



ADVISORY 7.4
HANDLING HAZARDOUS CHEMICALS - GENERAL PRINCIPLES

Every worker should observe the following rules and contact EH&S for guidance:

- Know the safety rules and procedures that apply to the work being performed. Determine the potential safety hazards and appropriate safety precautions before beginning any new operation. Material Safety Data Sheets provide useful information.
- Know the location of and how to use the emergency equipment in your area, as well as how to obtain additional help in an emergency. Be familiar with emergency procedures.
- Know the types of protective equipment available and use the proper type for each job.
- Be alert to unsafe conditions and actions and call attention to them so corrections can be made as soon as possible. Someone else's accident can be as dangerous to you as your own.
- Avoid consuming food or beverages or smoking in areas where chemicals are being used or stored.
- Avoid hazards to the environment by following accepted waste disposal procedures.
- Be certain all chemicals are correctly and clearly labeled. Post warning signs when unusual hazards (i.e., asbestos, laser operations, radiation, and biohazards) exist.
- Remain out of the area of a fire or personal injury unless it is your responsibility to help resolve the emergency.
- Avoid distracting or startling other workers.
- Use equipment only for its designated purpose.
- When performing chemical operations, combine reagents in the proper order and avoid adding solids to hot liquids or water to concentrated acids.

HEALTH AND HYGIENE

All persons working in the laboratory should observe the following safety practices:

- Wear appropriate eye protection at all times.
- Use protective apparel, including face shields, gloves, and other special clothing and footwear as needed. Sandals are not adequate footwear when working with chemicals. Do not wear shoes constructed of fabrics such as canvas or nylon.
- Confine long hair and loose clothing.
- Do not use mouth suction to pipette chemicals or to start a siphon; a pipette bulb or aspirator should be used to provide vacuum.
- Avoid exposure to gases, vapors and aerosols. Use appropriate safety equipment (i.e. fume hoods, respirators) whenever such exposure is likely. Respirators must be approved by EH&S.
- A medical evaluation and training is required prior to respirator use.



Environmental Health and Safety Advisory

- Wash hands well before leaving the lab or work area. Avoid the use of solvents when washing the skin as they can cause irritation and inflammation and may facilitate absorption of a toxic chemical.

TYPES OF HANDLING PROCEDURES

The following procedures should be followed when handling toxic chemicals:

- OSHA has published detailed procedures for working with substances classified as carcinogens (**see Appendix A**). Anyone contemplating work with these materials should consult EH&S who will advise them of the necessary approvals, training, working conditions, monitoring, recordkeeping and medical surveillance.
- **Appendix B** should be followed in operations using those substances believed to have a high chronic toxicity even when used in small amounts. This includes certain heavy metal compounds and carcinogens not currently regulated by OSHA (**see Appendix D**).
- **Appendix C** should be followed in operations using substances of moderate chronic or high acute toxicity (i.e., substances for which infrequent small quantities do not pose a significant toxic hazard, but which can be dangerous to those exposed to high concentrations or repeated small doses). These substances include corrosives and irritants.

The basic precautions for safe handling of flammable materials include the following:

- Flammable substances should be handled only in areas free of ignition sources.
- 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.
- When transferring flammable liquids in metal equipment, static generated sparks should be avoided by bonding and the use of ground straps.
- Ventilation is one of the most effective ways to prevent the formation of flammable mixtures. An exhaust hood should be used whenever appreciable quantities of flammable substances are transferred from one container to another, allowed to stand in open containers, heated in open containers, or handled in any other way.

Handling of explosive chemicals requires special precautions as follows:

- Barriers such as shields, barricades and guards should be used to protect personnel and equipment from injury or damage and should completely surround the hazardous area.
- Protective safety glasses should be worn at all times and face shields with throat protectors when worker is in a hazardous, exposed position (i.e. when operating or manipulating synthesis systems, when bench shields are moved aside, or when handling or transporting explosive chemicals).
- Protective gloves (i.e. electric lineman's gloves) should be worn whenever it is necessary to reach behind a shielded area while hazardous experiment is in progress or when handling adducts or gaseous reactants.
- Lab coats must be worn at all times while in labs where explosives are present. They should be of a slow-burning material and fitted with quick release cloth buttons.
- Explosive materials should be brought into the lab only as required and then in the smallest quantities adequate for the experiment being conducted.



Environmental Health and Safety Advisory

- When potentially explosive materials are being handled, the area should be posted with a sign such as:

**WARNING!
VACATE THE AREA AT THE FIRST SIGN OF ODOR
STAY OUT UNTIL THE VENTILATION SYSTEM
HAS BEEN CLEARED**

Precautions for handling peroxides include the following:

- The quantity of peroxide should be limited to the minimum amount required. Unused portions should not be returned to the container.
- All spills should be cleaned up immediately. Solutions of peroxides can be absorbed on vermiculite.
- The sensitivity of most peroxides to shock and heat can be reduced by dilution with inert solvents, such as aliphatic hydrocarbons. However, toluene is known to induce the decomposition of diacyl peroxides.
- Solutions of peroxides in volatile solvents should not be used under conditions in which the solvent might be vaporized, as this will increase the peroxide concentration in solution.
- Metal spatulas should not be used to handle peroxides because contamination by metals can lead to explosive decomposition. Ceramic or wooden spatulas should be used.
- Smoking, open flames, and other sources of heat should not be permitted near peroxides.
- Friction, grinding and all forms of impact should be avoided near peroxides. Glass containers with screw-cap lids or glass stoppers should not be used. Polyethylene bottles that have screw cap lids should be used.
- To minimize the rate of decomposition, peroxides should be stored at the lowest possible temperature consistent with their solubility or freezing point. Liquid solutions of peroxides should not be stored at or lower than the temperature at which the peroxide freezes or precipitates because peroxides in these forms are extremely sensitive to shock and heat.



APPENDIX A
OSHA LIST OF REGULATED CARCINOGENS
29 CFR 1910, as of 10/16/2003

Asbestos	Ethyleneimine	Coke oven emissions
4-Nitrobiphenyl	beta-Propiolactone	1,2-dibromo-3-chloropropane
alpha-Naphthylamine	2-Acetylaminofluorene	Acrylonitrile
Methyl chloromethyl ether	4-Dimethylaminoazobenzene	Ethylene oxide
3,3'-Dichlorobenzidine (and its salts)	N-Nitrosodimethylamine	Formaldehyde
bis-Chloromethyl ether	Vinyl chloride	Methylenedianiline
beta-Naphthylamine	Inorganic arsenic	1,3-Butadiene
Benzidine	Cadmium	Methylene Chloride
4-Aminodiphenyl	Benzene	



**APPENDIX B
GENERAL PROCEDURES AND PRECAUTIONS FOR WORKING WITH
SUBSTANCES OF MODERATE CHRONIC OR HIGH ACUTE TOXICITY**

The precautions and procedures described below should be followed if any of the substances being used in significant quantities is known to be moderately or highly toxic. (If any substance being used is known to be highly toxic, it is desirable that two people be present in the area at all times.) These procedures should also be followed if the toxicological properties of any of the substances being used or prepared are unknown. (Consult the MSDS or EH&S personnel for the toxicological properties of a chemical.) If any of the substances to be used or prepared are known to have high chronic toxicity (i.e., heavy metal compounds and strong carcinogens) then the precautions and procedures described below should be supplemented with additional precautions (**see Appendix C**).

The following three precautions should always be followed:

- Protect the hands and forearms by wearing both gloves and a lab coat or suitable long gloves to avoid contact of toxic material with the skin. Contact EH&S for information on suitable gloves.

- Procedures involving volatile toxic substances and those involving solid or liquid toxic substances that may result in the generation of aerosols should be conducted in a hood or other suitable containment device. If such a device is not feasible then proper respiratory protection shall be worn. Consult with EH&S regarding approved respiratory protection.

- After working with toxic materials, wash hands and arms immediately. Never eat, drink, smoke, apply cosmetics, take medicine or store food in areas where toxic substances are being used.

See Appendix D for a list of substances “known to be carcinogens” or “reasonably anticipated to be carcinogens” by the U.S. Department of Health and Human Services as published in the Annual Reports on Carcinogens. The Reports are informational documents that represent an initial step in hazard identification of the substances selected for inclusion; the Reports do not present assessments of carcinogenic risk.



**APPENDIX C
ADDITIONAL PROCEDURES AND PRECAUTIONS FOR WORKING WITH
SUBSTANCES OF KNOWN HIGH CHRONIC TOXICITY**

All of the procedures and precautions described in **Appendix B** should be followed when working with substances known to have chronic toxicity. In addition, when such substances are used in quantities in excess of a few milligrams to a few grams, the additional precautions described below should be used. Substances in this high-chronic-toxicity category include certain heavy metals (i.e., nickel carbonyl) and compounds normally classified as strong carcinogens.

The precautions are as follows:

- Each worker's plans for experimental or other work must be approved by a supervisor.
- An accurate record of the amounts of such substances being stored and the amounts used, dates of use, and names of users should be maintained.
- Any volatile substances having high chronic toxicity should be stored in a ventilated storage area in a secondary tray or container with sufficient capacity to contain the material should the primary container break.
- All containers of substances in this category should have labels that identify the contents and include a warning such as:

**WARNING!
HIGH CHRONIC TOXICITY or CANCER-SUSPECT AGENT**

- Storage areas for these substances should have limited access and special signs posted if special toxicity hazard exists.
- All work with and transfers of these substances or mixtures thereof should be done in a controlled area which is defined as an area designated for the use of highly toxic materials. Such areas should be clearly marked with a conspicuous sign such as:

**WARNING!
TOXIC SUBSTANCE IN USE or CANCER-SUSPECT AGENT
AUTHORIZED PERSONNEL ONLY**

- Only authorized and instructed personnel should be allowed to work in or have access to controlled areas.
- Surfaces on which high chronic toxicity materials are handled should be protected from contamination by using chemically resistant trays that can be decontaminated after work or by using dry, absorbent, plastic-backed paper that can be disposed of after use.
- On leaving a controlled area, workers should remove any protective apparel that has been used and thoroughly wash hands, forearms, face and neck. If disposable apparel or absorbent paper liners have been used, these items should be placed in a closed, impervious container that should then be labeled in some manner such as:

**CAUTION:
CONTENTS CONTAMINATED WITH SUBSTANCES
OF HIGH CHRONIC TOXICITY**



Environmental Health and Safety Advisory

- Nondisposable protective apparel should be thoroughly washed and containers of disposable apparel and paper liners should be incinerated.

- In the event of continued experimentation with a substance of high chronic toxicity (i.e. use of significant quantities three times a week), a qualified physician should be consulted to determine whether it is advisable to establish a regular schedule of medical surveillance and/or biological monitoring.

See Appendix D for a list of substances “known to be carcinogens” of “reasonably anticipated to be carcinogens” by the U.S. Department of Health and Human Services as published in the Annual Reports on Carcinogens. The Reports are informational documents that represent an initial step in hazard identification of the substances selected for inclusion; the Reports do not present assessments of carcinogenic risk.



APPENDIX D
LISTING OF SUBSTANCES IN THE ANNUAL REPORT ON
CARCINOGENS MANDATED BY PUBLIC LAW 95-622:

For the purpose of this Report, "known carcinogens" are defined as those substances for which there is sufficient evidence of carcinogenicity from studies in humans to indicate a causal relationship between the agent and human cancer. "Reasonably anticipated to be carcinogens" are those substances for which there is limited evidence of carcinogenicity in humans and/or sufficient evidence of carcinogenicity in experimental animals. Sufficient evidence in animals is demonstrated by positive carcinogenicity findings in multiple strains and species of animals, in multiple experiments, or to an unusual degree with regard to incidence, site, type of tumor, or age of onset. Only substances for which the evidence of carcinogenicity has been peer-reviewed are evaluated for possible inclusion in the Annual Reports".

The following list of substances is from the [Twelfth Annual Report on Carcinogens, 2011](#).

Substances or groups of substances, occupational exposures associated with a technological process, and medical treatments that are known to be carcinogenic:

Substances Listed in the Twelfth Report on Carcinogens	
Substance	CAS Number
Aflatoxins	1402-68-2
Alcoholic Beverage Consumption	NA
4-Aminobiphenyl	92-67-1
Analgesic Mixtures Containing Phenacetin	62-44-2 (Phenacetin)
Aristolcholic Acids	NA
Arsenic and Inorganic Arsenic Compounds	7440-38-2 (Arsenic)
Asbestos	1332-21-4
Azathioprine	446-86-6
Benzene	71-43-2
Benzidine	92-87-5
Beryllium and Beryllium Compounds	7440-41-7 (Beryllium)
Bis(chloromethyl) Ether and Technical Grade Chloromethyl Methyl Ether	542-88-1 and 107-30-2
1,3-Butadiene	106-99-0
Cadmium and Cadmium Compounds	7440-43-9 (Cadmium)
Chlorambucil	305-03-3
1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea	13909-09-6
Chromium Hexavalent Compounds	18540-29-9
Coal Tars and Coal-Tar Pitches	8007-45-2 (Coal Tars)



Environmental Health and Safety Advisory

Coke-Oven Emissions	NA
Cyclophosphamide	50-18-0
Cyclosporin A	59865-13-3
Diethylstilbestrol	56-53-1
Dyes Metabolized to Benzidine	NA
Erionite	66733-21-9
Estrogens, Steroidal	NA
Ethylene Oxide	75-21-8
Formaldehyde	50-00-0
Hepatitis B Virus	NA
Hepatitis C Virus	NA
Human Papillomaviruses: Some Genital-Mucosal Types	NA
Melphalan	148-82-3
Methoxsalen with Ultraviolet A Therapy	NA
Mineral Oils: Untreated and Mildly Treated	NA
Mustard Gas	505-60-2
2-Naphthylamine	91-59-8
Neutrons (see Ionizing Radiation)	NA
Nickel Compounds (see Nickel Compounds and Metallic Nickel)	7440-02-0 (Metallic Nickel)
Radon (see Ionizing Radiation)	10043-92-2
Silica, Crystalline (Respirable Size)	NA
Solar Radiation (see Ultraviolet Radiation Related Exposures)	NA
Soots	NA
Strong Inorganic Acid Mists Containing Sulfuric Acid	7664-93-9 (Sulfuric Acid)
Sunlamps and Sunbeds, Exposure to (see Ultraviolet Radiation Related Exposures)	NA
Tamoxifen	10540-29-1
2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin	1746-01-6
Thiotepa	52-24-4



Environmental Health and Safety Advisory

Thorium Dioxide (see Ionizing Radiation)	1314-20-1
Tobacco Smoke, Environmental (see Tobacco-Related Exposures)	NA
Tobacco Smoking (see Tobacco-Related Exposures)	NA
Tobacco, Smokeless (see Tobacco-Related Exposures)	NA
Ultraviolet Radiation, Broad Spectrum (see Ultraviolet Radiation Related Exposures)	NA
Vinyl Chloride (see Vinyl Halides [selected])	75-01-4
Wood Dust	NA
X-Radiation and Gamma Radiation (see Ionizing Radiation)	NA
NA none assigned	
Substances in Bold indicate OSHA Regulated Substances (see Appendix A)	

Substances or groups of substances, occupational exposures associated with a technological process, and medical treatments which may reasonably be anticipated to be carcinogens:

Substances Reasonably Anticipated To Be Human Carcinogens	
Substances	CAS Number
Acetaldehyde	75-07-0
2-Acetylaminofluorene	53-96-3
Acrylamide	79-06-1
Acrylonitrile	107-13-1
Adriamycin	23214-92-8
2-Aminoanthraquinone	117-79-3
o-Aminoazotoluene	97-56-3
1-Amino-2,4-dibromoanthraquinone	81-49-2
2-Amino-3,8-dimethylimidazo[4,5-f]quinoline (see Heterocyclic Amines [Selected])	77094-11-2
2-Amino-3,8-dimethylimidazo[4,5-f]quinoxaline (see Heterocyclic Amines [Selected])	77500-04-0
1-Amino-2-methylantraquinone	82-28-0



Environmental Health and Safety Advisory

2-Amino-3-methylimidazo[4,5- <i>f</i>]quinoline (see Heterocyclic Amines [Selected])	76180-96-6
2-Amino-1-methyl-6-phenylimidazo[4,5- <i>b</i>]pyridine (see Heterocyclic Amines [Selected])	105650-23-5
Amitrole	61-82-5
<i>o</i> -Anisidine and Its Hydrochloride	91-23-6
Azacitidine	320-67-2
Basic Red 9 Monohydrochloride	569-61-9
Benz[<i>a</i>]anthracene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)	56-55-3
Benzo[<i>b</i>]fluoranthene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)	205-99-2
Benzo[<i>j</i>]fluoranthene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)	205-82-3
Benzo[<i>k</i>]fluoranthene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)	207-08-9
Benzo[<i>a</i>]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)	50-32-8
Benzotrichloride	98-07-7
2,2-Bis(bromomethyl)-1,3-propanediol (Technical Grade)	3296-90-0
Bis(chloroethyl) Nitrosourea (see Nitrosourea Chemotherapeutic Agents)	154-93-8
Bromodichloromethane	75-27-4
1,4-Butanediol Dimethanesulfonate	55-98-1
Butylated Hydroxyanisole	25013-16-5
Captafol	2425-06-1
Carbon Tetrachloride	56-23-5
Ceramic Fibers (Respirable Size)	NA
Chloramphenicol	56-75-7
Chlorendic Acid	115-28-6
Chlorinated Paraffins (C12, 60% Chlorine)	108171-26-2
Chloroform	67-66-3



Environmental Health and Safety Advisory

1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea (see Nitrosourea Chemotherapeutic Agents)	13010-47-4
3-Chloro-2-methylpropene	563-47-3
4-Chloro- <i>o</i> -phenylenediamine	95-83-0
Chloropene	126-99-8
<i>p</i> -Chloro- <i>o</i> -toluidine and Its Hydrochloride	95-69-2
Chlorozotocin (see Nitrosourea Chemotherapeutic Agents)	54749-90-5
Cisplatin	15663-27-1
Cobalt Sulfate	10124-43-3
Cobalt-Tungsten Carbide: Powders and Hard Metals	NA
<i>p</i> -Cresidine	120-71-8
Cupferron	135-20-6
Dacarbazine	4342-03-4
Danthron	117-10-2
2,4-Diaminoanisole Sulfate	39156-41-7
2,4-Diaminotoluene	95-80-7
Diazoaminobenzene	136-35-6
Dibenz[<i>a,h</i>]acridine (see Polycyclic Aromatic Hydrocarbons: 15 Listings)	226-36-8
Dibenz[<i>a,l</i>]acridine (see Polycyclic Aromatic Hydrocarbons:15 Listings)	224-42-0
Dibenz[<i>a,h</i>]anthracene (see Polycyclic Aromatic Hydrocarbons:15 Listings)	53-70-3
7H-Dibenzo[<i>c,g</i>]carbazole (see Polycyclic Aromatic Hydrocarbons:15 Listings)	194-59-2
Dibenzo[<i>a,e</i>]pyrene (see Polycyclic Aromatic Hydrocarbons:15 Listings)	192-65-4
Dibenzo[<i>a,h</i>]pyrene (see Polycyclic Aromatic Hydrocarbons:15 Listings)	189-64-0
Dibenzo[<i>a,l</i>]pyrene (see Polycyclic Aromatic Hydrocarbons:15 Listings)	189-55-9



Environmental Health and Safety Advisory

Dibenzo[a,h]pyrene (see Polycyclic Aromatic Hydrocarbons:15 Listings)	191-30-0
1,2-Dibromo-3-chloropropane	96-12-8
1,2-Dibromoethane	106-93-4
2,3-Dibromo-1-propanol	96-13-9
1,4-Dichlorobenzene	106-46-7
3,3'-Dichlorobenzidine and Its Dihydrochloride	91-94-1 and 612-83-9
Dichlorodiphenyltrichloroethane	50-29-3
1,2-Dichloroethane	107-06-2
Dichloromethane	75-09-2
1,3-Dichloropropene (Technical Grade)	542-75-6
Diepoxybutane	1464-53-5
Diesel Exhaust Particulates	NA
Di(2-ethylhexyl) Phthalate	117-81-7
Deethyl Sulfate	64-67-5
Diglycidyl Resorcinol Ether	101-90-6
3,3'-Dimethoxybenzidine (see 3,3'-Dimethoxybenzidine and Dyes Metabolized 3,3'-Dimethoxybenzidine)	119-90-4
4-Dimethylaminoazobenzene	60-11-7
3,3'-Dimethylbenzidine (see 3,3'-Dimethylbenzidine and Dyes Metabolized 3,3'-Dimethylbenzidine)	119-93-7
Dimethylcarbamoyl Chloride	79-44-7
1,1-Dimethylhydrazine	57-14-7
Dimethyl Sulfate	77-78-1
Dimethylvinyl Chloride	513-37-1
1,6-Dinitropyrene (see Nitroarenes [Selected])	42397-64-8
1,8-Dinitropyrene (see Nitroarenes [Selected])	42397-65-9
1,4-Dioxane	123-91-1
Disperse Blue 1	2475-45-8



Environmental Health and Safety Advisory

Dyes Metabolized to 3,3'-Dimethoxybenzidine (3,3'-Dimethoxybenzidine Dye Class) (see 3,3'-Dimethoxybenzidine and Dyes Metabolized 3,3'-Dimethoxybenzidine)	NA
Dyes Metabolized to 3,3'-Dimethylbenzidine (3,3'-Dimethylbenzidine Dye Class) (see 3,3'-Dimethylbenzidine and Dyes Metabolized 3,3'-Dimethylbenzidine)	NA
Epichlorohydrin	106-89-8
Ethylene Thiourea	96-45-7
Ethyl Methanesulfonate	62-50-0
Furan	110-00-9
Glass Wool Fibers (Inhalable), Certain	NA
Glycidol	556-52-5
Hexachlorobenzene	118-74-1
Hexachloroethane	67-72-1
Hexamethylphosphoramide	680-31-9
Hydrazine and Hydrazine Sulfate	302-01-2 and 10034-93-2
Hydrazobenzene	122-66-7
Indeno[1,2,3- <i>cd</i>]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)	193-39-5
Iron Dextran Complex	9004-66-4
Isoprene	78-79-5
Kepone	143-50-0
Lead and Lead Compounds	7439-92-1 (Lead)
Lindane, Hexachlorocyclohexane (Technical Grade), and Other Hexachlorocyclohexane Isomers)	58-89-9 (Lindane)
2-Methylaziridine	75-55-8
5-Methylchrysene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)	3697-24-3
4,4'-Methylenebis(2-chloroaniline)	101-14-4
4,4'-Methylenebis(<i>N,N</i> -dimethyl)benzenamine	101-61-1



Environmental Health and Safety Advisory

4,4'-Methylenedianiline and Its Dihydrochloride	101-77-9 and 13552-44-8
Methyleugenol	93-15-2
Methyl Methanesulfonate	66-27-3
<i>N</i> -Methyl- <i>N</i> '-Nitro- <i>N</i> -Nitrosoguanidine (see <i>N</i> -Nitrosamines: 15 Listings)	70-25-7
Metronidazole	443-48-1
Michler's Ketone	90-94-8
Mirex	2385-85-5
Naphthalene	91-20-3
Nickel, Metallic (see Nickel Compounds and Metallic Nickel)	7440-02-0
Nitrilotriacetic Acid	139-13-6
<i>o</i> -Nitroanisole	91-23-6
Nitrobenzene	98-95-3
6-Nitrochrysene (see Nitroarenes [Selected])	7496-02-8
Nitrofen	1836-75-5
Nitrogen Mustard Hydrochloride	55-86-7
Nitromethane	75-52-5
2-Nitropropane	79-46-9
1-Nitropyrene (see Nitroarenes [Selected])	5522-43-0
4-Nitropyrene (see Nitroarenes [Selected])	57835-92-4
<i>N</i> -Nitrosodi- <i>n</i> -butylamine (see Nitroamines: 15 Listings)	924-16-3
<i>N</i> -Nitrosodiethanolamine (see Nitroamines: 15 Listings)	1116-54-7
<i>N</i> -Nitrosodiethylamine (see Nitroamines: 15 Listings)	55-18-5
<i>N</i> -Nitrosodimethylamine (see Nitroamines: 15 Listings)	62-75-9
<i>N</i> -Nitrosodi- <i>n</i> -propylamine (see Nitroamines: 15 Listings)	621-64-7
<i>N</i> -Nitroso- <i>N</i> -ethylurea (see Nitroamines: 15 Listings)	759-73-9
4-(Nitrosomethylamino)-1-(3-pyridil)-1-butanone (see Nitroamines: 15 Listings)	64091-91-4



Environmental Health and Safety Advisory

<i>N</i> -Nitroso- <i>N</i> -methylurea (see Nitroamines: 15 Listings)	684-93-5
<i>N</i> -Nitrosomethylvinylamine (see Nitroamines: 15 Listings)	4549-40-0
<i>N</i> -Nitrosomorpholine (see Nitroamines: 15 Listings)	59-89-2
<i>N</i> -Nitrosornicotine (see Nitroamines: 15 Listings)	16543-55-8
<i>N</i> -Nitrosopiperidine (see Nitroamines: 15 Listings)	100-75-4
<i>N</i> -Nitrosopyrrolidine (see Nitroamines: 15 Listings)	930-55-2
<i>N</i> -Nitrososarcosine (see Nitroamines: 15 Listings)	13256-22-9
<i>o</i> -Nitrotoluene	88-72-2
Norethisterone	68-22-4
Ochratoxin A	303-47-9
4,4'-Oxydianiline	101-80-4
Oxymetholone	434-07-1
Phenacetin (see Phenacetin and Analgesic Mixtures Containing Phenacetin)	62-44-2
Phenazopyridine Hydrochloride	136-40-3
Phenolphthalein	77-09-8
Phenoxybenzamine Hydrochloride	63-92-3
Phenytoin and Phenytoin Sodium	57-41-0 and 630-93-3
Polybrominated Biphenyls	NA
Polychlorinated Biphenyls	1336-36-3
Procarbazine and Its Hydrochloride	671-16-9 and 366-70-1
Progesterone	57-83-0
1,3-Propane Sultone	1120-71-4
□ Propiolactone	57-57-8
Propylene Oxide	75-56-9
Propylthiouracil	51-52-5
Reserpine	50-55-5
Riddelliine	23246-96-0



Environmental Health and Safety Advisory

Safrole	94-59-7
Selenium Sulfide	7446-34-6
Streptozotocin (see Nitrosourea Chemotherapeutic Agents)	18883-66-4
Styrene	100-42-5
Strene-7,8-oxide	96-09-3
Sulfallate	95-06-7
Tetrachloroethylene	127-18-4
Tetrafluoroethylene	116-14-3
Tetranitromethane	509-14-8
Tioacetamide	62-55-5
4,4'-Thiodianiline	139-65-1
Thiourea	62-56-6
Toluene Diisocyanates	26471-62-5
o-Toluidine and Its Hydrochloride	95-53-4 and 636-21-5
Toxaphene	8001-35-2
Trichloroethylene	79-01-6
2,4,6-Trichlorophenol	88-06-2
1,2,3-Trichloropropane	96-18-4
Tris(2,3-dibromopropyl) Phosphate	126-72-7
Ultraviolet Radiation A (see Ultraviolet Radiation Related Exposures)	NA
Ultraviolet Radiation B (see Ultraviolet Radiation Related Exposures)	NA
Ultraviolet Radiation C (see Ultraviolet Radiation Related Exposures)	NA
Urethane	51-79-6
Vinyl Bromide (see Vinyl Halides [Selected])	593-60-2
4-Vinyl-1-cyclohexene Diepoxide	106-87-6
Vinyl Fluoride (see Vinyl Halides [Selected])	75-02-5
NA none applied	