



Environmental Health & Safety Policy Manual		
Issue Date: 2/23/2011	Updated: 2/7/2022	Policy # EHS-200.09
High Hazard Chemical Policy		

1.0 PURPOSE:

To minimize hazardous exposures to high hazard chemicals as defined by OSHA which include select carcinogens, reproductive/developmental toxins, and chemicals that have a high degree of toxicity.

2.0 SCOPE:

The procedures provide guidance to all LSUHSC personnel who work with high hazard chemicals.

3.0 RESPONSIBILITIES:

3.1 Environmental Health and Safety (EH&S) shall:

- Provide technical assistance with the proper handling and safe disposal of high hazard chemicals.
- Maintain a list of high hazard chemicals used at LSUHSC, see Appendix A.
- Conduct exposure assessments and evaluate exposure control measures as necessary. Maintain employee exposure records.
- Provide emergency response for chemical spills.

3.2 Principle Investigator (PI) /Supervisor shall:

- Develop and implement a laboratory specific standard operation plan for high hazard chemical use per [OSHA 29CFR 1910.1450 \(e\)\(3\)\(i\); Occupational Exposure to Hazardous Chemicals in Laboratories](#). Plans shall include the development of chemical specific standard operating procedures (SOP). A set of pre-developed SOP for select chemical agents and blank SOP template is available at the [High Hazard Chemicals page](#) of the EH&S website.
- Notify EH&S of the addition of a high hazard chemical not previously used in the laboratory.



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- Ensure personnel are trained on specific chemical hazards present in the lab. This shall include ensuring an awareness and understanding by the users of each high hazard chemical SOP.
- Maintain Safety Data Sheets (SDS) for all chemicals, either on the computer hard drive or in hard copy.
- Coordinate the provision of medical examinations, exposure monitoring and recordkeeping as required.

3.3 Employees:

- Complete all necessary training before performing any work.
- Observe all safety rules and regulations.
- Know where the chemical spill kit, fire extinguishers, emergency showers and eye wash stations are located.
- Immediately report unsafe or unhealthy work conditions and any mishaps.

4.0 IMPLEMENTATION:

4.1 General Operating Procedures:

The OSHA Laboratory Standard [OSHA 29 CFR 1910.1450](#) requires that special handling procedures be employed for certain chemicals identified as “particularly hazardous substances.” Particularly hazardous substances are high hazard chemicals, which include select carcinogens, reproductive/developmental toxins, and chemicals that have a high degree of acute toxicity.

4.2. Handling:

- Only laboratory personnel trained to work with high hazard chemicals shall perform the work within the designated area.
- Designated areas (e.g., chemical hoods, lab benches, outside rooms, etc.) for material use must be established and the area identified by signs or postings. For more information on signs and labeling see [EHS 400.12, Hazard Communication Program](#).
- Written procedures for the safe use of the material, waste removal and decontamination procedures must be established prior to use.
- When working with high hazard chemicals of moderate/high chronic or high toxicity, maintain records of the date the chemical was used, the amount of chemical used, names of users, and the disposal dates.



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- When working with chemicals of high chronic toxicity, decontaminate the designated working area per SOP requirements before normal work is resumed.
- If a vacuum line is used, protect the vacuum line with an absorbent liquid or liquid trap and HEPA filter. If a volatile high hazard chemical is used, use a separate vacuum pump or other device placed in a chemical fume hood.
- Work surfaces, including chemical fume hoods and biological safety cabinets, should have a removable liner of absorbent plastic-backed paper to help contain spilled materials and to simplify subsequent cleanup and disposal.
- Use double containment to protect against spills and breakage when moving a high hazard chemical out of a laboratory to another location.

4.3 Personal Protective Equipment (PPE):

- Consult the SDS for recommendations. EH&S is available for additional consultation.
- At a minimum, goggles/safety glasses with side shields, laboratory coats, and closed-toe shoes should be worn.
- When methods for decontaminating clothing are unknown, disposable protective clothing should be worn.
- Gloves must be selected on the basis of their chemical resistance to the material being handled, their suitability for the procedures being conducted, and their resistance to wear and temperature extremes.
- If a respirator is required, contact EH&S in advance. The wearing of a respirator requires medical clearance, a fit test and training.

4.4 Ordering and Storage:

- Only the minimum quantity of the high hazard chemical necessary to conduct the research should be ordered.
- High hazard chemicals must be stored in a designated storage area which must be clearly marked with the appropriate hazard warning signs.
- All high hazard chemical containers must be clearly labeled with the chemical name or mixture components and the appropriate hazard warning information. For more information on signs and labeling see [EHS 400.12, Hazard Communication Program](#).
- High hazard chemicals should be stored in unbreakable, well-labeled, impervious secondary containers.



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- Additional storage precautions (e.g., refrigerator, chemical fume hood, or flammable liquid storage cabinet) may be required for certain compounds based upon other properties. For more information on chemical storage see [EHS 200.05, Chemical Ordering and Storage Procedures](#).

4.5 Disposal:

- Place dry materials contaminated with a high hazard chemical in a secure plastic bag. Liquid waste should be placed in containers that are compatible for the waste, in good condition, and have tight fitting lids.
- Label the contaminated waste material with the following:
 - The words “Hazardous Waste”.
 - The principle chemical constituents and the approximate percentage of each.
 - The date the waste was first placed in the container.
- Submit a service request to EH&S for removal.
- For more information on chemical waste disposal see [EHS 200.04, Chemical Waste Management Procedures](#).

4.6 Medical Surveillance

Medical surveillance may be required if:

- Significant quantities of high hazard chemicals are used on a regular basis.
- An individual develops signs or symptoms associated with a hazardous chemical.
- Where airborne exposure monitoring reveals an exposure level routinely above the action level (or in the absence of an action level, the Permissible Exposure Limit) for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements.
- Whenever an event such as a spill, leak, explosion or other occurrences takes place and results in the likelihood of an exposure to a hazardous chemical.

4.7 Exposure Monitoring

- Regular environmental monitoring is not usually practical in labs because chemicals are typically used for relatively short time periods and in small quantities. However, exposure monitoring as required by 29 CFR 1910.1450 will be provided when:
 - Significant quantities of hazardous chemicals are used over an extended period of time.



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- When regular use of an OSHA regulated substance is believed to be in excess of an action level (AL) or permissible exposure limits (PEL). AL and PELs for OSHA regulated substances can be found in [29 CFR 1910.1000 subpart Z](#).
- When laboratory personnel exhibit signs and symptoms of exposure to chemicals used or stored in their areas.

4.8 Spills:

- High hazard chemical spills that occur in the chemical fume hood may be cleaned by trained lab personnel.
- For all high hazard chemical spills that occur outside the chemical fume hood:
 - Evacuate the area.
 - Close door to laboratory.
 - Immediately, notify University Police at 568-8999 and EH&S at 568-6585.
 - Re-entry to the spill area is not permitted until EH&S responders have cleaned the area and verified that it is safe to reenter the lab.

5.0 TRAINING

The Principal Investigator/Laboratory supervisor will provide laboratory-specific training to all laboratory workers on chemical hazards before handling, using, or storing high hazard chemicals. Training elements should include how to understand an MSDS, selecting the correct PPE, and proper decontamination and disposal procedures.

6.0 RECORD KEEPING:

- 6.1 **Principal Investigators/Laboratory Supervisors** shall keep their employee's training records for the current fiscal year and the previous three fiscal years.
- 6.2 **EH&S** will maintain accurate records of any measurements taken to monitor an employee exposures required by OSHA 1910.1450, Occupational Exposure to Hazardous Chemicals in the Laboratories, for the current year plus ten calendar years.

7.0 INSPECTIONS:

7.1 PI/Laboratory Supervisor



Recurring assessments of high hazard chemical work and storage areas should be completed by laboratory personnel, to include a review chemical container and label integrity, good housekeeping practices, and emergency equipment.

7.2 EH&S

Overall compliance will be assessed by the Environmental Health and Safety Department as part of recurring laboratory inspections.

8.0 DEFINITIONS:

- **Action level** means a concentration designated in 29 CFR Part 1910 for a specific substance, calculated as an eight-hour time-weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.
- **Acute toxic chemicals** are chemicals with a high level of acute toxicity that have the ability to cause harmful local and systemic effects, or death after a single exposure. In general, acute toxic chemicals have an oral LD50 of <50 mg (rats, per kg), skin contact LD 50 of <200 mg (rabbits, per kg). For inhalation, a median lethal concentration LC50 in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each. See Appendix B for a list of acute toxic chemicals.
- **Carcinogens** are chemicals or physical agents that cause cancer or tumor development after repeated or chronic exposure. Their effects only become evident after a long period and may cause no immediate harmful effects. Some examples are Di-methyl mercury, Benzo-a-pyrene, and n-Nitrosodiethylamine.
- **Chronic Toxicity** is when harmful effects are produced through repeated or continuous exposure to a substance over an extended period of time. Some examples are carcinogens, reproductive toxins, and certain heavy metals.
- **Lethal Concentration 50 (LC50)** is the concentration of an air contaminant that will kill 50% of the test animals in a group during a single exposure.
- **Lethal Dose 50 (LD50)** is the dose of a substance or chemical that will kill 50% of the test animals in a group within the first 30 days following exposure.



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- **Permissible Exposure Limit (PEL)** is the maximum concentration averaged over 8 hour to which 95% healthy adults can be repeatedly exposed for 8 hours per day, 40 hours per week.
- **Reproductive/developmental toxins** are substances that cause chromosomal damage or genetic alterations with lethal or teratogenic effects in a developing fetus or embryo. Some examples are lead compounds, organomercurial compounds, arsenic trioxide, benzene, and formamides. See Appendix C for a list of reproductive/developmental toxins.
- **Select Carcinogen** is any substance found on the following lists:
 - OSHA Carcinogen List.
 - The Annual Report on Carcinogens published by the National Toxicity Program, including all the substances listed as “known to be carcinogens” and some substances listed as “reasonably anticipated to be carcinogens”.
 - All of Group I “Carcinogen to humans” and some in Group 2A and 2B, “reasonably anticipated to be carcinogens” listed by the International Agency for Research on Cancer (IARC)See Appendix D for a listing of Select Carcinogens.

9.0 APPENDICES

- Appendix A, High Hazard Chemicals Used at LSUHSC-NO
- Appendix B, Acute Toxic Chemicals List
- Appendix C, Reproductive/Developmental Toxins List
- Appendix D, Select Carcinogens List



APPENDIX A

HIGH HAZARD CHEMICALS USED AT LSUHSC

Acrolein – flammable, toxic
Acrylamides – toxic
Aminopterin - toxic
Arsenic acid – toxic – moisture sensitive
Benzene - flammable
Benzidine based dyes - toxic
Cadmium compounds - toxic
Carbon tetrachloride – toxic
Catechol – toxic, corrosive
Chloroform - toxic
Colchicine - toxic
Cyclophosphamide – toxic
Diaminobenzidine - toxic
Dimethyl sulfate – toxic, corrosive
Dioxane, 1,4- - flammable
Ethylene glycol monomethyl ether
Formaldehyde – flammable, (formalin is not considered flammable)
Hexane - flammable
Hydrazine – corrosive – moisture sensitive
Iodomethane – toxic – moisture sensitive
Lead compounds - toxic
Mercury and mercury compounds - toxic
Nicotine - toxic
Osmium tetroxide - toxic
Phenol – toxic
Phenylmethanesulfonylfluoride – toxic – moisture sensitive
Picrotoxin - toxic
Potassium cyanide – toxic – moisture sensitive
Sodium azide - toxic
Sodium cyanide – toxic – moisture sensitive
Strychnine - toxic
Styrene - flammable
Thiophenol - toxic
Thiosemicarbazide - toxic
Thiourea - toxic
Toluene - flammable
Urethane (ethyl carbamate) - toxic
Warfarin - toxic



APPENDIX B

ACUTE TOXIC CHEMICALS LIST

Chemical Name	Alternate Names	CAS#
Acrolein	2-Propen-1-one	107-02-8
Acrylonitrile	2-Propenenitrile; Cyanoethylene	107-13-1
Actinomycin	Actinomycin C; Oncostatin	1402-38-6
Actinomycin D	Oncostatin K	50-76-0
Aflatoxin B1		1402-68-2
Aldicarb	Propanal, 2-methyl-2-(methylthio)-, O-((methylamino)carbonyl)oxime	116-06-3
Aldrin		309-00-2
Allyl iodide	Iodopropene, 3-	556-56-9
Aminopterin	Aminofolic Acid, 4-	54-62-6
Aminopyridine, 3-	Aminopyridine, m-	462-08-8
Aminopyridine, 4-	Aminopyridine, p-	504-24-5
Amiton		78-53-5
Amiton oxalate	Tetram Monooxalate	3734-97-2
Amphetamine sulfate, d-	Benzedrine sulfate, d-	51-63-8
Antimony hydride	Stibine	7803-52-3
Antimycin A	Virosin	1397-94-0
Arsenic Acid	Orthoarsenic acid	7778-39-4
Arsenic(III) chloride	Arsenic trichloride	7784-34-1
Arsenic(III) fluoride	Arsenic trifluoride	7784-35-2
Arsenic(III) oxide	Arsenic trioxide; Arsenious Oxide	1327-53-3
Arsenic(III) sulfide	Arsenic trisulfide	1303-33-9
Arsenic(V) oxide	Arsenic pentoxide	1303-28-2
Arsenic(V) sulfide	Arsenic pentasulfide	1303-34-0
Arsine	Hydrogen arsenide	7784-42-1
Azinphos-Methyl	Guthion	86-5—0
Beryllium (powdered)		7440-41-7
Bis(2-chloroethyl)-N-nitrosourea, N, N-	BCNU; Carmustin	154-93-8
Bis(chloromethyl) Ether	BCME	542-88-1
Boron tribromide	Boron bromide	10294-33-4
Boron trichloride	Boron chloride	10294-34-5
Boron trifluoride	Boron fluoride	7637-07-2
Botulinum Toxin B	Botulinum Toxin E	93384-44-2
Bungarotoxin, b-		
Butyronitrile	Cyanopropane, 1-	109-74-0



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Calcium arsenate	Arsenic Acid, Calcium Salt (2:3)	7778-44-1
Calcium cyanide	Calcid; Cyanogas	592-01-8
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Carbachol chloride	Doryl	51-83-2
Carbofuran	Yaltox	1563-66-2
Carbophenothion	Acarithion	786-19-6
Cholera Toxin		9012-63-9
Cisplatin		15663-27-1
Colchicine		64-86-8
Copper acetoarsenite	C.I. Green 21	12002-03-8
Coumaphos		56-72-4
Cyanide		57-12-5
Cyanogen chloride	Chlorine cyanide	506-77-4
Cyanuric fluoride	Trifluorotriazine	675-14-9
Cycloheximide	Actidione	66-81-9
Cytochalasin D	Zygosporin A	22144-77-0
Dibutyltin diacetate		1067-33-0
Dichloroacetylene		7572-29-4
Dichlorophenylarsine	Phenyl dichloroarsine	696-28-6
Dichlorvos	DDVP	62-73-7
Dieldrin		60-57-1
Diethyl 4-Nitrophenol phosphate	Ethyl Paraoxon	311-45-5
Diethyl chlorophosphate		814-49-3
Digitoxin		71-63-6
Digoxigenin		1672-46-4
Digoxin		20830-75-5
Diisopropyl fluorophosphate	Isopropyl phosphorofluoridate	55-91-4
Dimethyl sulfate	Methyl sulfate	77-78-1
Dimethylmercury	Methyl mercury	592-74-8
Dimetilan		644-64-4
Dinitrobutylphenol	DNBP; 2-sec-butyl-4, 6-Dinitrophenol	88-85-7
Dinitro-o-Cresol, 4, 6-		534-52-1
Dinitrophenol, 2, 4-	Aldifen; DNP, 2, 4-	51-28-5
Dioxathion		78-34-2
Diphtheria Toxin		
Disulfoton		298-04-4
Di-tert-butyl dicarbonate	DOC-Anhydride	24424-99-5
Dithiobiuret, 2, 4-	DTB	541-53-7
Doxorubicin (Free Base)	Adriamycin (Free Base)	23214-92-8
Emetine dihydrochloride		316-42-7
Endosulfan sulfate		1031-07-8



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Endothion		2778-04-3
Endrin	Hexadrin	72-20-8
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Ergocalciferol	Vitamin D2	50-14-6
Ergosterol	Provitamin D2	57-87-4
Ethion		563-12-2
Ethopropos	Ethoprop	13194-48-4
Ethylene fluorohydrin	Fluroethanol, 2-	371-62-0
Ethyleneimine	Aziridine	151-56-4
Ethylmercuric phosphate		2235-25-8
Etorphine	Immobilon	14521-96-1
Fenamiphos		22224-92-6
Fensulfothion	Dasanit	115-90-2
Fluenetil		4301-50-2
Fluoride ion		16984-48-8
Fluorine		7782-41-4
Fluoroacetamide		640-19-7
Fluoroacetic acid		144-49-0
Formaldehyde	Methyl aldehyde	50-00-0
Formaldehyde cyanohydrin	Glycolonitrile	107-16-4
Fometanate hydrochloride		23422-53-9
Formparanate		17702-57-7
Gitoxin		4562-36-1
Heptachlor		76-44-8
Heptachlor epoxide		102405703
Hexaethyl tetraphosphate		757-58-4
Hydrazine		302-01-2
Hydrogen cyanide	Hydrocyanic acid	74-90-8
Hydrogen selenide	Selenium hydride	7783-07-5
Hygromycin B	Antihelmucin	31282-04-9
Iron pentacarbonyl		13463-40-6
Isobenzan	Telodrin	297-78-9
Isobutyronitrile	Isopropyl cyanide	78-82-0
Isocyanatoethyl methacrylate, 2-		30674-80-7
Isodrin		465-73-6
Lactonitrile		78-97-7
Lannate	Methomyl	16752-77-5
Leptophos		21609-90-5
Lewisite		541-25-3
Malonitrile	Malononitrile	109-77-3
Mephosfolan		950-10-7
Mercaptofos	Demeton	8065-48-3



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Mercury (II) acetate	Mercuric acetate	1600-27-7
Mercury (II) bromide	Mercuric bromide	7789-47-1
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Mercury (II) chloride	Mercuric chloride	7487-94-7
Mercury (II) cyanide	Mercuric cyanide	592-04-1
Mercury (II) iodide	Mercuric iodide	7774-29-0
Mercury (II) nitrate	Mercuric nitrate	10045-94-0
Mercury (II) oxide	Mercuric oxide	21908-53-2
Mercury (II) thiocyanate	Mercuric sulfocyanate	592-85-8
Methacrolein diacetate		10476-95-6
Methamidophos		10265-92-6
Methanesulfonyl fluoride	Mesyl fluoride; Fumette	558-25-8
Methidathion	Supracide	950-37-8
Methiocarb	Mecaptodimethur	2032-65-7
Methoxyethylmercuric acetate		151-38-2
Methoxyethylmercuric chloride		123-88-6
Methoxyflurane	Metofane; Penthrane	76-38-0
Methyl chloroformate	Methyl chlorocarbonate	79-22-1
Methyl fluoroacetate	fluoroacetic acid, Methyl ester	453-18-9
Methyl isocyanate		624-83-9
Methyl lactonitrile, 2-	Acetone cyanohydrin	75-86-5
Methyl phosphonic dichloride		676-97-1p
Methylaziridine, 2-	Propyleneimine	75-55-8
Methylhydrazine		60-34-4
Mevinphos	Phosdrin	7786-34-4
Mexacarbate		315-18-4
Mitomycin C	Ametycin	50-07-7
Monensin Sodium	Coban	22373-78-0
Monochrotophos		6923-22-4
Naphthylthiourea, alpha-	ANTU	86-88-4
Nickel carbonyl	Nickel tetracarbonyl	13463-39-3
Nickel cyanide	Dicyanonickel	557-19-7
Nicotine		54-11-5
Nicotine sulfate		65-30-5
Nitric Acid (red fuming)		7697-37-2
Nitric Oxide	Nitrogen monoxide	10102-43-9
Nitrobenzotrile, p-		619-72-7
Nitrogen dioxide		10102-44-0
Nitrogen tetroxide		10544-72-6
Nitrosodimethylamine, N-	Dimethylnitrosamine	62-75-9
Nitrosomethylvinylamine		4549-40-0
Norbormide		991-42-4



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Ochratoxin A 303-47-9
Osmium tetroxide 20816-12-0

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Ouabain	Acocantherin	630-60-4
Oxamyl		23135-22-0
Oxidiphenoxarsine, 10, 10-	Vinadine	58-36-6
Oxotremorine		70-22-4
Oxygen difluoride	Fluorine oxide; Oxygen fluoride	7783-41-7
Parathion	Phosphostigmine	56-38-2
Parathion-Methyl	Methyl parathion; Metaphor	298-00-0
Pentaborane (9)	Nonahydropentaborane	19624-22-7
Pentachlorophenol		87-86-5
Phalloidin	Phalloidin from Amanita Phalloides	17466-45-4
Phenyl mercaptan	Thiophenol; Benzenethiol	108-98-5
Phenylmercuric acetate	Phenylmercury acetate	62-38-4
Phenylmercuric triethanolamine		23319-66-6
Lactate		
Phenylphosphine		638-21-1
Phenylsilatrane		2097-19-0
Phenylthiocarbamide	Phenyl-2-thiourea, 1-	103-85-5
Phorate		298-02-2
Phosacetim		4104-14-7
Phosfolan		947-02-4
Phosgene	Carbonyl chloride	75-44-5
Phosphamidon		13171-21-6
Phosphine	Hydrogen phosphide	7803-51-2
Phosphorus oxychloride	Phosphoryl chloride	10025-87-3
Phosphorus trichloride	Phosphorous chloride	7719-12-2
Phosphorus, yellow	Phosphorus, white	7723-14-0
Physostigmine	Eserine	57-47-6
Physostigmine salicylate	Eserine salicylate	57-64-7
Physostigmine sulfate	Eserine sulfate	64-47-1
Picrotoxin	Cocculin	124-87-8
Potassium arsenite	Arsenenous acid, Potassium Salt	10124-50-2
Potassium azide		20762-60-1
Potassium cyanide		151-50-8
Potassium silver cyanide	Silver potassium cyanide	506-61-6
Promecarb		2631-37-0
Propanenitrile	Propionitrile; Ethyl cyanide	107-12-0
Propargyl alcohol		107-19-7
Propiolactone, beta	Propiolactone, 1, 3-	57-57-8
Puromycin	Achromycin	53-79-2



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Ricin 90009-86-3
Sarin Isopropylmethane fluorophosphate 107-44-8

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Selenium dioxide	Selenium (IV) dioxide	7446-08-4
Sodium arsenate	Arsenic acid, sodium salt	7631-89-2
Sodium azide		26628-22-8
Sodium cyanide		143-33-9
Sodium dichromate		10588-01-9
Sodium fluoroacetate	Fluoroacetic acid, sodium salt	62-74-8
Sodium meta arsenite		7784-46-5
Sodium selenate	Selenic acid, disodium salt	13410-01-0
Sodium selenite	Selenious acid, disodium salt	10102-18-8
Streptonigrin	Bruneomycin	3930-19-6
Strychnine		57-24-9
Strychnine sulfate	Vampirol	60-41-3
Sulfur pentafluoride	Sulfur decafluoride	5714-22-7
Sulfur tetrafluoride		7783-60-0
Tetraethyl dithiopyrophosphate	Sulfotep; TEDP	3689-24-5
Tetraethyl pyrophosphate	Vapatone	107-49-3
Tetraethyltin	Tetraethyl stannate	597-64-8
Tetrodotoxin	Tetrodotoxin citrate	4368-28-9
Thallium malonate	Thallos malonate	2757-18-8
Thallium sulfate		10031-59-1
Thallium (I) acetate	Thallos acetate	563-68-8
Thallium (I) carbonate	Thallos carbonate	6533-73-9
Thallium (I) chloride	Thallos chloride	7791-12-0
Thallium (I) nitrate	Thallos nitrate	10102-45-1
Thallium (I) sulfate	Thallos sulfate	7446-18-6
Thiocarbazide	Thiocarbohydrazide – TCH	2231-57-4
Thiosemicarbazide	Thiocarbamylhydrazine	79-19-6
Toluene diisocyanate	Methyl-m-phenylene diisocyanate	26471-62-5
Toxaphene	Camphechlor	8001-35-2
Trimethyltin chloride	Chlorotrimethylstannate	1066-45-1
Triphenyltin hydroxide		76-87-9
Tubocurarine	Tubocurarine hydrochloride	57-94-3
Tungsten hexafluoride	Tungsten (VI) fluoride	7783-82-6
Valinomycin, (+)-	Valinomycin	2001-95-8
Vanadium (V) oxide	Vanadium pentoxide	1314-62-1
Warfarin		81-81-2
Warfarin sodium	Sodium coumadin	129-06-6
Yohimbine hydrochloride		65-19-0
Zinc phosphide		1314-84-7



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Zinc silicofluoride

Zinc fluorosilicate

1687-71-9



APPENDIX C

REPRODUCTIVE/DEVELOPMENTAL TOXINS LIST

<u>Chemical Name</u>	<u>CAS#</u>
1-(2-chloroethyl)-3-cyclohexyl-1-Nitrosourea (CCNU)	13010-47-4
1, 2-Dibromo-3-chloropropane (DBCP)	96-12-8
1, 3-Butadiene	106-99-0
1, 4-Butanediol dimethanesulfonate (Busulfan)	55-98-1
1-Bromopropane	106-94-5
2, 3, 7, 8-Tetrachlorodibenzo-p- dioxin (TCDD)	1746-01-6
2, 4-D butyric acid	94-82-6
2, 4-Dinitrotoluene	121-14-2
2, 6-Dinitrotoluene	606-20-2
2-Bromopropane	75-26-3
Acetazolamide	59-66-5
Acetohydroxamic acid	546-88-3
Actinomycin D	50-76-0
All-trans Retinoic acid	302-79-4
Alprazolam	28981-97-7
Altretamine	645-05-6
Amantadine hydrochloride	665-66-7
Amikacin sulfate	39831-55-5
Aminoglutethimide	125-84-8
Aminoglycosides	-----
Aminopterin	54-62-6
Amiodarone hydrochloride	19774-82-4
Amitraz	33089-61-1
Amoxoapine	14028-44-5
Anabolic Steroids	-----
Angiotensin Converting Enzyme (ACE) Inhibitors	-----
Anisindione	117-37-3
Arsenic (inorganic oxides)	-----
Atenolol	29122-68-7
Auranofin	34031-32-8
Azathioprine	446-86-6
Barbituates	-----
Beclomethasone dipropionate	5534-09-8



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Benomyl	17804-35-2
Benzene	71-43-2
Benzodiazepines	-----
Benzphetamine hydrochloride	-----
Bischloroethyl nitrosourea (BCNU)	154-93-8
Bromacil lithium salt	3404-19-6
Bromoxynil	1689-84-5
Bromoxynil octanoate	1689-99-2
Butabarbital sodium	143-81-7
Butyl Benzyl phthalate	85-68-7
Cadmium	-----
Carbamazepine	298-46-4
Carbon Disulfide	75-15-0
Carbon Monoxide	630-08-0C
Carboplatin	41575-94-4
Chenodiol	474-25-9
Chinomethionat (Oxythioquinox)	2439-01-2
Chlorambucil	305-03-3
Chlorcyclizine hydrochloride	1620-21-9
Chlordecone (Kepone)	143-50-0
Chlordiazepoxide	58-25-3
Chlordiazepoxide hydrochloride	438-41-5
Chlorsulfuron	64902-72-3
Cidofovir	113852-37-2
Cladribine	4291-62-8
Clarithromycin	81103-11-9
Clobetasol propionate	25122-46-7
Clomiphene citrate	50-41-9
Clorazepate dipotassium	57109-90-7
Cocaine	50-36-2
Codeine phosphate	52-28-8
Colchicine	64-86-8
Conjugated Estrogens	-----
Cyanazine	21725-46-2
Cycloate	1134-23-2
Cycloheximide	66-81-9
Cyclophosphamide (anhydrous)	50-18-0
Cyclophosphamide (hydrated)	6055-19-2
Cyhexatin	13121-70-5
Cytarabine	147-94-4
Decarbazine	4342-03-4
Danazol	17230-88-5
Daunorubicin hydrochloride	23541-50-6



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Demeclocycline hydrochloride	64-73-3
Di(2-ethylhexyl)phthalate	117-81-7
Diazepam	439-14-5
Diazoxide	364-98-7
Dichlorophene	97-23-4
Dichlorphenamide	120-97-8
Diclofop Methyl	51338-27-3
Dicumarol	66-76-2
Diethylstilbestrol (DES)	56-53-1
Diflunisal	22494-42-4
Dihydroergotamine mesylate	6190-39-2
Diltiazem hydrochloride	33286-22-5
Di-n-butyl phthalate (DBP)	84-74-2
Di-n-hexyl phthalate (DNHP)	84-75-3
Dinitrotoluene (technical grade)	-----
Dinocap	39300-45-3
Dinoseb	88-85-7
Diphenylhydantoin (Phenytoin)	57-41-0
Disodium cyanodithioimidocarbonate	138-93-2
Doxorubicin hydrochloride	23214-92-8
Doxycycline calcium	94088-85-4
Doxycycline hydrate	24390-14-5
Doxycycline monohydrate	17086-28-1
Endrin	72-20-8
Epichlorohydrin	106-89-8
Ergotamine tartrate	379-79-3
Estropipate	7280-37-7
Ethionamide	536-33-4
Ethyl dipropylthiocarbamate	759-94-4
Ethylene dibromide	1 06-93-4
Ethylene glycol monoethyl ether	110-80-5
Ethylene glycol monoethyl ether acetate	111-15-9
Ethylene glycol monomethyl ether	109-86-4
Ethylene glycol monomethyl ether acetate	110-49-6
Ethylene oxide	75-21-8
Ethylene thiourea	96-45-7
Etodolac	41340-25-4
Etoposide	33419-42-0
Etretinate	54350-48-0
Fenoxaprop ethyl	66441-23-4
Filgrastim	121181-53-1
Fluazifop butyl	69806-50-4
Flunisolide	3385-03-3



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Fluorouracil	51-21-8
Fluoxymesterone	76-43-7
Flurazepam hydrochloride	1172-18-5
Flurbiprofen	5104-49-4
Flutamide	13311-84-7
Fluticasone propionate	80474-14-2
Fluvalinate	69409-94-5
Ganciclovir sodium	82410-32-0
Gemfibrozil	25812-30-0
Goserelin acetate	65807-02-5
Halazepam	23092-17-3
Halobetasol propionate	66852-54-8
Haloperidol	52-86-8
Halothane	151-67-7
Heptachlor	76-44-8
Hexachlorobenzene	118-74-1
Hexamethylphosphoramide	680-31-9
Hydramethylnon	67485-29-4
Hydroxyurea	127-07-1
Idarubicin hydrochloride	57852-57-0
Ifosfamide	3778-73-2
Iodine-131	10043-66-0
Isotretinoin	4759-48-2
Lead	-----
Leuprolide acetate	74381-53-6
Levodopa	59-92-7
Linuron	330-55-2
Lithium carbonate	554-13-2
Lithium citrate	919-16-4
Lorazepam	846-49-1
Lovastatin	75330-75-5
Dinitrobenzene, m-	99-65-0
Mebendazole	31431-39-7
Medroxyprogesterone acetate	71-58-9
Megestrol acetate	595-33-5
Melphalan	148-82-3
Menotropins	9002-68-0
Meprobamate	57-53-4
Mercaptopurine	6112-76-1
Mercury and mercury compounds	-----
Methacycline hydrochloride	3963-95-9
Metham sodium	137-42-8
Methazole	20354-26-1



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Methimazole	60-56-0
Methotrexate	59-05-2
Methotrexate sodium	15475-56-6
Methyl chloride	74-87-3
Methyl mercury	-----
Methyltestosterone	58-18-4
Metiram	9006-42-2
Midazolam hydrochloride	59467-96-8
Minocycline hydrochloride	13614-98-7
Misoprostol	5122-46-2
Mitoxantrone hydrochloride	70476-82-3
Myclobutanil	88671-89-0
Nabam	142-59-6
Nafarelin acetate	86220-42-0
Neomycin sulfate	1405-10-3
Netilmicin sulfate	56391-57-2
Nickel carbonyl	13463-39-3
Nicotine	54-11-5
Nifedipine	21829-25-4
Nimodipine	66085-59-4
Nitrapyrin	1929-82-4
Nitrofurantoin	67-20-9
N-Methylpyrrolidone	872-50-4
Norethisterone (Norethindrone)	68-22-4
Norethisterone acetate	51-98-9
Norgestrel	6533-00-2
o-Dinitrobenzene	52-82-90
Oxadiazon	19666-30-9
Oxazepam	604-75-1
Oxydemeton methyl	301-12-2
Oxymetholone	434-07-1
Oxytetracycline	79-57-2
Oxytetracycline hydrochloride	2058-46-0
Paclitaxel	33069-62-4
Paramethadione	115-67-3
p-Dinitrobenzene	100-25-4
Penicillamine	52-67-5
Pentobarbital sodium	57-33-0
Pentostatin	53910-25-1
Phenacemide	63-98-9
Phenprocoumon	435-97-2
Pimozide	2062-78-4
Pipobroman	54-91-1



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Plicamycin	18378-89-7
Polybrominated biphenyls	-----
Polychlorinated biphenyls	-----
Potassium dimethyldithiocarbamate	12-80-30
Pravastatin sodium	81131-70-6
Prednisolone sodium phosphate	125-02-0
Procarbazine hydrochloride	366-70-1
Propargite	2312-35-8
Propylthiouracil	51-52-5
Pyrimethamine	58-14-0
Quazepam	36735-22-5
Quizalofop-ethyl	76578-14-8
Resmethrin	10453-86-8
Ribivarin	36791-04-5
Rifampin	13292-46-1
Secobarbital sodium	309-43-3
Sermorelin acetate	-----
Sodium dimethyldithiocarbamate	128-04-1
Sodium fluoroacetate	62-74-8
Streptomycin sulfate	3810-74-0
Streptozocin (streptozotocin)	18883-66-4
Sulfasalazine	599-79-1
Sulindac	38194-50-2
Tamoxifen citrate	54965-24-1
Temazepam	846-50-4
Teniposide	29767-20-2
Terbacil	5902-51-2
Testosterone cypionate	58-20-8
Testosterone enanthate	315-37-7
Tetracycline (internal use)	60-54-8
Tetracycline hydrochloride (internal use)	64-75-5
Thalidomide	50-35-1
Thioguanine	154-42-7
Thiophanate methyl	23564-05-8
Tobramycin sulfate	49842-07-1
Toluene	108-88-3
Triadimefon	43121-43-3
Triazolam	28911-01-5
Tributyltin methacrylate	2155-70-6
Trientine hydrochloride	38260-01-4
Triforine	26644-46-2
Trilostane	13647-35-3
Trimethadione	127-48-0



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Trimetrexate glucuronate	82952-64-5
Triphenyltin hydroxide	76-87-9
Uracil mustard	66-75-1
Urethane (ethyl carbamate)	51-79-6
Urofollitropin	97048-13-0
Valproate (Valproic acid)	99-66-1
Vinblastine sulfate	143-67-9
Vinclozolin	50471-44-8
Vincristine sulfate	2068-78-2
Warfarin	81-81-2
Zileuton	111406-87-2



APPENDIX D

SELECT CARCINOGENS LIST

Aziridine
Benz(a)anthracene
Benzene
Benzidine
Benzidine –based dyes (technical grade)
 Direct Black 38
 Direct Blue 6
 Direct Brown 95

Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(i)fluoranthene
Benzo(k)fluoranthene
Benzofuran
Benzotrichloride
Benzyl violet 4B
Beryllium and beryllium compounds
Betel quid with tobacco
Betel quid without tobacco
Bis(2-chloroethyl)-2-naphthylamine (Chlornaphazine), N,N-Bis(chloromethyl)ether
Bis(bromomethyl)propane-1, 3-diol, 2, 2-
Bischloroethyl nitrosourea (BCNU)
Bis(chloromethyl) ether
Bitumens, extracts of steam-refined and air-refined
Bleomycins
Bracken fern
Bromodichloromethane
Butadiene, 1, 3-
Butanediol dimethanesulphonate (myleran), 1, 4-
Butanediol dimethylsulfonate (myleran), 1, 4-
Butylated hydroxyanisole (BHA)
Butyrolactone, beta-
C.I. Basic Red 9 monohydrochloride
Cadmium and certain cadmium compounds
Caffeic acid
Captafol
Carbon black extract
Carbon tetrachloride
Carrageenan, degraded
Catechol



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Ceramic fibers (respirable size)
Chlorambucil
Chloramphenicol
Chlordane
Chlordecone (kepone)
Chlorendic acid
Chloro-4-(dichloromethyl)5-hydroxy-2(5H)-furanone, 3-
Chloroaniline, para
Chloroethyl)-3-cyclohexy-1-nitrosourea (CCNU), 1-(2-
Chloroethyl)-3-4-methylcyclohexyl-1 nitrosourea, 1-(2-
Chlorinated paraffins (C12, 60% Chlorine)
Chlorinated toluenes, alpha-
Chlornaphazine
Chloro-2-methylpropene, 1-
Chloro-2-methylpropene, 3-
Chloro-o-phenylenediamine, 4-
Chloro-ortho-toluidine, para
Chloroform
Chloromethyl ether
Chloromethyl methyl ether (technical gradw)
Chlorophenols and their sodium salts
Chlorophenoxy herbicides
Chloroprene
Chlorothalonil
Chlorozotocin
Chromium compounds, hexavalent
CI Acid Red 114
CI Basic Red 9
CI Direct Blue 15
Cisplatin
Citrus Red No. 2
Coal tar pitches
Coal tars
Cobalt and cobalt compounds
Cobalt metal with tungsten carbide
Cobalt metal without tungsten carbide
Cobalt (II) sulfate and other soluble cobalt (II) salts
Coffee (bladder)
Conjugated estrogens
Creosotes
Cresidin, para
Cupferron
Cycasin



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Cyclophosphamide
Cyclosporin A
Dacarbazine
Danthron (1, 8-dihydroxyanthraquinone)
Daunomycin
DDT
Diacetylbenzidine, N. N-
Diaminoanisole, 2, 4-
Diaminodiphenyl ether, 4, 4-
Diaminotoluene, 2, 4'
Diazoaminobenzene
Dibenz(a, h)acridine
Dibenz(a, h)anthracene
Dibenz(a, j)acridine
Dibenzo(a, e)pyrene
Dibenzo(a, h)pyrene
Dibenzo(a, i)pyrene
Dibenzo(a, l)pyrene
Dibenzo(c, g)carbazole, 7H-
Dibromo-3-chloropropane, 1, 2-
Dibromoethane (EDB), 1, 2-
Dibromopropan-1-ol, 2, 3-
Dichloroacetic acid
Dichlorobenzene, para-
Dichlorobenzene, 1, 4-
Dichlorobenzidine, 3, 3'-
Dichloro-4, 4'-diaminodiphenyl ether, 3, 3'-
Dichloroethane, 1,2-
Dichloromethane (methylene chloride)
Dichloropropene (technical grade), 1, 3-
Dichlorvos
Diepoxybutane
Diesel engine exhaust
Di(2-ethylhexyl)phthalate
Diethyl sulphate
Diethylhydrazine, 1, 2-
Diethylstilbestrol
Diglycidyl resorcinol ether
Dihydrosafrole
Diisopropyl sulfate
Dimethoxybenzidine, 3, 3'-
Dimethoxybenzidine (ortho-dianisidine), 3, 3'-
Dimethyl Sulphate



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Dimethylaminoazobenzene, para
[(Dimethylamino)methylamino]-5-2-(5-nitro-2, trans-2-
Dimethylaniline, 2, 6- (2, 6-xylidene)
Dimethylbenzidine, 3, 3'-
Dimethylcarbamoyl chloride
Dimethylhydrazine, 1, 1-
Dimethylhydrazine, 1, 2-
Dimethylvinyl chloride
Dinitrofluoroanthrene, 3, 7-
Dinitrofluoroanthrene, 3, 9-
Dinitropyrene, 1, 6-
Dinitropyrene, 1, 8-
Dinitrotoluene, 2, 4-
Dinitrotoluene, 2, 6-
Diocyl phthalate [Di(2-ethylhexyl)phthalate]
Dioxane, 1, 4-
Direct Black 38
Direct Blue 6
Direct Brown 95
Disperse Blue I
Epichlorohydrin
Epoxybutane, 1, 2-
Erionite
Estrogens (not conjugated); estradiol-17
Estrogens (not conjugated); estrone
Estrogens (not conjugated); mestranol
Estrogens (not conjugated); ethinylestradiol
Ethylbenzene
Ethyl acrylate
Ethyl methanesulphonate
Ethyl-N-nitrosourea, N-
Ethylene oxide
Ethylene thiourea
Ethylene dibromide
Ethyleneimine
Etoposide
Etoposide in combination with cisplatin and bleomycin
Formaldehyde
Formylhydrazino)-4-(5-nitro-2-furyl) thiazole, 2-(2-
Fuel oils (residual, heavy)
Furan

Furyl)-3-(5-nitro-2-furyl)acrylamide], AF-2[2-



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Fusarium moniliform (toxins derived from)
 Fumonisin B1
 Fumonisin B2
 Fusarin C

Gallium arsenide
Gamma radiation (ionizing radiation)
Gasoline
Gasoline engine exhausts
Glasswool (respirable size)
Glu-P-1 (2-amino-6-methyldipyrdo[1, 2-a:3', 2'-d] imidazole)
Glu-P-2 (2-aminodipyrdo[1,2-a:3', 2'-d] imidazole)
Glycidaldehyde
Glycidol
Griseofulvin
HC blue No 1
Heptachlor
Hexachlorobenzene
Hexachlorocyclohexanes
Hexachloroethane
Hexamethylphosphoramide
Hydrazine and hydrazine sulfate
Hydrazobenzene
Hydroxyanthroquinone, 1-
Indeno(1, 2, 3-cd) pyrene
Indium phosphide
IQ (2-amino-3-methylimidazo[4, 5-f] quinoline)
Iron dextran complex
Isoprene
Kepone (chlordecone)
Lasiocarpine
Lead
Lead acetate and lead phosphate
Lead compounds, inorganic
Lindane and other hexachlorocyclohexane isomers
Magenta (containing CI Basic Red 9)
Man-made mineral fibers (glasswool, rockwool, slagwool, and ceramic fibers), respirable size
MeA-alpha-C(2-amino-3-methyl-9H-pyrido[2, 3-b] indole)
MeIQ (2-amino-3, 4-dimethylimidazo[4, 5-f] quinoxaline)
Medroxyprogesterone acetate
Melphalan

Merphalan



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Methoxsalen with ultraviolet A therapy (PUVA)
Methoxypsoralen, 8- plus ultraviolet radiation
Methoxypsoralen, 5-
Methyl mercury compounds (methylmercuric chloride)
Methyl methanesulphonate
Methyl chloromethyl ether
Methyl-1-nitroanthraquinone, 2-
Methyl-N'-nitro-N-nitrosoguanidine, N- (MNNG)
Methyl-N-nitrosourethane, N-
Methyl-N-nitrosourea, N-
Methylaziridine (propyleneimine), 2-
Methylazoxymethanol and its acetate
Methylchrysene, 5-
Methylene bis (2-methylaniline), 4, 4'-
Methylene bis (N,N-dimethyl) benzenamine, 4, 4'-
Methylene bis (2-chloroaniline) (MBOCA), 4, 4'-
Methylene chloride (dichloromethane)
Methylenedianiline, 4, 4'- and its dihydrochloride
Methyleugenol
Methylthiouracil
Metronidazole
Michler's Ketone
Mirex
Mitoxantrone
Mitomycin C
Monocrotaline
MOPP and other combined chemotherapy for cancer
Morpholinomethyl)-3-[5-nitrofurfurylidene) amino]-2-oxazolidinone, 5-(
Mustard gas (sulphur mustad)
Nafenopin
Naphthalene
Naphthalamine, alpha-
Naphthalamine, beta
Neutrons (ionizing radiation)
Nickel and certain nickel compounds
Niridazole
Nitrilotriacetic acid and its salts
Nitroacenaphthene
Nitroanisole, 2-
Nitrobenzene
Nitrobiphenyl, 4-

Nitrochrysene, 6-



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Nitrofen
Nitrofluorene, 2-
Nitrofurfurylidene) amino]-2-imidazolidinone, 1-[(5-
Nitro-2-furyl)-2-thiazolyl] acetamide, N-[4-(5-
Nitrogen mustard N-oxide
Nitrogen mustard hydrochloride
Nitrogen mustard
Nitrolotriacetic acid and its salts
Nitromethane
Nitropropane, 2-
Nitropyrene, 1-
Nitropyrene, 4-
Nitroso-N-ethylurea, N-
Nitroso-N-methylurea, N-
Nitrosodi-n-butylamine, N-
Nitrosodi-n-propylamine, N-
Nitrosodiethanolamine, N-
Nitrosodiethylamine, N-
Nitrosomethylamino)propionitrile, 3-(N-
Nitrosomethylamino)-1(3-pyridyl)-1-butanone (NNK), 4-(N-
Nitrosomethylethylamine, N-
Nitrosomethylvinylamine, N-
Norethisterone
Ocratoxin A
Oestrogen-progestogen therapy, postmenopausal
Oestrogens, nonsteroidal
Oestrogens, steroidal
Oil Orange SS
Oral contraceptives, sequential or combined
Oxazepam
Oxydianiline, 4, 4-
Oxymetholone
Panfuran S (containing dihydroxymethylfuratrizine)
Phenacetin
Phenazopyridine hydrochloride
Phenobabital
Phenolphthalein
Phenoxybenzamine hydrochloride
Phenyl glycidyl ether
Phenytoin
Polybrominated biphenyls (PCBs)

Polychlorinated biphenyls (PCBs)



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Polycyclic aromatic hydrocarbons (PAHs)
Ponceau MX
Ponceau 3R
Potassium bromated
Procarbazine hydrochloride
Progesterone
Progestins
Propanesultone-propiolactone, 1, 3-
Propane sultone, 1, 3-
Propiolactone, beta
Propylene oxide
Propylthiouracil
Refractory ceramic fibers
Reserpine
Riddlelline
Safrole
Selenium sulfide
Silica (crystalline)
Sodium ortho-phenylphenate
Sterigmatocystin
Streptozotocin
Styrene
Styrene oxide (styrene-7, 8-oxide)
Sulfallate
Sulphuric acid
Talc containing asbestiform fibers
Tamoxifen
Tenopside
Tetrachlorodibenzo-p-dioxin (TCDD), 2, 3,7, 8-
Tetrachloroethylene (perchloroethylene)
Tetrafluoroethylene
Tetranitromethane
Thioacetamide
Thiodianiline, 4,4'-
Thiotepa [tris(1-azinidiny) phosphine sulfide]
Thiouracil
Thiourea
Thorium dioxide
Toluene diisocyanates
Toluidine, ortho- (3, 3-Dimethylbenzidine)
Toluidine hydrochloride, ortho-

Toxaphene (polychlorinated camphenes)



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Trans-2[(Dimethylamino)methylimino]-5-[2-(5-nitro-2-furyl)vinyl]- (Treosulphan)
Trichloroethylene
Trichlormethine (Trimustine hydrochloride)
Trichlorophenol, 2, 4, 6-
Trichloropropane, 1, 2, 3-
Tris(2, 3-dibromopropyl) phosphate
Trp-P-1(3-Amino-1, 4-dimethyl-5H-pyrido[4,3-b]indole)
Trp-P-2(3-Amino-1-methyl-5H-pyrido[4,3-b]indole)
Trypan blue
Uracil mustard
Urethane
Vanadium pentoxide
Vinyl acetate
Vinyl bromide
Vinyl chloride
Vinyl fluoride
Vinylcyclohexene, 4-
Vinylcyclohexene diepoxide, 4-
Wood dust
Zalcitabine
Zidovudine (AZT, retrovir)