7	Ethanol, 2,2'-(nitrosoimino)bis-
U395	5952-26-1	Ethanol, 2,2'-oxybis-, dicarbamate.
U004	98-86-2	Ethanone, 1-phenyl-
U043	75-01-4	Ethene, chloro-
U042	110-75-8	Ethene, (2-chloroethoxy)-
U078	75-35-4	Ethene, 1,1-dichloro-
U079	156-60-5	Ethene, 1,2-dichloro-, (E)-
U210	127-18-4	Ethene, tetrachloro-
U228	79-01-6	Ethene, trichloro-
U112	141-78-6	Ethyl acetate (I)
U113	140-88-5	Ethyl acrylate (I)

U238	51-79-6	Ethyl carbamate (urethane)
U117	60-29-7	Ethyl ether (I)
U114	1 111-54-6	Ethylenebisdithiocarbamic acid, salts & esters
U067	106-93-4	Ethylene dibromide
U077	107-06-2	Ethylene dichloride
U359	110-80-5	Ethylene glycol monoethyl ether
U115	75-21-8	Ethylene oxide (I,T)
U116	96-45-7	Ethylenethiourea
U076	75-34-3	Ethylidene dichloride
U118	97-63-2	Ethyl methacrylate
U119	62-50-0	Ethyl methanesulfonate
U120	206-44-0	Fluoranthene
U122	50-00-0	Formaldehyde
U123	64-18-6	Formic acid (C,T)
U124	110-00-9	Furan (I)
U125	98-01-1	2-Furancarboxaldehyde (I)
U147	108-31-6	2,5-Furandione
U213	109-99-9	Furan, tetrahydro-(I)
U125	98-01-1	Furfural (I)
U124	110-00-9	Furfuran (I)
U206	18883-66-4	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-, D-
U206	18883-66-4	D-Glucose, 2-deoxy-2-[[[(methylnitrosoamino)-carbonyl]amino]-
U126	765-34-4	Glycidylaldehyde

U163	70-25-7	Guanidine, N-methyl-N'-nitro-N-nitroso-
U127	118-74-1	Hexachlorobenzene
U128	87-68-3	Hexachlorobutadiene
U130	77-47-4	Hexachlorocyclopentadiene
U131	67-72-1	Hexachloroethane
U132	70-30-4	Hexachlorophene
U243	1888-71-7	Hexachloropropene
U133	302-01-2	Hydrazine (R,T)
U086	1615-80-1	Hydrazine, 1,2-diethyl-
U098	57-14-7	Hydrazine, 1,1-dimethyl-
U099	540-73-8	Hydrazine, 1,2-dimethyl-
U109	122-66-7	Hydrazine, 1,2-diphenyl-
U134	7664-39-3	Hydrofluoric acid (C,T)
U134	7664-39-3	Hydrogen fluoride (C,T)
U135	7783-06-4	Hydrogen sulfide
U135	7783-06-4	Hydrogen sulfide H ₂ S
U096	80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl- (R)
U116	96-45-7	2-Imidazolidinethione
U137	193-39-5	Indeno[1,2,3-cd]pyrene
U190	85-44-9	1,3-Isobenzofurandione
U140	78-83-1	Isobutyl alcohol (I,T)
U141	120-58-1	Isosafrole
U142	143-50-0	Kepone

U143	303-34-4	Lasiocarpine
U144	301-04-2	Lead acetate
U146	1335-32-6	Lead, bis(acetato-O)tetrahydroxytri-
U145	7446-27-7	Lead phosphate
U146	1335-32-6	Lead subacetate
U129	58-89-9	Lindane
U163	70-25-7	MNNG
U147	108-31-6	Maleic anhydride
U148	123-33-1	Maleic hydrazide
U149	109-77-3	Malononitrile
U150	148-82-3	Melphalan
U151	7439-97-6	Mercury
U152	126-98-7	Methacrylonitrile (I, T)
U092	124-40-3	Methanamine, N-methyl- (I)
U029	74-83-9	Methane, bromo-
U045	74-87-3	Methane, chloro- (I, T)
U046	107-30-2	Methane, chloromethoxy-
U068	74-95-3	Methane, dibromo-
U080	75-09-2	Methane, dichloro-
U075	75-71-8	Methane, dichlorodifluoro-
U138	74-88-4	Methane, iodo-
U119	62-50-0	Methanesulfonic acid, ethyl ester

U211	56-23-5	Methane, tetrachloro-
U153	74-93-1	Methanethiol (I, T)
U225	75-25-2	Methane, tribromo-
U044	67-66-3	Methane, trichloro-
U121	75-69-4	Methane, trichlorofluoro-
U036	57-74-9	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-
U154	67-56-1	Methanol (I)
U155	91-80-5	Methapyrilene
U142	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-
U247	72-43-5	Methoxychlor
U154	67-56-1	Methyl alcohol (I)
U029	74-83-9	Methyl bromide
U186	504-60-9	1-Methylbutadiene (I)
U045	74-87-3	Methyl chloride (I,T)
U156	79-22-1	Methyl chlorocarbonate (I,T)
U226	71-55-6	Methyl chloroform
U157	56-49-5	3-Methylcholanthrene
U158	101-14-4	4,4'-Methylenebis(2-chloroaniline)
U068	74-95-3	Methylene bromide
U080	75-09-2	Methylene chloride
U159	78-93-3	Methyl ethyl ketone (MEK) (I,T)
U160	1338-23-4	Methyl ethyl ketone peroxide (R,T)
U138	74-88-4	Methyl iodide

U161	108-10-1	Methyl isobutyl ketone (I)
U162	80-62-6	Methyl methacrylate (I,T)
U161	108-10-1	4-Methyl-2-pentanone (I)
U164	56-04-2	Methylthiouracil
U010	50-07-7	Mitomycin C
U059	20830-81-3	5,12-Naphthacenedione, 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-, (8S-cis)-
U167	134-32-7	1-Naphthalenamine
U168	91-59-8	2-Naphthalenamine
U026	494-03-1	Naphthalenamine, N,N'-bis(2-chloroethyl)-
U165	91-20-3	Naphthalene
U047	91-58-7	Naphthalene, 2-chloro-
U166	130-15-4	1,4-Naphthalenedione
U236	72-57-1	2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl[1,1'-biphenyl]-4,4'-diyl)bis(azo)bis[5-amino-4-hydroxy]-, tetrasodium salt
U279	63-25-2	1-Naphthalenol, methylcarbamate.
U166	130-15-4	1,4-Naphthoquinone
U167	134-32-7	alpha-Naphthylamine
U168	91-59-8	beta-Naphthylamine
U217	10102-45-1	Nitric acid, thallium(1+) salt
U169	98-95-3	Nitrobenzene (I,T)
U170	100-02-7	p-Nitrophenol
U171	79-46-9	2-Nitropropane (I,T)
U172	924-16-3	N-Nitrosodi-n-butylamine

U173	1116-54-7	N-Nitrosodiethanolamine
U174	55-18-5	N-Nitrosodiethylamine
U176	759-73-9	N-Nitroso-N-ethylurea
U177	684-93-5	N-Nitroso-N-methylurea
U178	615-53-2	N-Nitroso-N-methylurethane
U179	100-75-4	N-Nitrosopiperidine
U180	930-55-2	N-Nitrosopyrrolidine
U181	99-55-8	5-Nitro-o-toluidine
U193	1120-71-4	1,2-Oxathiolane, 2,2-dioxide
U058	50-18-0	2H-1,3,2-Oxazaphosphorin-2-amine,N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide
U115	75-21-8	Oxirane (I,T)
U126	765-34-4	Oxiranecarboxyaldehyde
U041	106-89-8	Oxirane, (chloromethyl)-
U182	123-63-7	Paraldehyde
U183	608-93-5	Pentachlorobenzene
U184	76-01-7	Pentachloroethane
U185	82-68-8	Pentachloronitrobenzene (PCNB)
See F027	87-86-5	Pentachlorophenol
U161	108-10-1	Pentanol, 4-methyl-
U186	504-60-9	1,3-Pentadiene (I)
U187	62-44-2	Phenacetin
U188	108-95-2	Phenol

U048	95-57-8	Phenol, 2-chloro-
U039	59-50-7	Phenol, 4-chloro-3-methyl-
U081	120-83-2	Phenol, 2,4-dichloro-
U082	87-65-0	Phenol, 2,6-dichloro-
U089	56-53-1	Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)-
U101	105-67-9	Phenol, 2,4-dimethyl-
U052	1319-77-3	Phenol, methyl-
U132	70-30-4	Phenol, 2,2'-methylenebis[3,4,6-trichloro-
U411	114-26-1	Phenol, 2-(1-methylethoxy)-, methylcarbamate.
U170	100-02-7	Phenol, 4-nitro-
See F027	87-86-5	Phenol, pentachloro-
See F027	58-90-2	Phenol, 2,3,4,6-tetrachloro-
See F027	95-95-4	Phenol, 2,4,5-trichloro-
See F027	88-06-2	Phenol, 2,4,6-trichloro-
U150	148-82-3	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-
U145	7446-27-7	Phosphoric acid, lead(2+) salt (2:3)
U087	3288-58-2	Phosphorodithioic acid, O,O-diethyl S-methyl ester
U189	1314-80-3	Phosphorus sulfide (R)
U190	85-44-9	Phthalic anhydride
U191	109-06-8	2-Picoline
U179	100-75-4	Piperidine, 1-nitroso-
U192	23950-58-5	Pronamide
U194	107-10-8	1-Propanamine (I,T)

U111	621-64-7	1-Propanamine, N-nitroso-N-propyl-
U110	142-84-7	1-Propanamine, N-propyl- (I)
U066	96-12-8	Propane, 1,2-dibromo-3-chloro-
U083	78-87-5	Propane, 1,2-dichloro-
U149	109-77-3	Propanedinitrile
U171	79-46-9	Propane, 2-nitro- (I,T)
U027	108-60-1	Propane, 2,2'-oxybis[2-chloro-
U193	1120-71-4	1,3-Propane sultone
See F027	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-
U235	126-72-7	1-Propanol, 2,3-dibromo-, phosphate (3:1)
U140	78-83-1	1-Propanol, 2-methyl- (I,T)
U002	67-64-1	2-Propanone (I)
U007	79-06-1	2-Propenamide
U084	542-75-6	1-Propene, 1,3-dichloro-
U243	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-
U009	107-13-1	2-Propenenitrile
U152	126-98-7	2-Propenenitrile, 2-methyl- (I,T)
U008	79-10-7	2-Propenoic acid (I)
U113	140-88-5	2-Propenoic acid, ethyl ester (I)
U118	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester
U162	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester (I,T)
U373	122-42-9	Propham.
U411	114-26-1	Propoxur.

U387	52888-80-9	Prosulfocarb.
U194	107-10-8	n-Propylamine (I,T)
U083	78-87-5	Propylene dichloride
U148	123-33-1	3,6-Pyridazinedione, 1,2-dihydro-
U196	110-86-1	Pyridine
U191	109-06-8	Pyridine, 2-methyl-
U237	66-75-1	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-
U164	56-04-2	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U180	930-55-2	Pyrrolidine, 1-nitroso-
U200	50-55-5	Reserpine
U201	108-46-3	Resorcinol
U203	94-59-7	Safrole
U204	7783-00-8	Selenious acid
U204	7783-00-8	Selenium dioxide
U205	7488-56-4	Selenium sulfide
U205	7488-56-4	Selenium sulfide SeS ₂ (R,T)
U015	115-02-6	L-Serine, diazoacetate (ester)
See F027	93-72-1	Silvex (2,4,5-TP)
U206	18883-66-4	Streptozotocin
U103	77-78-1	Sulfuric acid, dimethyl ester
U189	1314-80-3	Sulfur phosphide (R)
See F027	93-76-5	2,4,5-T

U207	95-94-3	1,2,4,5-Tetrachlorobenzene
U208	630-20-6	1,1,1,2-Tetrachloroethane
U209	79-34-5	1,1,2,2-Tetrachloroethane
U210	127-18-4	Tetrachloroethylene
See F027	58-90-2	2,3,4,6-Tetrachlorophenol
U213	109-99-9	Tetrahydrofuran (I)
U214	563-68-8	Thallium(I) acetate
U215	6533-73-9	Thallium(I) carbonate
U216	7791-12-0	Thallium(I) chloride
U216	7791-12-0	thallium chloride TlCl
U217	10102-45-1	Thallium(I) nitrate
U218	62-55-5	Thioacetamide
U410	59669-26-0	Thiodicarb.
U153	74-93-1	Thiomethanol (I,T)
U244	137-26-8	Thioperoxydicarbonic diamide [(H ₂ N)C(S)] ₂ S ₂ , tetramethyl-
U409	23564-05-8	Thiophanate-methyl.
U219	62-56-6	Thiourea
U244	137-26-8	Thiram
U220	108-88-3	Toluene
U221	25376-45-8	Toluenediamine
U223	26471-62-5	Toluene diisocyanate (R,T)
U328	95-53-4	o-Toluidine
U353	106-49-0	p-Toluidine

U222	636-21-5	o-Toluidine hydrochloride
U389	2303-17-5	Triallate.
U011	61-82-5	1H-1,2,4-Triazol-3-amine
U226	71-55-6	1,1,1-Trichloroethane
U227	79-00-5	1,1,2-Trichloroethane
U228	79-01-6	Trichloroethylene
U121	75-69-4	Trichloromonofluoromethane
See F027	95-95-4	2,4,5-Trichlorophenol
See F027	88-06-2	2,4,6-Trichlorophenol
U404	121-44-8	Triethylamine.
U234	99-35-4	1,3,5-Trinitrobenzene (R,T)
U182	123-63-7	1,3,5-Trioxane, 2,4,6-trimethyl-
U235	126-72-7	Tris(2,3-dibromopropyl) phosphate
U236	72-57-1	Trypan blue
U237	66-75-1	Uracil mustard
U176	759-73-9	Urea, N-ethyl-N-nitroso-
U177	684-93-5	Urea, N-methyl-N-nitroso-
U043	75-01-4	Vinyl chloride
U248	1 81-81-2	Warfarin, & salts, when present at concentrations of 0.3% or less
U239	1330-20-7	Xylene (I)
U200	50-55-5	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester, (3beta,16beta,17alpha,18beta,20alpha)-
U249	1314-84-7	Zinc phosphide Zn ₃ P ₂ , when present at concentrations of 10% or less

U001	75-07-0	Acetaldehyde (I)
U001	75-07-0	Ethanal (I)
U002	67-64-1	Acetone (I)
U002	67-64-1	2-Propanone (I)
U003	75-05-8	Acetonitrile (I,T)
U004	98-86-2	Acetophenone
U004	98-86-2	Ethanone, 1-phenyl-
U005	53-96-3	Acetamide, -9H-fluoren-2-yl-
U005	53-96-3	2-Acetylaminofluorene
U006	75-36-5	Acetyl chloride (C,R,T)
U007	79-06-1	Acrylamide
U007	79-06-1	2-Propenamide
U008	79-10-7	Acrylic acid (I)
U008	79-10-7	2-Propenoic acid (I)
U009	107-13-1	Acrylonitrile
U009	107-13-1	2-Propenenitrile

U010	50-07-7	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-, [1aS-(1aalpha, 8beta,8aalp,8balp)]]-
U010	50-07-7	Mitomycin C
U011	61-82-5	Amitrole
U011	61-82-5	1H-1,2,4-Triazol-3-amine
U012	62-53-3	Aniline (I,T)
U012	62-53-3	Benzenamine (I,T)

U014	492-80-8	Auramine
U014	492-80-8	Benzenamine, 4,4'-carbonimidoylbis[N,N-dimethyl-
U015	115-02-6	Azaserine
U015	115-02-6	L-Serine, diazoacetate (ester)
U016	225-51-4	Benz[c]acridine
U017	98-87-3	Benzal chloride
U017	98-87-3	Benzene, (dichloromethyl)-
U018	56-55-3	Benz[a]anthracene
U019	71-43-2	Benzene (I,T)
U020	98-09-9	Benzenesulfonic acid chloride (C,R)
U020	98-09-9	Benzenesulfonyl chloride (C,R)
U021	92-87-5	Benzidine
U021	92-87-5	[1,1'-Biphenyl]-4,4'-diamine
U022	50-32-8	Benzo[a]pyrene
U023	98-07-7	Benzene, (trichloromethyl)-
U023	98-07-7	Benzotrichloride (C,R,T)
U024	111-91-1	Dichloromethoxy ethane
U024	111-91-1	Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-
U025	111-44-4	Dichloroethyl ether
U025	111-44-4	Ethane, 1,1'-oxybis[2-chloro-
U026	494-03-1	Chlornaphazin
U026	494-03-1	Naphthalenamine, N,N'-bis(2-chloroethyl)-
U027	108-60-1	Dichloroisopropyl ether

U027	108-60-1	Propane, 2,2'-oxybis[2-chloro-
U028	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester
U028	117-81-7	Diethylhexyl phthalate
U029	74-83-9	Methane, bromo-
U029	74-83-9	Methyl bromide
U030	101-55-3	Benzene, 1-bromo-4-phenoxy-
U030	101-55-3	4-Bromophenyl phenyl ether
U031	71-36-3	1-Butanol (I)
U031	71-36-3	n-Butyl alcohol (I)
U032	13765-19-0	Calcium chromate
U032	13765-19-0	Chromic acid H ₂ CrO ₄ , calcium salt
U033	353-50-4	Carbonic difluoride
U033	353-50-4	Carbon oxyfluoride (R,T)
U034	75-87-6	Acetaldehyde, trichloro-
U034	75-87-6	Chloral
U035	305-03-3	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-
U035	305-03-3	Chlorambucil
U036	57-74-9	Chlordane, alpha & gamma isomers
U036	57-74-9	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-
U037	108-90-7	Benzene, chloro-
U037	108-90-7	Chlorobenzene
U038	510-15-6	Benzenecetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester
U038	510-15-6	Chlorobenzilate

U039	59-50-7	p-Chloro-m-cresol
U039	59-50-7	Phenol, 4-chloro-3-methyl-
U041	106-89-8	Epichlorohydrin
U041	106-89-8	Oxirane, (chloromethyl)-
U042	110-75-8	2-Chloroethyl vinyl ether
U042	110-75-8	Ethene, (2-chloroethoxy)-
U043	75-01-4	Ethene, chloro-
U043	75-01-4	Vinyl chloride
U044	67-66-3	Chloroform
U044	67-66-3	Methane, trichloro-
U045	74-87-3	Methane, chloro- (I,T)
U045	74-87-3	Methyl chloride (I,T)
U046	107-30-2	Chloromethyl methyl ether
U046	107-30-2	Methane, chloromethoxy-
U047	91-58-7	beta-Chloronaphthalene
U047	91-58-7	Naphthalene, 2-chloro-
U048	95-57-8	o-Chlorophenol
U048	95-57-8	Phenol, 2-chloro-
U049	3165-93-3	Benzenamine, 4-chloro-2-methyl-, hydrochloride
U049	3165-93-3	4-Chloro-o-toluidine, hydrochloride
U050	218-01-9	Chrysene
U051		Creosote

U052	1319-77-3	Cresol (Cresylic acid)
U052	1319-77-3	Phenol, methyl-
U053	4170-30-3	2-Butenal
U053	4170-30-3	Crotonaldehyde
U055	98-82-8	Benzene, (1-methylethyl)-(I)
U055	98-82-8	Cumene (I)
U056	110-82-7	Benzene, hexahydro-(I)
U056	110-82-7	Cyclohexane (I)
U057	108-94-1	Cyclohexanone (I)
U058	50-18-0	Cyclophosphamide
U058	50-18-0	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide
U059	20830-81-3	Daunomycin
U059	20830-81-3	5,12-Naphthacenedione, 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-, (8S-cis)-
U060	72-54-8	Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro-
U060	72-54-8	DDD
U061	50-29-3	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-
U061	50-29-3	DDT
U062	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-di chloro-2-propenyl) ester
U062	2303-16-4	Diallate
U063	53-70-3	Dibenz[a,h]anthracene
U064	189-55-9	Benzo[rs]pentaphene
U064	189-55-9	Dibenzo[a,i]pyrene

U066	96-12-8	1,2-Dibromo-3-chloropropane
U066	96-12-8	Propane, 1,2-dibromo-3-chloro-
U067	106-93-4	Ethane, 1,2-dibromo-
U067	106-93-4	Ethylene dibromide
U068	74-95-3	Methane, dibromo-
U068	74-95-3	Methylene bromide
U069	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester
U069	84-74-2	Dibutyl phthalate
U070	95-50-1	Benzene, 1,2-dichloro-
U070	95-50-1	o-Dichlorobenzene
U071	541-73-1	Benzene, 1,3-dichloro-
U071	541-73-1	m-Dichlorobenzene
U072	106-46-7	Benzene, 1,4-dichloro-
U072	106-46-7	p-Dichlorobenzene
U073	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-
U073	91-94-1	3,3'-Dichlorobenzidine
U074	764-41-0	2-Butene, 1,4-dichloro-(I,T)
U074	764-41-0	1,4-Dichloro-2-butene (I,T)
U075	75-71-8	Dichlorodifluoromethane
U075	75-71-8	Methane, dichlorodifluoro-
U076	75-34-3	Ethane, 1,1-dichloro-
U076	75-34-3	Ethylidene dichloride
U077	107-06-2	Ethane, 1,2-dichloro-

U077	107-06-2	Ethylene dichloride
U078	75-35-4	1,1-Dichloroethylene
U078	75-35-4	Ethene, 1,1-dichloro-
U079	156-60-5	1,2-Dichloroethylene
U079	156-60-5	Ethene, 1,2-dichloro-, (E)-
U080	75-09-2	Methane, dichloro-
U080	75-09-2	Methylene chloride
U081	120-83-2	2,4-Dichlorophenol
U081	120-83-2	Phenol, 2,4-dichloro-
U082	87-65-0	2,6-Dichlorophenol
U082	87-65-0	Phenol, 2,6-dichloro-
U083	78-87-5	Propane, 1,2-dichloro-
U083	78-87-5	Propylene dichloride
U084	542-75-6	1,3-Dichloropropene
U084	542-75-6	1-Propene, 1,3-dichloro-
U085	1464-53-5	2,2'-Bioxirane
U085	1464-53-5	1,2:3,4-Diepoxybutane (I,T)
U086	1615-80-1	N,N'-Diethylhydrazine
U086	1615-80-1	Hydrazine, 1,2-diethyl-
U087	3288-58-2	O,O-Diethyl S-methyl dithiophosphate
U087	3288-58-2	Phosphorodithioic acid, O,O-diethyl S-methyl ester
U088	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester
U088	84-66-2	Diethyl phthalate

U089	56-53-1	Diethylstilbesterol
U089	56-53-1	Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)-
U090	94-58-6	1,3-Benzodioxole, 5-propyl-
U090	94-58-6	Dihydrosafrole
U091	119-90-4	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-
U091	119-90-4	3,3'-Dimethoxybenzidine
U092	124-40-3	Dimethylamine (I)
U092	124-40-3	Methanamine, -methyl-(I)
U093	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-
U093	60-11-7	p-Dimethylaminoazobenzene
U094	57-97-6	Benz[a]anthracene, 7,12-dimethyl-
U094	57-97-6	7,12-Dimethylbenz[a]anthracene
U095	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-
U095	119-93-7	3,3'-Dimethylbenzidine
U096	80-15-9	alpha,alpha-Dimethylbenzylhydroperoxide (R)
U096	80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl-(R)
U097	79-44-7	Carbamic chloride, dimethyl-
U097	79-44-7	Dimethylcarbamoyl chloride
U098	57-14-7	1,1-Dimethylhydrazine
U098	57-14-7	Hydrazine, 1,1-dimethyl-
U099	540-73-8	1,2-Dimethylhydrazine
U099	540-73-8	Hydrazine, 1,2-dimethyl-

U101	105-67-9	2,4-Dimethylphenol
U101	105-67-9	Phenol, 2,4-dimethyl-
U102	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester
U102	131-11-3	Dimethyl phthalate
U103	77-78-1	Dimethyl sulfate
U103	77-78-1	Sulfuric acid, dimethyl ester
U105	121-14-2	Benzene, 1-methyl-2,4-dinitro-
U105	121-14-2	2,4-Dinitrotoluene
U106	606-20-2	Benzene, 2-methyl-1,3-dinitro-
U106	606-20-2	2,6-Dinitrotoluene
U107	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester
U107	117-84-0	Di-n-octyl phthalate
U108	123-91-1	1,4-Diethyleneoxide
U108	123-91-1	1,4-Dioxane
U109	122-66-7	1,2-Diphenylhydrazine
U109	122-66-7	Hydrazine, 1,2-diphenyl-
U110	142-84-7	Dipropylamine (I)
U110	142-84-7	1-Propanamine, N-propyl-(I)
U111	621-64-7	Di-n-propylnitrosamine
U111	621-64-7	1-Propanamine, N-nitroso-N-propyl-
U112	141-78-6	Acetic acid ethyl ester (I)
U112	141-78-6	Ethyl acetate (I)
U113	140-88-5	Ethyl acrylate (I)

U113	140-88-5	2-Propenoic acid, ethyl ester (I)
U114	1111-54-6	Carbamodithioic acid, 1,2-ethanediybis-, salts & esters
U114	1111-54-6	Ethylenebisdithiocarbamic acid, salts & esters
U115	75-21-8	Ethylene oxide (I,T)
U115	75-21-8	Oxirane (I,T)
U116	96-45-7	Ethylenethiourea
U116	96-45-7	2-Imidazolidinethione
U117	60-29-7	Ethane, 1,1'-oxybis-(I)
U117	60-29-7	Ethyl ether (I)
U118	97-63-2	Ethyl methacrylate
U118	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester
U119	62-50-0	Ethyl methanesulfonate
U119	62-50-0	Methanesulfonic acid, ethyl ester
U120	206-44-0	Fluoranthene
U121	75-69-4	Methane, trichlorofluoro-
U121	75-69-4	Trichloromonofluoromethane
U122	50-00-0	Formaldehyde
U123	64-18-6	Formic acid (C,T)
U124	110-00-9	Furan (I)
U124	110-00-9	Furfuran (I)
U125	98-01-1	2-Furancarboxaldehyde (I)
U125	98-01-1	Furfural (I)
U126	765-34-4	Glycidylaldehyde

U126	765-34-4	Oxiranecarboxyaldehyde
U127	118-74-1	Benzene, hexachloro-
U127	118-74-1	Hexachlorobenzene
U128	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-

U128	87-68-3	Hexachlorobutadiene
U129	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha,5alpha,6beta)-
U129	58-89-9	Lindane
U130	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-
U130	77-47-4	Hexachlorocyclopentadiene
U131	67-72-1	Ethane, hexachloro-
U131	67-72-1	Hexachloroethane
U132	70-30-4	Hexachlorophene
U132	70-30-4	Phenol, 2,2'-methylenebis[3,4,6-trichloro-
U133	302-01-2	Hydrazine (R,T)
U134	7664-39-3	Hydrofluoric acid (C,T)
U134	7664-39-3	Hydrogen fluoride (C,T)
U135	7783-06-4	Hydrogen sulfide
U135	7783-06-4	Hydrogen sulfide H ₂ S
U136	75-60-5	Arsinic acid, dimethyl-
U136	75-60-5	Cacodylic acid
U137	193-39-5	Indeno[1,2,3-cd]pyrene
U138	74-88-4	Methane, iodo-

U138	74-88-4	Methyl iodide
U140	78-83-1	Isobutyl alcohol (I,T)
U140	78-83-1	1-Propanol, 2-methyl- (I,T)
U141	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-
U141	120-58-1	Isosafrole
U142	143-50-0	Kepone
U142	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-
U143	303-34-4	2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z),7(2S*,3R*),7aalpha]]-
U143	303-34-4	Lasiocarpine
U144	301-04-2	Acetic acid, lead(2+) salt
U144	301-04-2	Lead acetate
U145	7446-27-7	Lead phosphate
U145	7446-27-7	Phosphoric acid, lead(2+) salt (2:3)
U146	1335-32-6	Lead, bis(acetato-O)tetrahydroxytri-
U146	1335-32-6	Lead subacetate
U147	108-31-6	2,5-Furandione
U147	108-31-6	Maleic anhydride
U148	123-33-1	Maleic hydrazide
U148	123-33-1	3,6-Pyridazinedione, 1,2-dihydro-
U149	109-77-3	Malononitrile
U149	109-77-3	Propanedinitrile
U150	148-82-3	Melphalan

U150	148-82-3	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-
U151	7439-97-6	Mercury
U152	126-98-7	Methacrylonitrile (I,T)
U152	126-98-7	2-Propenenitrile, 2-methyl- (I,T)
U153	74-93-1	Methanethiol (I,T)
U153	74-93-1	Thiomethanol (I,T)
U154	67-56-1	Methanol (I)
U154	67-56-1	Methyl alcohol (I)
U155	91-80-5	1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-
U155	91-80-5	Methapyrilene
U156	79-22-1	Carbonochloridic acid, methyl ester (I,T)
U156	79-22-1	Methyl chlorocarbonate (I,T)
U157	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U157	56-49-5	3-Methylcholanthrene
U158	101-14-4	Benzenamine, 4,4'-methylenebis[2-chloro-
U158	101-14-4	4,4'-Methylenebis(2-chloroaniline)
U159	78-93-3	2-Butanone (I,T)
U159	78-93-3	Methyl ethyl ketone (MEK) (I,T)
U160	1338-23-4	2-Butanone, peroxide (R,T)
U160	1338-23-4	Methyl ethyl ketone peroxide (R,T)
U161	108-10-1	Methyl isobutyl ketone (I)
U161	108-10-1	4-Methyl-2-pentanone (I)
U161	108-10-1	Pentanol, 4-methyl-

U162	80-62-6	Methyl methacrylate (I,T)
U162	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester (I,T)
U163	70-25-7	Guanidine, -methyl-N'-nitro-N-nitroso-
U163	70-25-7	MNNG
U164	56-04-2	Methylthiouracil
U164	56-04-2	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U165	91-20-3	Naphthalene
U166	130-15-4	1,4-Naphthalenedione
U166	130-15-4	1,4-Naphthoquinone
U167	134-32-7	1-Naphthalenamine
U167	134-32-7	alpha-Naphthylamine
U168	91-59-8	2-Naphthalenamine
U168	91-59-8	beta-Naphthylamine
U169	98-95-3	Benzene, nitro-
U169	98-95-3	Nitrobenzene (I,T)
U170	100-02-7	p-Nitrophenol
U170	100-02-7	Phenol, 4-nitro-
U171	79-46-9	2-Nitropropane (I,T)
U171	79-46-9	Propane, 2-nitro- (I,T)
U172	924-16-3	1-Butanamine, N-butyl-N-nitroso-
U172	924-16-3	N-Nitrosodi-n-butylamine
U173	1116-54-7	Ethanol, 2,2'-(nitrosoimino)bis-

U173	1116-54-7	N-Nitrosodiethanolamine
U174	55-18-5	Ethanamine, -ethyl-N-nitroso-
U174	55-18-5	N-Nitrosodiethylamine
U176	759-73-9	N-Nitroso-N-ethylurea
U176	759-73-9	Urea, N-ethyl-N-nitroso-
U177	684-93-5	N-Nitroso-N-methylurea
U177	684-93-5	Urea, N-methyl-N-nitroso-
U178	615-53-2	Carbamic acid, methylnitroso-, ethyl ester
U178	615-53-2	N-Nitroso-N-methylurethane
U179	100-75-4	N-Nitrosopiperidine
U179	100-75-4	Piperidine, 1-nitroso-
U180	930-55-2	N-Nitrosopyrrolidine
U180	930-55-2	Pyrrolidine, 1-nitroso-
U181	99-55-8	Benzenamine, 2-methyl-5-nitro-
U181	99-55-8	5-Nitro-o-toluidine
U182	123-63-7	1,3,5-Trioxane, 2,4,6-trimethyl-
U182	123-63-7	Paraldehyde
U183	608-93-5	Benzene, pentachloro-
U183	608-93-5	Pentachlorobenzene
U184	76-01-7	Ethane, pentachloro-
U184	76-01-7	Pentachloroethane
U185	82-68-8	Benzene, pentachloronitro-
U185	82-68-8	Pentachloronitrobenzene (PCNB)

U186	504-60-9	1-Methylbutadiene (I)
U186	504-60-9	1,3-Pentadiene (I)
U187	62-44-2	Acetamide, -(4-ethoxyphenyl)-
U187	62-44-2	Phenacetin
U188	108-95-2	Phenol
U189	1314-80-3	Phosphorus sulfide (R)
U189	1314-80-3	Sulfur phosphide (R)
U190	85-44-9	1,3-Isobenzofurandione
U190	85-44-9	Phthalic anhydride
U191	109-06-8	2-Picoline
U191	109-06-8	Pyridine, 2-methyl-
U192	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-
U192	23950-58-5	Pronamide
U193	1120-71-4	1,2-Oxathiolane, 2,2-dioxide
U193	1120-71-4	1,3-Propane sultone
U194	107-10-8	1-Propanamine (I,T)
U194	107-10-8	n-Propylamine (I,T)
U196	110-86-1	Pyridine
U197	106-51-4	p-Benzoquinone
U197	106-51-4	2,5-Cyclohexadiene-1,4-dione
U200	50-55-5	Reserpine
U200	50-55-5	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester,(3beta,16beta,17alpha,18beta,20alpha)-

U201	108-46-3	1,3-Benzenediol
U201	108-46-3	Resorcinol
U203	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-
U203	94-59-7	Safrole
U204	7783-00-8	Selenious acid
U204	7783-00-8	Selenium dioxide
U205	7488-56-4	Selenium sulfide
U205	7488-56-4	Selenium sulfide SeS ₂ (R,T)
U206	18883-66-4	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-, D-
U206	18883-66-4	D-Glucose, 2-deoxy-2-[[[(methylnitrosoamino)-carbonyl]amino]-
U206	18883-66-4	Streptozotocin
U207	95-94-3	Benzene, 1,2,4,5-tetrachloro-

U207	95-94-3	1,2,4,5-Tetrachlorobenzene
U208	630-20-6	Ethane, 1,1,1,2-tetrachloro-
U208	630-20-6	1,1,1,2-Tetrachloroethane
U209	79-34-5	Ethane, 1,1,2,2-tetrachloro-
U209	79-34-5	1,1,2,2-Tetrachloroethane
U210	127-18-4	Ethene, tetrachloro-
U210	127-18-4	Tetrachloroethylene
U211	56-23-5	Carbon tetrachloride
U211	56-23-5	Methane, tetrachloro-
U213	109-99-9	Furan, tetrahydro-(I)

U213	109-99-9	Tetrahydrofuran (I)
U214	563-68-8	Acetic acid, thallium(1+) salt
U214	563-68-8	Thallium(I) acetate
U215	6533-73-9	Carbonic acid, dithallium(1+) salt
U215	6533-73-9	Thallium(I) carbonate
U216	7791-12-0	Thallium(I) chloride
U216	7791-12-0	Thallium chloride TlCl
U217	10102-45-1	Nitric acid, thallium(1+) salt
U217	10102-45-1	Thallium(I) nitrate
U218	62-55-5	Ethanethioamide
U218	62-55-5	Thioacetamide
U219	62-56-6	Thiourea
U220	108-88-3	Benzene, methyl-
U220	108-88-3	Toluene
U221	25376-45-8	Benzenediamine, ar-methyl-
U221	25376-45-8	Toluenediamine
U222	636-21-5	Benzenamine, 2-methyl-, hydrochloride
U222	636-21-5	o-Toluidine hydrochloride
U223	26471-62-5	Benzene, 1,3-diisocyanatomethyl- (R,T)
U223	26471-62-5	Toluene diisocyanate (R,T)
U225	75-25-2	Bromoform
U225	75-25-2	Methane, tribromo-
U226	71-55-6	Ethane, 1,1,1-trichloro-

U226	71-55-6	Methyl chloroform
U226	71-55-6	1,1,1-Trichloroethane
U227	79-00-5	Ethane, 1,1,2-trichloro-
U227	79-00-5	1,1,2-Trichloroethane
U228	79-01-6	Ethene, trichloro-
U228	79-01-6	Trichloroethylene
U234	99-35-4	Benzene, 1,3,5-trinitro-
U234	99-35-4	1,3,5-Trinitrobenzene (R,T)
U235	126-72-7	1-Propanol, 2,3-dibromo-, phosphate (3:1)
U235	126-72-7	Tris(2,3-dibromopropyl) phosphate
U236	72-57-1	2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl[1,1'-biphenyl]-4,4'-diyl)bis(azo)bis[5-amino-4-hydroxy]-, tetrasodium salt
U236	72-57-1	Trypan blue
U237	66-75-1	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-
U237	66-75-1	Uracil mustard
U238	51-79-6	Carbamic acid, ethyl ester
U238	51-79-6	Ethyl carbamate (urethane)
U239	1330-20-7	Benzene, dimethyl- (I,T)
U239	1330-20-7	Xylene (I)
U240	1 94-75-7	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters
U240	1 94-75-7	2,4-D, salts & esters
U243	1888-71-7	Hexachloropropene
U243	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-

U244	137-26-8	Thioperoxydicarbonic diamide [(H ₂ N)C(S)] ₂ S ₂ , tetramethyl-
U244	137-26-8	Thiram
U246	506-68-3	Cyanogen bromide (CN)Br
U247	72-43-5	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4- methoxy-
U247	72-43-5	Methoxychlor
U248	1 81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations of 0.3% or less
U248	1 81-81-2	Warfarin, & salts, when present at concentrations of 0.3% or less
U249	1314-84-7	Zinc phosphide Zn ₃ P ₂ , when present at concentrations of 10% or less
U271	17804-35-2	Benomyl
U271	17804-35-2	Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2-yl]-, methyl ester
U278	22781-23-3	Bendiocarb
U278	22781-23-3	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate
U279	63-25-2	Carbaryl
U279	63-25-2	1-Naphthalenol, methylcarbamate
U280	101-27-9	Barban
U280	101-27-9	Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester
U328	95-53-4	Benzenamine, 2-methyl-
U328	95-53-4	o-Toluidine
U353	106-49-0	Benzenamine, 4-methyl-
U353	106-49-0	p-Toluidine
U359	110-80-5	Ethanol, 2-ethoxy-
U359	110-80-5	Ethylene glycol monoethyl ether

U364	22961-82-6	Bendiocarb phenol
U364	22961-82-6	1,3-Benzodioxol-4-ol, 2,2-dimethyl-,
U367	1563-38-8	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-
U367	1563-38-8	Carbofuran phenol
U372	10605-21-7	Carbamic acid, 1H-benzimidazol-2-yl, methyl ester
U372	10605-21-7	Carbendazim
U373	122-42-9	Carbamic acid, phenyl-, 1-methylethyl ester
U373	122-42-9	Propham
U387	52888-80-9	Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester
U387	52888-80-9	Prosulfocarb
U389	2303-17-5	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3,3-trichloro-2-propenyl) ester
U389	2303-17-5	Triallate
U394	30558-43-1	A2213
U394	30558-43-1	Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester
U395	5952-26-1	Diethylene glycol, dicarbamate
U395	5952-26-1	Ethanol, 2,2'-oxybis-, dicarbamate
U404	121-44-8	Ethanamine, N,N-diethyl-
U404	121-44-8	Triethylamine
U409	23564-05-8	Carbamic acid, [1,2-phenylenebis(iminocarbonothioyl)]bis-, dimethyl ester
U409	23564-05-8	Thiophanate-methyl
U410	59669-26-0	Ethanimidothioic acid, N,N'-[thiobis[(methylimino)carbonyloxy]]bis-, dimethyl ester
U410	59669-26-0	Thiodicarb
U411	114-26-1	Phenol, 2-(1-methylethoxy)-, methylcarbamate

U411	114-26-1	Propoxur
See F027	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-
See F027	87-86-5	Pentachlorophenol
See F027	87-86-5	Phenol, pentachloro-
See F027	58-90-2	Phenol, 2,3,4,6-tetrachloro-
See F027	95-95-4	Phenol, 2,4,5-trichloro-
See F027	88-06-2	Phenol, 2,4,6-trichloro-
See F027	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-
See F027	93-72-1	Silvex (2,4,5-TP)
See F027	93-76-5	2,4,5-T
See F027	58-90-2	2,3,4,6-Tetrachlorophenol
See F027	95-95-4	2,4,5-Trichlorophenol
See F027	88-06-2	2,4,6-Trichlorophenol

1 CAS Number given for parent compound only.

[45 FR 78529, 78541, Nov. 25,
1980]

(completed Quarterly)

Laboratory Safety Survey

College of Idaho
Caldwell ID

Principal Investigator _____ Department _____
Phone _____ email _____
Inspector _____ Date _____

Health and Safety management

Y	N	N/A	
			Is the Chemical hygiene Plan and Laboratory Safety manual present?
			Are workers trained in chemical safety, physical hazards and laboratory safety?
			Do laboratory workers have access to and familiarity with the use of Safety Data Sheets? (SDS')
			Have workers using biohazards, toxins and campus regulated carcinogens been given documented special training?
			Are workers instructed in laboratory emergency action/fire prevention plan procedures (exits, locations and use of fire extinguishers, how to get medical help)?
			Have workers been trained on how to respond in the event of a chemical spill? Are spill procedures posted?
			Are there complete training records and documentation?
			Have all hazards identified by previous safety audits been abated? (Action records must be retained)
			Are periodic laboratory safety inspections (at least quarterly) performed by CHO

General Safety

Y	N	N/A	
			Are rooms and cabinets containing campus-regulated carcinogens and biohazards materials labeled?
			Are work areas clean and uncluttered?
			Do employees know the location of the first aid kit and is it accessible?
			Are food and beverages prohibited in the lab and kept out of the laboratory refrigerators or cabinets?
			Any physical signs of eating in the laboratory?
			Are fire extinguishers accessible and charged? Are tags marked properly to include monthly check?
			Are protective gloves available and worn for laboratory procedures where skin contact with chemicals may occur?
			Are safety spectacles or other eye protection available and worn in the laboratory?
			Is other protective clothing (lab coats, aprons, etc.) available and worn in laboratory?
			If respirators are used has wearer been properly fitted? (Documentation needed)
			Are all work areas well lit?

Comments:

Laboratory Equipment

Y	N	N/A	
			Have chemical fume hoods been tested within the past year as indicated by Facilities Services test labels on the hoods?
			Is storage in hoods kept to minimum and is it placed so it does not impeded proper air flow?
			Does the fume hood draw air (test with a tissue on hood edge) and is a flow indicator installed and working?
			Is the laboratory ventilation negative with respect to corridors and offices?
			Are rotating or moveable parts and belts guarded with screens having less than ¼" opening?
			Are refrigerators/freezers used for storage of flammables non- sparking (laboratory safe) and properly labeled?
			Are non-spark-proof refrigerators (household-type) labeled as "Unsafe for Flammable Storage"?
			Are all gas cylinders chained to an immovable object to prevent tipping or falling?
			Are valves of gas cylinders capped when not in use?

Hazardous Materials

Y	N	N/A	
			Are chemicals labeled to identify contents and hazards?
			Are campus-regulated carcinogens handled safely to reduce employee exposure? (All campus regulated chemical carcinogens must be authorized. Call CHO is authorization needed)
			Are chemicals separated by hazard class and stored to prevent spills? (Acids, bases, oxidizers, flammables, etc.?)
			Are chemicals inventoried (chemical name, quantity on hand, amount used per year)? Are the SDS available in lab? Are they logged into chemical inventory system as well as MSDSonline.com?
			Are chemical waste containers properly segregated, sealed with tight fitting caps, and stored with waste labels attached to containers?
			Are all hazardous wastes disposed properly?
			Is a plumbed emergency shower available within 100 feet of all areas where chemicals may splash onto an employee's body?
			Are ether and other peroxide forming chemicals dated?
			Are sharps stored in puncture-proof containers and labeled appropriately (medical or hazardous wastes)

Comments:

Fire and Electrical Safety

Y	N	N/A	
			Are fire doors unobstructed and easily closed?
			If more than 10 gallons of flammables are stored, is an approved flammable storage cabinet used?
			Are flammable liquids, stored in flammable storage cabinets, limited to 60 gallons per fire rated area?
			Are plugs, cords, and receptacles in good condition (no spliced or frayed cords)?
			Is all equipment properly grounded? (three prong plugs in good condition)
			Are extension cords used only for temporary operations? (Not to be used in place of permanent wiring, running through walls, ceiling, and doors.)
			Are all electrical boxes, panels, receptacles and fittings covered to protect against electrical shock?
			Are control switches, circuit breakers, electrical panels and emergency power cabinets free of obstruction
			Are exit signs properly functioning?
			Are circuit breakers labeled to indicate what equipment is served by each?
			Are exits to the lab unobstructed?

Comments :

Types of regulated carcinogens _____

Types and quantity of compressed gases _____

Gallons of Flammable liquids _____

Types of personal protective equipment _____

Correction action required completion within 14 days

