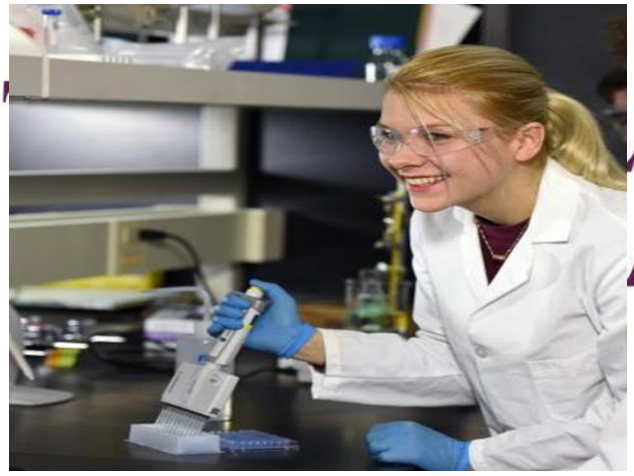

THE COLLEGE of IDAHO

# Chemical Hygiene Plan

## 2019-2020

# College of Idaho

# CHEMICAL HYGIENE PLAN

**Revised 6/12/2019**

| 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, ameded dress code forlabs 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 to 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-condensible 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. <u>Corrosive Chemicals</u>

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. <u>Perchloric acid should be stored by itself</u>. 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

picked up by College of Idaho's hazardous waste contractor.

v) 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 peroxided 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 | Asbestos |
| Benzene* | Benzidine |
| Bis-chloromethyl ether | 1,2-Dibromo-3-chloropropane |
| 3,3'-Dichlorobenzidine (+ salts) | 4-Dimethylaminoazobenzene |
| Ethylene oxide* | Ethyleneimine |
| Inorganic arsenic* | Methyl chloromethyl ether |
| a- Naphthylamine* | b- Naphthylamine |
| 4-Nitrobiphenyl | N-Nitrosodimethylamine |
| B-Propiolactone | Vinyl chloride |

**Other recognized carcinogens:**

| | |
|---|---|
| Analgesics with Phenacetin* | Azathioprine |
| Myleran | Chlorambucil |
| Chromium and certain compounds* | Conjugated estrogens |
| Cyclophosphamide | Diethylstilbestrol |
| Melphalan | PUVA |
| Mustard gas | Thorium dioxide |

**Suspected carcinogens:**

| | |
|---|---|
| Adriamycin | Afltoxins |
| 2-Aminoanthraquinone | o-Aminoazotoluene |
| 1-Amino-2-methylanthraquinone | Amitrole |
| o-Anisidine hydrochloride | Benzotrichloride |
| Beryllium and some compounds | Bischloroethyl nitrosourea |
| 1,3 Butadiene | Cadmium and some compounds* |
| Carbon tetrachloride | Chlorendic acid |
| Chlorinated paraffins | Chloroform* |
| CCNU | 3-Chloro-2-methylpropene |
| 4-Chloro-o-phenylenediamine | C.I. Basic red 9 mono HCL |
| p-Cresidine | Cupferron |
| Dacarbazine | DDT |
| 2,4-Diaminoanisole sulfate | 2,4 Diaminotoluene |
| 1,2-Dibromo-3-chloropropane | 1,2 Dibromoethane |
| 1,4-Dichlorobenzene* | 3,3'-dichlorobenzidine |
| 3,3'-dichlorobenzidine HCL | 1,2-Dichloroethane * |
| Methylene chloride* | 1,3-Dichloropropene |
| Diepoxybutane | Di(2-ethylhexyl)phthalate |
| Diethyl sulfate | Diglycidyl resorcinol ether |
| 3,3'-Dimethoxybenzidine | 3,3'-Dimethylbenzidine |
| Dimethylcarbamoyl chloride | 1,1-Dimethylhydrazine |
| Dimethyl sulfate* | Dimethylvinyl chloride |
| 1,4-Dioxane | Direct black 38 |
| Direct blue 6 | Epichlorohydrin* |
| Estrogens (not conjugated) | Ethyl acrylate |

| | |
|---|---|
| Ethylene oxide* | Ethylene thiourea |
| Formaldehyde gas | 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 occured. 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" actions 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 $mg/m^3$ (T.L.V. is 0.05 $mg/m^3$) 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 sewered.

- 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.

PART FOUR

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

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)
Sysphagia (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)
Proteinaria (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 or 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 |

Appendix B

# 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 | Benzes, 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 | Acetylaldehyde, acetic acid, acetone, alcohols, carboxylic acid, combustible materials, metals, nitric acid, organic compounds, phosphorous, sulfuric acid, sodium, aniline |
| Hydrogen sulfide | Acetylaldehyde, metals, oxidizers, sodium |
| Hypochlorites | Acids, activated carbon |
| Iodine | Acetylaldehyde, 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 |
| Ehylenediamine | 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 X C + 32
From F to C  C = 0.556 X 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: 27Date: 2012-07-01Original Date: 2012-07-01Title: 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.

**§ 261.32Hazardous 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: | | |

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| 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) |

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| 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) |

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|---|---|---|
| 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 Hydrorefining 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) |

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|---|---|---|
| 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: 27Date: 2012-07-01Original Date: 2012-07-01Title: 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.

**§ 261.33Discarded 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 COMMERCIALLY 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 $H_3 AsO_4$ |
| P012 | 1327-53-3 | Arsenic oxide $As_2 O_3$ |
| P011 | 1303-28-2 | Arsenic oxide $As_2 O_5$ |
| 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-, (1aalpha,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-, (1aalpha,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 |

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| 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 |

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| 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)- |

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| 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-Methyllactonitrile |
| 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 |

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| 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) |

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| 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 |

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| 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 |

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| 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 $Tl_2 O_3$ |
| 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 $[(H_2 N)C(S)]_2 NH$ |
| 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- |

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| 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 $V_2 O_5$ |
| 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 $Zn_3 P_2$, 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)- |

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| 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 |

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| 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- |

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| 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 $Ca(CN)_2$ |
| 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 Cu(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 (CN)Cl |
| P034 | 131-89-5 | 2-Cyclohexyl-4,6-dinitrophenol |

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| 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- |

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| 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)- |

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| 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-Methyllactonitrile |
| 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- |

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| 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 | Diphosphoramide, octamethyl- |
| P085 | 152-16-9 | Octamethylpyrophosphoramide |
| P087 | 20816-12-0 | Osmium oxide $OsO_4$, (T-4)- |
| P087 | 20816-12-0 | Osmium tetroxide |

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| 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 |

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|---|---|---|
| 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- |

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|---|---|---|
| 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 $V_2O_5$ |
| 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 |

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|---|---|---|
| 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 |

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|---|---|---|
| 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-mediates, 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) |

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|---|---|---|
| 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- |

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|---|---|---|
| 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,8aalpha,8balpha)]- |
| 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- |

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|---|---|---|
| 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. |

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| 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) |

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| 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-ethanediylbis-,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 |

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| 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 $H_2CrO_4$, 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) |

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|---|---|---|
| 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 |

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| 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 |

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| 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) |

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|---|---|---|
| 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- |

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| 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) |

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| 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 |

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| 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 $H_2S$ |
| 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 |

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| 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 |

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| 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 |

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| 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 |

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| 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- |

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| U186 | 504-60-9 | 1,3-Pentadiene (I) |
| U187 | 62-44-2 | Phenacetin |
| U188 | 108-95-2 | Phenol |

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| 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) |

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| 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. |

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| 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) |

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| 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 |

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| 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 |

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| 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 |

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| 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,8aalpha,8balpha)]- |
| 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) |

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| 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 |

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| 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 $H_2CrO_4$, 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 | Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester |
| U038 | 510-15-6 | Chlorobenzilate |

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| 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 |

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| 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[rst]pentaphene |
| U064 | 189-55-9 | Dibenzo[a,i]pyrene |

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| 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- |

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| 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 |

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| 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- |

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| 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) |

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| U113 | 140-88-5 | 2-Propenoic acid, ethyl ester (I) |
| U114 | 1111-54-6 | Carbamodithioic acid, 1,2-ethanediylbis-, 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 |

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| 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 $H_2S$ |
| 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- |

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| 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 |

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| 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- |

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| 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- |

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| 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) |

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| 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)- |

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| 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) |

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| 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- |

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|---|---|---|
| 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- |

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|---|---|---|
| U244 | 137-26-8 | Thioperoxydicarbonic diamide $[(H_2N)C(S)]_2 S_2$, 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 |

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|---|---|---|
| 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 |

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|---|---|---|
| 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 shapes 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