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HAZARDOUS WASTE MANUAL

Procedure Cover Sheet

Procedure Title: Waste Characterization

Procedure Number: TSO-07-01-REV 0

Effective Date: 01 September, 2007

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Technical Safety Office Director

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Procedure #: TSO-07-01-REV 0
Procedure Title: Waste Characterization
Approval Date: August 20, 2007
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A. INTRODUCTION

In order for a waste to be considered hazardous, it must exhibit some characteristic or characteristics of hazardous waste. If a material is classifiable as ignitable, corrosive, reactive, toxic or characteristic, it is considered to be hazardous (40 CFR 261 Part B).

B. PURPOSE

The purpose of this procedure is to aid in the classification of waste materials in order to determine whether it is hazardous.

C. REQUIRED MATERIAL(S)

Hazardous waste classifications

D. PROCEDURE

There are many different types of hazardous waste generated at ISU. A list of the wastes that fall into each category can be found in 40 CFR 261. The type of waste generated most commonly at ISU is characteristic waste, but several other categories are possible, including ignitable, corrosive, peroxide forming chemicals and reactive.

1. Characteristic Waste
 - a. D-Listed Characteristic Toxic Waste (40 CFR 261.24)
 - b. D-Listed Specific Waste
 - c. P-Listed Hazardous Waste (40 CFR 261.33(e))
 - d. U-Listed Specific Waste (40 CFR 261.33(f))
 - e. F-Listed Waste (40 CFR 261 Appendix VII)
2. Ignitable (40 CFR 261.21)
3. Corrosive (40 CFR 261.22)

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4. Reactive (40 CFR 261.23)

E. ATTACHMENTS

D-Listed Ignitable Waste

D-Listed Corrosive Waste

D-Listed Reactive Waste

D-Listed Specific Waste

P-Listed Waste

U-Listed Waste

Peroxidizable Chemicals

Shock-Sensitive Chemicals

Water Reactive Chemicals

Pyrophoric Chemicals

D-Listed Ignitable Waste

Waste Code	Waste Description
D001	<ol style="list-style-type: none">1. It is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume and has a flash point less than 60°C (140°F).2. It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.3. It is an ignitable compressed gas.4. It is an oxidizer.

D-Listed Corrosive Waste

Waste Code	Waste Description
D002	<ol style="list-style-type: none">1. It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5.2. It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35mm (0.250 inch) per year at a test temperature of 55°C (130°F).

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D-Listed Reactive Waste

Waste Code	Waste Description
D003	<ol style="list-style-type: none"><li data-bbox="423 405 1325 478">1. It is normally unstable and readily undergoes violent change without detonating.<li data-bbox="423 506 873 541">2. It reacts violently with water.<li data-bbox="423 569 1166 604">3. It forms potentially explosive mixtures with water.<li data-bbox="423 632 1414 741">4. 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.<li data-bbox="423 768 1414 911">5. 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 fumes in a quantity sufficient to present a danger to human health or the environment.<li data-bbox="423 938 1433 1012">6. It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.<li data-bbox="423 1039 1373 1113">7. It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.<li data-bbox="423 1140 1433 1251">8. 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.

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D-Listed Specific Waste

Waste Code	Waste Description	Regulatory Level (mg/L)
D004	Arsenic	5.0
D005	Barium	100.0
D006	Benzene	0.5
D007	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 (1)
D024	m-Cresol	200.0 (1)
D025	p-Cresol	200.0 (1)
D026	Cresol	200.0
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichlorobenzene	0.5
D029	1,1-Dichlorobenzene	0.7
D030	2,4-Dinitrotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor (and its expoxide)	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachlorbutadiene	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
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

Note 1: If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/L.

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P-Listed Waste

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
P023	Acetaldehyde, chloro-
P002	Acetamide, N-(aminothioxomethyl)-
P057	Acetamide, 2-fluoro-
P058	Acetic acid, fluoro-, sodium salt
P002	1-Acetyl-2-thiourea
P003	Acrolein
P070	Aldicarb
P004	Aldrin
P005	Allyl alcohol
P006	Aluminum phosphide (R,T)
P007	5-(Aminomethyl)-3-isoxazolol
P008	4-Aminopyridine
P009	Ammonium picrate (R)
P119	Ammonium vanadate
P099	Argemate(1-), bis(cyano-C)-, potassuim
P010	Arsenic acid H_3AsO_4
P012	Arsenic oxide As_2O_3
P011	Arsenic oxide As_2O_5
P011	Arsenic pentaoxide
P012	Arsenic trioxide
P038	Arsine, diethyl-
P036	Arsonous dichloride, phenyl-
P054	Aziridine
P067	Aziridine, 2-methyl-
P013	Barium cyanide
P024	Benzenamine, 4-chloro-
P077	Benzenamine, 4-nitro-
P028	Benzene, (chloromethyl)-
P042	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino) ethyl]-, (R)-
P046	Benzeneethanamine, alpha,alpha-dimethyl-
P014	Benzenethiol
P001	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations greater than 0.3%
P028	Benzyl chloride
P015	Beryllium
P017	Bromozcetone
P018	Brucine

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P-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
P045	2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[methylamino]carbonyl] oxime
P021	Calcium cyanide
P021	Calcium cyanide $\text{Ca}(\text{CN})_2$
P022	Carbon disulfide
P095	Carbonic dichloride
P023	Chloroacetaldehyde
P024	p-Chloroaniline
P026	1-(o-Chlorophenyl)thiourea
P027	3-Chloropropionitrile
P029	Copper cyanide
P029	Copper cyanide $\text{Cu}(\text{CN})$
P030	Cyanides (soluble cyanide salts), not otherwise specified
P031	Cyanogen
P033	Cyanogen chloride
P033	Cyanogen chloride $(\text{CN})\text{Cl}$
P034	2-Cyclohexyl-4,6-dinitrophenol
P016	Dichloromethyl ether
P036	Dichlorophenylarsine
P037	Dieldrin
P038	Diethylarsine
P041	Diethyl-p-nitrophenyl phosphate
P040	O,O-Diethyl O-pyrazinyl phosphorothioate
P043	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a,-hexahydro-, (1alpha,4alpha,4abeta,5alpha,8alpha,8abeta)-
P060	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5beta,8beta,8abeta)-
P037	2,7:3,6-Demethanonaphth[2,3-b]oxirene,3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octa-hydro-, (1aalpha,2beta,2aalpha,3beta,6beta,6aalpha,7beta,7aalpha)-
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
P044	Dimethoate
P046	alpha,alpha-Dimethylphenethylamine

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P-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
P047	4,6-Dinitro-o-cresol, & salts
P048	2,4-Dinitrophenol
P020	Dinoseb
P085	Diphosphoramidate, octamethyl-
P111	Diphosphoric acid, tetraethyl ester
P039	Disulfoton
P049	Dithiobiuret
P050	Endosulfan
P088	Endothall
P051	Endrin
P051	Endrin, & metabolites
P042	Epinephrine
P031	Ethanimidothioic acid, N-[[[(methylamino) carbonyl]oxy]-, methyl ester
P101	Ethyl cyanide
P054	Ethyleneimine
P097	Famphur
P056	Fluorine
P057	Fluoroacetamide
P058	Fluoroacetic acid, sodium salt
P065	Fulminic acid, mercury(2+) salt (R,T)
P059	Heptachlor
P062	Hexaethyl tetraphosphate
P116	Hydrazinecarbothioamide
P068	Hydrazine, methyl-
P063	Hydrocyanic acid
P063	Hydrogen cyanide
P096	Hydrogen phosphide
P060	Isodrin
P007	3(2H0-Isoxazolone, 5-(aminomethyl)-
P092	Mercury, (acetato-O)phenyl-
P065	Mercury fulminate (R,T)
P082	Methanamine, N-methyl-N-nitroso-
P064	Methane, isocyanato
P016	Methane, oxybis[chloro-
P112	Methane, tetranitro- (R)

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Methanethiol, trichloro-

P-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
P050	6,9-Methano-2,4,3-benzodioxathiepin,6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-,3-oxide
P059	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P066	Methomyl
P068	Methyl hydrazine
P064	Methyl isocyanate
P069	2-Methylactonitrile
P071	Methyl parathion
P072	alpha-Naphthylthiourea
P073	Nickel carbonyl
P073	Nickel carbonyl Ni(CO) ₄ , (T-4)-
P074	Nickel cyanide
P074	Nickel cyanide Ni(CN) ₂
P075	Nicotine, & salts
P076	Nitric oxide
P077	p-Nitroaniline
P078	Nitrogen dioxide
P076	Nitrogen oxide NO
P078	Nitrogen oxide NO ₂
P081	Nitroglycerine (R)
P082	N-Nitrosodimethylamine
P084	N-Nitrosomethylvinylamine
P085	Octamethylpyrophosphoramide
P087	Osmium oxide OsO ₄ , (T-4)-
P087	Osmium tetroxide
P088	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P089	Parathion
P034	Phenol, 2-cyclohexyl-4,6-dinitro-
P048	Phenol, 2,4-dinitro-
P047	Phenol, 2-methyl-4,6-dinitro-, & salts
P020	Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P009	Phenol, 2,4,6-trinitro-, ammonium salt (R)
P092	Phenylmercury acetate

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P093	Phenylthiourea
P094	Phorate
P095	Phosgene
P096	Phosphine

P-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
P041	Phosphoric acid, diethyl 4-nitrophenyl ester
P039	Phosphorodithioic acid, O,O-diethyl S-[2-ethylthio)ethyl] ester
P094	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P044	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester
P043	Phosphorofluoridic acid, bis(1-methylethyl) ester
P089	Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester
P040	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P097	Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimehtyl ester
P071	Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester
P110	Plumbane, tetraethyl-
P098	Potassium cyanide
P098	Potassium cyanide K(CN)
P099	Potassium silver cyanide
P070	Propanal, 2-methyl-2-(methylthio)-,O-[(methylamino)carbonyl]oxime
P101	Propanenitrile
P027	Propanenitrile, 3-chloro-
P069	Propanenitrile, 2-hydroxy-2-methyl-
P081	1,2,3-Propanetriol, trinitrate, (R)
P017	2-Propanone, 1-bromo-
P102	Propargyl alcohol
P003	2-Propenal
P005	2-Propen-1-ol
P067	1,2-Propylenimine
P102	2-Propyn-1-ol
P008	4-Pyridinamine
P075	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts
P114	Selenious acid, dithallium(1+) salt
P103	Selenourea
P104	Silver cyanide

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P105	Sodium azide
P106	Sodium cyanide
P108	Strychnidin-10-one, & salts
P018	Strychnidin-10-one, 2,3-dimethoxy-
P108	Strychnine, & salts
P115	Sulfuric acid, dithallium(1+) salt
P109	Tetraethyldithiopyrophosphate

P-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
P110	Tetraethyl lead
P111	Tetraethyl pyrophosphate
P112	Tetranitromethane (R)
P062	Tetraphosphoric acid, hexaethyl ester
P113	Thallic oxide
P113	Thallium oxide Tl_2O_3
P114	Thallium(I) selenite
P115	Thallium(I) sulfate
P109	Thiodiphosphoric acid, tetrethyl ester
P045	Thiofanox
P049	Thioimidodicarbonic diamide $[(H_2N)C(S)]_2NH$
P014	Thiophenol
P116	Thiosemicarbazide
P026	Thiourea, (2-chlorophenyl)-
P072	Thiourea, 1-naphthalenyl-
P093	Thiourea, phenyl-
P123	Toxaphene
P118	Trichloromethanethiol
P119	Vanadic acid, ammonium salt
P120	Vanadium oxide V_2O_5
P120	Vanadium pentoxide
P084	Vinylamine, N-methyl-N-nitroso-
P001	Warfarin, & salts, when present at concentrations greater than 0.3%
P121	Zinc cyanide
P121	Zinc cyanide $Zn(CN)_2$
P122	Zinc phosphide Zn_3P_2 , when present at concentrations greater than 10%

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U-Listed Waste

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U001	Acetaldehyde (I)
U034	Acetaldehyde, trichloro-
U187	Acetamide, N-(4-ethoxyphenyl)-
U005	Acetamide, N-9H-fluoren-2-yl-
U240	Acetic acid, (2,4-dichlorophenoxy)-, salts, & esters
U112	Acetic acid ethyl ester (I)
U144	Acetic acid, lead(2+) salt
U214	Acetic acid, thallium(1+) salt
U002	Acetone (I)
U003	Acetonitrile (I,T)
U004	Acetophenone
U005	2-Acetylaminofluorene
U006	Acetyl chloride (C,R,T)
U007	Acrylamide
U008	Acrylic acid (I)
U009	Acrylonitrile
U011	Amitrole
U012	Aniline (I,T)
U136	Arsinic acid, dimethyl-
U014	Auramine
U015	Azaserine
U010	Azirino[2'c3':3,4]pyrrolo[1,2-a]indole-4,7-dione, 6-amino-8-[[aminocarbonyloxy]methyl]-1,1a,2,8,8a,8b-hexahydro- 8a-methoxy-5-methyl-, [1aS-(1aalpha, 8beta, 8aalpha,8balpha)]-
U157	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U016	Benz[c]acridine
U017	Benzal chloride
U192	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-
U018	Benz[a]anthracene
U094	Benz[a]anthracene, 7,12-dimethyl-
U012	Benzenamine (I,T)
U014	Benzenamine, 4,4'-carbonimidoylbis[N,N-dimethyl]-
U049	Benzenamine, 4-chloro-2-methyl-, hydro-chloride
U093	Benzenamine, N,N-dimethyl-4-(phenylazo)-
U328	Benzenamine, 2-methyl-
U353	Benzenamine, 4-methyl-
U158	Benzenamine, 4,4'-mentylenebis[2-chloro-
U222	Benzenamine, 2-methyl-, hydrochloride

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U-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U019	Benzene (I,T)
U181	Benzenamine, 2-methyl-5-nitro-
U038	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester
U030	Benzene, 1-bromo-4-phenoxy-
U035	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-
U037	Benzene, chloro-
U221	Benzenediamine, ar-methyl-
U028	1,2-Benzenedicarboxylic acid, bis(2-ethyl-hexyl) ester
U069	1,2-Benzenedicarboxylic acid, dibutyl ester
U088	1,2-Benzenedicarboxylic acid, diethyl ester
U102	1,2-Benzenedicarboxylic acid, dimethyl ester
U107	1,2-Benzenedicarboxylic acid, dioctyl ester
U070	Benzene, 1,2-dichloro-
U071	Benzene, 1,3-dichloro-
U072	Benzene, 1,4-dichloro-
U060	Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro-
U017	Benzene, (dichloromethyl)-
U223	Benzene, 1,3-diisocyanatomethyl- (R,T)
U239	Benzene, dimethyl- (I,T)
U201	1,3-Benzenediol
U127	Benzene, hexachloro-
U056	Benzene, hexahydro- (I)
U220	Benzene, methyl-
U105	Benzene, 1-methyl-2,4-dinitro-
U106	Benzene, 2-methyl-1,3-dinitro-
U055	Benzene, (1-methylethyl)- (I)
U169	Benzene, nitro-
U183	Benzene, pentachloro-
U185	Benzene, pentachloronitro-
U020	Benzenesulfonic acid chloride (C,R)
U020	Benzenesulfonyl chloride (C,R)
U207	Benzene, 1,2,4,5-tetrachloro-
U061	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-
U247	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[r-methoxy-
U023	Benzene, (trichloromethyl)-
U234	Benzene, 1,3,5-trinitro-
U021	Benidine

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U-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U202	1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, & salts
U203	1,3-Benzodioxole, 5-(2-propenyl)-
U141	1,3-Benzodioxole, 5-(1-propenyl)-
U090	1,3-Benzodioxole, 5-propyl-
U064	Benzo[<i>a</i>]pentaphene
U248	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations of 0.3% or less
U022	Benzo[<i>a</i>]pyrene
U197	p-Benzoquinone
U023	Benzotrichloride (C,R,T)
U085	2,2'-Bioxirane
U021	[1,1'-Biphenyl]-4,4'-diamine
U073	[1,1'-Binphenyl]-4,4'-diamine, 3,3'-dichloro-
U091	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-
U095	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-
U225	Bromoform
U030	4-Bromophenyl phenyl ether
U128	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-
U172	1-Butanamine, N-butyl-N-nitroso-
U031	1-Butanol (I)
U159	2-Butanone (I,T)
U160	2-Butanone, peroxide (R,T)
U053	2-Butenal
U074	2-Butene, 1,4-dichloro- (I,T)
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- [1 α (Z),7(2S*,3R*),7a α]]-
U031	n-Butyl alcohol (I)
U136	Cacodylic acid
U032	Calcium chromate
U238	Carbamic acid, ethyl ester
U178	Carbamic acid, methylnitroso-, ethyl ester
U097	Carbamic chloride, dimethyl-
U114	Carbamodithioic acid, 1,2-ethanediybis-, salts & esters

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U062	Carbamothioic acid, bis(1-methylethyl)-,S-(2,3-dichloro-2-propenyl) ester
U215	Carbonic acid, dithallim(1+) salt
U033	Carbonic difluoride

U-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U156	Carbonochloridic acid, methyl ester (I,T)
U033	Carbon oxyfluoride (R,T)
U211	Carbon tetrachloride
U034	Chloral
U035	Chlorambucil
U036	Chlordane, alpha & gamma isomers
U026	Chlornaphazin
U037	Chlorobenzene
U038	Chlorobenzilate
U039	p-Chloro-m-cresol
U042	2-Chloroethyl vinyl ether
U044	Chloroform
U046	Chloromethyl methyl ether
U047	beta-Chloronaphthalene
U048	o-Chlorophenol
U049	4-Chloro-o-toluidine, hydrochloride
U032	Chromic acid H ₂ CrO ₄ , calcium salt
U050	Chrysene
U051	Creosote
U052	Cresol (Cresylic acid)
U053	Crotonaldehyde
U055	Cumene (I)
U246	Cyanogen bromide (CN)Br
U197	2,5-Cyclohexadiene-1,4-dione
U056	Cyclohexane (I)
U129	Cyclohexane,1,2,3,4,5,6-hexachloro-,(1alpha,2alpha,3beta,4alpha,5alpha,6beta)-
U057	Cyclohexanone (I)
U130	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-
U058	Cyclophosphamide
U240	2,4-D, salts & esters
U059	Daunomycin
U060	DDD

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U061	DDT
U062	Diallate
U063	Dibenz[a,h]anthracene
U064	Dibenzo[a,l]pyrene
U066	1,2-Dibromo-3-chloropropane

U-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U069	Dibutyl phthalate
U070	o-Dichlorobenzene
U071	m-Dichlorobenzene
U072	p-Dichlorobenzene
U073	3,3'-Dichlorobenzidine
U074	1,4-Dichloro-2-butene (I,T)
U075	Dichlorodifluoromethane
U078	1,1-Dichloroethylene
U079	1,2-Dichloroethylene
U025	Dichloroethyl ether
U027	Dichloroisopropyl ether
U024	Dichloromethoxy ethane
U081	2,4-Dichlorophenol
U082	2,6-Dichlorophenol
U084	1,3-Dichloropropene
U085	1,2:3,4-Diepoxybutane (I,T)
U108	1,4-Diethyleneoxide
U028	Diethylhexyl phthalate
U086	N,N'-Diethylhydrazine
U087	O,O-Diethyl S-methyl dithiophosphate
U088	Diethyl phthalate
U089	Diethylstilbesterol
U090	Dihydrosafrole
U091	3,3'-Dimethoxybenzidine
U092	Dimethylamine (I)
U093	p-Dimethylaminoazobenzene
U094	7,12-Dimethylbenz[a]anthracene
U095	3,3'-Dimethylbenzidine
U096	alpha,alpha-Dimethylbenzylhydroperoxide (R)
U097	Dimethylcarbamoyl chloride
U098	1,1-Dimethylhydrazine

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U099	1,2-Dimethylhydrazine
U101	2,4-Dimethylphenol
U102	Dimethyl phthalate
U103	Dimethyl sulfate
U105	2,4-Dinitrotoluene
U106	2,6-Dinitrotoluene
U107	Di-n-octyl phthalate

U-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U108	1,4-Dioxane
U109	1,2-Diphenylhydrazine
U110	Dipropylamine (I)
U111	Di-n-propylnitrosamine
U041	Epichlorohydrin
U001	Ethanal (I)
U174	Ethanamine, N-ethyl-N-nitroso-
U155	1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-
U067	Ethane, 1,2-dibromo-
U076	Ethane, 1,1-dichloro-
U077	Ethane, 1,2-dichloro-
U131	Ethane, hexachloro-
U024	Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-
U117	Ethane, 1,1'-oxybis-(I)
U025	Ethane, 1,1'-oxybis[2-chloro-
U184	Ethane, pentachloro-
U208	Ethane, 1,1,1,2-tetrachloro-
U209	Ethane, 1,1,2,2-tetrachloro-
U218	Ethanethioamide
U226	Ethane, 1,1,1-trichloro-
U227	Ethane, 1,1,2-trichloro-
U359	Ethanol, 2-ethoxy-
U173	Ethanol, 2,2'-(nitrosoimino)bis-
U004	Ethanone, 1-phenyl-
U043	Ethene, chloro-
U042	Ethene, (2-chloroethoxy)-
U078	Ethene, 1,1-dichloro-
U079	Ethene, 1,2-dichloro-, (E)-
U210	Ethene, tetrachloro-

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U228	Ethene, trichloro-
U112	Ethyl acetate (I)
U113	Ethyl acrylate (I)
U238	Ethyl carbamate (urethane)
U117	Ethyl ether (I)
U114	Ethylenebisdithiocarbamic acid, salts & esters
U067	Ethylene dibromide
U077	Ethylene dichloride
U359	Ethylene glycol monoethyl ether

U-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U115	Ethylene oxide (I,T)
U116	Ethylenethiourea
U076	Ethylidene dichloride
U118	Ethyl methacrylate
U119	Ethyl methanesulfonate
U120	Fluoranthene
U122	Formaldehyde
U123	Formic acid (C,T)
U124	Furan
U125	2-Furancarboxaldehyde (I)
U147	2,5-Furandione
U213	Furan, tetrahydro-(I)
U125	Furfural (I)
U124	Furfuran (I)
U206	Glucopyranose, 2-deoxy-2-(3-methyl-3nitrosoureido)-, D-
U206	D-Glucose, 2-deoxy-2-[[[(methylnitroso-amino)-carbonyl]amino]-
U126	Glycidylaldehyde
U163	Guanidine, N-methyl-N'-nitro-N-nitroso-
U127	Hexachlorobenzene
U128	Hexachlorobutadiene
U130	Hexachlorocyclopentadiene
U131	Hexachloroethane
U132	Hexachlorophene
U243	Hexachloropropene
U133	Hydrazine (R,T)
U086	Hydrazine, 1,2-diethyl-
U098	Hydrazine, 1,1-dimethyl-

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U099	Hydrazine, 1,2-dimehtyl-
U109	Hydrazine, 1,2-diphenyl-
U134	Hydrofluoric acid (C,T)
U134	Hydrogen fluoride (C,T)
U135	Hydrogen sulfide
U135	Hydrogen sulfide H ₂ S
U096	Hydroperoxide, 1-methyl-1-phenyethyl- (R)
U116	2-Imidazolidinethione
U137	Indeno[1,2,3-cd]pyrene
U190	1,3-Isobenzofurandione
U140	Isobutyl alcohol (I,T)

U-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U141	Isosarole
U142	Kepone
U143	Lasiocarpine
U144	Lead acetate
U146	Lead, bis(acetate-O)tetrahydroxytri-
U145	Lead phosphate
U146	Lead subacetate
U129	Lindane
U163	MNNG
U147	Maleic anhydride
U148	Maleic hydrazide
U149	Malononitrile
U150	Melphalan
U151	Mercury
U152	Methacrylonitrile (I,T)
U092	Methanamine, N-methyl- (I)
U029	Methane, bromo-
U045	Methane, chloro- (I,T)
U046	Methane, chloromethoxy-
U068	Methane, dibromo-
U080	Methane, dichloro-
U075	Methane, dichlorodifluoro-
U138	Methane, iodo-
U119	Methanesulfonic acid, ethyl ester
U211	Methane, tetrachloro-

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U153	Methanethiol (I,T)
U225	Methane, tribromo-
U044	Methane, trichloro-
U121	Methane, trichlorofluoro-
U036	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-
U154	Methanol (I)
U155	Methapyrilene
U142	1,3,4-Metheno-2H-cyclobutal[cd]pentalen-2-one,1,1a,3,3a,4,5,5,5a,5b,6-decachloro-octabhydro-
U247	Methoxychlor
U154	Methyl alcohol (I)
U029	Methyl bromide
U186	1-Methylbutadiene (I)

U-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U054	Methyl chloride (I,T)
U156	Methyl chlorocarbonate (I,T)
U226	Methyl chloroform
U157	3-Methylcholanthrene
U158	4,4'-Methylenebis(2-chloroaniline)
U068	Methylene bromide
U080	Methylene chloride
U159	Methyl ethyl ketone (MEK) (I,T)
U160	Methyl ethyl ketone peroxide (R,T)
U138	Methyl iodide
U161	Methyl isobutyl ketone (I)
U162	Methyl methacrylate (I,T)
U161	4-Methyl-2-pentanone (I)
U164	Methylthiouracil
U010	Mitomycin C
U059	5,12-Naphthacenedione,8-acetyl-10-[(3-amino-2,3,6-trideoxy)-alpha-L-lyxo-hexo-pyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-
U167	1-Naphthalenamine
U168	2-Naphthalenamine
U026	Naphthalenamine, N,N'-bis(2-chloroethyl)-
U165	Naphthalene
U047	Naphthalene, 2-chloro-

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U166	1,4-Naphthalenedione
U236	2,7-Naphthalenedisulfonic acid,3,3'-[(3,3'-dimethyl[1,1'-biphenyl]-4,4'-diyl)bis(azo)bis[4-amino-4-hydroxy]-, tetrasodium salt
U166	1,4-Naphtho1uinone
U167	alpha-Naphthylamine
U168	beta-Naphthylamine
U217	Nitric acid, thallium(1+) salt
U169	Nitrobenzene (I,T)
U170	p-Nitrophenol
U171	2-Nitropropane (I,T)
U172	N-Nitrosodi-n-butylamine
U173	N-Nitrosodiethanolamine
U174	N-Nitrosodiethylamine
U176	N-Nitroso-N-ethylurea

U-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U177	N-Nitroso-N-methylurea
U178	N-Nitroso-N-methylurethane
U179	N-Nitrosopiperidine
U180	N-Nitrosopyrrolidine
U181	5-Nitro-o-toluidine
U193	1,2-Oxathiolane, 2,2-dioxide
U058	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide
U115	Oxirane (I,T)
U126	Oxiranecarboxyaldehyde
U041	Oxirane, (chloromethyl)-
U182	Paraldehyde
U183	Pentachlorobenzene
U184	Pentachloroethane
U185	Pentachloronitrobenzene (PCNB)
See F027	Pentachlorophenol
U161	Pentanol, 4-methyl-
U186	1,3-Pentadiene (I)
U187	Phenacetin
U188	Phenol
U048	Phenol, 2-chloro-

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U039	Phenol, 4-chloro-3-methyl-
U081	Phenol, 2,4-dichloro-
U082	Phenol, 2,6-dichloro-
U089	Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)-
U101	Phenol, 2,4-dimethyl-
U052	Phenol, methyl-
U132	Phenol, 2,2'-methylenebis[3,4,6-trichloro-
U170	Phenol, 4-nitro-
See F027	Phenol, pentachloro-
See F027	Phenol, 2,3,4,6-tetrachloro-
See F027	Phenol, 2,4,5-trichloro-
See F027	Phenol, 2,4,6-trichloro-
U150	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-
U145	Phosphoric acid, lead(2+) salt (2:3)
U087	Phosphorodithioic acid, O,O-diethyl S-methylester
U189	Phosphorus sulfide (R)
U190	Phthalic anhydride

U-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U191	2-Picoline
U179	Piperidine, 1-nitroso-
U192	Pronamide
U194	1-Propanamine (I,T)
U111	1-Propanamine, N-nitroso-N-propyl-
U110	1-Propanamine, N-propyl- (I)
U066	Propane, 1,2-dibromo-3-chloro-
U083	Propane, 1,2-dichloro-
U149	Propanedinitrile
U171	Propane, 2-nitro- (I,T)
U027	Propane, 2,2'-oxybis[2-chloro-
U193	1,3-Propane sultone
See F027	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-
U235	1-Propanol, 2,3-dibromo-, phosphate (3:1)
U140	1-Propanol, 2-methyl- (I,T)
U002	2-Propanone (I)
U007	2-Propenamide
U084	1-Propene, 1,3-dichloro-
U243	1-Propene, 1,1,2,3,3,3-hexachloro-

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U009	2-Propenenitrile
U152	2-Propenenitrile, 2-methyl- (I,T)
U008	2-Propenoic acid (I)
U113	2-Propenoic acid, ethyl ester (I)
U118	2-Propenoic acid, 2-methyl-, ethyl ester
U162	2-Propenoic acid, 2-methyl-, methylester (I,T)
U194	n-Propylamine (I,T)
U083	Propylene dichloride
U148	3,6-Pyridazinedione, 1,2-dihydro-
U196	Pyridine
U191	Pyridine, 2-methyl-
U237	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-
U164	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U180	Pyrrolidine, 1-nitroso-
U200	Reserpine
U201	Resorcinol
U202	Saccharin, & salts
U203	Safrole
U204	Selenious acid

U-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U204	Selenium dioxide
U205	Selenium sulfide
U015	L-Serine, diazoacetate (ester)
See F027	Silvex (2,4,5-TP)
U206	Streptozotocin
U103	Sulfuric acid, dimethyl ester
U189	Sulfur phosphide (R)
See F027	2,4,5-T
U207	1,2,4,5-Tetrachlorobenzene
U208	1,1,1,2-Tetrachloroethane
U209	1,1,2,2-Tetrachloroethane
U210	Tetrachloroethylene
See F027	2,3,4,6-Tetrachlorophenol
U213	Tetrahydrofuran (I)
U214	Thallium(I) acetate
U215	Thallium(I) carbonate
U216	Thallium(I) chloride

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U217	Thallium(I) nitrate
U218	Thioacetamide
U153	Thiomethanol (I,T)
U244	Thioperoxydicarbonic diamide [(H ₂ N)C(S)] ₂ S ₂ , tetramethyl-
U219	Thiourea
U244	Thiram
U220	Toluene
U221	Toluenediamine
U223	Toluene diisocyanate (R,T)
U328	o-Toluidine
U353	p-Toluidine
U222	o-Toluidine hydrochloride
U011	1H-1,2,4-Triazol-3-amine
U227	1,1,2-Trichloroethane
U228	Trichloroethylene
U121	Trichloromonofluoromethane
See F027	2,4,5-Trichlorophenol
See F027	2,4,6-Trichlorophenol
U234	1,3,5-Trinitrobenzene (R,T)
U182	1,3,5-Trioxane, 2,4,6-trimethyl-
U235	Tris(2,3-dibromopropyl) phosphate

U-Listed Waste cont.

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUALS, AND SPILL RESIDUES THEREOF-ACTUE HAZARDOUS WASTE

Waste Code	Waste Description
U236	Trypan blue
U237	Uracil mustard
U176	Urea, N-ethyl-N-nitroso-
U177	Urea, N-methyl-N-nitroso-
U043	Vinyl chloride
U248	Warfarin, & salts, when present at concentrations of 0.3% or less
U239	Xylene (I)
U200	Yohimban-16-carboxylic acid,11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methylester,(3beta,16beta,17alpha,18beta,20alpha)-
U249	Zinc phosphide Zn ₃ P ₂ , when present at concentrations of 10% or less

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Peroxidizable Chemicals

1. All peroxidizable chemicals including those listed below, must be dated upon receipt at ISU. Storage and use must be limited in time, and may require other special conditions, such as temperature control in an explosion-proof refrigerator. Store according to the following time controls:

3 Months After Initial Container Opening

diethyl ether
isopropyl ether
dioxanes
tetrahydrofuran (THF)
sodium amide
cyclohexene

12 months After Receipt at ISU

acrylonitrile
bitadoene
vinylidene chloride
chlorotrifluoroethylene
tetrafluoroethylene
vinyl chloride
vinyl ether

2. The following materials may be susceptible to peroxidation, must be dated upon receipt, and should not be kept longer than 24 months after receipt at ISU or beyond their expiration date, whichever occurs first:

Peroxidation Hazard by Concentration

acetal
ethylene glycol dimethyl ether
(Glyme)
dicyclopentadiene
tetrahydronaphthalene
diethylene glycol dimethyl ether
(Diglyme)
decahydronaphthalene
methyllylene
diacetylene

Hazardous due to Peroxide Initiation of Polymerization

methyl methacrylate
styrene
acrylic acid
chloroprene
diacetylene
methylacetylene

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Shock-Sensitive Chemicals

These chemicals require special handling techniques and conditions. Please contact TSO personnel for instructions and assistance if any of these chemicals is purchased or created in the laboratory.

Diazo Compounds

2,2-azonaphthalene
azoxybenzene
diazomethane
dimethyl amino azobenzene-2-naphthalene
2,3-dimethyl azobenzene
hydrazoic acid
3-methyl-4-dimethylaminoazobenzene
1-phenylazo-2-naphthol

Metal Azides

Sodium azide

Miscellaneous

nitrocellulose
perchloric acid
perchlorate salts
peroxidizable chemicals
picric acid
picrate salts
polynitroaromatics
nitrogen triiodide
mercury fulminate

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Water Reactive Chemicals

There are two classes of water-reactive chemicals, those that undergo a chemical reaction with water, and those that undergo a physical reaction, followed by the release of energy (heat/light). Examples of these two categories of waste-reactives are given below:

Chemical Water-Reactives

lithium metal
sodium metal
potassium metal
alkaline metals (Ca, Mg, Sr)
aldyl lithium reagents
boron trifluoride solutions
grignard reagents
metal hydrides (Al, B, Ca, K, Li, Na)
anhydrous metal halides
(Al, As, B, Fe, P, S, Sb, Si, Sn, Ti)
phosphorus oxychloride
phosphorus pentoxide
sulfuryl chloride
thionyl chloride
calcium carbide

Physical Water Reactives

sulfuric acid (concentrated)
fuming nitric acid
phosphoric acid (hot)

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Pyrophoric Chemicals

Some chemicals react spontaneously either with air or exposure to moisture in the air, and may produce either heat, fire, flammable reaction products, or toxic fumes. Some examples of these chemicals are provided below:

- Silane
- Phosphine
- Arsine
- Phosphorus (white or yellow)
- Sodium metal
- Potassium metal
- Lithium metal

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Procedure #: TSO-07-01
Procedure Title: Waste Characterization
Approval Date: August 20, 2007
Effective Date: September 1, 2007

REVISION TRACKER

Revision 0	September 1, 2007	Original Procedure
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