UNIVERSITY OF ALASKA
FAIRBANKS

Chemical Hygiene Plan

NOTE: You can save this document in your preferred Word Processor by clicking on the Edit menu, choosing "select all" then click on Copy. Paste it into your word processing program and edit for your laboratory specific Standard Operating Procedures.

The text in brackets {} are formatted for the table of contents. The text will not show up when printed.

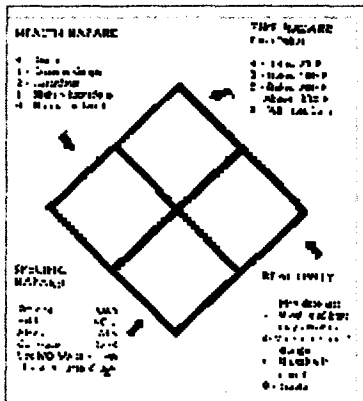
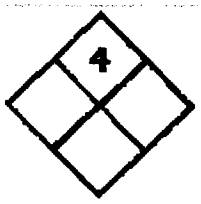
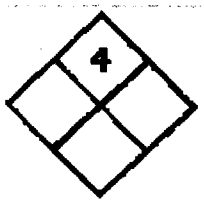
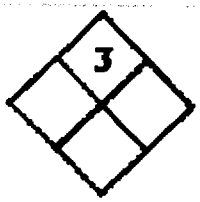
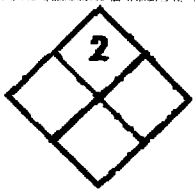
LABORATORY EMERGENCY PROCEDURES DURING POWER OUTAGES

Appendix 8

It is important to remember that some equipment cannot be turned off and certain other pieces of equipment do not shut themselves off when there is a power outage. Pre-plan specific procedures for your laboratory while adhering to the following:

- Close chemical fume hood sashes. No work is allowed in fume hoods during a power outage.
- Ensure that all chemical containers are secured with caps, parafilm, etc.
- All non-essential electrical devices should be turned off. Keep the doors of refrigerators and freezers closed. Check to ensure large lasers, radio frequency generators, etc have been turned off.
- Turn off all gas cylinders at the tank valves.
- If a low flow of an inert gas is being used to "blanket" a reactive compound or mixture, it may be appropriate to leave the flow of gas on. The decision to do this should be part of the written Standard Operating Procedure specific for each lab in Appendix 1.
- Check all cryogenic vacuum traps (N_2, CO_2 and solvent). The evaporation of trapped materials may cause dangerous conditions.
- Check all pressure, temperature, air, or moisture sensitive materials and equipment. This includes vacuum work, distillations, glove boxes used for airless /moistureless reactions.

REQUIREMENTS FOR STORAGE AND HANDLING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS - Appendix 9

CLASS	**IA**	**IB**	**IC**	**II**
Flash point	less than 73F	less than 73F	73 - 100 F	100 - 140F
Boiling point	less than 100F	greater than 100F		
Flammability Potential	Extremely High	Very High	High	Moderate
EXAMPLES OF COMMONLY USED MATERIALS	acetaldehyde benzoyl peroxide ethyl ether pentane methyl formate	acetone ethanol butylamine gasoline methanol isopropanol	amyl acetate butanol chlorobenzene turpentine xylene	formaldehyde hydrazine kerosene
 NFPA 704 HAZARD RATINGS *				
MAXIMUM CONTAINER SIZE Glass	1 pint (*500 ml*)	1 quart (*1 liter*)	1 gallon (*4 liters*)	1 gallon (*4 liters*)
Metal or approved plastic	1 gallon	5 gallons	5 gallons	5 gallons
Safety cans	2 gallons	5 gallons	5 gallons	5 gallons
Metal drums (DOT)	N/A	5 gallons	5 gallons	60 gallons

NFPA is the acronym for the National Fire Protection Association. NFPA 704, Standard System for the Identification of the Fire Hazards of Materials, provides

planning guidance to fire departments for safe tactical procedures in emergency operations, and gives on-the-spot information to safeguard the lives of fire fighting personnel and the others who may be exposed. The Hazard Identification System is not intended to identify the nonemergency health hazards of chemicals.

STORAGE REQUIREMENTS

1. Flammable and/or combustible liquids stored in the open in a laboratory work area or inside any building shall be kept to the minimum necessary for the work being done.
2. Maximum quantity permitted in labs and other areas of use is limited to a total of 10 gallons, all classifications combined, outside of a flammable storage cabinet or approved flammable storage room. Please refer to the table above.
3. Quantities stored in flammable storage cabinets shall be limited to 60 gallons of class I or II liquids and the total of all liquids shall not exceed 120 gallons. Please refer to the table above for maximum allowable container size for each class. Not more than three cabinets shall be located in the same room.

1. Quantities exceeding the above must be stored in an approved flammable storage room meeting the requirements of the Uniform Building and Fire Codes.
2. Flammable and combustible liquids shall not be stored near exit doorways, stairways, in exit corridors, or in a location that would impede egress from the building.
3. Flammable aerosols and unstable liquids shall be treated as class I-A liquids. Please refer to the table above.
4. Materials which will react with water or other liquids to produce a hazard shall be segregated from flammable and/or combustible liquids.

HANDLING AND DISPENSING

1 Class I liquids shall not be transferred from one vessel to another in any exit passageway.

2 Transfer of flammable liquids from 5 gallon containers (or less) to smaller containers shall be done in a laboratory fume hood or in an approved flammable liquid storage room.

Conditionally Exempt Small Quantity Generator Hazardous Waste Management

Environmental Health & Safety
and Risk Management
P.O. Box 758145
Fairbanks, Alaska 99775-8145

Offices: University Park Building
Rooms 155, 157, and 159
1000 University Avenue

Office Phone: 474-5413
Office Fax: 474-5489

www.uaf.edu/safety

Conditionally Exempt Small Quantity Generator Hazardous Waste Management – Table of Contents

Introduction to Hazardous Waste Management

Background: In Alaska, hazardous wastes are regulated by the Environmental Protection Agency under the authority of the Resource Conservation and Recovery Act (RCRA). Hazardous waste regulations are found in the Code of Federal Regulations (CFR) at 40 CFR Parts 260-282. These regulations identify:

- "Cradle to grave" responsibilities for generators of hazardous waste.
- Criteria for the identification and listing of hazardous wastes.
- Enforceable standards applicable to hazardous waste generators, transporters, and treatment, storage and disposal facilities.

Based upon the volume and type of wastes generated, hazardous waste generators are classified into three categories:

- Conditionally Exempt Small Quantity Generators (CESQG),
- Small Quantity Generators (SQG)
- Large Quantity Generators (LQG)

Conditionally Exempt Small Quantity Generators

A generator is a conditionally exempt small quantity generator if the facility generates no more than 100 kg (kilograms) of RCRA hazardous waste or 1 kilogram of acutely hazardous waste (P-listed waste) in a calendar month. One kilogram equals approximately 2.2 pounds.

Wastes accumulated on-site should never be allowed to exceed 1000 kilograms (2,200 pounds) of RCRA-regulated hazardous waste or 1 kilogram (2.2 pounds) of acutely hazardous waste.

If volumes of regulated waste are generated in excess to these limitations, the generator will become subject to additional regulations (40 CFR Part 262).

Conditionally exempt small quantity generators of hazardous waste shall comply with standards set forth in 40 CFR 261.5 "Special requirements for hazardous waste generated by conditionally exempt small quantity generators." Materials that are regulated, but do not count towards the 1,000 kilogram maximum quantity of waste in storage, include:

- Spent lead-acid batteries that are shipped for recycling
- Fluorescent lamps that are shipped for recycling
- Cathode ray tubes (ie., computer monitors, TVs) for redistribution or recycling
- Used oil (as long as it is not mixed with hazardous waste)

Small Quantity Generators

A generator is a SQG as defined by the following criteria:

In one or more months of the year the site generated more than 100 kg of hazardous waste, but in no month generated 1000 kg or more of hazardous waste or no more than 1 kg of acutely hazardous (P-listed) waste or had no more than 100 kg of cleanup materials from the cleanup of spillage of a P-listed waste.

Large Quantity Generators

A generator is a LQG as defined by the following criteria:

The site generated more than 1000 kg of hazardous waste per month or more than 1 kg of acutely hazardous waste per month or more than 100 kg of spill cleanup materials, contaminated with a RCRA acutely hazardous waste.

CESQG's	SQG's	LQG's
< 100 kg/month < 1 kg P-listed Never to exceed 1000 kg in storage prior to disposal	>100 kg < 1000 kg < 1 kg P-listed per month Never to exceed 6000 kg in storage Must ship within 180 days*	> 1000 kg per month or > 1 kg P-listed Must ship RCRA-regulated wastes every 90 days

* Pending distance to EPA permitted TSDF (Treatment Storage and Disposal Facilities)

The University of Alaska Fairbanks Rural Campuses and other extended sites are currently regulated as conditionally exempt small quantity generators of hazardous waste. Wastes are primarily generated by laboratory procedures and facility maintenance activities.

RCRA Hazardous Waste Criteria

RCRA hazardous wastes fall into two major categories: ***characteristic wastes*** (see 40 CFR 261.20) and ***listed wastes*** (see 40 CFR 261.30).

Characteristic wastes (**D-code** designations) are materials that meet specified criteria as being ignitable, corrosive, reactive or toxic.

Characteristic waste code D001 are **ignitable** wastes having a flash point of less than or equal to 140^0 F. **Oxidizers** as defined in 49 CFR (Department of Transportation regulations) are also listed as **D001** hazardous wastes. Oxidizers are defined as a material that may, generally by

yielding oxygen, cause or enhance the combustion of other materials. Please note, that although oxidizers and characteristic ignitable materials share the same waste code, they are not compatible and must not be stored together.

D001 characteristics consist of:

- Liquids (other than < 24 vol% aqueous alcohol solutions) with a flash point less than 140^0 F. using specified ASTM standard closed cup methods.

- Non-liquids capable under standard temperature and pressure of causing fire through friction, absorbtion of moisture, or spontaneous chemical changes and when ignited, burn vigorously enough to create a hazard.

- Ignitable compressed gases (as defined by DOT in 49 CFR 173.300) Note: The ignitability characteristic is different than the various classifications of flammable material under the International Classification System for hazardous materials used by DOT).

(See 40 CFR 261.21 for complete information regarding characteristic wastes).

D002 characteristic wastes are **corrosive** wastes ie., acidic or basic wastes and have the following characteristics:

- are aqueous and exhibit a pH of ≤ 2 or ≥ 12.5 or

- corrode steel (SAE 1020) at a rate of 6.35 mm/yr (0.25 in/yr) at a test temperature of 130^0F (55^0C).

(See 40 CFR 261.22 for complete information)

D003 characteristic wastes have **reactive** characteristics as defined in 40 CFR 261.23. The characteristic of reactivity is based on the waste having <u>any</u> of the following properties:

- It is normally unstable and readliy undergoes violent change without detonating.

- It reacts violently with water.

- It forms potentially explosive mixtures with water.

- When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

- It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fume in a quantity sufficient to present a danger to human health or the environment.

- It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

- It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

- It is a forbidden explosive as defined in 49 CFR 173.51, or a Class A explosive as defined in 49 CFR 173.53 or a Class B explosive as defined in 49 CFR 173.88.

D004-D043 TCLP (Toxicity Characteristic Leaching Procedure) wastes contain the following contaminants at concentrations equal to or in excess of the maximum concentration limits as defined in 40 CFR 261.24. Suspect TCLP waste materials are analyzed by EPA Method 1311. TCLP analytes consist of 8 metals, 6 pesticides and 26 organic compounds.

EPA HW #	Contaminant	Regulatory Level mg/L
D004	Arsenic	5.0
D005	Barium	100.0
D018	Benzene	0.5
D006	Cadmium	1.0
D019	Carbon tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D007	Chromium	5.0
D023	o-Cresol	200.0
D024	m-Cresol	200.0
D025	p-Cresol	200.0
D026	Cresol (mixed isomers)	200.0
D016	2,4-Dichlorophenoxyacetic acid	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.7
D030	2,4-Dinitrotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor (and it's epoxides)	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead	5.0
D013	Lindane	0.4
D009	Mercury	0.2
D014	Methoxychlor	10.0
D035	Methyl ethyl ketone	200.0
D036	Nitrobenzene	2.0

EPA HW #	Contaminant	Regulatory Level mg/L
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium	1.0
D011	Silver	5.0
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D017	2,4,5-TP (Silvex)	1.0
D043	Vinyl chloride	0.2

Listed wastes fall into two major categories with two subcategories each. F and K–listed wastes originate from processes or procedures. U and P-listed wastes are from discarded commercial chemical products, off-specification species, container residues and spill residues containing one or more of the listed wastes.

Process wastes originating from general and specific activities or processes.

- **F-listed** wastes are listed wastes from non-specific sources such as F001, (spent halogenated solvents used in degreasing). (Refer to 40 CFR 261.31)

- **K-listed** wastes are listed wastes from specific sources such as K001, (bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol). (Refer to 40 CFR 261.32)

- **U-listed** wastes include materials such as U001, acetaldehyde. U-listed wastes are "toxic" wastes and typically have lethal dose 50% (LD_{50}) of between 50-500 mg/kg oral rat. (Refer to 40 CFR 261.33)

- **P-listed** wastes are also discarded commercial chemical products, manufacturing chemical intermediates, off-specification species and container or spill residues. P-listed wastes include materials such a P105, sodium azide. ***P-listed wastes are "acutely hazardous wastes"*** and typically have lethal dose 50% (LD_{50}) of $\leq$ 50 mg/kg oral rat. (Refer to 40 CFR 261.33).

Listed wastes are found at **Attachment 1**.

Three requirements supplement the technical specifications for hazardous waste identification:

- Mixture Rule
- Derived-from Rule
- Contained-in Policy

The *mixture rule* indicates that a mixture of **characteristic** hazardous waste and a non-hazardous waste is a regulated hazardous waste unless the resultant mixture does not exhibit any hazardous waste characteristics. A mixture of a **listed waste** and a non-hazardous waste remains the listed waste unless the listed waste is only designated because of it's ignitable, corrosive or reactive characteristics. The intentional dilution of hazardous wastes with non-hazardous wastes is considered waste treatment and typically requires an EPA treatment permit. Do not mix hazardous with non-hazardous wastes.

The *derived-from rule* indicates that any waste *derived from the treatment* of characteristic waste remains a hazardous waste unless the waste does not exhibit the characteristic. Any waste *derived from the treatment* of a listed waste is regulated as a listed waste.

The *contained-in policy* relates to releases of a characteristic or listed waste into soil, surface waters, sediments or groundwater. If hazardous waste contaminates these media, then the media is regulated as a hazardous waste. Media contaminated with a characteristic waste is regulated as long as it exhibits that characteristic. Media contaminated with a listed wastes remains regulated as a listed waste until such time that the waste is formally de-listed by the EPA, the hazardous constituents have been completely removed or until a specific determination has been made by the authorized agency that the residuals hazardous constituents do not pose a threat to the environment or human health.

Non-RCRA regulated wastes may still be prohibited from sewer or sanitary landfill disposal. Local POTW's (public-owned treatment works) establish prohibited discharge standards. They also typically incorporate the national categorical pretreatment standards (40 CFR, Subchapter N, Parts 405-471). More information regarding the prohibited discharge standards is found at **Attachment 2**. The regulations found at attachment 2 are from Golden Heart and College Utilities in Fairbanks. Please check with your community for specific discharge limitations.

CESQG Hazardous Waste Management Procedures:

To maintain CESGQ status and ensure the timely removal of regulated hazardous waste, it is very important to keep a running inventory of those waste materials. Inventories of surplus hazardous materials and chemical wastes, will be compiled by completing the **Non-Radioactive Hazardous Materials Transfer Request Forms**, which are available from your Chemical Hygiene Officer, Lab Manager or Safety Coordinator.

Each of the three-part numbered forms has a similarly numbered adhesive container label. When a waste is generated or a surplus material identified, please complete the form and label and affix the hazardous material label on the container(s).

At the time when the accumulation of the waste material begins, the date should be clearly marked and visible for inspection (mark "satellite accumulation start date" on transfer label.)

The information to be completed on the Non-Radioactive Hazardous Material Transfer Request Form includes:

- Material description and/or chemical name. (If a chemical substance or mixture, include the concentration and/or percentages of the chemical constituents).
- Approximate quantity of the material
- The physical state of the material, i.e., solid, liquid, gas or semi-solid
- Container type, i.e., glass, plastic, metal, fiber-board
- On-site temporary storage location
    - Date generated (satellite accumulation start date)
- Lab or shop location and contact name/phone number
- Material origin, i.e., research, academic or support activities

(A sample copy of the Non-Radioactive Hazardous Material Transfer Request form is found at **Attachment 3**).

Retain the pink copy of the three part form and send the white and yellow copies to:

UAF Environmental Health & Safety
1000 University Avenue
P.O. Box 758145
Fairbanks, Alaska 99775-8145

Upon receipt of the Non-Radioactive Hazardous Material Transfer Request Form, EH&S-RM will complete the regulatory review and compile an inventory of the materials that have been listed on the form(s).

UAF maintains a contract for hazardous waste removal services. EH&S-RM will coordinate with the contractor for the timely removal of hazardous wastes. There is currently no charge for these services to the originating department.

Primary RCRA Concerns

The eight primary ***RCRA concerns*** involve:

- Appropriate labeling
- Appropriate accumulation start date
- Less than maximum storage time
- Less than maximum storage volumes
- Lids/caps are securely fastened
- Materials are properly segregated

- Compatible containers and closure are used for waste storage
- Spills, overfills and general mismanagement are absent

General rules for proper management of surplus hazardous materials and wastes include, but are not limited to, the following:

- A container holding hazardous waste must always be closed during storage, except when it is necessary to add or remove waste - per 40 CFR 265.173(a).

- A container holding hazardous waste must not be opened, handled or stored in a manner which may rupture the container or cause it to leak – per 40 CFR 265.173(b).

- Containers holding hazardous wastes must be made of or lined with materials that will not react with the waste, so that as the waste is stored the ability of the container to hold the waste will not be impaired – per 40 CFR 265.172

- If a container holding hazardous waste is not in good condition, or if it begins to leak, the contents must be transferred to a container in good condition – per 40 CFR 256.171(a).

- Assure the hazardous materials located in collection areas are stored in a safe manner, i.e.; with regard to chemical compatibility. *To determine chemical compatibility, refer to the UAF Chemical Hygiene Plan's Appendix 10 "Chemical Inventory Worksheet." The worksheet includes DOT Hazard Class and storage color-coding information. The information is accessible at the EH&S-RM website:* http:www.uaf.edu/safety/ *Additional references are available at EH&S-RM.*

- Liquid wastes should be stored in secondary containment.

- Hazardous material collection areas, (satellite accumulation areas), should be inspected by departmental personnel at least once per week.

- Label and identify the contents of all containers. List the name and percentages of all constituents.

- Accumulation of materials in containers larger than 26 gallons must be approved by your Chemical Hygiene Officer or EH&S-RM Safety Officer, prior to use.

- To maintain satellite accumulation area status, no more than one quart of acutely hazardous (P-listed) waste or 55 gallons of hazardous waste may be collected in a shop or laboratory, prior to removal. *If a laboratory or shop accumulates in excess of 500 ml of acutely hazardous waste (see P-list), or 50 gallons of a regulated waste, personnel must contact EH&S-&RM immediately to request the removal of those materials.*

If accumulating ignitable materials, care must be taken to store the material in accordance with applicable fire safety codes and procedures.

Before placing hazardous materials in a collection area, check containers thoroughly to assure that no leaks are present.

- The outside of the containers must be clean and free of chemical contamination.
- Use appropriate containers. All glass containers must be securely packaged to prevent breakage during transport.
- All containers of liquids must have screw lids and must not leak when inverted. Corks, cotton plugs, tape, or parafilm are not acceptable lids for containers of hazardous materials.
- All containers of liquids must be placed in secondary containment.
- If possible, use the same container for disposal of used material that held the new material originally.
- Loose solid materials must be placed in a sealed container or in a cardboard box lined with two polyethylene bags.

Containers storing hazardous waste must be kept closed, except when adding or removing contents.

Any leaks or spills must be promptly reported to your departmental Chemical Hygiene Officer (CHO), Lab Manager or Safety Officer. They in turn should notify the appropriate parties, including UAF Dispatch (907)-474-7721 and Environmental Health & Safety – Risk Management (907)-474-5487).

Attach information to the container to identify any special known or suspect hazard information.

Hazardous materials should never be simply abandoned at hazardous material collection areas or accumulation sites.

Waste Determination: Upon receipt of the Non-Radioactive Hazardous Materials Transfer Request, UAF EH&S-RM's Hazmat Section will review the regulatory requirements to establish whether or not the material is a:

- RCRA-regulated waste
- Non-regulated potentially hazardous waste
- Useable surplus material
- Recyclable material
- Hazardous waste that can safely be consolidated with other chemically compatible waste streams to reduce over-all disposal costs, ie., consolidated non-flammable halogenated liquids
- Non-hazardous waste
- TSCA-regulated waste

An inventory of materials for disposal will be compiled and submitted to the university disposal contractor, approximately three weeks prior to the anticipated pick-up. RCRA-regulated waste materials must be managed to prevent the accumulation of more that 1000 kilograms of regulated waste or 1 kilogram of acutely hazardous (P-Listed) waste.

EH&S - RM chemical review procedures:

- All materials must be documented on the CESGQ Hazardous Materials Transfer Request Forms. EH&S-RM will perform a regulatory and safety information review and waste determination for the materials identified on the transfer forms. This is accomplished by accessing information available from, but not limited to, the following resources:
    - 40 CFR Parts 260-299
    - 49 CFR Parts 100-177
    - Sigma-Aldrich Library of Regulatory & Safety Data
    - Sigma-Aldrich Library of Chemical Safety Data
    - Bretherick's Handbook of Reactive Chemical Hazards
    - Merck Index
    - CRC Handbook of Laboratory Safety
    - Farm Chemicals Handbook
    - JT Baker Safety Storage Information
    - Material Safety Data Sheets; a good link to MSDS's is available at: http://www.ilpi.com/msds/
- List pertinent information on the CESGQ Hazardous Materials Transfer Request form.

Record-keeping:

CESQG Hazardous Materials Transfer Request form information will be entered into the EH&S-RM chemical inventory data base. Information recorded (if pertinent) includes:

Item transfer number
Date
Chemical/listing of constituents
Quantity
Number of containers
Container type
Physical state of material
Department name
Building name
Room number
Contact name
Material origin: academic

EPA Waste ID number
DOT Hazard Class
DOT Shipping Name
UN/NA Number
LD_{50} Information
Flash point
pH
Storage Color Code
UAF transfer location
Consolidation drum number
Waste manifest number
Waste profile number

research	Invoice number
support	Invoice line item number
Chemical abstract service number	Chemical characteristics
Sigma Aldrich reference number	Chemical incompatibilities
Health hazard information	

Computer generated reports can be sorted by the criteria listed above.

Reports

UAF EH&S - RM completes a biennial waste report for UAF campus facilities which is mandated by the EPA. Currently, biennial reporting is required on even numbered years for the previous year activities. Biennial Reports are not currently required for CESQG's.

Empty Containers

Empty containers should be clean and marked with the word "Empty" or the initials M/T.

Containers which have held P-listed (acutely hazardous) listed materials are regulated for disposal.

Pesticide containers should be triple rinsed (with the rinsate added as a part of the application solution). The container should be punctured and marked accordingly.

Broken glass should be properly packaged in puncture proof containers, ie., poly-lined fibreboard boxes, and marked to identify contents.

Bio-Hazardous Materials

Please refer to the UAF Institutional Biosafety Handbook, which is available at: http://www.uaf.edu/ibc/

The UAF Bloodborne Pathogen Policy and Procedure that is available at: http://www.uaf.edu/safety/ or contact EH&S - RM Section for more information.

Used Oil Management

Used oil management standards are found at 40 CFR Part 279. Used oil means any oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use is contaminated by physical or chemical impurities.

Used oils must be:

- Collected in clean containers in good condition (no severe rusting, apparent structural defects or deterioration) that are intact and do not leak.

All containers of used oil, including collection and transfer containers must be marked with the words "Used Oil". Adhesive "Used Oil" labels are available from EH&S –Risk Management. Also identify containers of used oil with the Non-Radioactive Hazardous Materials Transfer form and adhesive label.

- Used oil containers should remain closed at all times other than when adding or removing used oil.

- Solvents, parts washer fluids, carburetor cleaners or glycols must never be added to the used oil container.

Used Oil Spills – Releases: Notify EH&S-RM (40 CFR 279.22 (d) identifies the following cleanup steps in the event of a release of used oil: a) stop the release, b) contain the released used oil, c) clean up and mange properly the used oil and other materials and d) if necessary, repair or replace any leaking used oil storage containers or tanks prior to returning them to service).

To determine if used oils are on-specification, off-specification or regulated as a hazardous waste, samples of used oils can be submitted for analyses which includes:

- EPA 6010: arsenic, cadmium, chromium and lead content
- EPA 1010: flashpoint
- ASTM D808: total halogens
- EPA 8080: polychlorinated biphenyls

Used Oil Specifications:

o Arsenic	5 ppm maximum
o Cadmium	2 ppm maximum
o Chromium	10 ppm maximum
o Lead	100 ppm maximum
o Flash point	100^0 F minimum
o Total Halogens	4,000 ppm maximum*

*Used oil containing more than 1,000 ppm total halogens is presumed to be a hazardous waste under the rebuttable presumption provided under 279.10 (b)(ii). Such used oil is subject to subpart H of part 266 of the Code of Federal Regulations rather than this part when burned for energy recovery unless the presumption of mixing can be successfully rebutted. Call EH&S-Risk Management for more information.

An alternative test for total halogens can be performed on-site, by using the Dexsil "Chlor-d-tect 1000 test kit.

UNIVERSAL WASTE BATTERIES INFORMATION

Background:

An alternative set of management standards, in lieu of regulation under 40 CFR parts 260-272 (hazardous waste regulations), are identified in 40 CFR part 273, Standards for Universal Waste Management. This part establishes requirements for managing batteries (as described in 273.2), pesticides (as described in 273.3), thermostats (as described in 273.4) and lamps (as described in 273.5). The universal waste regulations include seven subparts. A brief description o four of these subparts follow:

Small quantity handlers (SQHUW's); 5000 kg or less of total universal waste handled at one time. Notification to EPA is not required, shipments are not required to be manifested, no record retention requirement.

Large quantity handlers (LQHUW's); greater than 5000 kg of total universal waste at one time. Must notify EPA of universal waste activity, obtain an EPA ID number (if they don't already have one) and retain off-site shipment records for 3 years. This can be a logbook, invoice, manifest, bill of lading or other shipping document.

Transporters of universal waste batteries; must be done in accordance with Department of Transportation regulations found at 49 CFR part 171-180.

Destination Facilities; regulations found at 40 CFR 273.6.

The management requirements for SQHUW's are found at 40 CFR 273.13 and include the following:

Packaging requirements:
A small quantity handler of universal waste must contain any universal waste battery that shows evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions in a container. The container must be closed, structurally sound, compatible with the contents of the battery, and must lack evidence of leakage, spillage or damage that could cause leakage under reasonably foreseeable conditions.

Ensure that all batteries are completely discharged before segregation in the appropriate container.

Labeling requirements:
Universal waste batteries (i.e.; each battery), or a container in which batteries are contained, must be labeled or marked clearly with any on of the following phrases: "Universal Waste Battery(ies)," or "Waste Battery(ies)," or "Used Battery(ies)."

Accumulation time limitations:
A small quantity handler of universal waste may accumulate universal waste for no longer than one year from the date the universal waste is generated, or received from another handler. The

handler must be able to demonstrate the length of time that the universal waste has been accumulated from the date it becomes a waste or was received.

Employee training:
A small quantity handler of universal waste must inform all employees who handle or have responsibility for managing universal waste. The information must describe proper handling and emergency procedures appropriate to the type(s) of universal waste handled at the facility.

Responses to releases:
A small quantity handler of universal wastes must immediately contain any releases of universal waste and other residues from universal wastes. Determine whether or not any of the material resulting from the release is hazardous waste, and if so, compliance with all applicable requirements of 40 CFR parts 260-272 is required.

Standard Operating Procedures:

- Call EHS&RM, Hazmat Section (474-5487 or 474-5758) to obtain battery collection containers with lids. Mixing battery types is permissible under SQHUW regulations found at 40 CFR 273.13(a)(2)(ii).

- Ensure that each collection container is marked with the words, "Universal Waste Batteries," and that each collection container is marked with the date that the accumulation of batteries began. (Container labels are available from EHS&RM, Hazmat Section).

- Ensure that the collection containers are closed at all times unless adding or removing.

- In writing, identify the location of the battery collection container(s) under your control to EHS&RM, Hazmat Section.

USED FLUORESCENT LAMP MANAGEMENT INFORMATION

Background:

On June 28, 1999, the EPA announced that spent mercury containing fluorescent lamps were included in the "universal waste final rule." This Final Rule, (59 FR 38288) pertains to the management of spent mercury containing lamps including fluorescent, high-pressure sodium, neon, HID (high intensity discharge), mercury vapor, and metal halide lamps. Other universal wastes include spent lead-acid batteries, mercury thermostats, and certain types of pesticides.

The final rule defines four types of universal waste handlers (generators):

Small quantity handlers (SQHUW's); 5000 kg or less of total universal waste handled at one time. Notification to EPA is not required, shipments are not required to be manifested, no record retention requirement.

Large quantity handlers (LQHUW's); greater than 5000 kg of total universal waste at one time. Must notify EPA of universal waste activity, obtain an EPA ID number (if they don't already have one) and retain off-site shipment records for 3 years. This can be a logbook, invoice, manifest, bill of lading or other shipping document.

Transporters of universal waste do not need to comply with the RCRA manifest requirements. Transporters can store universal wastes for ten days or less. If shipments are made to facilities with State Authorization and where lamps are already regulated as a hazardous waste, then a uniform hazardous waste manifest is required to document the shipment.

Destination Facilities; regulations found at 40 CFR 273.6

The management requirements for SQHUW's and LQHUW's are found at 40 CFR 273.13 and include the following:

Packaging requirements to prevent breakage of spent lamps during accumulation, storage and transport as identified in the Final Rule, "Universal waste lamps must be stored in containers or packages that remain closed", are structurally sound, adequate to prevent breakage, compatible with contents of the lamps, and lack evidence of leakage, spillage or damage that could cause leakage under reasonably foreseeable conditions. Examples of acceptable packaging could include placing lamps evenly spaced in double or triple-ply cardboard containers with closed lids.

Labeling requirements indicate that each lamp or the container holding the lamps must be labeled with the words "Universal Waste Lamps", or "Waste Lamps" or "Used Lamps."

Accumulation limitations indicate that handlers may accumulate universal waste for one year. Mark the date on the container to identify when the first lamp has been packaged.

Regulations for release of universal waste are found at 273.17 and 273.37. For SQHUW's immediately cleanup and containerize accidentally broken lamps; containerize in structurally sound, compatible packaging that prevents the leakage of mercury into the environment.

Employee training requirements are found at 40 CFR 273.16 and 273.36. The training requirements indicate all employees that handle or have responsibility for the management of universal waste are informed of the proper handling and emergency procedures appropriate to the type(s) of universal waste handled at the facility.

Land Disposal Restriction information is found at 40 CFR part 268.

The prohibition on treatment; includes crushing operations. *Note:* There is some discussion that may allow RCRA CESQG's (conditionally exempt small quantity generators) to crush lamps at the point of generation. This would not apply to UAF campus.

Standard Procedures

- Segregate fluorescent lubes by length and style, i.e.; 4 ft., 8 ft., HID and U-shaped tubes.
- Package all lamps to comply with requirements. Reuse packaging provided with the new replacement lamps until further notice. (If needed, alternative packaging is also available from EH&S-RM).
- Document the type of lamp, the quantity and the packaging date on the labels provided.
- Tape both ends, and all openings of the packaging shut.
- Apply the label to the end of the package.

Broken Lamp Procedures

The Final Rule indicates that, "handlers must contain any universal waste lamps that show evidence of breakage, leakage or damage that could cause a release of mercury or other hazardous constituents to the environment."

Utilize protective eyewear and puncture resistant gloves to pick-up and containerize all glass shards, end caps and phosphors resulting from unintentionally broken lamps.

Accidentally broken lamps must be placed in the sealable containers.

Hazardous Waste Minimization

Waste minimization is always a priority. It can and should occur by a variety of means such as:

- Product substitution
- Surplus chemical exchange programs (Contact EH&S-RM for a listing of surplus chemicals which are available to approved campus laboratories).
- Distillation/recovery
- Microscale chemistry techniques.

Information regarding waste minimization is available from EH&S-RM, the Environmental Protection Agency and the Alaska Department of Environmental Conservation.

Chemical Spills

Chemical leaks or spills must be promptly reported to your Chemical Hygiene Officer, the UAF Fire Department Dispatch Center (907)-474-7721 and UAF EH&S-RM (907)-474-5487. The caller should try to provide a detailed description of the spill, including the name and approximate quantity of the chemical(s) involved. Do not put yourself or others at risk to obtain this information.

The Fire Department is responsible for notifying UAF Environmental Health & Safety – Risk Management and/or the Fairbanks Borough Hazardous Material Response Team as deemed necessary. **In all instances, report chemical spills to the UAF Fire Department** and complete the **UAF Oil and Hazardous Substances Spill Reporting Form (see attachment 4).** More instructions and reporting information is included in the reporting form.

Cleanup of small chemical spills, in which no fire or health hazards are present and no injuries have occurred, can be done by department personnel. Personnel doing the cleanup must be properly trained and have access to the appropriate personnel protective equipment, necessary to cleanup the spill. Do not attempt clean up the spill if it puts you or others at risk.

General Rules and Precautions include:

- Call (907)-474-7721 to communicate as much information about the spill as possible. If the material or hazards are unknown, do not put yourself or others at risk to gain additional information. Without putting yourself at risk, attend to anyone who may have been contaminated by the spill.

- Avoid breathing vapors of the spilled material. If available, ensure that the fume hood(s) is on. Open windows when appropriate to increase ventilation.

- Secure the area and notify others about the spill. Evacuate all nonessential personnel from the spill area. Notify responsible parties; e.g., Chemical Hygiene Offier, instructors, department head, supervisors, etc.

- If the chemical nature of the spill is unknown, treat the spill as you would a highly toxic hazardous material; take all safety precautions and evacuate the area. If the spilled material is flammable, turn off all ignition and heat sources.

- Consult reference materials, including, but not limited to, the MSDS (material safety data sheet) for information regarding the spilled material(s). The material safety data sheet will provide information on the potential hazard involved (sections 1 through 6); spill and disposal procedures (section 7); protective equipment and measures (section 8); storage, handling data (section 9); and transportation data.

- MSDS's for most products are available on-line at: http://www.ilpi.com/msds/

The Sigma-Aldrich Library of Chemical Safety Data contains procedures for mitigating hazardous materials spills. This information is available from UAF EH&S-RM.

- Secure cleanup supplies and the appropriate personnel protective equipment. Ensure protective apparel is resistant to the spill material.
- Confine or contain the spill to the smallest area as possible.
- Utilize methods and procedures as described in the reference material to cleanup the spill.
- Materials resulting from cleanup operations may be RCRA-regulated. Contact EH&S-RM for assistance and removal.

Emergency Procedures

- **Evacuation Information**

✓ Evacuate the building using the nearest exit (or alternate exit if the nearest exit is blocked).

✓ Do not use elevators!

✓ Take personal belongings (keys, purses, wallets, etc.)

✓ Secure any hazardous materials or equipment before leaving.

✓ Follow directions given by emergency personnel.

✓ Go to Evacuation Assembly Points (EAP) designated on the building's emergency evacuation sign.

✓ Assist persons with disabilities

✓ Do not leave area/campus until your status is reported to your supervisor, resident advisor or instructor.

- **Hazardous Material Emergency Procedures**

➢ If an emergency or if anyone is in danger, call 911.

➢ Move away from the site of the hazard to a safe location.

➢ Follow the instructions of emergency personnel.

➢ Alert others to stay clear of the area.

➢ Notify emergency personnel if you have been exposed or have information regarding the release.

- **Fire**

✓ Activate the nearest fire alarm pull station and call 911 from the nearest phone if possible.

✓ Evacuate the building and go to the Evacuation Assembly Point or designated area of safe refuge.

✓ Advise emergency personnel of anyone still inside the building.

✓ Do not enter the building until authorized by emergency personnel.

Transportation of Hazardous Materials - Waste

Regulations governing the transportation of hazardous materials by commercial vehicle are found in 49 CFR 171-178. All persons who package, handle, offer for transport, transport or receive hazardous materials shipments must attend and complete documented Hazardous Materials Transportation training per Subpart H of 49 CFR.

If you are not a certified shipper, please contact EH&S-RM for assistance with hazardous materials shipping needs and for the use of UAF's 24 hour emergency phone number (UAF Fire & Police Dispatch Center 474-7721). A provision for use of this number is that Dispatch must know the pertinent details of the shipment. This can be accomplished by faxing a copy of the bill of lading (prior to or at the time of the shipment) to Dispatch (fax 474-7377).

A hazardous materials shipment request form is available at the EH&S-RM website, located at: www.uaf.edu/safety/

- The DOT Hazardous Materials Table, Special Provisions, Hazardous Material Communication Requirements and Emergency Response Information requirements are located in 49 CFR Part 172. The Department of Transportation hazardous materials shipping regulations are available at: http://www.myregs.com/dotrspa/

- General requirements for shipments and packagings are found in 40 CFR Part 173. Prior to transport, materials must be properly packaged and labeled in accordance to DOT transportation regulations as found in 49 CFR Parts 107, 171, 172, 173, 177 and 178.

- All shipments must be properly packaged and documented. Hazardous waste shipments, for small and large quantity generators must be documented on Uniform Hazardous Waste Manifests. Shipments must be made by EPA permitted transporters. Non-hazardous waste manifests are typically used for shipments of materials from Conditionally Exempt Small Quantity Generators. Waste manifests are completed by UAF's hazardous waste contractor.

- IATA/ICAO Air Transport Regulations, containing additional shipping information for air transportation, is available from the Dangerous Goods Regulations. This reference material includes such information needed to properly package and identify materials for air transport (documentation on Shipper's Declaration for Dangerous Goods manifests). It also contains specific information regarding air carrier limitations (identifies items they will not accept for shipment). Copies are available from the International Air Transport Association, 2000 Peel Street, Montreal, Quebec, Canada H3A 2R4.

- Please refer to the Dangerous Goods Regulations or contact EH&S-RM for more information.

- Commercial drivers licenses, with hazardous materials endorsements, are required for transporting placarded amounts of hazardous materials/wastes. Contact EH&S – Risk Management (x 5487) for more information.

UAF Hazardous Waste Self-Audit Checklist

Name:_____ **Location:**_____ **Date:**_____

__Yes __No __N/A 1) Are all personnel aware of how to have hazardous waste removed from the lab or shop?

__Yes __No __N/A 2) Is the disposal of hazardous substances down the drain or in the normal trash prevented?

__Yes __No __N/A 3) Are personnel instructed to not dispose of chemicals by evaporation in the fumehood?

__Yes __No __N/A 4) Are the proper containers obtained and used for storing hazardous waste?

__Yes __No __N/A 5) Are all containers properly marked to identify their contents and constituent concentrations and labeled with the CESQG Hazardous Material Transfer Request tag?

__Yes __No __N/A 6) Is the "satellite accumulation start date" identified on the waste container?

__Yes __No __N/A 7) Is the accumulation of waste communicated to EH&S-RM in time to prevent the accumulation of more than 50 gallons of RCRA-regulated waste and/or 500 ml of acutely hazardous (P-listed waste)?

__Yes __No __N/A 8) Are all containers kept tightly closed except when adding or removing waste?

__Yes __No __N/A 9) Are wastes properly segregated with regard to their chemical compatibility?

__Yes __No __N/A 10) Are liquid waste containers kept in secondary containment tubs?

__Yes __No __N/A 11) Are waste storage areas inspected weekly?

__Yes __No __N/A 12) Are waste minimization practices used in the shop or laboratory?

__Yes __No __N/A 13) Is infectious-biohazardous waste properly bagged and autoclaved or incinerated?

__Yes __No __N/A 14) Are all "sharps" collected in puncture and leak resistant containers prior to decontamination/disposal?

__Yes __No __N/A 15) Is broken glass collected in puncture resistant containers, marked with the words "Broken Glass" and sealed before disposal?

__Yes __No __N/A 16) Are empty containers marked with the words "empty" or the initials MT?

*Note that empty containers that held P-listed substances are still regulated as a RCRA-regulated waste.

Attachments

1. EPA Lists of Hazardous Wastes

   a. 40 CFR 261.24 Toxicity Characteristic (TCLP)
   b. 40 CFR 261.30 - 261.33 F, K, U and P listed wastes

2. Sewer Discharge Limitations; Golden Heart – College Utilities

3. Non-Radioactive Hazardous Material Transfer Request Form (Sample)

4. UAF Oil and Hazardous Substances Spill Reporting Form

Document: Conditionally Exempt Small Quantity Generator Hazardous Waste Management
Prepared by: Bill Krause
Last revised: May 10, 2005
Files: CESQG Hazardous Waste Management.doc

EPA HAZARDOUS WASTE CODES

Code	Waste description
	CHARACTERISTICS OF HAZARDOUS WASTE *(SEE 40 CFR 261.24)*
D001	Ignitable waste
D002	Corrosive waste
D003	Reactive waste
D004	Arsenic
D005	Barium
D006	Cadmium
D007	Chromium
D008	Lead
D009	Mercury
D010	Selenium
D011	Silver
D012	Endrin
D013	Lindane
D014	Methoxychlor
D015	Toxaphene
D016	2,4-D
D017	2,4,5-TP Silvex
D018	Benzene
D019	Carbon tetrachloride
D020	Chlordane
D021	Chlorobenzene
D022	Chloroform
D023	o-Cresol
D024	m-Cresol
D025	p-Cresol
D026	Cresol
D027	1,4-Dichlorobenzene
D028	1,2-Dichloroethane
D029	1,1-Dichloroethylene
D030	2,4-Dinitrotoluene
D031	Heptachlor (and its epoxide)
D032	Hexachlorobenzene
D033	Hexachlorobutadiene
D034	Hexachloroethane
D035	Methyl ethyl ketone
D036	Nitrobenzene
D037	Pentachlorophenol
D038	Pyridine
D039	Tetrachloroethylene
D040	Trichlorethylene
D041	2,4,5-Trichlorophenol
D042	2,4,6-Trichlorophenol
D043	Vinyl chloride
	HAZARDOUS WASTE FROM NONSPECIFIC SOURCES *(SEE 40 CFR 261.31)*
F001	The following spent halogenated solvents used in degreasing: tetrachloroethylene, trichlorethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

EPA HAZARDOUS WASTE CODES

(Continued)

Code	Waste description
F002	The following spent halogenated solvents: tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2, trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F001, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F003	The following spent non-halogenated solvents: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/ blends containing, before use, only the above spent nonhalogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above nonhalogenated solvents, and a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F004	The following spent nonhalogenated solvents: cresols, cresylic acid, and nitrobenzene; and the still bottoms from the recovery of these solvents; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above nonhalogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F005	The following spent nonhalogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above nonhalogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc, and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.
F007	Spent cyanide plating bath solutions from electroplating operations.
F008	Plating bath residues from the bottom of plating baths from electroplating operations in which cyanides are used in the process.
F009	Spent stripping and cleaning bath solutions from electroplating operations in which cyanides are used in the process.
F010	Quenching bath residues from oil baths from metal heat treating operations in which cyanides are used in the process.
F011	Spent cyanide solutions from slat bath pot cleaning from metal heat treating operations.
F012	Quenching wastewater treatment sludges from metal heat treating operations in which cyanides are used in the process.
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process.
F020	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from

EPA HAZARDOUS WASTE CODES
(Continued)

Code	Waste description
	the production of hexachlorophene from highly purified 2,4,5-trichlorophenol.)
F021	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce derivatives.
F022	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions.
F023	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol.)
F024	Process wastes including, but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of certain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution. (This listing does not include wastewaters, wastewater treatment sludge, spent catalysts, and wastes listed in Sections 261.31. or 261.32.)
F025	Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one, to and including five, with varying amounts and positions of chlorine substitution.
F026	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.
F027	Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component.)
F028	Residues resulting from the incineration or thermal treatment of soil contaminated with EPA hazardous waste nos. F020, F021, F022, F023, F026, and F027.
F032	Wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use, or have previously used, chlorophenolic formulations [except potentially cross-contaminated wastes that have had the F032 waste code deleted in accordance with Section 261.35 (i.e., the newly promulgated equipment cleaning or replacement standards), and where the generator does not resume or initiate use of chlorophenolic formulations]. (This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.)
F034	Wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.

EPA HAZARDOUS WASTE CODES
(Continued)

Code	Waste description
F035	Wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.
F037	Petroleum refinery primary oil/water/solids separation sludge - Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow, sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in §261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing. This listing does include residuals generated from processing or recycling oil-bearing hazardous secondary materials excluded under §261.4(a)(12)(i), if those residuals are to be disposed of.
F038	Petroleum refinery secondary (emulsified) oil/water/solids separation sludge - Any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated in aggressive biological treatment units as defined in Section 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units), and F037, K048, and K051 wastes are exempted from this listing.
F039	Leachate resulting from the treatment, storage, or disposal of wastes classified by more than one waste code under Subpart D, or from a mixture of wastes classified under Subparts C and D of this part. (Leachate resulting from the management of one or more of the following EPA Hazardous Wastes and no other hazardous wastes retains its hazardous waste code(s): F020, F021, F022, F023, F026, F027, and/or F028.)

HAZARDOUS WASTE FROM SPECIFIC SOURCES *(SEE 40 CFR 261.32)*

Code	Waste description
K001	Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol.
K002	Wastewater treatment sludge from the production of chrome yellow and orange pigments.
K003	Wastewater treatment sludge from the production of molybdate orange pigments.
K004	Wastewater treatment sludge from the production of zinc yellow pigments.
K005	Wastewater treatment sludge from the production of chrome green pigments.
K006	Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated).
K007	Wastewater treatment sludge from the production of iron blue pigments.
K008	Oven residue from the production of chrome oxide green pigments.
K009	Distillation bottoms from the production of acetaldehyde from ethylene.

EPA HAZARDOUS WASTE CODES

(Continued)

Code	Waste description
K010	Distillation side cuts from the production of acetaldehyde from ethylene.
K011	Bottom stream from the wastewater stripper in the production of acrylonitrile.
K013	Bottom stream from the acetonitrile column in the production of acrylonitrile.
K014	Bottoms from the acetonitrile purification column in the production of acrylonitrile.
K015	Still bottoms from the distillation of benzyl chloride.
K016	Heavy ends or distillation residues from the production of carbon tetrachloride.
K017	Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin.
K018	Heavy ends from the fractionation column in ethyl chloride production.
K019	Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production.
K020	Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.
K021	Aqueous spent antimony catalyst waste from fluoromethane production.
K022	Distillation bottom tars from the production of phenol/acetone from cumene.
K023	Distillation light ends from the production of phthalic anhydride from naphthalene.
K024	Distillation bottoms from the production of phthalic anhydride from naphthalene.
K025	Distillation bottoms from the production of nitrobenzene by the nitration of benzene.
K026	Stripping still tails from the production of methyl ethyl pyridines.
K027	Centrifuge and distillation residues from toluene diisocyanate production.
K028	Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.
K029	Waste from the product steam stripper in the production of 1,1,1-trichloroethane.
K030	Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene.
K031	By-product salts generated in the production of MSMA and cacodylic acid.
K032	Wastewater treatment sludge from the production of chlordane.
K033	Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.
K034	Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane.
K035	Wastewater treatment sludges generated in the production of creosote.
K036	Still bottoms from toluene reclamation distillation in the production of disulfoton.
K037	Wastewater treatment sludges from the production of disulfoton.
K038	Wastewater from the washing and stripping of phorate production.
K039	Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate.
K040	Wastewater treatment sludge from the production of phorate.
K041	Wastewater treatment sludge from the production of toxaphene.
K042	Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T.
K043	2,6-dichlorophenol waste from the production of 2,4-D.

EPA HAZARDOUS WASTE CODES

(Continued)

Code	Waste description
K044	Wastewater treatment sludges from the manufacturing and processing of explosives.
K045	Spent carbon from the treatment of wastewater containing explosives.
K046	Wastewater treatment sludges from the manufacturing, formulation, and loading of lead-based initiating compounds.
K047	Pink/red water from TNT operations.
K048	Dissolved air flotation (DAF) float from the petroleum refining industry.
K049	Slop oil emulsion solids from the petroleum refining industry.
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry.
K051	API separator sludge from the petroleum refining industry.
K052	Tank bottoms (leaded) from the petroleum refining industry.
K060	Ammonia still lime sludge from coking operations.
K061	Emission control dust/sludge from the primary production of steel in electric furnaces.
K062	Spent pickle liquor from steel finishing operations of plants that produce iron or steel.
K064	Acid plant blowdown slurry/sludge resulting from the thickening of blowdown slurry from primary copper production.
K065	Surface impoundment solids contained in and dredged from surface impoundments at primary lead smelting facilities.
K066	Sludge from treatment of process wastewater and/or acid plant blowdown from primary zinc production.
K069	Emission control dust/sludge from secondary lead smelting.
K071	Brine purification muds from the mercury cell process in chlorine production, in which separately prepurified brine is not used.
K073	Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production.
K083	Distillation bottoms from aniline production.
K084	Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.
K085	Distillation or fractionation column bottoms from the production of chlorobenzenes.
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.
K087	Decanter tank tar sludge from coking operations.
K088	Spent potliners from primary aluminum reduction.
K090	Emission control dust or sludge from ferrochromiumsilicon production.
K091	Emission control dust or sludge from ferrochromium production.
K093	Distillation light ends from the production of phthalic anhydride from ortho-xylene.
K094	Distillation bottoms from the production of phthalic anhydride from ortho-xylene.
K095	Distillation bottoms from the production of 1,1,1-trichloroethane.
K096	Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.

EPA HAZARDOUS WASTE CODES
(Continued)

Code	Waste description
K097	Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane.
K098	Untreated process wastewater from the production of toxaphene.
K099	Untreated wastewater from the production of 2,4-D.
K100	Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.
K101	Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.
K102	Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.
K103	Process residues from aniline extraction from the production of aniline.
K104	Combined wastewaters generated from nitrobenzene/aniline production.
K105	Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes.
K106	Wastewater treatment sludge from the mercury cell process in chlorine production.
K107	Column bottoms from product separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.
K108	Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazine from carboxylic acid hydrazides.
K109	Spent filter cartridges from product purification from the product of 1,1-dimethylhydrazine from carboxylic acid hydrazides.
K110	Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine from carboxylic acid hydrazides.
K111	Product washwaters from the production of dinitrotoluene via nitration of toluene.
K112	Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene.
K113	Condensed liquid light ends from purification of toluenediamine in production of toluenediamine via hydrogenation of dinitrotoluene.
K114	Vicinals from the purification of toluenediamine in production of toluenediamine via hydrogenation of dinitrotoluene.
K115	Heavy ends from purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.
K116	Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine.
K117	Wastewater from the reactor vent gas scrubber in the production of ethylene dibromide via bromination of ethene.
K118	Spent adsorbent solids from purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.
K123	Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salts.
K124	Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts.
K125	Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts.

EPA HAZARDOUS WASTE CODES

(Continued)

Code	Waste description
K126	Baghouse dust and floor sweepings in milling and packaging operations from production or formulation of ethylenebisdithiocarbamic acid and its salts.
K131	Wastewater from the reactor and spent sulfuric acid from the acid dryer from the production of methyl bromide.
K132	Spent absorbent and wastewater separator solids from the production of methyl bromide.
K136	Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.
K140	Floor sweepings, off-specification product, and spent filter media from the production of 2,4,6-tribromophenol.
K141	Process residues from the recovery of coal tar, including, but not limited to, tar 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 sludge from coking operations).
K142	Tank storage residues from the production of coke from coal or from the recovery of coke by-products from coal.
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.
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.
K145	Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal.
K147	Tar storage residues from coal tar refining.
K148	Residues from coal tar distillation, including, but not limited to, still bottoms.
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 benzoyl chloride]
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, benzoyl chlorides, and compounds with mixtures of these functional groups.
K151	Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of wastewaters from the production of alpha (or methyl-) chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups.
K156	Organic waste (including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decamtates) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2propynl n-butylcarbamate.).
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-2propynl n-butylcarbamate.).
K158	Bag house 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-2propynl n-butylcarbamate.).
K159	Organics from the treatment of thiocarbamate wastes.

EPA HAZARDOUS WASTE CODES
(Continued)

Code	Waste description
K161	Purification soilids (including filtration, evaporation, and centrifugation soilds), bag house dust and floor sweepings from the production of dithiocarbamate acids and their salts. (This listing does not include K125 or K126).
K169	Crude oil tank sediment from petroleum refining operations.
K170	Clarified slurry oil tank sediment and/or in-line filter/separation solids from petroleum refining operations.
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).
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).

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF – ACUTE HAZARDOUS WASTE *(SEE 40 CFR 261.33 FOR AN ALPHABETIZED LISTING)*

P001	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations greater than 0.3%
P001	Warfarin, & salts, when present at concentrations greater than 0.3%
P002	1-Acetyl-2-thiourea
P002	Acetamide, N-(aminothioxomethyl)-
P003	2-Propenal
P003	Acrolein
P004	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)-
P004	Aldrin
P005	2-Propen-1-ol
P005	Allyl alcohol
P006	Aluminum phosphide (R,T)
P007	3(2H)-Isoxazolone, 5-(aminomethyl)-
P007	5-(Aminomethyl)-3-isoxazolol
P008	4-Aminopyridine
P008	4-Pyridinamine
P009	Ammonium picrate (R)
P009	Phenol, 2,4,6-trinitro-, ammonium salt (R)
P010	Arsenic acid H_3AsO_4
P011	Arsenic oxide As_2O_5
P011	Arsenic pentoxide
P012	Arsenic oxide As_2O_3
P012	Arsenic trioxide
P013	Barium cyanide
P014	Benzenethiol
P014	Thiophenol
P015	Beryllium powder
P016	Dichloromethyl ether
P016	Methane, oxybis[chloro-
P017	2-Propanone, 1-bromo-
P017	Bromoacetone
P018	Brucine
P018	Strychnidin-10-one, 2,3-dimethoxy-

EPA HAZARDOUS WASTE CODES

(continued)

Code	Waste description
P020	Dinoseb
P020	Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P021	Calcium cyanide
P021	Calcium cyanide $Ca(CN)_2$
P022	Carbon disulfide
P023	Acetaldehyde, chloro-
P023	Chloroacetaldehyde
P024	Benzenamine, 4-chloro-
P024	p-Chloraniline
P026	1-(o-Chlorophenyl)thiourea
P026	Thiourea, (2-chlorophenyl)-
P027	3-Chloropropionitrile
P027	Propanenitrile, 3-chloro-
P028	Benzene, (chloromethyl)-
P028	Benzyl chloride
P029	Copper cyanide
P029	Copper cyanide Cu(CN)
P030	Cyanides (soluble cyanide salts), not otherwise specified
P031	Cyanogen
P031	Ethanedinitrile
P033	Cyanogen chloride
P033	Cyanogen chloride (CN)Cl
P034	2-Cyclohexyl-4,6-dinitrophenol
P034	Phenol, 2-cyclohexyl-4,6-dinitro-
P036	Arsonous dichloride, phenyl-
P036	Dichlorophenylarsine
P037	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)-
P037	Dieldrin
P038	Arsine, diethyl-
P038	Diethylarsine
P039	Disulfoton
P039	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester
P040	O,O-Diethyl O-pyrazinyl phosphorothioate
P040	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P041	Diethyl-p-nitrophenyl phosphate
P041	Phosphoric acid, diethyl 4-nitrophenyl ester
P042	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)-
P042	Epinephrine
P043	Diisopropylfluorophosphate (DFP)
P043	Phosphorofluoridic acid, bis(1-methylethyl) ester
P044	Dimethoate
P044	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester
P045	2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[methylamino)carbonyl] oxime
P045	Thiofanox
P046	alpha,alpha-Dimethylphenethylamine
P046	Benzeneethanamine, alpha, alpha-dimethyl-
P047	4,6-Dinitro-o-cresol, & salts
P047	Phenol, 2-methyl-4,6-dinitro-, & salts

EPA HAZARDOUS WASTE CODES
(Continued)

Code	Waste description
P048	2,4-Dinitrophenol
P048	Phenol, 2,4-dinitro-
P049	Dithiobiuret
P049	Thioimidodicarbonic diamide $[(H_2N)C(S)]_2NH$
P050	6,9-Methano-2,4,3-benzodioxathiepin,6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-,3-oxide
P050	Endosulfan
P051	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	Endrin
P051	Endrin, & metabolites
P054	Aziridine
P054	Ethyleneimine
P056	Fluorine
P057	Acetamide, 2-fluoro-
P057	Fluoroacetamide
P058	Acetic acid, fluoro-, sodium salt
P058	Fluoroacetic acid, sodium salt
P059	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P059	Heptachlor
P060	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa-chloro-1,4,4a,5,8,8a,-hexahydro-, (1alpha, 4alpha, 4abeta, 5beta, 8beta, 8abeta)-
P060	Isodrin
P062	Hexaethyl tetraphosphate
P062	Tetraphosphoric acid, hexaethyl ester
P063	Hydrocyanic acid
P063	Hydrogen cyanide
P064	Methane, isocyanato-
P064	Methyl isocyanate
P065	Fulminic acid, mercury(2+) salt (R,T)
P065	Mercury fulminate (R,T)
P066	Ethanimidothioic acid, N-[[(methylamino)carbonyl]oxy]-, methyl ester
P066	Methomyl
P067	1,2-Propylenimine
P067	Aziridine, 2-methyl-
P068	Hydrazine, methyl-
P068	Methyl hydrazine
P069	2-Methyllactonitrile
P069	Propanenitrile, 2-hydroxy-2-methyl-
P070	Aldicarb
P070	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime
P071	Methyl parathion
P071	Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester
P072	alpha-Naphthylthiourea
P072	Thiourea, 1-naphthalenyl-
P073	Nickel carbonyl
P073	Nickel carbonyl $Ni(CO)_4$, (T-4)-

EPA HAZARDOUS WASTE CODES

(Continued)

Code	Waste description
P074	Nickel cyanide
P074	Nickel cyanide $Ni(CN)_2$
P075	Nicotine, & salts
P075	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-,(S)-, & salts
P076	Nitric oxide
P076	Nitrogen oxide NO
P077	Benzenamine, 4-nitro-
P077	p-Nitroaniline
P078	Nitrogen dioxide
P078	Nitrogen oxide NO_2
P081	1,2,3-Propanetriol, trinitrate (R)
P081	Nitroglycerine (R)
P082	Methanimine, N-methyl-N-nitroso-
P082	N-Nitrosodimethylamine
P084	N-Nitrosomethylvinylamine
P084	Vinylamine, N-methyl-N-nitroso-
P085	Diphosphoramide, octamethyl-
P085	Octamethylpyrophosphoramide
P087	Osmium oxide OsO_4, (T-4)-
P087	Osmium tetroxide
P088	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P088	Endothall
P089	Parathion
P089	Phosphorothioic acid, O,O-diethyl-O-(4-nitrophenyl) ester
P092	Mercury, (acetato-O)phenyl-
P092	Phenylmercury acetate
P093	Phenylthiourea
P093	Thiourea, phenyl-
P094	Phorate
P094	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P095	Carbonic dichloride
P095	Phosgene
P096	Hydrogen phosphide
P096	Phosphine
P097	Famphur
P097	Phosphorothioic acid O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester
P098	Potassium cyanide
P098	Potassium cyanide K(CN)
P099	Argentate (1-), bis(cyano-C)-, potassium
P099	Potassium silver cyanide
P101	Ethyl cyanide
P101	Propanenitrile
P102	2-Propyn-1-ol
P102	Propargyl alcohol
P103	Selenourea
P104	Silver cyanide
P104	Silver cyanide Ag(CN)
P105	Sodium azide
P106	Sodium cyanide
P106	Sodium cyanide Na(CN)

EPA HAZARDOUS WASTE CODES
(Continued)

Code	Waste description
P108	Strychnidin-10-one, & salts
P108	Strychnine, & salts
P109	Tetraethyldithiopyrophosphate
P109	Thiodiphosphoric acid, tetraethyl ester
P110	Plumbane, tetraethyl-
P110	Tetraethyl lead
P111	Diphosphoric acid, tetraethyl ester
P111	Tetraethyl pyrophosphate
P112	Methane, tetranitro- (R)
P112	Tetranitromethane (R)
P113	Thallic oxide
P113	Thallium oxide Tl_2O_3
P114	Selenious acid, dithallium (1+) salt
P114	Thallium(I) selenite
P115	Sulfuric acid, dithallium (1+) salt
P115	Thallium(I) sulfate
P116	Hydrazinecarbothioamide
P116	Thiosemicarbazide
P118	Methanethiol, trichloro-
P118	Trichloromethanethiol
P119	Ammonium vanadate
P119	Vanadic acid, ammonium salt
P120	Vanadium oxide V_2O_5
P120	Vanadium pentoxide
P121	Zinc cyanide
P121	Zinc cyanide $Zn(CN)_2$
P122	Zinc phosphide Zn_3P_2, when present at concentrations greater than 10% (R,T)
P123	Toxaphene
P127	7-Benzofuranol, 2-3dihydro-2,2-dimethyl-, methylcarbamate
P127	Carbofuran.
P127	7-Benzufuranol, 2, 3-dihydro-2, 2 dimethyl-methylcarbamate
P128	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester)
P128	Mexacarbate
P185	1,3-Dithiolane-2carboxaldehyde, 2,4-dimethyl-, O-[(methylamino)-carbonyl]oxime.
P188	Physostigmine salicylate
P189	Carbosulfan
P189	Carbamic acid, [(dibutylamino)-thio]methyl-,2,3-dihydro-2,2dimethyl-7benzofuranyl ester.
P190	Metolcarb.
P191	Dimetilan
P191	Carbamic acid, dimethyl-, 1-[(dimethyl-amino)carbonyl]-5-methyl-1H-pyrazol-3-yl ester.
P192	Isolan
P192	Carbamic acid, dimethyl-, 3-methyl-1-(1-methylethyl)-1H-pyrazo-5-yl ester.
P194	Ethanimidothioc acid, 2-(dimethylamino)-N-[((methylamino) carbonyl)oxy)-2-oxo-,methyl ester
P194	Oxamyl
P196	Manganese, bis(dimethylcarbamodithioato-S,S')

EPA HAZARDOUS WASTE CODES

(Continued)

Code	Waste description
P196	Manganese dimethyldithiocarbamate
P197	Formparanate
P197	Methanimidamide, N,N-dimethyl-N'-[2-methyl-4[[(methylamino)carbonyl)oxy] phenyl]
P198	Methanimidamide, N,N-dimethyl-N'-[3-[[(methylamino)-carbonyl]oxy]phenyl]-, monohydrochloride
P198	Formetanate hydrochloride
P199	Methiocarb.
P199	Phenol, (3,5-dimethyl-4(methlthio)-, methylcarbamate
P201	Promecarb
P201	Phenol, 3-methyl-5-(1-methylethyl)-,methyl carbamate
P202	Phenol, 3-(1 methylethyl)-, methyl carbamate
P202	3-Isopropylphenyl N-methylcarbamate
P202	m-Cumenyl methylcarbamate
P203	Aldicarb sulfone.
P203	Propanal, 2-methyl-2-(methyl-sulfonyl)-,O-[(methylamino)carbonyl]oxime
P204	Physostigmine
P204	Pyrrolo[2,3-b]indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1, 3a,8-trimethylmethyl-carbamate (ester), (3aS-cis)-
P205	Ziram

Code	Waste description
	DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUES, AND SPILL RESIDUES THEREOF – TOXIC WASTES *(SEE 40 CFR 261.33 FOR AN ALPHABETIZED LISTING)*
	2,3,4,6-Tetrachlorophenol
	2,4,5-T
	2,4,5-Trichlorophenol
	2,4,6-Trichlorophenol
	Acetic acid, (2,4,5-trichlorophenoxy)-
	Pentachlorophenol
See F027	⇐ Phenol, 2,3,4,6-tetrachloro-
	Phenol, 2,4,5-trichloro-
	Phenol, 2,4,6-trichloro-
	Phenol, pentachloro-
	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-
	Silvex (2,4,5-TP)
U001	Acetaldehyde (I)
U001	Ethanal (I)
U002	2-Propanone (I)
U002	Acetone (I)
U003	Acetonitrile (I,T)
U004	Acetophenone
U004	Ethanone, 1-phenyl-

EPA HAZARDOUS WASTE CODES
(Continued)

Code	Waste description
U005	2-Acetylaminofluorene
U005	Acetamide, N-9H-fluoren-2-yl
U006	Acetyl chloride (C,R,T)
U007	2-Propenamide
U007	Acrylamide
U008	2-Propenoic acid (I)
U008	Acrylic acid (I)
U009	2-Propenenitrile
U009	Acrylonitrile
U010	Azirino [2',3':3,4]pyrrolo[1,2-a]indole-4,7-dione, 6-amino-8-[[(aminocarbonyl)oxy] methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-, [1aS-(1aalpha, 8beta, 8aalpha, 8balpha)]-
U010	Mitomycin C
U011	1H-1,2,4-Triazol-3-amine
U011	Amitrole
U012	Aniline (I,T)
U012	Benzenamine (I,T)
U014	Auramine
U014	Benzenamine, 4,4'-carbonimidoylbis[N,N-dimethyl-
U015	Azaserine
U015	L-Serine, diazoacetate (ester)
U016	Benz[c]acridine
U017	Benzal chloride
U017	Benzene, (dichloromethyl)-
U018	Benz[a]anthracene
U019	Benzene (I,T)
U020	Benzenesulfonic acid chloride (C,R)
U020	Benzenesulfonyl chloride (C,R)
U021	[1,1'-Biphenyl]-4,4'-diamine
U021	Benzidine
U022	Benzo[a]pyrene
U023	Benzene, (trichloromethyl)-
U023	Benzotrichloride (C,R,T)
U024	Dichloromethoxy ethane
U024	Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-
U025	Dichloroethyl ether
U025	Ethane, 1,1'-oxybis[2-chloro-
U026	Chlornaphazin
U026	Naphthalenamine, N,N'-bis(2-chloroethyl)-
U027	Dichloroisopropyl ether
U027	Propane, 2,2'-oxybis[2-chloro-
U028	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester
U028	Diethylhexyl phthalate
U029	Methane, bromo-
U029	Methyl bromide
U030	4-Bromophenyl phenyl ether
U030	Benzene, 1-bromo-4-phenoxy-
U031	1-Butanol (I)
U031	n-Butyl alcohol (I)
U032	Calcium chromate
U032	Chromic acid H_2CrO_4, calcium salt
U033	Carbon oxyfluoride (R,T)
U033	Carbonic difluoride
U034	Acetaldehyde, trichloro-
U034	Chloral
U035	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-
U035	Chlorambucil

EPA HAZARDOUS WASTE CODES

(Continued)

Code	Waste description
U036	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-
U036	Chlordane, alpha & gamma isomers
U037	Benzene, chloro-
U037	Chlorobenzene
U038	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester
U038	Chlorobenzilate
U039	p-Chloro-m-cresol
U039	Phenol, 4-chloro-3-methyl-
U041	Epichlorohydrin
U041	Oxirane, (chloromethyl)-
U042	2-Chloroethyl vinyl ether
U042	Ethene, (2-chloroethoxy)-
U043	Ethene, chloro-
U043	Vinyl chloride
U044	Chloroform
U044	Methane, trichloro-
U045	Methane, chloro- (I,T)
U045	Methyl chloride (I,T)
U046	Chloromethyl methyl ether
U046	Methane, chloromethoxy-
U047	beta-Chloronaphthalene
U047	Naphthalene, 2-chloro-
U048	o-Chlorophenol
U048	Phenol, 2-chloro-
U049	4-Chloro-o-toluidine, hydrochloride
U049	Benzenamine, 4-chloro-2-methyl-, hydrochloride
U050	Chrysene
U051	Creosote
U052	Cresol (Cresylic acid)
U052	Phenol, methyl-
U053	2-Butenal
U053	Crotonaldehyde
U055	Benzene, (1-methylethyl)- (I)
U055	Cumene (I)
U056	Benzene, hexahydro- (I)
U056	Cyclohexane (I)
U057	Cyclohexanone (I)
U058	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide
U058	Cyclophosphamide
U059	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)-
U059	Daunomycin
U060	Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro-
U060	DDD
U061	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-
U061	DDT
U062	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester
U062	Diallate
U063	Dibenz[a,h]anthracene
U064	Benzo[rst]pentaphene
U064	Dibenzo[a,i]pyrene
U066	1,2-Dibromo-3-chloropropane
U066	Propane, 1,2-dibromo-3-chloro-
U067	Ethane, 1,2-dibromo-
U067	Ethylene dibromide

EPA HAZARDOUS WASTE CODES
(Continued)

Code	Waste description
U068	Methane, dibromo-
U068	Methylene bromide
U069	1,2-Benzenedicarboxylic acid, dibutyl ester
U069	Dibutyl phthalate
U070	Benzene, 1,2-dichloro-
U070	o-Dichlorobenzene
U071	Benzene, 1,3-dichloro-
U071	m-Dichlorobenzene
U072	Benzene, 1,4-dichloro-
U072	p-Dichlorobenzene
U073	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-
U073	3,3'-Dichlorobenzidine
U074	1,4-Dichloro-2-butene (I,T)
U074	2-Butene, 1,4-dichloro- (I,T)
U075	Dichlorodifluoromethane
U075	Methane, dichlorodifluoro-
U076	Ethane, 1,1-dichloro-
U076	Ethylidene dichloride
U077	Ethane, 1,2-dichloro-
U077	Ethylene dichloride
U078	1,1-Dichloroethylene
U078	Ethene, 1,1-dichloro-
U079	1,2-Dichloroethylene
U079	Ethene, 1,2-dichloro-,(E)-
U080	Methane, dichloro-
U080	Methylene chloride
U081	2,4-Dichlorophenol
U081	Phenol, 2,4-dichloro-
U082	2,6-Dichlorophenol
U082	Phenol, 2,6-dichloro-
U083	Propane, 1,2-dichloro-
U083	Propylene dichloride
U084	1,3-Dichloropropene
U084	1-Propene, 1,3-dichloro-
U085	1,2:3,4-Diepoxybutane (I,T)
U085	2,2'-Bioxirane
U086	Hydrazine, 1,2-diethyl-
U086	N,N'-Diethylhydrazine
U087	O,O-Diethyl S-methyl dithiophosphate
U087	Phosphorodithioic acid, O,O-diethyl S-methyl ester
U088	1,2-Benzenedicarboxylic acid, diethyl ester
U088	Diethyl phthalate
U089	Diethylstilbesterol
U089	Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis, (E)-
U090	1,3-Benzodioxole, 5-propyl-
U090	Dihydrosafrole
U091	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-
U091	3,3'-Dimethoxybenzidine
U092	Dimethylamine (I)
U092	Methanamine, N-methyl- (I)
U093	Benzenamine, N,N-dimethyl-4-(phenylazo)-
U093	p-Dimethylaminoazobenzene
U094	7,12-Dimethylbenz[a]anthracene
U094	Benz[a]anthracene, 7,12-dimethyl-
U095	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-
U095	3,3'-Dimethylbenzidine

EPA HAZARDOUS WASTE CODES

(Continued)

Code	Waste description
U096	alpha,alpha-Dimethylbenzylhydroperoxide (R)
U096	Hydroperoxide, 1-methyl-1-phenylethyl- (R)
U097	Carbamic chloride, dimethyl-
U097	Dimethylcarbamoyl chloride
U098	1,1-Dimethylhydrazine
U098	Hydrazine, 1,1-dimethyl-
U099	1,2-Dimethylhydrazine
U099	Hydrazine, 1,2-diphenyl-
U101	2,4-Dimethylphenol
U101	Phenol, 2,4-dimethyl-
U102	1,2-Benzenedicarboxylic acid, dimethyl ester
U102	Dimethyl phthalate
U103	Dimethyl sulfate
U103	Sulfuric acid, dimethyl ester
U105	2,4-Dinitrotoluene
U105	Benzene, 1-methyl-2,4-dinitro-
U106	2,6-Dinitrotoluene
U106	Benzene, 2-methyl-1,3-dinitro-
U107	1,2-Benzenedicarboxylic acid, dioctyl ester
U107	Di-n-octyl phthalate
U108	1,4-Diethyleneoxide
U108	1,4-Dioxane
U109	1,2-Diphenylhydrazine
U109	Hydrazine, 1,2-diphenyl-
U110	1-Propanimine, N-propyl-(I)
U110	Dipropylamine (I)
U111	1-Propanamine, N-nitroso-N-propyl-
U111	Di-n-propylnitrosamine
U112	Acetic acid, ethyl ester (I)
U112	Ethyl acetate (I)
U113	2-Propenoic acid, ethyl ester (I)
U113	Ethyl acrylate (I)
U114	Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters
U114	Ethylenebisdithiocarbamic acid, salts & esters
U115	Ethylene oxide (I,T)
U115	Oxirane (I,T)
U116	2-Imidazolidinethione
U116	Ethylenethiourea
U117	Ethane, 1,1'-oxybis-(I)
U117	Ethyl ether (I)
U118	2-Propenoic acid, 2-methyl-, ethyl ester
U118	Ethyl methacrylate
U119	Ethyl methanesulfonate
U119	Methanesulfonic acid, ethyl ester
U120	Fluoranthene
U121	Methane, trichlorofluoro-
U121	Trichloromonofluoromethane
U122	Formaldehyde
U123	Formic acid (C,T)
U124	Furan (I)
U124	Furfuran (I)
U125	2-Furancarboxaldehyde (I)
U125	Furfural (I)
U126	Glycidylaldehyde
U126	Oxiranecarboxyaldehyde
U127	Benzene, hexachloro-

EPA HAZARDOUS WASTE CODES

(Continued)

Code	Waste description
U127	Hexachlorobenzene
U128	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-
U128	Hexachlorobutadiene
U129	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha, 2alpha, 3beta, 4alpha, 5alpha, 6beta)-
U129	Lindane
U130	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-
U130	Hexachlorocyclopentadiene
U131	Ethane, hexachloro-
U131	Hexachloroethane
U132	Hexachlorophene
U132	Phenol, 2,2'-methylenebis[3,4,6-trichloro-
U133	Hydrazine (R,T)
U134	Hydrofluoric acid (C,T)
U134	Hydrogen fluoride (C,T)
U135	Hydrogen sulfide
U135	Hydrogen sulfide H_2S
U136	Arsinic acid, dimethyl-
U136	Cacodylic acid
U137	Indeno[1,2,3-cd]pyrene
U138	Methane, iodo-
U138	Methyl iodide
U140	1-Propanol, 2-methyl- (I,T)
U140	Isobutyl alcohol (I,T)
U141	1,3-Benzodioxole, 5-(1-propenyl)-
U141	Isosafrole
U142	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-
U142	Kepone
U143	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	Lasiocarpine
U144	Acetic acid, lead(2+) salt
U144	Lead acetate
U145	Lead phosphate
U145	Phosphoric acid, lead(2+) salt (2:3)
U146	Lead subacetate
U146	Lead, bis(acetato-O)tetrahydroxytri-
U147	2,5-Furandione
U147	Maleic anhydride
U148	3,6-Pyridazinedione, 1,2-dihydro-
U148	Maleic hydrazide
U149	Malononitrile
U149	Propanedinitrile
U150	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-
U150	Melphalan
U151	Mercury
U152	2-Propenenitrile, 2-methyl- (I,T)
U152	Methacrylonitrile (I,T)
U153	Methanethiol (I,T)
U153	Thiomethanol (I,T)
U154	Methanol (I)
U154	Methyl alcohol (I)
U155	1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-
U155	Methapyrilene
U156	Carbonochloridic acid, methyl ester, (I,T)

EPA HAZARDOUS WASTE CODES
(Continued)

Code	Waste description
U156	Methyl chlorocarbonate (I,T)
U157	3-Methylcholanthrene
U157	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U158	4,4'-Methylenebis(2-chloroaniline)
U158	Benzenamine, 4,4'-methylenebis[2-chloro-
U159	2-Butanone (I,T)
U159	Methyl ethyl ketone (MEK) (I,T)
U160	2-Butanone, peroxide (R,T)
U160	Methyl ethyl ketone peroxide (R,T)
U161	4-Methyl-2-pentanone (I)
U161	Methyl isobutyl ketone (I)
U161	Pentanol, 4-methyl-
U162	2-Propenoic acid, 2-methyl-, methyl ester (I,T)
U162	Methyl methacrylate (I,T)
U163	Guanidine, N-methyl-N'-nitro-N-nitroso-
U163	MNNG
U164	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U164	Methylthiouracil
U165	Naphthalene
U166	1,4-Naphthalenedione
U166	1,4-Naphthoquinone
U167	1-Napthalenamine
U167	alpha-Naphthylamine
U168	2-Napthalenamine
U168	beta-Naphthylamine
U169	Benzene, nitro-
U169	Nitrobenzene (I,T)
U170	p-Nitrophenol (I,T)
U170	Phenol, 4-nitro-
U171	2-Nitropropane (I,T)
U171	Propane, 2-nitro- (I,T)
U172	1-Butanamine, N-butyl-N-nitroso-
U172	N-Nitrosodi-n-butylamine
U173	Ethanol, 2,2'-(nitrosoimino)bis-
U173	N-Nitrosodiethanolamine
U174	Ethanamine, N-ethyl-N-nitroso-
U174	N-Nitrosodiethylamine
U176	N-Nitroso-N-ethylurea
U176	Urea, N-ethyl-N-nitroso-
U177	N-Nitroso-N-methylurea
U177	Urea, N-methyl-N-nitroso-
U178	Carbamic acid, methylnitroso-, ethyl ester
U178	N-Nitroso-N-methylurethane
U179	N-Nitrosopiperidine
U179	Piperidine, 1-nitroso-
U180	N-Nitrosopyrrolidine
U180	Pyrrolidine, 1-nitroso-
U181	5-Nitro-o-toluidine
U181	Benzenamine, 2-methyl-5-nitro
U182	1,3,5-Trioxane, 2,4,6-trimethyl-
U182	Paraldehyde
U183	Benzene, pentachloro-
U183	Pentachlorobenzene
U184	Ethane, pentachloro-
U184	Pentachloroethane
U185	Benzene, pentachloronitro-
U185	Pentachloronitrobenzene (PCNB)

EPA HAZARDOUS WASTE CODES

(Continued)

Code	Waste description
U186	1,3-Pentadiene (I)
U186	1-Methylbutadiene (I)
U187	Acetamide, N-(4-ethoxyphenyl)-
U187	Phenacetin
U188	Phenol
U189	Phosphorus sulfide (R)
U189	Sulfur phosphide (R)
U190	1,3-Isobenzofurandione
U190	Phthalic anhydride
U191	2-Picoline
U191	Pyridine, 2-methyl-
U192	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-
U192	Pronamide
U193	1,2-Oxathiolane, 2,2-dioxide
U193	1,3-Propane sultone
U194	1-Propanamine (I,T)
U194	n-Propylamine (I,T)
U196	Pyridine
U197	2,5-Cyclohexadiene-1,4-dione
U197	p-Benzoquinone
U200	Reserpine
U200	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl) oxy]-, methyl ester, (3beta, 16beta, 17alpha, 18beta, 20alpha)-
U201	1,3-Benzenediol
U201	Resorcinol
U202	1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, & salts
U202	Saccharin, & salts
U203	1,3-Benzodioxole, 5-(2-propenyl)-
U203	Safrole
U204	Selenious acid
U204	Selenium dioxide
U205	Selenium sulfide
U205	Selenium sulfide SeS_2 (R,T)
U206	D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)-carbonyl]amino]-
U206	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-,D-
U206	Streptozotocin
U207	1,2,4,5-Tetrachlorobenzene
U207	Benzene, 1,2,4,5-tetrachloro-
U208	1,1,1,2-Tetrachloroethane
U208	Ethane, 1,1,1,2-tetrachloro-
U209	1,1,2,2-Tetrachloroethane
U209	Ethane, 1,1,2,2-tetrachloro-
U210	Ethene, tetrachloro-
U210	Tetrachloroethylene
U211	Carbon tetrachloride
U211	Methane, tetrachloro-
U213	Furan, tetrahydro-(I)
U213	Tetrahydrofuran (I)
U214	Acetic acid, thallium(1+) salt
U214	Thallium(I) acetate
U215	Carbonic acid, dithallium(1+) salt
U215	Thallium(I) carbonate
U216	Thallium chloride Tlcl
U216	Thallium(I) chloride
U217	Nitric acid, thallium(1+) salt
U217	Thallium(I) nitrate

EPA HAZARDOUS WASTE CODES

(Continued)

Code	Waste description
U218	Ethanethioamide
U218	Thioacetamide
U219	Thiourea
U220	Benzene, methyl-
U220	Toluene
U221	Benzenediamine, ar-methyl-
U221	Toluenediamine
U222	Benzenamine, 2-methyl-, hydrochloride
U222	o-Toluidine hydrochloride
U223	Benzene, 1,3-diisocyanatomethyl- (R,T)
U223	Toluene diisocyanate (R,T)
U225	Bromoform
U225	Methane, tribromo-
U226	Ethane, 1,1,1-trichloro-
U226	Methyl chloroform
U227	1,1,2-Trichloroethane
U227	Ethane, 1,1,2-trichloro-
U228	Ethene, trichloro-
U228	Trichloroethylene
U234	1,3,5-Trinitrobenzene (R,T)
U234	Benzene, 1,3,5-trinitro-
U235	1-Propanol, 2,3-dibromo-, phosphate (3:1)
U235	Tris(2,3,-dibromopropyl) phosphate
U236	2,7-Naphthalenedisulfonic acid,3,3'-[(3,3'-dimethyl[1,1'-biphenyl]-4,4'-diyl)bis(azo)bis[5-amino-4-hydroxy]-, tetrasodium salt
U236	Trypan blue
U237	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-
U237	Uracil mustard
U238	Carbamic acid, ethyl ester
U238	Ethyl carbamate (urethane)
U239	Benzene, dimethyl- (I,T)
U239	Xylene (I)
U240	2,4-D, salts & esters
U240	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters
U240	Dichlorophenoxyacetic acid 2,4-D
U243	1-Propene, 1,1,2,3,3,3-hexachloro-
U243	Hexachloropropene
U244	Thioperoxydicarbonic diamide $[(H_2N)C(S)]_2S_2$, tetramethyl-
U244	Thiram
U246	Cyanogen bromide (CN)Br
U247	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-methoxy-
U247	Methoxychlor
U248	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations of 0.3% or less
U248	Warfarin, & salts, when present at concentrations of 0.3% or less
U249	Zinc phosphide Zn_3P_2, when present at concentrations of 10% or less
U271	Benomyl
U278	Bendiocarb
U278	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate
U279	Carbaryl
U279	1-Naphthalenol, methylcarbamate
U280	Barban
U280	Carbamic acid, (3-chlorophenol)-, 4-chloro-2-butynyl ester
U328	Benzenamine, 2-methyl-

EPA HAZARDOUS WASTE CODES

(Continued)

Code	Waste description
U328	o-Toluidine
U353	Benzenamine, 4-methyl-
U353	p-Toluidine
U359	Ethanol, 2-ethoxy-
U359	Ethylene glycol monoethyl ether
U364	1,3-Benzodioxol-4ol, 2,2-dimethyl
U364	Bendiocarb phenol
U367	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-
U367	Carbofuran phenol
U372	Carbamic acid, 1H-benzimidazol-2-yl, methyl ester
U372	Carbendazim
U373	Carbamic acid, phenyl-, 1-methylethyl ester
U373	Propham
U387	Carbamothiocic acid, dipropyl-, S-(phenylmethyl) ester
U387	Prosulfocarb
U389	Triallate
U389	Carbamothiocic acid, bis (1-methylethyl)-, S-(2,3,3-trichloro-2propenyl) ester
U394	Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo, methyl ester
U394	A2213
U395	Diethylene glycol, dicarbamate
U395	Ethanol, 2, 2;-oxybis-,dicarbamate
U404	Ethanamine, N, N-diethyl-
U404	Triethylamine
U408	2,4,6-Tribromophenol
U409	Thiophanate-methyl
U409	Carbamic acid, (1,2-phenylenebis (iminocarbonothioyl)]bis-, dimethyl ester
U410	Ethanimidothioci acid, N, N'-(thiobis[(methylimino)carbonyloxy])bis-, dimethyl ester
U411	Propoxur
U411	Phenol, 2-(-1-methylethoxy)-, methylcarbamate

Prohibited Sewer Discharge Standards & Supplementary Discharge Limitations

Golden Heart Utilities
Wastewater Utility
4247 Peger Road
Fairbanks, Alaska 99709-5468

Chapter 82 Utilities
Article II Wastewater Treatment Regulations
Division 6 General Requirements

Sec. 82-206. Prohibited discharge standards.

(a) *General prohibitions.* No user shall introduce or cause to be introduced into the GHU wastewater collection system or into the POTW any pollutant or wastewater which causes pass through or interference. These general prohibitions apply to all users of the POTW whether or not they are subject to categorical pretreatment standards or any other national, state, or local pretreatment standards or requirements.

(b) *Specific prohibitions.* No use shall introduce or cause to be introduced into the GHU wastewater collection system or into the POTW the following pollutants, substances, or wastewater:

(1) Pollutants which create a fire or explosive hazard in the GHU wastewater collection system and/or the POTW, including but not limited to waste streams with a closed-cup flashpoint of less than 140 degrees Fahrenheit (60 degrees Celsius) using the test methods specified in 40 CFR 261.21;

(2) Wastewater having a pH less than 5.0 or more than 10, or otherwise causing corrosive structural damage to the POTW or equipment;

(3) Solid or viscous substances in amounts which will cause obstruction of the flow to and within the POTW resulting in interference;

(4) Pollutants, including oxygen-demanding pollutants (BOD, etc.), released in a discharge at a flow rate and/or pollutant concentration which, either singly or by interaction with other pollutants, will cause interference with the POTW;

(5) Wastewater having a temperature which will inhibit biological activity in the treatment plant resulting in interference, but in no case wastewater which causes the temperature at the introduction into the treatment plant to exceed 104 degrees Fahrenheit (40 degrees Celsius) unless the approval authority, upon the request of the POTW, approves alternate temperature limits;

(6) Petroleum oil, nonbiodegradable cutting oil or products of mineral oil origin, in amounts that will cause interference or pass through;

(7) Pollutants which result in the presence of toxic gases, vapors or fumes within the POTW in a quantity that may cause acute worker health and safety problems;

(8) Trucked or hauled pollutants, except at discharge points designed and approved by GHU;

(9) Noxious or malodorous liquids, gases, solids or other wastewater which, either singly or by interaction with other wastes, are sufficient to create a public nuisance or a hazard to life, or to prevent entry into the sewers for maintenance or repair;

(10) Wastewater which imparts color which cannot be removed by the treatment process, such as, but not limited to, dye wastes and vegetable tanning solutions, which consequently imparts color to the treatment plant's effluent, thereby violating NPDES permit of the city and GHU; color (in combination with turbidity) shall not cause the treatment plant effluent to reduce the depth of the compensation point for photosynthetic activity by more than ten percent from the seasonably established norm for aquatic life;

(11) Wastewater containing any radioactive wastes or isotopes except as specifically approved by the superintendent in compliance with applicable state or federal regulations;

(12) Stormwater, surface water, groundwater, artesian well water, roof runoff, subsurface drainage, swimming pool drainage, condensate, deionized water, noncontact cooling water, and unpolluted wastewater unless specifically authorized by the superintendent;

(13) Sludges, screenings or other residues from the pretreatment of industrial wastes;

(14) Medical wastes, except as specifically authorized by the superintendent in a wastewater discharge permit;

(15) Wastewater causing, alone or in conjunction with other sources, the treatment plant's effluent to fail a toxicity test;

(16) Detergents, surface-activity agents, or other substances which may cause excessive foaming in the POTW;

(17) Any liquids, solids or gases which by reason of their nature or quantity are, or may be, sufficient, either alone or by interaction with other substances, to cause fire or explosion or be injurious in any other way to the POTW or to the operation of the POTW; at no time shall two successive readings on an explosion meter, at the point of discharge into the system or at any point in the system be more than five percent nor any single reading over ten percent of the lower explosive limit (LEL) of the meter;

(18) Grease, animal guts or tissue, paunch manure, bones, hair, hides or fleshings, entrails, whole blood, feathers, ashes, cinders, sand, spent lime, stone or marble dusts, metal, glass, straw, shavings, grass clippings, rags, spent grains, spent hops, wastepaper, wood, plastics, gas, tar, asphalt residues, residues from refining or processing of fuel or lubricating oil, mud or glass grinding or polishing wastes;

(19) Any substance which will cause the POTW to violate its NPDES and/or other disposal system permits;

(20) The contents of any tank or other vessel owned or used by any person in the business of collecting or pumping sewage, effluent, septage or other wastewater unless the person has first obtained testing and approval as may be generally required by GHU and paid all fees assessed for the privilege of the discharge;

(21) Any hazardous wastes as defined in rules published by the state or in EPA rules, 40 CFR 261; or

(22) Persistent pesticides and/or pesticides regulated by the Federal Insecticide Fungicide Rodenticide Act (FIFRA).

Pollutants, substances of wastewater prohibited by this section shall not be processed or stored in such a manner that they could be discharged to the POTW.
(Code 1960, § 15.201)

Sec. 82-207. Federal Categorical Pretreatment Standards.

The national categorical pretreatment standards found in 40 CFR parts 405 through 471 are incorporated by reference.
(Code 1960, § 15.202)

Sec. 82-808. State requirements.

State requirements and limitations on discharges to the POTW shall be met by all users which are subject to such standards in any instance in which they are more stringent than federal requirements and limitations or those in this article or other applicable code.
(Code 1960, § 15.203)

Sec. 82-209. Local limits.

The following pollutant limits are established to protect against pass through and interference. No person shall discharge wastewater containing in excess of the following daily maximum allowable discharge limits:

Concentration (mg/l)	*Material*
4.35	Arsenic
0.33	Cadmium
1.23	Chromium
3.38	Copper
1.20	Cyanide
0.69	Lead
0.19	Mercury
4.74	Nickel
25.0	Oil and grease (petroleum or mineral oil products)
100.0	Oil and grease (animal and vegetable based)
0.0	PCB
0.0	Pesticides (all)
0.5	Phenol
0.43	Silver
5.0	Tin
2.61	Zinc

These limits apply at the point where the wastewater is discharged to the wastewater collection system. All concentrations for metallic substances are for total metal unless indicated otherwise. The superintendent may impose mass limitations in addition to or in place of the concentration-based limitations above. Where a user is subject to a categorical pretreatment standard and a local limit for a given pollutant, the more stringent limit shall apply.
(Code 1960, § 15.203.1; Ord. No. 5398, § 1, 10-11-99)

UAF Use: **Report all spills to the UAF Dispatch Center at 474-7721. Ask for assistance if needed. After reporting the spill, complete this form, provide a copy to your supervisor and fax copies to the UAF Dispatch Center (fax: 474-7377) and UAF EHS&RM (fax: 474-5489).**

Contact Name:_____ Department:_____

Building/Room:_____ Phone: _____ Fax:_____ E-mail:_____

Contractor Use: **Report all spills to the UAF Dispatch Center at 474-7721. Ask for assistance if needed. After reporting the spill, complete this form, provide a copy to the DDC Project Manager and fax copies to the UAF Dispatch Center (fax: 474-7377) and UAF EHS&RM (fax: 474-5489).**

Project Location:_____ DDC Project Manager:_____

Company Name:_____ Contact: _____ Phone: _____

Potential Responsible Party:_____ **Date:**____/____/____

- ☐ Date and time of the discharge or release:
- ☐ Location of the discharge or release:
- ☐ Describe the surface area impacted by the spill or release ie., (asphalt, concrete, gravel, soil, water) and the size of the area impacted is approx. _____ sq. ft.
- ☐ Type and amount of oil or hazardous substance discharged or released:
- ☐ Factors that caused or contributed to the discharge or release:
- ☐ Description of the actions taken for containment and cleanup:
- ☐ Estimated amount of oil or hazardous substance recovered in cleanup:
- ☐ How are the cleanup materials currently contained and where are they stored?

- ☐ Proposed method and date for disposal:

- ☐ Comments or follow-up actions required:

<u>UAF Spill Reporting Requirements:</u>

For hazardous substance spills, oil discharges to water or oil discharges greater than 55 gallons spilled to land, the potentially responsible party must immediately notify:

- ☐ ADEC (451-2360)
- ☐ UAF Dispatch Center (474-7721)
- ☐ Department Supervisor
- ☐ UAF EHS&RM (474-5487)

<u>For oil spills to land, in quantities less than 55 gallons</u>, the potentially responsible party must immediately notify:

- ☐ UAF Dispatch Center (474-7721)
- ☐ UAF EHS&RM (474-5487)

In all cases, the potentially responsible party must complete the **UAF Oil and Hazardous Substances Spill Reporting Form.** Please see the form for additional instructions.

The Alaska Department of Environmental Conservation (ADEC) identifies the following notification requirements for spill reporting:

Hazardous substances discharges must be reported as soon as the person has knowledge of the discharge.

Oil discharges to water must be reported immediately.

Oil discharges to land:

- Spills greater than 55 gallons must be reported immediately.
- Spills greater than 10 gallons but less than 55 gallons must be reported within 48 hours. ***UAF EHS&RM will assist the responsible party in reporting the spill.***
- Spills from 1 to 10 gallons are reported on a monthly log. ***The monthly spill log is compiled and reported by UAF EHS&RM.***
- Spills to secondary containment greater than 55 gallons must be reported within 48 hours. ***UAF EHS&RM will assist the responsible party in reporting the spill***

For more information, please call UAF Environmental Health, Safety, and Risk Management (474-5487). Never put yourself at risk to cleanup a hazardous substance spill. If you don't know, please don't go…

Chukchi Campus

Non-Radioactive Hazardous Material Transfer Request Form

Fiscal Year _____ | _____

Department _____ Contact _____ Phone _____

Building _____ Room _____ Date ____ / ____ / ____ (month / day / year)

Material Origin: ☐ Research ☐ Academic ☐ Support

Chemical Name/Description (for mixtures please list % or ppm of constituents, specify organic compounds, inorganic compounds and heavy metals):

_____

_____

Number of Containers		Container Size	Total Volume (Liters or Kilograms)
	x		
	x		
	x		

Container Type: ☐ Glass ☐ Plastic ☐ Metal Other: _____

Physical State: ☐ Solid ☐ Liquid ☐ Gas ☐ Semi-Solid

Transfer Information: Satellite Accumulation Area # _____ Accumulation Start Date: ____ / ____ / ____ (month / day / year)

Cabinet: _____ Shelf: _____ Other: _____

Consolidation Drum #: _____ Accumulation Start Date: ____ / ____ / ____ (month / day / year)

Compatibility Information:

Storage Color Code: _____

Hazard Characteristics:
☐ Flam. Liquid ☐ Flam. Solid ☐ Corrosive ☐ Toxic ☐ Highly Toxic
☐ Oxidizer ☐ Irritant ☐ Hygroscopic ☐ Reactive* ☐ Lachrymator
☐ Mutagen ☐ Carcinogen ☐ Teratogen
*explain reactivity in comments

Comments: _____

_____

EH&S Use Only

Regulatory Information: ☐ RCRA Regulated ☐ Non-Regulated ☐ TSCA Regulated

EPA Waste ID: _____ DOT Hazard: _____ ☐ UN # ☐ NA # _____

Est. pH: _____ Specific Gravity: _____ Inhalation: _____

LD50: _____ mg/kg _____ Est. Flashpoint: _____ CAS Number: _____

☐ RCRA Hazardous Waste ☐ TSCA Waste

☐ Non-RCRA Hazardous Waste ☐ Surplus Chemical

☐ Non-Hazardous Waste ☐ Other Regulated Waste: _____

MSDS Attached: ☐ Yes ☐ No ☐ Requested Data Entry By: _____

Please send white and yellow copies to:

University of Alaska Fairbanks
Environmental Health, Safety & Risk Mgmt.
PO Box 758145
Fairbanks, AK 99775-8145

For Information Call: 907-474-5487

Transfer No. _____ [ ]
Fiscal Year

Non-Radioactive Hazardous Material

Satellite Accumulation Area # _____

Chemical Name: _____

_____

EH&S Use Only

- [ ] RCRA Hazardous Waste
- [ ] Non-RCRA Hazardous Waste
- [ ] Non-Hazardous Waste
- [ ] TSCA Waste
- [ ] Surplus Chemical
- [ ] Other Reg. Waste

_____ of _____

Accumulation Start Date: ____/____/____

UAF Conditionally Exempt Small Quantity Generator

Chemical Transfer - Disposal Request Worksheet

files: CESQG Disposal Request Worksheet.xls

Please send the completed worksheet to UAF EHS-RM

email: fnwrk1@uaf.edu or fnred@uaf.edu or call (907)-474-5413 for assistance

Location of materials for shipment:

Contact name & phone number:

Chemical name or material description (if a mixture, please include a listing and approximate concentration of constituents)	Transfer form number	Number of containers	Quantity per container	Container type: glass, plastic, metal, fibreboard	Physical state: solid, liquid, gas, semisolid	Comments

INTRODUCTION

The University of Alaska Fairbanks (UAF) encourages and supports all programs which promote safety, good health, and well being of UAF faculty, staff, students, participants in UAF sponsored programs, and visitors. It is the policy of UAF to provide safe and healthful conditions and to reduce injuries and illnesses to the lowest possible level. No task is so important and no service so urgent that it cannot be done safely. In keeping with this commitment, this Chemical Hygiene Plan was developed as part of the Laboratory Safety Program.

The Chemical Hygiene Plan (CHP) is designed to protect laboratory personnel from potential hazards associated with the use of chemicals. Compliance is mandatory for all employees working in campus laboratories due to requirements of the Occupational Safety and Health Administration (OSHA) standard on "Hazardous Chemicals In Laboratories". While these regulations pertain specifically to employees, provisions of the CHP may apply to students and visitors depending on their activities.

A variety of hazardous chemicals are used in small quantities in research and teaching laboratories creating a unique environment with a number of risks. These chemicals may cause injury or damage because they are toxic, flammable, corrosive, or reactive with water and other materials. How these substances are handled will determine the degree of risk.

The objective of this CHP is to provide uniform requirements for safe use of potentially hazardous substances in UAF laboratories. General standard operating procedures are outlined, including work with select carcinogens, reproductive toxins, and highly acute substances.

Specific standard operating procedures developed by each lab for operations posing a special hazard (for example, heating perchloric acid, working with pyrophorics, conducting electrophoresis, distillations, extractions, etc.) must be developed for your laboratory specific SOP's (Appendix 1).

Maintaining a safe and healthy environment in the laboratory is ultimately the responsibility of the Chemical Hygiene Officer (CHO). However, each individual is expected to conduct all operations and procedures involving chemicals in a safe and prudent manner.

Basic Instructions

- Assign PI and Lab Supervisor (page 3 of the CHP)
- Complete Appendix 1 for each lab's Standard Operating Procedures. Then, return a copy of Appendix 1 to Environmental Health, Safety, and Risk Management (EHS&RM) (fnsms2@uaf.edu)
- Complete the Chemical Inventory Worksheet (excel spreadsheet). Then, return a copy of the inventory to EHS&RM (fnsms2@uaf.edu).
- If any chemicals are present in the lab that are highlighted in yellow on the inventory worksheet, a Laboratory Hazard Statement form must be completed and included in Appendix 1. A blank form is available in Appendix 1 of this CHP.
- Retain a copy of the CHP and inventory in the lab it pertains to.

I. ROLES AND RESPONSIBILITIES

A. Principal Investigator (PI)
(PI:_____ Lab Supervisor: _____)
The PI has responsibility for implementation of the Chemical Hygiene Plan (CHP) in his/her laboratory. The PI shall:

1. ensure that workers are trained and follow the CHP outlined in this document;
2. ensure that the necessary protective and emergency equipment is available, in working order, and that appropriate training has been provided;
3. ensure that periodic laboratory inspections are performed (refer to Appendix 2);
4. know current legal requirements concerning regulated substances;
5. review and evaluate the effectiveness of the laboratory specific Standard Operating Procedures (SOP) at least annually and update as necessary.

B. Laboratory Employees
Laboratory employees are responsible for:

1. planning and conducting each operation in accordance with practices and procedures established in this CHP;
2. using equipment only for its designed purpose;
3. being familiar with emergency procedures, including knowledge of the location and use of emergency equipment for the laboratory, as well as how to obtain additional help in an emergency;
4. knowing the types of protective equipment available and using the proper type for each procedure;
5. being alert to unsafe conditions and actions and calling attention to them so corrections can be made as soon as possible.

C. Chemical Hygiene Officer (CHO) is an employee designated by the employer who is qualified by training or experience to provide technical guidance in the development and implementation of the provisions of the CHP. The current Chemical Hygiene Officer for the building/lab is designated by the Dean, Director, or Department Head.
The Chemical Hygiene Officer shall:

1. assist PI's and other laboratory employees with development and implementation of appropriate chemical hygiene procedures and practices, including providing consultation and information;
2. keep abreast of legal requirements concerning regulated substances and communicate any changes to PI's and laboratory employees.
3. seek ways to improve the overall chemical hygiene program.

II. EMPLOYEE INFORMATION AND TRAINING

PI's shall ensure that information and training are provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. Refresher information and training shall be conducted at least annually and documented.

A. Information

All laboratory personnel shall be informed of:

1. Requirements of the OSHA Standard, "Occupational Exposure to Hazardous Chemicals in Laboratories", 29 CR 1910.1450
2. The contents and availability of this Chemical Hygiene Plan,
3. Permissible Exposure Limits (PELs) for OSHA regulated substances or recommended exposure limits where there is no applicable OSHA standard,
4. Signs and symptoms associated with exposures to hazardous chemicals used in their laboratory,
5. The location of reference materials on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to, Material Safety Data Sheets (MSDS's).

B. Training

Employee training shall include:

1. The physical and health hazards associated with chemicals stored and used in their work area,
2. The contents of this Chemical Hygiene Plan,
3. Methods and observations that may be used to detect the presence or release of a hazardous chemical; e.g., exposure monitoring conducted by the CHO, visual appearance or odor of hazardous chemicals when being released, etc.
4. The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.

III. PRIOR APPROVAL CIRCUMSTANCES

Employees must obtain prior approval to proceed with a laboratory task from the PI or his/her designee when:

A. Radioactive materials will be used,
B. Recombinant DNA or biological material of Biosafety Level 3 or greater will be used,
C. It is likely that exposure limit concentrations could be exceeded or that other harm is likely,
D. There is failure of any equipment used in the process, especially of safeguards such as chemical fume hoods.
E. Members of the laboratory staff become ill, suspect that they or others have been exposed, or otherwise suspect a failure of any safeguards.

IV. STANDARD OPERATING PROCEDURES

A. General Rules

1. For chemicals they are working with, all employees should know:
   a. the chemical's hazards, as determined from a MSDS and other appropriate references;
   b. appropriate safeguards for using that chemical, including personal protective equipment;
   c. how to properly store the chemical when it is not in use;
   d. proper chemical waste disposal procedures (Appendix 6);
   e. proper personal hygiene practices;
   f. appropriate procedures for emergencies, including first aid, evacuation routes, and spill cleanup procedures.
2. Employees should avoid working alone. Arrangements should be made between individuals working in separate laboratories outside of regular working hours to crosscheck each other periodically. Experiments known to be hazardous should not be undertaken by an employee who is alone in the laboratory.

B. Personal Hygiene

1. Wash promptly whenever a chemical has contacted your skin. Flush for at least 15 minutes prior to seeking medical attention.
2. Avoid inhalation of chemicals. Do not "sniff" to test chemicals.
3. Do not use mouth suction to pipette anything. Pipetting aids must be used at all times.
4. Do not bring food (including gum and candy), beverages, tobacco, or cosmetic products into chemical storage or use areas. Eating, drinking, and applying cosmetics is allowed in designated areas only. Smoking is prohibited in all UAF facilities.
5. Wash well with soap and water before leaving the laboratory. Avoid the use of solvents for washing skin. Solvents remove the natural protective oils from skin and can cause irritation and inflammation. In some cases, washing with solvent may facilitate absorption of toxic chemicals.

C. Housekeeping

Housekeeping is directly related to safety and must be given importance of equal value to other procedures. Lack of good housekeeping reduces work efficiency and may result in accidents. Laboratory personnel must adhere to the following:

1. Access to emergency equipment, showers, eyewashes, fire extinguishers, exits and circuit breakers shall never be blocked or obstructed.
2. Chemical containers should be regularly monitored for proper labeling and container integrity. Labels which are fading, falling off, or deteriorating must be promptly replaced. If abbreviations are used, they should be kept to a minimum and clearly identify the contents of the container as well as hazards associated with use; i.e., HgCl2/poison, HCl/corrosive, MeOH/flammable,

H2O2/corrosive-oxidizer, Nonhazardous buffer, etc. Improperly labeled or unlabeled chemicals make hazard identification and disposal difficult, and may create a hazard.

3. All chemicals should be placed in their proper storage areas at the end of each workday. Chemicals shall not be stored on desks, laboratory bench tops, floors, fume hoods or in aisles.
4. Each laboratory must have a puncture resistant (e.g., cardboard) container specifically designated for glassware disposal.
5. At the end of each workday, the contents of all unlabeled containers are to be considered waste and disposed of appropriately.
6. Collection containers for wastes must be clearly labeled including hazard identification.
7. All work areas, especially laboratory bench tops, should be kept clear of clutter.
8. All aisles, corridors, stairs, and stairwells shall be kept clear of chemicals, equipment, supplies, boxes, and debris.
9. Food and drink for human consumption shall not be kept in the same refrigerator used to store chemicals and laboratory samples. Eating and office areas must be clearly separated from laboratory and chemical storage areas.
10. Empty containers shall be treated in the following manner:
    a. For water soluble solvents: triple rinse, deface the label, relabel as "Empty" and dispose with normal trash.
    b. For non-water soluble solvents: triple rinse using a solvent capable of removing the chemical. ALL rinsate must be collected in a hazardous waste disposal container. Deface the label, relabel as "Empty" and dispose with normal trash.

D. Protective Clothing and Equipment

1. Carefully inspect all protective equipment prior to use. Do not use defective equipment.
2. Eye protection (safety glasses, chemical-resistant goggles, or face shield) shall be worn at all times in laboratories where chemicals are being used. This includes visitors. Ordinary prescription glasses are not considered effective eye protection since they lack necessary shielding. Chemical-resistant goggles should be worn over the glasses or prescription safety glasses be provided to employees required to wear corrective lenses.
3. The wearing of contact lenses in the laboratory is very controversial. Consult with an Optometrist prior to wear in the laboratory. Safety glasses or chemical-resistant goggles shall be worn over contacts at all times.
4. When working with corrosive, toxic, allergenic, or sensitizing chemicals, rough or sharp-edged objects, very hot or very cold materials, gloves made of material known to be resistant to

permeation by the substance shall be worn. No one glove can protect against all hazards. Cloth gloves, while not appropriate for use around liquids, can protect against light abrasive materials and moderate temperature changes. Synthetic or rubber gloves protect against corrosives, solvents, and poisons. Leather gloves, often used for tasks like welding, protect against sparks, heat, and rough abrasives.
Consult the manufacturer's performance chart or contact the Chemical Hygiene Officer to determine the proper choice of glove material.

5. Low-heeled shoes with fully covered uppers shall be worn at all times in the laboratory. Shoes or sandals with open toes shall not be worn.
6. Long pants and long sleeves should be worn when working with or around chemicals.
7. Long hair should be held in place behind the head.
8. Loose clothing, especially loose trouser legs and sleeves, should not be worn in the laboratory.
9. A full-body-length rubber, plastic, or neoprene apron appropriate for the material being handled should be worn if there is risk of splash or spill.
10. A proper respirator must be worn whenever exposure by inhalation is likely to exceed the action level or Personnel Exposure Limit (PEL) and a fume hood is not accessible. Procedures specified in the UAF Respiratory Protection Program must be followed. Employees must be medically qualified, trained, and fit-tested prior to using a respirator. Consult your PI and/or the CHO before doing any such work.

E. Flammable Materials

Precautions for safe handling of flammable materials include the following:

1. Storage of flammable substances shall be limited to quantities specified in Appendix 9.
2. Flammable substances shall be handled only in areas free of ignition sources.
3. Flammable substances should never be heated by using an open flame. Preferred heat sources include steam baths, water baths, oil baths, heating mantles, and hot air baths.
4. Class I liquids (Appendix 9) shall not be transferred from one vessel to another in any exit way.
5. Transfer of flammable liquids from 5 gallon containers (or less) to smaller containers shall be conducted in a laboratory fume hood or an approved flammable liquid storage room.

F. Reactive Chemicals

A reactive chemical is one that:

1. Fits the OSHA definition of "unstable" in 1910.1450(b): "Unstable (reactive) means a chemical which in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure, or temperature
2. Is ranked by the National Fire Protection Association (NFPA) as 3 or 4 for reactivity,
3. Is identified by the Department of Transportation (DOT) as:
   a. An oxidizer,
   b. An organic peroxide, or
   c. A class A, B, or C explosive,
4. Violently reacts with exposure to water or air.

Handle reactive chemicals with all proper safety precautions. This includes designating a separate storage area, monitoring periodically for degradation, and using appropriate personal protection.

G. Corrosive Chemicals

1. Materials are classified as corrosive if they:
   a. are capable of rapidly eroding building materials or metals, or
   b. burn, irritate or destructively attack organic tissues such as skin, eyes, lungs and stomach.

Examples of commonly used chemicals that have corrosive properties are:

acetic anhydride	bromine	chlorine
fluorine	glacial acetic acid	hydrochloric acid
hydrofluoric acid	nitric acid	potassium hydroxide
sodium hydroxide	sulfuric acid	

Safe handling procedures will vary with each operation and the type and concentration of the corrosive chemical.

H. Acids and Bases

1. The following general guidelines should be followed for procedures involving acids and bases:
   a. Never pour water into acid. Slowly add the acid to the water and stir.
   b. Open bottles or carboys slowly and carefully, wearing protective equipment to guard hands, face, and body.
   c. OSHA requires suitable facilities, such as a safety shower and eyewash, to be located within the work area. The American National Standards Institute (ANSI) recommends that the safety shower and eyewash be within 100 feet of the work area for quick drenching or flushing of the eyes and body. Eyewash stations and showers should be tested annually by Facility Services.
   d. Procedures requiring the use of concentrated acids and bases must be conducted in a fume hood.
   e. Never mix acid wastes with other materials such as solvents, metal-contaminated solutions, etc. Noncontaminated acid wastes can be easily disposed by neutralization. Specific procedures are outlined in Appendix 1.
   f. When disposable containers are completely emptied of their contents, flush them thoroughly with water before throwing them away.
   g. Never dispose of acids or bases in the sanitary sewer system (i.e., down the drain) until neutralized (pH 6.0-8.0). Neutralization may be conducted in the laboratory when included as part of an experiment, and should be conducted in a fume hood. The solution should then be poured slowly down the drain with copious amounts of water; i.e., leave the water running for approximately 5 minutes.
   h. Contact EHS&RM Hazmat Section, 474-5487, for assistance with disposal of large quantities (more than 1 gallon or 1/2 pound) of acids and bases.
   i. Each laboratory should have access to a spill kit that includes acid and base neutralizer; follow Spill Response Procedures in section V. B. Never use combustible organic materials (sawdust, excelsior, wood scraps and shavings, paper, rags, or burlap bags) to absorb or cleanup spillage.

I. Compressed Gas Cylinders

Use of compressed gases in the laboratory requires anticipating chemical, physical, and health hazards. Cylinders that are knocked over or dropped can be very dangerous. If a valve is knocked off, the cylinder can become a lethal projectile. Accidental releases may result in an oxygen depleted atmosphere or adverse health effects. In short, improper handling and use can cause structural damage, severe injury, and possibly death.

The following guidelines will help ensure safe handling, use, and storage of compressed gas cylinders.

RECEIVING AND STORAGE

1. Be sure to arrange a return agreement with suppliers prior to purchase since disposal of compressed gas cylinders is difficult and very expensive.
2. Cylinders should not be accepted unless the cylinder contents are clearly labeled. Color code only should not be accepted, since it does not constitute adequate labeling.
3. Do not accept cylinders which are damaged or do not have a valve protection cap.
4. All gas cylinders in use shall be secured in an upright position in racks, holders, or clamping devices. When cylinders are grouped together, they should be individually secured and conspicuously labeled on the neck area.
5. Oxygen cylinders shall never be placed near highly combustible materials, especially oil and grease, or near stocks of carbide and acetylene or other fuel gas cylinders, nor near any other substance likely to cause or accelerate a fire. Systems and components used for other gases and purposes must never be used for oxygen or interconnected with oxygen.
6. Cylinders should have current hydrostatic test date (normally less than 5 years old for steel and 3 years old for aluminum) engraved on the cylinder. Cylinders should be returned to the supplier for servicing prior to the expiration date.
7. Do not place cylinders near heat, sparks, or flames or where they might become part of an electrical circuit.
8. Do not store cylinders in exit corridors or hallways.

HANDLING AND USE

1. Only Compressed Gas Association fittings and components are permitted for use with gas cylinders. Only use regulators approved for the type of gas in the cylinder. Do not use adapters to interchange regulators.
2. Open cylinder valves slowly and away from the direction of people (including yourself). Never force a gas cylinder valve. If the valve cannot be opened by the wheel or small wrench provided, the cylinder should be returned.

3. No attempt shall be made to transfer gases from one cylinder to another, to refill cylinders, or to mix gases in a cylinder in the laboratory.
4. All cylinders are to be considered full unless properly identified as empty by the user. Empty cylinders must be returned to the supplier and not accumulated.
5. Compressed gases must not be used to clean your skin or clothing.
6. Never heat cylinders to raise internal pressure.
7. Do not use copper (>65%) connectors or tubing with acetylene. Acetylene can form explosive compounds with copper, silver, and mercury.
8. Always leave at least 30 psi minimum pressure in all "empty" cylinders. Do not leave an empty cylinder attached to a pressurized system.

V. CONTROL MEASURES

A. Ventilation

1. Laboratory ventilation is normally designed to provide a minimum of eight air changes per hour. This flow is not necessarily sufficient to prevent accumulation of chemical vapors. Laboratory work shall be conducted in a fume hood, glove box, or similar device when:
   a. Procedures call for work with toxic substances which are volatile; i.e., evaporate at normal temperature and pressure, or
   b. There is a possibility the action level or PEL will be exceeded.
2. The protection provided by laboratory fume hoods is dependent upon two important factors:
   a. proper use of the hood, and
   b. maintenance of adequate airflow through the hood.
3. The way the hood is used will determine the degree of protection it will provide. Each employee is responsible for implementing the following work practices when using a hood.
   a. Continually monitor air being drawn into the hood. This can be done by attaching a light-weight strip of paper to the bottom of the sash.
   b. Operate the hood at a sash position that will provide splash protection for the user; e.g. 10-12 inch opening for hoods with vertical sliding (up and down) sashes and the sashes closed as much as possible for continuous air flow hoods with horizontal sliding (left and right) sashes. This helps to ensure optimum protection when conducting operations in the hood.
   c. Avoid using the hood for storage of bottles and equipment, especially along the back wall. Any apparatus that must be housed within the hood should fit completely inside the hood. Elevate the apparatus on blocks (at least 2 inches

off the bench top) to allow air to flow freely around and beneath.

d. Manipulations within the hood should be performed at least 6 inches inside the face of the hood or as far towards the back of the hood as possible. This minimizes the possibility of contaminants escaping from the hood.

e. Things which cause air turbulence across the face of the hood such as fans, window air conditioning units, or excessive movement should be avoided.

f. Exhaust hoods do not provide adequate protection for all operations involving toxic materials. A higher level of containment should be used for procedures where minor contamination can be serious. If you are in doubt about the level of containment needed for your operation, ask your PI, Lab Supervisor, or contact the CHO.

4. Fume hoods should be performed annually to verify adequate airflow is maintained through the hood face. Departments can do this themselves by borrowing EHS&RM's testing equipment or call EHS&RM to schedule an appointment. Face velocities should be between 80 and 125 feet per minute (fpm). Contact EHS&RM at x5413 if you suspect the hood is not working properly.

5. In the event of a fume hood failure or low-flow alarm, discontinue all fume hood operations and, **only if it is safe to do so**, place lids on open containers, lower the hood sash and secure reactions that may be generating hazardous emissions. Contact Facilities Services Dispatch (x7000) to report the alarm after following the steps listed above. After work hours, this number is forwarded to Emergency Dispatch so essentially, x 7000 is manned 24 hours. If the danger level is immanent, leave the lab immediately. If conditions warrant, i.e. concentrations are not higher than the LEL, activate the fire alarm via the pull down stations that are located near building exits. When arriving in a safe area, call 911.

B. Spill Clean-up Procedures

1. Attend to anyone who may have been contaminated.
2. Notify occupants in the immediate area about the spill.
3. Evacuate all nonessential personnel from the spill area.
4. If the spilled material is flammable, turn off all ignition and heat sources; this includes magnetic stirrers.
5. Avoid breathing vapors of the spilled material. If medically qualified and trained as required in the Respiratory Protection Program, use a respirator if necessary.
6. Ensure that the fume hood(s) is on. Open windows where possible to increase exhaust ventilation.

7. Secure cleanup supplies. Ensure protective apparel is resistant to the spill material.
8. Confine or contain the spill to a small area.
9. Use appropriate kit to neutralize and absorb inorganic acids and bases.

VI. EXPOSURE MONITORING

Exposure monitoring shall be performed when there is reason to believe that exposures are in excess of the action-level or the PEL. Materials which require monitoring under these conditions are listed in OSHA Regulations. If an employee would like to have an exposure assessment conducted, the CHO should be contacted. Exposure assessments and monitoring may be conducted by the CHO, Facility Services, or a UAF Industrial Hygienist. Documentation of exposure monitoring shall be kept and maintained as part of each employee's personnel record.

VII. MEDICAL CONSULTATIONS AND EXAMINATIONS

Employees shall be provided an opportunity to receive medical attention, including any related follow-up examinations, at UAF's expense, under the following circumstances:

A. An individual develops signs or symptoms associated with exposure to hazardous chemicals in the laboratory.
B. Exposure monitoring reveals an exposure level routinely above the action level or PEL for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements.
C. An accident such as a spill, leak, equipment failure, or explosion results in possible over-exposure to hazardous chemicals.

The PI is responsible for establishing and maintaining an accurate record of any medical consultations and examinations provided to an employee.

VIII. SELECT CARCINOGENS, REPRODUCTIVE TOXINS, HIGHLY ACUTE TOXINS

The procedures described in this section are mandatory when performing laboratory work with greater than 10 mg or 100 mL of any carcinogen, reproductive toxin, or substance that has a high degree of acute toxicity.

A. Definitions
    1. Select carcinogens: any substance defined as such by OSHA (refer to Appendix 7).
    2. Reproductive toxin: chemicals which affect reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis).
    3. Highly Acute Toxin is any substance for which:
        a. the median oral LD50 is less than or equal to 50 mg/kg when administered orally to albino rats, or
        b. the median inhalation lethal concentration, LC50, value is less than or equal to 200 ppm by volume of gas or vapor, or 2 mg/liter or less of dust, mist, or fume when

administered continuously for one hour or less to albino rats, or

c. the median LD50 is less than or equal to 200 mg/kg when administered by continuous contact for 24 hours or less with the bare skin of albino rabbits.

4. Designated area: a hood, glove box, portion of a laboratory, or an entire laboratory room, designated as the only area where work shall be conducted with quantities of select carcinogens, reproductive toxins, or highly acute toxins in excess of the limits specified above.

B. Designated Area

Access to designated areas shall be restricted. Only trained employees will be allowed to work with chemicals in the designated area. All such persons will:

1. Use the smallest amount of chemical that is consistent with the requirement of the work to be done.
2. Always use these chemicals in a hood with adequate air flow (face velocity between 80 and 120 feet per minute) or other containment device for procedures which may result in the generation of aerosols or vapors containing the substance.
3. Use high-efficiency particulate air (HEPA) filters or high-efficiency scrubber systems to protect vacuum lines and pumps.
4. Decontaminate designated areas before normal work is resumed there. This includes contaminated equipment.
5. Remove any protective apparel, place it in an appropriately labeled container, and thoroughly wash hands, forearms, face, and neck on leaving a designated area.
6. Prepare wastes for disposal in accordance with Chemical Waste Disposal Guidelines
7. Do not wear jewelry when working in designated areas since decontamination of jewelry may be difficult or impossible.

Appendix 1
LABORATORY SPECIFIC STANDARD OPERATING PROCEDURE

In addition to the Chemical Hygiene Plan, you must include your own laboratory specific SOP's in this Appendix

Examples of information to provide include:

- Specialized Laboratory Equipment Description Policies, Procedures and Operating Requirements. Such equipment includes but is not limited to: Ventilation, lasers, Atomic Absorption, Muffle furnaces, etc.
- Specific standard operating procedures developed by each lab for operations posing a special hazard (for example, heating perchloric acid, working with pyrophorics, conducting electrophoresis, distillations, extractions, etc.
- A reference to the UAF Chemical Inventory Worksheet that should be attached as Appendix 10. Please call 6771 or 5487 if you do not have this worksheet.
- **For each chemical used in the lab that is also highlighted in yellow on the Inventory Worksheet, a Specific Laboratory Hazard Statement is required and should be included in this Appendix. A blank form is on the next page.**
- Specific procedures neutralizing noncontaminated acid wastes.
- Specific clean-up procedures for the different types of chemical in used in the lab. This should also include where the clean-up materials are stored.
- Training requirements of lab personnel. Documents should record who will be the trainer, topics to be covered, and the frequency of the training.
- Methods and frequency of conducting chemical inventories including who will perform them, where the inventory is listed is kept, and how the list will be updated.
- Policy of disposing materials when the shelf life has expired.
- Policy for storing chemicals that require special attention such as refrigeration, freezing, acid cabinets, flammable cabinets, etc.
- Specific procedures for operations that are to be conducted in fume hoods.
- Any procedures in place for transporting chemicals.
- Procedures during Emergency Power Outages as referenced in Appendix 8.
- Any other laboratory specific procedure that is required.

Portions of these requirements may be omitted if they are adequately covered in the Departmental Laboratory Policies & Procedures.

University Of Alaska Fairbanks
Chemical Hygiene Plan

Specific Laboratory Hazard Statement

This hazard statement is to be completed for any chemical present in the lab that is highlighted in yellow on the chemical inventory worksheet.

The following information is provided to communicate potentially hazardous operations and the actions taken to mitigate their associated hazards.

Department Name:_____

Lab Location: Building _____ Room _____

Laboratory Contacts:

Name: _____ Work Phone_____ Home Phone _____

Name: _____ Work Phone_____ Home Phone _____

Name: _____ Work Phone_____ Home Phone _____

Project Description (please include quantity and concentration of chemical): _____

Anticipated Duration of Project: _____

Laboratory Process or Equipment: _____

Approval Required: Yes ☐ No ☐

Principal Investigator: _____ Date _____

Lab Supervisor: _____ Date _____

University Of Alaska Fairbanks
Chemical Hygiene Plan

Chemical Information

Chemical Name: _____ CAS:_____

Quantity _____ LEL:_____ UEL:_____

Physical State Solid ☐ Liquid ☐ Gas ☐ Semi-solid ☐

Freezing Point:_____ LD50:_____ Fire Code Classification:_____

Boiling Point: _____LC50: _____ PEL:_____

Fumehood Use Only: Yes ☐ No _____

Hazard Type (check all that apply)

☐ Toxic	☐ Highly Toxic	☐ Carcinogen	☐ Teratogen
☐ Mutagen	☐ Biohazardous	☐ Radioactive	☐ Explosive
☐ Flammable	☐ Oxidizer	☐ Corrosive	☐ Reactive
☐ Pyrophoric	☐ Water Reactive	☐ Peroxide Former	

Special Precautions: _____

Potential Routes of Exposure (check all that apply)

☐ Inhalation ☐ Skin Absorption ☐ Ingestion ☐ Injection

Other:

Personal Protective Equipment (check all that apply)

☐ Gloves (specify type):_____

☐ Splash goggles	☐ Safety glasses	☐ Face shield
☐ Lab coat	☐ Apron	☐ Rubber boots
☐ Half-face respirator*		☐ Full face respirator*
☐ Powered air-purifying respirator*		☐ Supplied air respirator

☐ Self-contained breathing apparatus (SCBA)

Other PPE (please describe): _____

*Specify cartridge type: _____

Please notify UAF Environmental Health, Safety, and Risk Management if respiratory protection is needed. Medical examinations and fit tests are required for most respirator users.

Engineering/Ventilation Controls

- ☐ Fumehood use only
- ☐ Local exhaust ventilation required
- ☐ Glove box use required
- ☐ Glove bag use required
- ☐ Biosafety Cabinet use only (identify biosafety cabinet class)
  - ☐ Class I
  - ☐ Class II
  - ☐ Class III
- ☐ Ground fault interrupter required
- ☐ Grounding required
- ☐ Shielding required
- ☐ Relief valve required
- ☐ Vacuum breakers required
- ☐ Back-flow preventers required
- ☐ Spill; containment required
- ☐ Leak detection required
- ☐ Monitoring required
- ☐ Alarm(s) required

Other (please describe): _____

Special Handling Procedures and Storage Requirements

- ☐ Refrigerated storage
- ☐ Freezer storage
- ☐ Store with desiccant
- ☐ Store under nitrogen
- ☐ Light-sensitive
- ☐ Water-reactive
- ☐ Ventilated storage required
- ☐ Spill containment required

Describe safe handling and storage procedures: _____

Spill Response Procedures

Leaks or spills must be promptly reported to the UAF Fire Department (911 or 7721). The caller should try to provide a detailed description of the spill, including the name and approximate quantity of the chemical(s) involved. Do not put yourself or others at risk to gather this information if it is unknown. The Fire Department is responsible for notifying UAF Environmental Health, Safety, and Risk Management or Hazardous Materials Response Team, as deemed necessary.

Waste Disposal

The UAF non-radioactive hazardous materials Transfer Request form is used to communicate the need for chemical waste removal. Chemical wastes are managed by UAF Environmental Health, Safety, and Risk Management, Hazardous Materials Division (phone 5487).

For radioactive waste removal, contact the UAF Radiation Safety Officer.

Basic in-lab non-radioactive waste management procedure checklist:

- ☐ The waste container is labeled with the UAF Non-Radioactive Hazardous Materials Transfer Request adhesive tag.
- ☐ The waste container is marked to identify its contents, including the quantity or percentage of its constituents.
- ☐ The waste container remains closed (capped) at all times, unless adding or removing waste.
- ☐ The "satellite" accumulation start date is identified on the waste container.
- ☐ The waste is stored in secondary containment.
- ☐ The waste is segregated from all incompatible materials.
- ☐ Incompatible materials are never stored in the same container.
- ☐ Waste storage areas are inspected weekly by departmental personnel.
- ☐ Containers holding hazardous waste are in good condition and not subject to failure due to their contents.
- ☐ Materials containing >500ppm VOC's in excess of 26 gallons per container are stored in DOT specification containers (contact EHS&RM).
- ☐ Completed Hazmat Transfer Request forms are sent to UAF EHS&RM to schedule waste removal when container is full.

Decontamination

Equipment and glassware decontamination procedures are as follows:

_____

Other Information:_____

LABORATORY INSPECTION CHECKLIST
Appendix 2

Laboratory Safety Inspection Checklist

This checklist is provided as a guideline to conduct internal safety surveys. This summary does not list every possible hazard, but may be useful in performing periodic safety inspections. All items are not always applicable to all facilities. Please contact UAF EHS&RM for assistance in correcting deficiencies.

Department Name:_____ Area Inspected:_____

Inspected by: _____ Date of Inspection: ___/___/___

A. Administrative

__Yes __No __N/A 1) Are employees aware of how to access and interpret Material Safety Data Sheets (MSDS's)?

__Yes __No __N/A 2) Are safety training records maintained and available for review by employees, EH&S, outside agencies?

__Yes __No __N/A 3) Is the Department's Chemical Hygiene Plan readily available to all employees?

__Yes __No __N/A 4) Are safety inspection reports maintained and available for review by employees, EH&S, outside agencies?

__Yes __No __N/A 5) Is an annual (or continuous) listing of the chemical inventory maintained and available to employees, EH&S, outside agencies?

B. General Safety Concerns

__Yes __No __N/A 1) Has an emergency information sign been posted outside the lab, indicating department personnel to contact in the event of an emergency?

__Yes __No __N/A 2) Are rooms, cabinets, designated areas containing such materials as regulated hazardous substances, radioactive materials, and biohazardous materials, posted with the appropriate warning signs?

__Yes __No __N/A 3) Are all exits and aisles to the outside free from any obstructions?

__Yes __No __N/A 4) Are there provisions in place to prevent acids, caustics, flammable liquids, and other potentially hazardous substances from entering the sewer discharge system via floor or any other type of drain?

C. Seismic Safety

__Yes __No __N/A 1) Does shelving have lips or restraints in place to prevent spillage?

__Yes __No __N/A 2) Is overhead storage minimized and restrained?

__Yes __No __N/A 3) Are cabinets and storage shelves over 42 inches in height braced or otherwise fastened to the wall to prevent their falling in the event of an earthquake?

D. Personal Protective Equipment

__Yes __No __N/A 1) Is the appropriate personal protective equipment required for the lab available and utilized?

___ Safety Glasses ___ Goggles ___ Face Shields ___ Gloves

___ Lab Coats ___ Aprons ___ Foot wear

E. Laboratory Equipment

__Yes __No __N/A 2) Are the eyewash and emergency shower stations free from any obstructions and have been tested within the last 12 months?

__Yes __No __N/A 3) Is the maximum operable sash height information posted on the chemical fumehood(s)?

__Yes __No __N/A 4) Is the maximum operable sash height information followed by all fumehood users?

__Yes __No __N/A 5) Is an airflow indicator located on the fumehood?

__Yes __No __N/A 6) Has the fumehood been tested within the last year?

__Yes __No __N/A 7) Is storage with the fumehood minimized and operations conducted at least six inches inside the fumehood face?

__Yes __No __N/A 8) Are the biological safety cabinets appropriate for the biohazard class of material being examined?

__Yes __No __N/A 9) Are the biological safety cabinets certified annually?

__Yes __No __N/A 10) Is non-ionizing radiation equipment such as lasers, microwaves, and ultraviolet light sources properly posted and shielded?

__Yes __No __N/A 11) Are vacuum systems that are capable of imploding protected with cages or barriers; are smaller vacuum systems taped?

__Yes __No __N/A 12) Glass dewars are wrapped or shielded?

__Yes __No __N/A 13) Vacuum pump belt guard is in place?

__Yes __No __N/A 14) Two pronged appliances are not with a five foot radius or directly located above a sink or flammable materials?

__Yes __No __N/A 15) GFI's (ground fault interrupters) are located on outlets within six feet of sinks?

F. Refrigerators

__Yes __No __N/A 1) Are food and beverages kept out of work areas and out of laboratory refrigerators?

__Yes __No __N/A 2) Is the proper type of refrigerator used i.e., explosion-proof for flammable liquids?

__Yes __No __N/A 3) The laboratory refrigerators are properly marked, prohibiting the storage of food or drink?

__Yes __No __N/A 4) Walk-in refrigerators can be opened from the inside?

__Yes __No __N/A 5) The refrigerator/freezer is free of chemical spills or contamination; all containers are labeled, stoppered or tightly closed?

G. Compressed Gases

__Yes __No __N/A 1) Are all cylinders properly secured in an upright position?

__Yes __No __N/A 2) Are protective caps in place when the cylinder is not in use?

__Yes __No __N/A 3) Are incompatible cylinders stored separately?

__Yes __No __N/A 4) Are the cylinders legibly marked to identify contents?

__Yes __No __N/A 5) Are gages of oxygen regulators marked with the words, "Use No Oil"?

__Yes __No __N/A 6) Are the regulators, connections and supply lines in good condition?

__Yes __No __N/A 7) Are flash arresters on flammable gas supplies for atomic absorption instruments, in-house propane gas lines, hydrogen and oxy-acetylene torch lines?

H. Hazardous Materials

__Yes __No __N/A 1) Are chemical containers properly labeled with the chemical name and hazard of the material?

__Yes __No __N/A 2) Are chemicals color-coded to identify proper storage location?

__Yes __No __N/A 3) Are chemicals stored according to hazard classification and compatibility?

__Yes __No __N/A 4) Are all containers of potential peroxide- forming chemicals dated upon receipt and utilized or disposed within one year?

__Yes __No __N/A 5) Are flammable liquids stored in flammable liquid storage cabinets or in closed metal safety cans whenever possible?

__Yes __No __N/A 6) No storage of corrosive chemicals above eye level?

I. Standard Microbiological Practices Applicable to Biosafety Level 1 & 2* Laboratories

** (Additional conditions and requirements for Biosafety Level 2 Laboratories begins at item J)*

Biosafety Level 1 Standard Microbiological Practices

__Yes __No __N/A 1) Access to the laboratory is limited or restricted at the discretion of the laboratory director when experiments or work with cultures and specimens are in progress.

__Yes __No __N/A 2) Persons wash their hands after they handle viable materials, after removing gloves, and before leaving the laboratory.

__Yes __No __N/A 3) Eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food for human use are not permitted in the work areas. Persons who wear contact lenses in laboratories should also wear goggles or a face shield. Food is stored outside the work area in cabinets or refrigerators designated and used for this purpose only.

__Yes __No __N/A 4) Mouth pipetting is prohibited; mechanical pipetting devices are used.

__Yes __No __N/A 5) Policies for the safe handling of sharps are instituted.

__Yes __No __N/A 6) All procedures are performed carefully to minimize the creation of splashes or aerosols.

__Yes __No __N/A 7) Work surfaces are decontaminated at least once a day and after any spill of viable material.

__Yes __No __N/A 8) All cultures, stocks, and other regulated wastes are decontaminated before disposal by an approved decontamination method such as autoclaving. Materials to be decontaminated outside of the immediate laboratory are to be placed in a durable, leakproof container and

closed for transport from the laboratory. Materials to be decontaminated outside of the immediate laboratory are packaged in accordance with applicable local, state, and federal regulations before removal from the facility.

__Yes __No __N/A 9) A biohazard sign may be posted at the entrance to the laboratory whenever infectious agents are present. The sign may include the name of the agent(s) in use and the name and phone number of the investigator.

__Yes __No __N/A 10) Housekeeping and maintenance activities are adequate in eliminating pest management issues.

Biosafety Level 1 Safety Equipment (Primary Barriers)

__Yes __No __N/A 11) Special containment devices or equipment such as a biological safety cabinet are generally not required for manipulations of agents assigned to Biosafety Level 1.

__Yes __No __N/A 12) It is recommended that laboratory coats, gowns, or uniforms be worn to prevent contamination or soiling of street clothes.

__Yes __No __N/A 13) Gloves should be worn if the skin on the hands is broken or if a rash is present. Alternatives to powdered latex gloves should be available.

__Yes __No __N/A 14) Protective eyewear should be worn for conduct of procedures in which splashes of microorganisms or other hazardous materials is anticipated.

Biosafety Level 1 Laboratory Facilities (Secondary Barriers)

__Yes __No __N/A 15) Laboratories should have doors for access control.

__Yes __No __N/A 16) Each laboratory contains a sink for hand washing.

__Yes __No __N/A 17) The laboratory is designed so that it can be easily cleaned. Carpets and rugs in laboratories are not appropriate.

__Yes __No __N/A 18) Bench tops are impervious to water and are resistant to moderate heat and the organic solvents, acids, alkalis, and chemicals used to decontaminate the work surface and equipment.

__Yes __No __N/A 19) Laboratory furniture is capable of supporting anticipated loading and uses. Spaces between benches, cabinets, and equipment are accessible for cleaning.

__Yes __No __N/A 20) If the laboratory has windows that open to the exterior, they are fitted with fly screens.

J. Biosafety Level 2 - Additional Conditions and Requirements

__Yes __No __N/A 1) The laboratory director has established policies and procedures whereby only persons who have been advised of the potential hazards and meet specific entry requirements (e.g., immunizations) may enter the laboratory.

__Yes __No __N/A 2) A biohazard sign has been posted on the entrance to the laboratory when etiologic agents are in use. Appropriate information that is posted includes the agent(s) in use, the biosafety level, the required immunizations, the investigator's name and telephone number, any personal

protective equipment that must be worn in the laboratory, and any procedures for exiting the laboratory.

__Yes __No __N/A 3) Laboratory personnel have received appropriate immunizations or tests for agents handled or potentially present in the laboratory (e.g., hepatitis B vaccine or TB skin testing).

__Yes __No __N/A 4) When appropriate, considering the agent(s) handled, baseline serum samples for laboratory and other at-risk personnel are collected and stored. Additional serum specimens may be collected periodically, depending on the agents handled or the function of the facility.

__Yes __No __N/A 5) Biosafety procedures have been incorporated into standard operating procedures or in a biosafety manual adopted or prepared specifically for the laboratory by the laboratory director. Personnel are advised of special hazards and are required to read and follow instruction on practices and procedures.

__Yes __No __N/A 6) The biosafety procedures described in item 67 are available for review at the following location(s):_____
_____
_____

__Yes __No __N/A 7) The laboratory director has ensured that laboratory and support personnel receive appropriate training on the potential hazards associated with the work involved, the necessary precautions to prevent exposures, and the exposure evaluation procedures. Personnel receive annual updates or additional training as necessary for procedural or policy changes.

__Yes __No __N/A 8) A high degree of precaution must always be taken with any contaminated sharp items, including needles and syringes, slides, pipettes, capillary tubes, and scalpels.

__Yes __No __N/A 9) Needles and syringes or other sharp instruments are restricted in the laboratory for use only when there is no alternative, such as parenteral injection, phlebotomy, or aspiration of fluids from laboratory animals and diaphragm bottles. Plasticware should be substituted for glassware whenever possible.

__Yes __No __N/A 10) Only needle-locking syringes or disposable syringe-needle units (i.e., needle integral to the syringe) are used for injection or aspiration of infectious materials. Used disposable needles must not be bent, sheared or broken, recapped, removed from disposable syringes, or otherwise manipulated by hand before disposal; rather, they must be carefully placed in conveniently located puncture-resistant containers for sharps disposal. Non-disposable sharps must be placed in hard-walled container for transport to a processing area for decontamination, preferably by autoclaving.

__Yes __No __N/A 11) Appropriate sharps containers are available or in use.

__Yes __No __N/A 12) Syringes which re-sheathe the needle, needleless systems, and other safety devices are used when appropriate.

__Yes __No __N/A 13) Broken glassware is not handled directly by hand, but is removed by mechanical means such as a brush and dustpan, tongs, or forceps. Containers of contaminated needles, sharp equipment, and broken glass are decontaminated before disposal, according to local, state or federal regulations.

__Yes __No __N/A 14) Cultures, tissues, specimens of bodily fluids, or potentially infectious wastes are placed in a container with a cover that prevents leakage during collection, handling, processing, storage, transport, or shipping.

__Yes __No __N/A 15) Laboratory equipment and work surfaces are decontaminated with an effective disinfectant on a routine basis, after work with infectious materials is finished, and especially after overt spills, splashes, or other contamination by infectious materials. Contaminated equipment is decontaminated according to local, state or federal regulations before it is sent for repair or maintenance or packaged for transport in accordance with applicable local, state or federal regulations, before removal from the facility.

__Yes __No __N/A 16) Spills and accidents that result in overt exposures to infectious materials are immediately reported to the laboratory director. Medical evaluation, surveillance, and treatment are provided as appropriate and written records are maintained.

__Yes __No __N/A 17) Animals not involved in the work being performed are not permitted in the lab.

Biosafety Level 2 – Safety Equipment (Primary Barriers)

__Yes __No __N/A 18) Properly maintained biological safety cabinets, preferably Class II, or other appropriate personal protective equipment or physical containment devices are used whenever:

a) Procedure with a potential for creating infectious aerosols or splashes are conducted. These may include centrifuging, grinding, blending, vigorous shaking or mixing, sonic disruption, opening containers of infectious materials whose internal pressures may be different form ambient pressures, inoculating animals intranasally, and harvesting infected tissues from animals or embryonate eggs.

b) High concentrations of large volumes of infectious agents are used. Such materials may be centrifuged in the open laboratory if sealed rotor heads or centrifuge safety cups are used, and if these rotors or safety cups are opened only in the biological safety cabinet.

__Yes __No __N/A 19) A biosafety cabinet is available in this laboratory. Provide a description of the cabinet, including manufacturer, class and safety features:

_____

_____

_____

_____

__Yes __No __N/A 20) Face protection (goggles, mask, face shield or other splatter guard) are used for anticipated splashes or sprays of infectious or other hazardous materials to the face when the microorganisms must be manipulated outside of the biosafety cabinet.

__Yes __No __N/A 21) Protective laboratory coats, gowns, smocks or uniforms designated for lab use are worn while in the laboratory. This protective clothing is removed and left in the laboratory before leaving for non-laboratory areas (e.g., cafeteria, library, administrative offices). All protective clothing is either disposed of in the laboratory or laundered by the institution; it should never be taken home by personnel.

__Yes __No __N/A 22) Gloves are worn when hands may contact potentially infectious materials, contaminated surface or equipment. Wearing two pair of gloves may be appropriate. Gloves are disposed of when overtly contaminated, and removed when work with infectious materials is completed or when the integrity of the glove is compromised. Disposable gloves are not washed, reused, or used for touching "clean" surfaces (keyboards, telephones, etc.), and they are not worn outside of the lab. Alternatives to powdered latex gloves are available. Hands are washed following removal of gloves.

Biosafety Level 2 – Laboratory Facilities (Secondary Barriers)

__Yes __No __N/A 23) Lockable doors are provided for facilities that house restricted agents (as defined in 42 CFR 72.6)

__Yes __No __N/A 24) Each laboratory contains a sink for handwashing. Foot, knee, or automatically operated sinks are recommended.

__Yes __No __N/A 25) The laboratory is designed so that it can be easily cleaned. Carpets and rugs are not present.

__Yes __No __N/A 26) Bench tops are impervious to water and resistant to moderate heat and organic solvents, acids, alkalis, and chemicals used to decontaminate the work surface and equipment.

__Yes __No __N/A 27) Laboratory furniture is capable of supporting anticipated loading and uses. Spaces between benches, cabinets, and equipment are accessible for cleaning. Chairs and other furniture used in laboratory work are covered with a non-fabric material that can be easily decontaminated.

__Yes __No __N/A 28) Biological safety cabinets are installed is such a manner that fluctuations of the room air supply and exhaust air do not cause biological safety cabinets to operate outside their parameters for containment. The biological cabinets are located away from doors, from windows, that can be opened, from heavily traveled laboratory areas, and from other potentially disruptive equipment so as to maintain the biological safety cabinets' air flow parameters for containment.

__Yes __No __N/A 29) An eyewash station is readily available.

__Yes __No __N/A 30) Illumination is adequate for all activities, avoiding reflections, and glare that could impede vision.

K. Hazardous Waste

__Yes __No __N/A 1) Is all lab personnel aware of how to have hazardous waste picked up?

__Yes __No __N/A 2) Is the disposal of hazardous substances down the drain or in the normal trash prevented?

__Yes __No __N/A 3) Are lab personnel instructed to not dispose of chemicals by evaporation in the fumehood?

__Yes __No __N/A 4) Are the proper containers obtained and used for storing hazardous waste?

__Yes __No __N/A 5) Are all containers properly marked to identify their contents and constituent concentrations and labeled with the UAF Non-Radioactive Transfer Request tag?

__Yes __No __N/A 6) Is the "satellite accumulation start date" identified on the waste container?

__Yes __No __N/A 7) Are all containers kept tightly closed except when adding or removing waste?

__Yes __No __N/A 8) Are wastes properly segregated with regard to their chemical compatibility?

__Yes __No __N/A 9) Are liquid waste containers kept in secondary containment tubs?

__Yes __No __N/A 10) Are waste storage areas inspected weekly by lab personnel?

__Yes __No __N/A 11) Are waste minimization practices used in the laboratory?

__Yes __No __N/A 12) Is infectious/biohazardous waste properly bagged and autoclaved or incinerated?

__Yes __No __N/A 13) Are all "sharps" collected in puncture and leak resistant containers prior to decontamination/disposal?

__Yes __No __N/A 14) Is broken glass collected in puncture resistant containers, marked with the words "Broken Glass" and sealed before disposal?

LABORATORY SAFETY TRAINING RECORD

Appendix 3

Print this form and keep it with your Chemical Hygiene Plan.

This is to certify that the individuals listed below were trained on the following elements of the Chemical Hygiene Plan.

- Standard Operating Procedures
- Prior Approval Circumstances
- Conducting a Hazard Assessment
- Methods of Control
- Proper Laboratory Hood Use
- Exposure Detection
- Chemical Storage
- Laboratory Waste Disposal
- Emergency Notification Procedures
- Spill Response Procedures
- Emergency Preparedness

Date:_____ Location:_____Instructor:_____

NAME (please print)	Department/Title	Initials
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Add additional pages as necessary.

Appendix 4 Chemical Hygiene Plan - Checklist for Vacating Labs

PI name: _____ **Person(s) completing checklist:** _____

Building: _____ **Room #:** _____ **Date lab is to be vacated:** _____

When vacating a lab space, please complete this checklist and return to your Chemical Safety Officer (CSO). As a courtesy to the next person moving into the lab, outgoing PIs are responsible for ensuring that the following checklist is completed. Questions? Call EHS&RM at x5812 for assistance with any of the items below or if you do not have a CSO.

- ❑ **Chemicals:** All chemicals and chemical wastes must be removed from the lab.
  - o Contact your CSO regarding the following:
    - For assistance in moving chemicals to a new lab space
    - To surplus unwanted chemicals
    - For assistance in arranging for chemical and other hazardous waste to be removed from the lab
  - o Contact your CSO if your lab needs to be decontaminated (e.g. if you used ethidium bromide or other toxic chemicals in the lab).

- ❑ **Equipment:** All unwanted equipment (including glassware and other lab supplies) must be removed from the lab. Freestanding chemical storage cabinets (e.g. flammables and corrosives) may remain, as long as they are empty and clean.

- ❑ **Hoods:** Fume hood work surfaces must be free of chemical spills and any paper liners should be removed and disposed of appropriately (e.g. in trash or in chemical waste if contaminated with hazardous chemicals such as ethidium bromide).

- **Radioactive materials areas:**
  - o All labs where radioactive materials were used must be swiped to ensure that the lab is free of radioactive contamination. Please contact EHS&RM prior to moving anything out of the lab, as all potentially contaminated surfaces/items must be tested.
  - o If the lab is destined to become an unrestricted space, it must be decommissioned. Please contact EHS&RM for further assistance.

- ❑ **General lab cleanliness:**
  - o All lab bench tops, sinks, and shelves should be washed down with soap and water so that they are free of dust and dirt.
  - o All trash should be removed from the lab, and floors should be swept and/or mopped.
  - o All tape should be removed from walls, doors, drawers, and cabinets.
  - o All posters should be removed from walls and doors.

Following completion of this checklist, the lab will be inspected by your CSO, EHS&RM, or departmental head prior to being turned over to either a new occupant or to Facilities Services for renovations and/or painting. The lab will not be released until all of the guidelines listed above have been met. Please ask for assistance if necessary.

For office use only:

Inspected by: _____ Date: _____

Pass: Y N

Notes:

Appendix 5 In Case of Emergency

YOU ARE IN ROOM # _____ IN BLDG# _____ AT PHONE#_____

Employee = Workers' Compensation "First Report of Injury" Student/Visitor = UAF "Accident/Injury Report"

EMERGENCY ASSEMBLY POINT (OUTSIDE): _____

Please keep this form in a prominent position in your off

EMERGENCY **EVENT**	**FIRST ACTION**	**THEN DO THIS**
FIRE OR EXPLOSION	Call 911	PULL ALARM, CLOSE DOORS, EVACUATE
CHEMICAL SPILL THAT IS or MIGHT BE LIFE THREATENING	Call 911	EVACUATE TO NEARBY AREA, REMOVE VICTIMS CLOTHING, DOUSE W/ WATER -15 MINUTES
CHEMICAL SPILL NOT LIFE THREATENING	Attend to anyone who may have been contaminated, call EHS&RM Hazmat Section at x5487	SECURE SPILL AREA, CLOSE DOORS, AND NOTIFY NEIGHBORING AREAS. (See Section V.B. of this Plan)
RADIOACTIVE SPILL	Call 911 and RSO	DETAIN THOSE CONTAMINATED, CONSULT RADIATION SAFETY MANUAL
CARDIAC ARREST	Call 911	ENSURE ACCESS TO THE AREA, BEGIN CPR IF QUALIFIED
ODD ODOR Gas Odor	Call CHO, EHS&RM 5413, or UFD 7721	IDENTIFY SOURCE IF POSSIBLE
EARTHQUAKE If a gas leak or electrical hazard is detected	DO NOT CALL Call 7000 (FS)	INSIDE- GET BENEATH STRUCTURE (desk, doorway) / OUTDOORS GET INTO OPEN AREA AFTER TREMOR.
SECURITY PROBLEM - PERSON OR ANIMAL	Call 6200 or 911 24 hrs/UAF Police	GET COMPLETE DESCRIPTION
UTILITY FAILURE	Call x7000 (FS) If after hours call Dispatch at x7721	GIVE EXACT LOCATION OF UTILITY FAILURE. TURN OFF EQUIPMENT, MAJOR APPLIANCES. DO NOT USE OPEN FLAMES FOR LIGHTING.
MEDICAL ASSIST	Call 911	COMPLETE THE APPROPRIATE REPORTING FORM*

IN CASE OF EMERGENCY -

HAZARDOUS MATERIALS PICKUP AND DISPOSAL PROCEDURES

Appendix 6

Hazardous materials are defined as those materials that are: flammable, corrosive, air or water reactive or toxic (see Definitions of Hazardous Materials below). Environmental Health, Safety, and Risk Management (EHS&RM), Hazardous Materials Section, is charged with the responsibility of removing all hazardous materials, used and unused, from UAF facilities. Materials picked up by EHS&RM are recycled, used by someone else, or disposed of at an EPA approved facility. The complete disposal procedure is found under UAF Policy 601 Hazardous Materials Management Procedure.

TO HAVE HAZARDOUS MATERIALS REMOVED FROM YOUR AREA, YOU MUST:

- Communicate the need for the removal of hazardous materials or other chemicals by utilizing the UAF Hazardous Materials Transfer Request Forms which are available upon request from the EHS&RM Hazmat Section.
- Fill out and affix required hazardous material label on containers and promptly place in approved hazardous material collection areas.
- At the time when the accumulation of a material begins, the date should be clearly marked and visible for inspection (mark "satellite accumulation start date" on transfer label).
- Send the white and yellow copies of the three part UAF Hazardous Material Transfer Request Form to the EHS&RM Hazmat Section.
- Retain the pink copy of request form for department records.
- Upon receipt of the UAF Hazardous Material Transfer Request Form, the EHS&RM Hazmat Section will arrange for pick-up and transfer of all the materials listed on the form to an approved hazardous material accumulation site. The hazardous materials are removed from collection areas by EHS&RM Hazmat Section personnel.

PROCEDURES FOR PROPERLY COLLECTING, STORING, HANDLING AND TRANSPORTING HAZARDOUS MATERIALS:

- Keep all hazardous materials in appropriate closed containers with airtight lids. Do not store hazardous materials in a fume hood. Keep all hazardous material containers closed at all times except when adding or removing the material.
- Do not mix incompatible chemicals (i.e. oxidizers with flammables . . .).
- Do not mix hazardous materials with non-hazardous materials. It greatly increases waste disposal costs.
- Accurately label all containers with chemical names and exact content as well as date of purchase. It is imperative to avoid producing containers whose contents are unknown. Such materials are very expensive to dispose of. If containers of unknown chemicals are found, please contact EHS&RM Hazmat Section to make special arrangements.

PACKAGING REQUIREMENTS FOR ALL HAZARDOUS MATERIALS

- The outside of the containers must be clean and free of chemical contamination.
- Use appropriate containers. All glass containers must be securely packaged to prevent breakage during transport.
- All containers of liquids must have screw lids and must not leak when inverted. Corks, cotton plugs, tape, or parafilm are not acceptable lids for containers of hazardous materials.
- If possible, use the same container for disposal of used material that held the new material originally.
- Metal cans are not acceptable for accumulating hazardous solvents - except for waste oil.
- Loose solid materials must be placed in a sealed container or in a cardboard box lined with two polyethylene bags.
- Containers storing hazardous materials must be kept closed, except when adding or removing contents.

DEFINITIONS OF HAZARDOUS MATERIALS

Hazardous materials are those that "could cause injury or death; or damage or pollute land, air, or water." Hazardous wastes are defined as substances that are ignitable (flammable), corrosive, toxic, explosive, or reactive, i.e., react with air, water, or acids or bases. Specific definitions are found in the Code of Federal Regulations: 40CFR part 261. These are summarized below.

Ignitable: This category contains materials that are easily combustible or flammable. This includes liquids that have a flash point less than 60C (140F), and non-liquids that are capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture, or spontaneous chemical change and when ignited burn so vigorously and persistently that they create a hazard, and any ignitable compressed gas described in 40 CFR 173.300. Examples are solvents and spent solvents (acetone, benzene, ethyl acetate, ethyl ether, methanol, methyl isobutyl ketone, xylene); ignitable paint waste (some paint removers, brush cleaners, and stripping agents; epoxy resins and adhesives (epoxies, rubber cements and marine glues); inks containing flammable solvents, and some degreasers. For additional information see 40 CFR 261.21.

Corrosive: This category includes acids and bases or mixtures having a pH less than or equal to 2 or greater than or equal to 12.5, and materials that burn the skin or dissolve metals. Examples are strong mineral acids (chromic, sulfuric, hydrochloric, or nitric) strong alkalis (potassium hydroxide), rust removers, and acid or alkaline cleaning fluids. This category also includes solids that when mixed with water form solutions that are strongly acidic or basic (ferric chloride, sodium hydroxide). For additional information see 40 CFR 261.22

Reactive: This category includes materials that are unstable or undergo rapid or violent chemical reaction when exposed to air, water or other material, generate toxic gases or vapors when mixed with water or when exposed to pH conditions between 2 and 12.5 (as in the case with cyanide or sulfide containing materials), forms potentially explosive mixtures with water, are capable of detonation or explosive reaction when heated or subjected to shock. Examples are acetyl chloride, chromic acid, cyanides, hypochlorides, organic peroxides, perchlorates, permanganates, sulfides, some plating materials and bleaches. For additional information see 40 CFR 261.23

Toxic: This category includes heavy metal compounds such as: arsenic, barium, cadmium, chromium, lead, mercury, silver, selenium, etc. Pesticides such as, Aldrin, arsenic pentoxide, arsenic trioxide, cacodylic acid, chlordane, copper cyanides, DDT, Dieldrin, dimethylcarbamoyl chloride, Endrin, Lindane, pentachlorophenol, strychnine, etc.

Pathogenic, Carcinogenic, Infectious, and Etiologic agents: Includes any material that directly cause health problems such as, "a viable microorganism, or its toxin, which causes or may cause disease in humans or animals" (41 CFR 173.134). Infectious waste includes BloodBorne pathogens (for example, hepatitis or AIDS virus). For a more detailed definition see the UAF Biosafety Manual and BloodBorne Pathogens Exposure Control Plan, available from the Department of EHS&RM (phone 5413).

Sharps: Sharps are defined as any non-contaminated sharp object that can penetrate the skin, including, but not limited to: broken capillary tubes and pipettes, blades from power tools, glass microscope slides and cover plates, and hypodermic and non-hypodermic needles.

There may be other hazardous substance that are not included here. It is your responsibility to determine if the materials you use are hazardous to human health or the environment. If you have any doubt, tag it for pickup and EHS&RM Hazmat Section will dispose of it appropriately.

You can find information about your material by looking at the Material Safety Data Sheet, available from the manufacturer. You should have Material Safety Data Sheets accessible for all substances you utilize.

UAF Hazardous Materials Shipment Request Form

Instructions: Complete the following questionnaire and submit to your Lab Safety Manager. *In the event that your department does not employ an individual that is trained and certified to prepare hazardous materials shipments, please fax the request form to UAF Environmental, Health, Safety and Risk Management (fax # 474-5489).*

Note: In addition to chemical substances, the hazardous materials shipping regulations include such items as: batteries, internal combustion engines, dry ice, diagnostic specimens, etc. A searchable copy of the regulations is available at: http://www.myregs.com/dotrspa/

Shipped From: (include department name, street address, point of contact and phone number)
Shipped To: (include name, street address, point of contact and phone number)
Special shipping requirements, (ie., cold packs, dry ice):
Preferred shipping method and carrier: (ground transport, air transport) via:
Proposed date for shipment:
Will a return shipment of these materials be required ? (Yes) (No)
Material Description (please complete questions 1 thru 5 for each individual substance)
1) Name of Material:
2) Physical state, ie., solid, liquid, gas, semisolid
3) Quantity of material (per container):
4) Total quantity of material to be shipped:
5) Describe how the material is currently packaged (ie., glass, plastic, metal, fibreboard; original packagings etc.):

Please identify additional materials for this shipment on the attached continuation sheet.

Hazmat Shippers Request Form submitted by:_____

Page 1 of____ Phone: _____ Date:____/____/____

Material Description (please complete questions 1 thru 5 for each individual substance)
1) Name of Material:
2) Physical state, ie., solid, liquid, gas, semisolid
3) Quantity of material (per container):
4) Total quantity of material to be shipped:
5) Describe how the material is currently packaged (ie., glass, plastic, metal, fibreboard; original packagings etc.):
Material Description (please complete questions 1 thru 5 for each individual substance)
1) Name of Material:
2) Physical state, ie., solid, liquid, gas, semisolid
3) Quantity of material (per container):
4) Total quantity of material to be shipped:
5) Describe how the material is currently packaged (ie., glass, plastic, metal, fibreboard; original packagings etc.):
Material Description (please complete questions 1 thru 5 for each individual substance)
1) Name of Material:
2) Physical state, ie., solid, liquid, gas, semisolid
3) Quantity of material (per container):
4) Total quantity of material to be shipped:
5) Describe how the material is currently packaged (ie., glass, plastic, metal, fibreboard; original packagings etc.):

 By:_____ Date: ___/___/___

SELECT CARCINOGENS
Appendix 7 *

OSHA's definition of Select Carcinogens includes substances on the following lists:

OSHA Regulated Carcinogens including substance such as (29 CFR...)

"13 Carcinogens" 1910.1045	1910.1003	Acrylonitrile
Inorganic Arsenic 1910.1101	1910.1018	Asbestos
Benzene 1910.1051	1910.1028	1,3-Butadiene
Cadmium 1910.1029	1910.1027	Coke oven emissions
1,2-Dibromo-3-chloropropane 1910.1047	1910.1044	Ethylene oxide
Formaldehyde 1910.1052	1910.1048	Methylene chloride
Methylenedianiline 1910.1017	1910.1050	Vinyl chloride

WHO IARC Monographs Database
- Group 1 – List of Human Carcinogens
- Group 2A – List of Probable Human Carcinogens
- Group 2B – List of Possible Human Carcinogens

NTP's most recent Report on Carcinogens:
- List of Substances Known to be Human Carcinogens
- List of Substances Reasonably Anticipated to be Human Carcinogens

The following a PARTIAL list of known or potential carcinogens:

CHEMICAL NAME	CAS NUMBER	CATEGORY*
2-Acetylaminofluorene	53-96-3	NTPAHC OSHA 13
Acrylonitrile	107-13-1	IARC 2B;NTPAHC
Actinimycin D	50-76-0	IARC 3
Adriamycin	23214-928	IARC 2A;NTPAHC
Aflatoxins	1402-68-2	IARC 1;NTPHC
2-Aminoanthraquinone	117-79-3	NTPAHC
o-Aminoazotoluene	97-56-3	IARC 2Bs
4-Aminodiphenyl	92-67-1	IARC 1;NTPHC, OSHA 13
2-Amino-5-(5-nitro-2-furyl)-1,3,4-thiadiazole	712-68-5	IARC 2Bs
Amitrole	61-82-5	IARC 2B;NTPAHC

CHEMICAL NAME	CAS NUMBER	CATEGORY*
O-Anisidine	90-04-0	IARC 2Bs;NTPAHC
O-Anisidine hydrochloride	134-29-2	NTPAHC
Aramite	140-57-8	IARC 2Bs;NTPAHC
Arsenic	7440-38-2	IARC 1;NTPHC
Arsenic compounds	7440-38-2	NTPHC
Arsenic pentoxide	1303-28-2	IARC 1
Arsenic trioxide	1327-53-3	IARC 1;NTPHC
Arsenic, inorganic compounds	7440-38-2	IARC 1;NTPHC
Asbestos		IARC 1;NTPHC
Auramine	492-80-8	IARC 2B
Azaserine	115-02-6	IARC 2Bs
Azathioprine	446-86-6	IARC 1;NTPHC
Benzene	71-43-2	IARC 1;NTPHC
Benzidine	92-87-5	IARC 1;NTPHC, OSHA 13
Benzo(a)pyrene	50-32-8	IARC 2A
Benzo(b)fluoranthene	205-99-2	IARC 3
Benzotrichloride	98-07-7	NTPAHC
Benzyl violet	1694-09-3	IARC 2Bs
Beryllium and compounds	7440-41-7	IARC 1;NTPAHC
Bis-(chloromethyl) ether	542-88-1	IARC 1;NTPHC, OSHA 13
Bis-chloroethyl nitrosourea	154-93-8	IARC 2A;NTPAHC
1,4-Butanediol dimethane-sulphonate	55-98-1	IARC 1;NTPHC
B-butyrolactone	3068-88-0	IARC 2Bs
Cadmium and compounds	7440-43-9	NTPAHC
Carbon tetrachloride	56-23-5	IARC 2B;NTPAHC
Chlorambucil	305-03-3	IARC 1;NTPHC
Chloramphenicol	56-75-7	IARC 2B
Chlorinated toluenes		IARC 1
1-(2-Chloroethyl)-3-cyclo-hexyl-1-nitrosourea	13010-47-4	IARC 1;NTPAHC
4-Chloro-*o*-phenylenediamine	95-83-0	IARC 2Bs;NTPAHC
Chromium hexavalent compounds	1333-82-0	IARC 1;NTPHC
Cisplatin	15663-27-1	IARC 2A
Citrus red no. 2	6358-53-8	IARC 2Bs
Cobalt-chromium alloy	11114-92-4	IARC 2B;NTPHC

CHEMICAL NAME	CAS NUMBER	CATEGORY*
Creosote(s)	8001-58-9	IARC 2Bs
p-Cresidine	120-71-8	IARC 2Bs;NTPAHC
Cupferron	135-20-6	NTPAHC
Cycasin	14901-08-7	IARC 2Bs;NTPAHC
Cyclophosphamide	50-18-0	IARC 1;NTPHC
Dacarbazine	4342-03-4	IARC 2B;NTPAHC
Daunomycin	20830-81-3	IARC 2Bs
DDT	50-29-3	IARC 2B;NTPAHC
N,N'-Diacetylbenzidine	613-35-4	IARC 2Bs
2,4-Diaminoanisole sulfate	39156-41-7	IARC 2Bs;NTPAHC
4,4'-Diaminodiphenyl ether	101-80-4	IARC 2Bs
2,4-Diaminotoluene	95-80-7	IARC 2Bs;NTPAHC
Dibenz(a,h)acridine	226-36-8	IARC 2Bs;NTPAHC
Dibenz[a,j]acridine	224-42-0	IARC 2Bs;NTPAHC
Dibenz[a,h]anthracene	53-70-3	IARC 2B;NTPAHC
Dibenzo(a,e)pyrene	192-65-4	IARC 2Bs
Dibenzo[a,h]pyrene	189-64-0	IARC 2Bs;NTPAHC
Dibenzo([a,i]pyrene	189-55-9	IARC 2Bs;NTPAHC
Dibenzo[q,i]pyrene	189-55-9	IARC 2Bs;NTPAHC
Dibromochloropropane (DBCP)	96-12-8	IARC 2Bs;NTPAHC
3,3'-Dichlorobenzidine	91-94-1	IARC 2B;NTPAHC, OSHA 13
Dichlorodiaminodiphenyl ether	284-34-86-8	IARC 2Bs
Diethyl sulfate	64-67-5	IARC 2A;NTPAHC
Diethylstilbestrol	56-53-1	IARC 1;NTPHC
Dihydrosafrole	94-58-6	IARC 2Bs
3,3'-Dimethoxybenzidine	119-90-4	IARC 2B;NTPAHC
trans-2((Dimethylamino)methylimino)5-(2-(5-nitro-2-furyl)vinyl)-1,3,4-oxadiazole	55738-54-0	IARC 2Bs
1,1-Dimethylhydrazine (UDMH)	57-14-7	IARC 2Bs;NTPAHC
Dimethyl sulfate	77-78-1	IARC 2A;NTPAHC
Dimethylaminoazobenzene	60-11-7	IARC 3;NTPAHC, OSHA 13
Dimethylcarbamoyl chloride	79-44-7	IARC 2A;NTPAHC
Dioxane	123-91-1	IARC 2B;NTPAHC
Estrone	53-16-7	IARC 2B;NTPAHC
Ethyl methanesulfonate (EMS)	62-50-0	IARC 2B

CHEMICAL NAME	CAS NUMBER	CATEGORY*
Ethylene dibromide (EDB)	106-93-4	IARC 2B;NTPAHC
Ethylene thiourea	964-45-7	IARC 2B;NTPAHC
Ethyleneimine	15-15-64	OSHA 13
Formaldehyde	50-00-0	IARC 2B;NTPAHC
2-(2-Formylhydrazino)-4-(5-nitro-2-furyl)thiazole	3570-75-0	IARC 2B
Glycidylaldehyde	765-34-4	IARC 2B
Hexachlorobenzene	118-74-1	IARC 2B;NTPAHC
Hexamethyl phosphoramide	680-31-9	IARC 2B;NTPAHC
Hydrazine, sulfate (1:1)	10034-93-2	NTPAHC
Lasiocarpine	303-34-4	IARC 2B
Lead acetate	301-04-2	NTPAHC
Lead chromate(VI) oxide	18454-12-1	IARC 1;NTPHC
Lindane, and mixed isomers	58-89-9	NTPAHC
Melphalan	148-82-3	IARC 1;NTPHC
Merphalan	531-76-0	IARC 2B
Mestranol	72-33-3	IARC 2B;NTPAHC
Methyl chloromethyl ether	107-30-2	OSHA 13
4,4'-Methylene bis-(2-chloroaniline)	101-14-4	IARC 2B;NTPAHC
4,4'-Methylene bis(N,N-dimethyl)benzeneamine	101-61-1	NTPAHC
4,4'-Methylene bis (2-methylaniline	838-88-0	IARC 2A
Methylenedianiline	101-77-9	NTPAHC
Methylenedianiline dihydro-chloride	13552-44-8	NTPAHC
Methyl iodide	74-88-4	IARC 3;NTPAHC
Methyl methanesulfonate (MMS)	66-27-3	IARC 2A
Methylnitroanthraquinone	129-15-7	IARC 2B
Methylnitronitrosoguanidine	70-25-7	IARC 2A
Methylazoxymethanol acetate	592-62-1	IARC 2B
Methylthiouracil	56-04-2	IARC 2B
Metronidazole	443-48-1	IARC 2B;NTPAHC
Michler's ketone	90-94-8	NTPAHC
Mirex	2385-85-5	IARC 2B;NTPAHC
Mitomycin C	50-07-7	IARC 2B
Monocrotaline	315-22-0	IARC 2B
Mustard gas	505-60-2	IARC 1;NTPHC
alpha-Naphthylamine	134-32-7	OSHA 13

CHEMICAL NAME	CAS NUMBER	CATEGORY*
beta-Naphthylamine (2-Naphthylamine)	91-59-8	IARC 1;NTPHC, OSHA 13
5-Nitroacenaphthene	602-87-9	IARC 2B
4-Nitrobiphenyl	92-93-3	OSHA 13
5-Nitro-*o*-anisidine	99-59-2	NTPAHC
N-Nitrosodimethylamine	62-75-9	OSHA 13
beta-Propiolactone	57-57-8	OSHA 13

IARC International Agency for Research on Cancer

Group 1 The agent (mixture) is carcinogenic to humans. The exposure circumstances entail exposures that are carcinogenic to humans.

Group 2A The agent (mixture) is *probably* carcinogenic to humans. The exposure circumstance entails exposures that are probably carcinogenic to humans.

Group 2B The agent (mixture) is *possibly* carcinogenic to humans. The exposure circumstance entails exposures that are possibly carcinogenic to humans.

Group 3 The agent (mixture or exposure circumstances) is unclassifiable as to carcinogenicity in humans.

Group 4 The agent (mixture, exposure circumstance) is probably not carcinogenic to humans,

NTP National Toxicity Program

AHC Anticipated Human Carcinogen

HC Known Human Carcinogen

OSHA - Occupational Safety and Health Administration

13 OSHA-Regulated carcinogens