EPA 530-R-95-032
NTIS PB95-230 926

FINAL

BEST DEMONSTRATED AVAILABLE TECHNOLOGY (BDAT)

BACKGROUND DOCUMENT FOR

UNIVERSAL STANDARDS

VOLUME A:

UNIVERSAL STANDARDS FOR

NONWASTEWATER FORMS OF LISTED HAZARDOUS WASTES

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July 1994

NRJ-073
0629-01.nrj

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NRJ-073
0629-01.nrj

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF TABLES (Continued)

EXECUTIVE SUMMARY

In accordance with the amendments to the Resource Conservation and Recovery Act (RCRA) enacted in the Hazardous and Solid Waste Amendments (HSWA) of November 8, 1984, the Environmental Protection Agency (EPA or the Agency) is establishing Best Demonstrated Available Technology (BDAT) universal standards for the listed wastes identified in Title 40, Code of Federal Regulations Section 261.31 (40 CFR 261.31). Compliance with the treatment standards is a prerequisite for land disposal of restricted wastes, as defined in 40 CFR Part 268. EPA may grant variances from the applicable treatment standards in 40 CFR 268.44 and under 40 CFR 268.8. EPA may grant waste- and site-specific waivers from the applicable treatment standards under 40 CFR 268.41-268.43.

A universal treatment standard (i.e., universal standard) is a single concentration-based treatment standard established for a specific constituent; a constituent has the same treatment standard in each waste code in which it is regulated. The Agency is establishing two different sets of universal standards: one for nonwastewater forms of wastes and one for wastewater forms of wastes.[1]

This background document provides the Agency's rationale and technical support for selecting the constituents for regulation under universal standards and for developing the universal standards for nonwastewater forms of listed hazardous wastes.

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[1]Wastewaters are defined as wastes containing less than 1% (weight basis) total suspended solids[2] (TSS) and less than 1% (weight basis) total organic carbon (TOC). Wastes not meeting this definition are classified as nonwastewaters and must comply with a nonwastewater treatment standard.

[2]The term "total suspended solids" (TSS) clarifies EPA's previously used terminology of "total solids" and "filterable" solids." Specifically, total suspended solids is measured by Method 209C (total suspended solids dried at 103-105°C) in *Standard Methods for the Examination of Water and Wastewater*, Sixteenth Edition (1).

The development of the universal standards for wastewater forms of listed hazardous wastes is presented in Volume B of this two volume set. When promulgated, these universal standards will replace BDAT treatment standards in most of the previously promulgated waste codes (as presented in Section 2.0 and Table ES-3) and may be used in the future to promulgate treatment standards for newly listed wastes.

The Agency selected constituents for regulation under universal standards from the BDAT List of Constituents as well as other hazardous constituents regulated by EPA under the RCRA Land Disposal Restrictions Program. Universal standards were determined for the regulated constituents utilizing constituent-specific treatment performance data. These data were used to develop BDAT treatment standards in previous rulemakings. The Agency then evaluated the data on a constituent-by-constituent basis to determine the data most appropriate to use in establishing a universal standard.

The Agency is establishing universal standards for 185 organic constituents and 14 metal constituents in nonwastewater forms of listed hazardous wastes, and 195 organic constituents and 13 metal constituents in wastewater forms of listed hazardous wastes. The Agency's rationale and technical support for establishing universal standards for cyanide is provided in a separate document. As discussed in Section 2.1, the number of constituents selected for regulation in nonwastewater and wastewater forms of universal standards wastes differ since, in some instances, a constituent may be readily analyzed in one waste form (e.g., wastewater) and not in the other form (e.g., nonwastewater).

The universal standards for organic constituents in nonwastewater forms of listed hazardous wastes are based on incineration, fuel substitution, and sludge drying treatment performance data that were used to promulgate previous BDAT treatment standards. The universal standards for metal constituents in nonwastewater forms of listed hazardous wastes are based on performance data from High Temperature Metals

Recovery (HTMR) treatment of nonwastewater forms of K061, F006, and K062 wastes, acid leaching treatment of nonwastewater forms of K071 wastes, stabilization treatment of nonwastewater forms of D007 wastes, and vitrification of an arsenic-bearing slag.

The universal standards for organic and metal constituents in wastewater forms of listed hazardous wastes are equal to the treatment standards for wastewater forms of F039 wastes, with a few exceptions. The universal treatment standards for wastewaters are based on treatment performance data from several sources, including the BDAT database, the NPDES database, the WERL database, EPA-collected WAO/PACT® data, the EAD database, industry-submitted leachate treatment performance data, data submitted to EPA by the Chemical Manufacturers Association's (CMA) Carbon Disulfide Task Force, data submitted to EPA by the California Toxic Substances Control Division, data in literature that were not already part of the WERL database, and data in literature submitted by industry on the WAO and PACT® treatment processes. These data reflect the performance of numerous industrial wastewater treatment systems, and the Agency believes it is appropriate to develop universal standards for wastewaters based on these data. The Agency's rationale and technical support for establishing universal standards for wastewater forms of wastes is provided in EPA's Final Best Demonstrated Available Technology (BDAT) Background Document for Universal Standards, Volume B: Universal Standards for Wastewater Forms of Listed Hazardous Wastes (2).

Table ES-1 lists the organic constituents selected for regulation and the corresponding universal standards for both wastewater and nonwastewater forms of listed hazardous wastes. Table ES-2 presents the universal standards for metal constituents in wastewater and nonwastewater forms of listed hazardous wastes. Table ES-3 presents previously promulgated treatment standards and the revised treatment standards from the application of universal standards for nonwastewater forms of wastes. This table presents, by waste code, the revised treatment standards from the application of universal

standards for nonwastewater forms of all of the previously promulgated waste codes to which universal standards are applicable.

In Table ES-1, the universal standards for organic constituents in nonwastewater forms of listed hazardous wastes are expressed as the total composition concentration of each constituent, except as noted for a few constituents. All of the universal standards for organic constituents in wastewater forms of listed hazardous wastes are expressed as the total composition concentration of each constituent. The units for the total composition concentrations are measured in mg/kg (weight basis) for nonwastewater forms of listed hazardous wastes and in mg/L (volume basis) for wastewater forms of listed hazardous wastes. In Table ES-2, the universal standards for metal constituents in nonwastewater forms of listed hazardous wastes are expressed as the concentration in the waste extract, as measured by the Toxicity Characteristic Leaching Procedure (TCLP). The units used for leachate data are mg/L. The universal standards for metal constituents in wastewater forms of listed hazardous wastes are expressed as total composition values, measured in mg/L.

EPA notes, however, that the wastewater standards being promulgated apply on a limited basis: only to wastewater managed in treatment systems other than a Clean Water Act (CWA) or CWA-equivalent treatment system. Thus, facilities managing decharacterized wastewater in treatment systems with impoundments, and then discharging to navigable waters or Publicly Owned Treatment Works (POTWs) are not affected. In the succeding Phase III rule, EPA is actively considering an approach whereby technology-based CWA standards for a specific industry or plant also serve as the BDAT standards.

Table ES-1

Universal Standards for Organic Constituents

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
Acenaphthalene	208-96-8	0.059	3.4
Acenaphthene	83-32-9	0.059	3.4
Acetone	67-64-1	0.28	160
Acetonitrile	75-05-8	5.6	1.8
Acetophenone	96-86-2	0.010	9.7
2-Acetylaminofluorene	53-96-3	0.059	140
Acrolein	107-02-8	0.29	NR
Acrylamide	79-06-1	19	23
Acrylonitrile	107-13-1	0.24	84
Aldrin	309-00-2	0.021	0.066
4-Aminobiphenyl	92-67-1	0.13	NR
Aniline	62-53-3	0.81	14
Anthracene	120-12-7	0.059	3.4
Aramite	1460-57-8	0.36	NR
Benz(a)anthracene	56-55-3	0.059	3.4
Benzal Chloride	98-87-3	0.055	6.0

NR - Not Regulated.

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
Benzene	71-43-2	0.14	10
Sum of Benzo(b)fluoranthene and Benzo(k)fluoranthene[a]	205-99-2/207-08-9	0.11[a]	6.8[a]
Benzo(b)fluoranthene[a,b]	205-99-2	0.11[a,b]	6.8[a,b]
Benzo(k)fluoranthene[a,b]	207-08-9	0.11[a,b]	6.8[a,b]
Benzo(g,h,i)perylene	191-24-2	0.0055	1.8
Benzo(a)pyrene	50-32-8	0.061	3.4
alpha-BHC	319-84-6	0.00014	0.066
beta-BHC	319-85-7	0.00014	0.066
delta-BHC	319-86-6	0.023	0.066
gamma-BHC (Lindane)	58-89-9	0.0017	0.066
Bromodichloromethane	75-27-4	0.35	15
Bromoform (Tribromomethane)	75-25-2	0.63	15
4-Bromophenyl Phenyl Ether	101-55-3	0.055	15

[a]As discussed in Section 3.2.1, benzo(b)fluoranthene and benzo(k)fluoranthene are regulated as a sum under universal standards in wastewater and nonwastewater forms of wastes to compensate for analytical concerns in distinguishing between the two compounds.

[b]If benzo(b)fluoranthene and benzo(k)fluoranthene are not both regulated in a specific waste code, the universal standard for the individual isomer will be equivalent to the universal standard for the sum of benzo(b)fluoranthene and benzo(k)fluoranthene.

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
Bromomethane (Methyl Bromide)	74-83-9	0.11	15
n-Butanol	71-36-3	5.6	2.6
Butyl Benzyl Phthalate	85-68-7	0.017	28
2-sec-Butyl-4,6-dinitrophenol (Dinoseb)	88-85-7	0.066	2.5
Carbon Disulfide	75-15-0	3.8	4.8°
Carbon Tetrachloride	56-23-5	0.057	6.0
Chlordane	57-74-9	0.0033	0.26
p-Chloroaniline	106-47-8	0.46	16
Chlorobenzene	108-90-7	0.057	6.0
Chlorobenzilate	510-15-6	0.10	NR
2-Chloro-1,3-butadiene	126-99-8	0.057	0.28
Chlorodibromomethane	124-48-1	0.057	15
Chloroethane	75-00-3	0.27	6.0

°As discussed in the development of treatment standards for F001-F005 wastes, this constituent is controlled by regulating other organic compounds in the waste, unless the only listed hazardous constituents in the waste are carbon disulfide, cyclohexanone, and/or methanol. In such cases, the universal standard for this constituent will be applicable and compliance will be determined by analysis of the TCLP extract.

NR - Not Regulated.

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
bis(2-Chloroethoxy)methane	111-91-1	0.036	7.2
bis(2-Chloroethyl)ether	111-44-4	0.033	6.0
2-Chloroethyl vinyl ether	110-75-8	0.062	NR
Chloroform	67-66-3	0.046	6.0
bis(2-Chloroisopropyl)ether	108-60-1	0.055	7.2
p-Chloro-m-cresol	59-50-7	0.018	14
Chloromethane	74-87-3	0.19	30
2-Chloronaphthalene	91-58-7	0.055	5.6
2-Chlorophenol	95-57-8	0.044	5.7
3-Chloropropene	107-05-1	0.036	30
Chrysene	218-01-9	0.059	3.4
Cresol (m- and p-isomers) (3-Methylphenol, 4-Methylphenol)	106-44-5	0.77	5.6
o-Cresol (2-Methylphenol)	95-48-7	0.11	5.6
Cyclohexanone	108-94-1	0.36	0.75°
o,p'-DDD	53-19-0	0.023	0.087

°As discussed in the development of treatment standards for F001-F005 wastes, this constituent is controlled by regulating other organic compounds in the waste, unless the only listed hazardous constituents in the waste are carbon disulfide, cyclohexanone, and/or methanol. In such cases, the universal standard for this constituent will be applicable and compliance will be determined by analysis of the TCLP extract.

NR - Not Regulated.

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
p,p'-DDD	72-54-8	0.023	0.087
o,p'-DDE	3424-82-6	0.031	0.087
p,p'-DDE	72-55-9	0.031	0.087
o,p'-DDT	789-02-6	0.0039	0.087
p,p'-DDT	50-29-3	0.0039	0.087
Dibenz(a,h)anthracene	53-70-3	0.055	8.2
Dibenzo(a,e)pyrene	192-65-4	0.061	NR
1,2-Dibromo-3-chloropropane	96-12-8	0.11	15
Dibromomethane	74-95-3	0.11	15
tris-(2,3-Dibromopropyl)phosphate	126-72-7	0.11	0.10
(m) 1,3-Dichlorobenzene	541-73-1	0.036	6.0
(o) 1,2-Dichlorobenzene	95-50-1	0.088	6.0
(p) 1,4-Dichlorobenzene	106-46-7	0.090	6.0
Dichlorodifluoromethane	75-71-8	0.23	7.2
1,1-Dichloroethane	75-34-3	0.059	6.0
1,2-Dichloroethane	107-06-2	0.21	6.0

NR - Not Regulated.

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
1,1-Dichloroethylene	75-35-4	0.025	6.0
trans-1,2-Dichloroethylene	156-60-5	0.054	30
2,4-Dichlorophenol	120-83-2	0.044	14
2,6-Dichlorophenol	87-65-0	0.044	14
2,4-Dichlorophenoxyacetic Acid (2,4-D)	94-75-7	0.72	10
1,2-Dichloropropane	78-87-5	0.85	18
cis-1,3-Dichloropropene	10061-01-5	0.036	18
trans-1,3-Dichloropropene	10061-02-6	0.036	18
Dieldrin	60-57-1	0.017	0.13
Diethyl Phthalate	84-66-2	0.20	28
p-Dimethylaminoazobenzene	60-11-7	0.13	NR
2,4-Dimethyl Phenol	105-67-9	0.036	14
Dimethyl Phthalate	131-11-3	0.047	28
Di-n-butyl Phthalate	84-74-2	0.057	28
1,4-Dinitrobenzene	100-25-4	0.32	2.3
4,6-Dinitro-o-cresol	534-52-1	0.28	160

NR - Not Regulated.

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
2,4-Dinitrophenol	51-28-5	0.12	160
2,4-Dinitrotoluene	121-14-2	0.32	140
2,6-Dinitrotoluene	606-20-2	0.55	28
Di-n-octyl Phthalate	117-84-0	0.017	28
1,4-Dioxane	123-91-1	NR	170
Sum of Diphenylamine and Diphenylnitrosamine[d]	122-39-4/86-30-6	0.92[d]	13[d]
Diphenylamine[d,e]	122-39-4	0.92[d,e]	13[d,e]
Diphenylnitrosamine[d,e]	86-30-6	0.92[d,e]	13[d,e]
1,2-Diphenylhydrazine	122-66-7	0.087	NR
Di-n-propylnitrosamine	621-64-7	0.40	14
Disulfoton	298-04-4	0.017	6.2
Endosulfan I	959-98-8	0.023	0.066

NR - Not Regulated.

[d]As discussed in Section 3.2.1, diphenylamine and diphenylnitrosamine are regulated as a sum under universal standards in wastewater and nonwastewater forms of waste to compensate for analytical concerns in distinguishing between the two compounds.
[e]If diphenylamine and diphenylnitrosamine are not both regulated in a specific waste code, the universal standard for the individual isomer will be equivalent to the universal standard for the sum of diphenylamine and diphenylnitrosamine.

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
Endosulfan II	33213-65-9	0.029	0.13
Endosulfan Sulfate	1031-07-8	0.029	0.13
Endrin	72-20-8	0.0028	0.13
Endrin Aldehyde	7421-93-4	0.025	0.13
Ethyl Acetate	141-78-6	0.34	33
Ethyl Ether	60-29-7	0.12	160
bis(2-Ethylhexyl)phthalate	117-81-7	0.28	28
Ethyl Methacrylate	97-63-2	0.14	160
Ethylbenzene	100-41-4	0.057	10
Ethylene Dibromide (1,2-Dibromoethane)	106-93-4	0.028	15
Ethylene Oxide	75-21-8	0.12	NR
Famphur	52-85-7	0.017	15
Fluoranthene	206-44-0	0.068	3.4
Fluorene	86-73-7	0.059	3.4
Heptachlor	76-44-8	0.0012	0.066
Heptachlor Epoxide	1024-57-3	0.016	0.066

NR - Not Regulated.

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
Hexachlorobenzene	118-74-1	0.055	10
Hexachlorabutadiene	87-68-3	0.055	5.6
Hexachlorocyclopentadiene	77-47-4	0.057	2.4
Hexachlorodibenzo-p-dioxins	-	0.000063	0.001
Hexachlorodibenzofurans	-	0.000063	0.001
Hexachloroethane	67-72-1	0.055	30
Hexachloropropene	1888-71-7	0.035	30
Indeno(1,2,3)pyrene	193-39-5	0.0055	3.4
Iodomethane	74-88-4	0.19	65
Isobutanol	78-83-1	5.6	170
Isodrin	465-73-6	0.021	0.066
Isosafrole	120-58-1	0.081	2.6
Kepone	143-50-0	0.0011	0.13
Methacrylonitrile	126-98-7	0.24	84
Methanol	67-56-1	5.6	0.75°

°As discussed in the development of treatment standards for F001-F005 wastes, this constituent is controlled by regulating other organic compounds in the waste, unless the only listed hazardous constituents in the waste are carbon disulfide, cyclohexanone, and/or methanol. In such cases, the universal standard for this constituent will be applicable and compliance will be determined by analysis of the TCLP extract.

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
Methapyrilene	91-80-5	0.081	1.5
Methoxychlor	72-43-5	0.25	0.18
Methyl Ethyl Ketone	78-93-3	0.28	36
Methyl Isobutyl Ketone	108-10-1	0.14	33
Methyl Methacrylate	80-62-6	0.14	160
Methyl Methanesulfonate	66-27-3	0.018	NR
Methyl Parathion	298-00-0	0.014	4.6
3-Methylcholanthrene	56-49-5	0.0055	15
Methylene Chloride	75-09-2	0.089	30
4,4'-Methylene-bis(2-chloroaniline)	101-14-4	0.50	30
Naphthalene	91-20-3	0.059	5.6
2-Naphthylamine	91-59-8	0.52	NR
o-Nitroaniline (2-Nitroaniline)	88-74-4	0.27	14
p-Nitroaniline (4-Nitroaniline)	100-01-6	0.028	28
Nitrobenzene	98-95-3	0.068	14
N-Nitroso-di-n-butylamine	924-16-3	0.40	17

NR - Not Regulated.

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
N-Nitrosodiethylamine	55-18-5	0.40	28
N-Nitrosodimethylamine	62-75-9	0.40	2.3
N-Nitrosomethylethylamine	10595-95-6	0.40	2.3
N-Nitrosomorpholine	59-98-2	0.40	2.3
N-Nitrosopiperidine	100-75-4	0.013	35
N-Nitrosopyrrolidine	930-55-2	0.013	35
o-Nitrophenol (2-Nitrophenol)	88-75-5	0.028	13
p-Nitrophenol (4-Nitrophenol)	100-02-7	0.12	29
5-Nitro-o-toluidine	99-65-8	0.32	28
Parathion	56-38-2	0.014	4.6
Pentachlorobenzene	608-93-5	0.055	10
Pentachlorodibenzo-p-dioxins	-	0.000063	0.001
Pentachlorodibenzofurans	-	0.000035	0.001
Pentachloroethane	76-01-7	0.055	6.0
Pentachloronitrobenzene	82-68-8	0.055	4.8
Pentachlorophenol	87-86-5	0.089	7.4
Phenacetin	62-44-2	0.081	16

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
Phenacetin	62-44-2	0.081	16
Phenanthrene	85-01-8	0.059	5.6
Phenol	108-95-2	0.039	6.2
Phorate	298-02-2	0.021	4.6
Phthalic Anhydride[f]	85-44-9	0.055	28
Phthalic Anhydride[f] (as measured by Phthalic Acid)	85-44-9	0.055	28
Pronamide	23950-58-5	0.093	1.5
Propanenitrile (Ethyl Cyanide)	107-12-0	0.24	360
Pyrene	129-00-0	0.067	8.2
Pyridine	110-86-1	0.014	16
Safrole	94-59-7	0.081	22
Silvex (2,4,5-TP)	93-72-1	0.72	7.9
1,2,4,5-Tetrachlorobenzene	95-94-3	0.055	14
Tetrachlorodibenzo-p-dioxins	-	0.000063	0.001
Tetrachlorodibenzofurans	-	0.000063	0.001

[f]The Agency is establishing universal standards for phthalic anhydride and phthalic anhydride (as measured by phthalic acid) to compensate for possible analytical difficulties in the accurate quantification of phthalic anhydride.

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
1,1,1,2-Tetrachloroethane	630-20-6	0.057	6.0
1,1,2,2-Tetrachloroethane	79-34-5	0.057	6.0
Tetrachloroethylene	127-18-4	0.056	6.0
2,3,4,6-Tetrachlorophenol	58-90-2	0.030	7.4
Toluene (Methyl Benzene)	108-88-3	0.080	10
Total PCBs	1336-36-3	0.10	10
Toxaphene	8001-35-1	0.0095	2.6
1,2,4-Trichlorobenzene	120-82-1	0.055	19
1,1,1-Trichloroethane	71-55-6	0.054	6.0
1,1,2-Trichloroethane	79-00-5	0.054	6.0
Trichloroethylene	79-01-6	0.054	6.0
Trichloromonofluoromethane (Fluorotrichloromethane)	75-69-4	0.020	30
2,4,5-Trichlorophenol	95-95-4	0.18	7.4
2,4,6-Trichlorophenol	88-06-2	0.035	7.4
2,4,5-Trichlorophenoxyacetic Acid (2,4,5-T)	93-76-5	0.72	7.9
1,2,3-Trichloropropane	96-18-4	0.85	30
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	0.057	30

Table ES-1

(Continued)

Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Total Composition Concentration (mg/kg)
Vinyl Chloride	75-01-4	0.27	6.0
Xylene(s) (total)	1330-20-7	0.32	30

Table ES-2

Universal Standards for Metal Constituents

BDAT List Constituent Selected for Regulation	CAS #	Universal Standard	
		Wastewaters	Nonwastewaters
		Total Composition Concentration (mg/L)	Concentration in TCLP Extract (mg/L)
Antimony	7740-36-0	1.9	2.1
Arsenic	7740-38-2	1.4	5.0
Barium	7740-39-3	1.2	7.6
Beryllium	7740-41-7	0.82	0.014
Cadmium	7740-43-9	0.69	0.19
Chromium (total)	7740-47-3	2.77	0.86
Lead	7439-92-1	0.69	0.37
Mercury	7439-97-6	0.15	0.20 (Low-mercury subcategory wastes[a] - RMERC[b] residues
			0.025 (Low-mercury subcategory wastes[a] - Non-RMERC[b] residues
Nickel	7440-02-0	3.98	5.0
Selenium	7782-49-2	0.82	0.16
Silver	7440-22-4	0.43	0.30
Thallium	7440-28-0	1.4	0.078
Vanadium	7440-62-2	4.3	0.23
Zinc	7440-66-6	NR	5.3

[a]Low-mercury subcategory wastes = Listed wastes with mercury concentrations less than 260 mg/kg.
[b]RMERC = Mercury recovery by roasting/retorting.
NR - Not Regulated.

Table ES-3

Previously Promulgated Nonwastewater Treatment Standards and Revised Treatment Standards from the Application of Nonwastewater Universal Standards

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F001 - F005				
Acetone	160	-	160	-
Butanol	2.6	-	2.6	-
Carbon Disulfide	-	4.8[a]	-	4.8[a]
Carbon Tetrachloride	5.6	-	6.0	-
Chlorobenzene	5.7	-	6.0	-
Cresol (m- and p- isomers)	3.2	-	5.6	-
o-Cresol	5.6	-	5.6	-
Cyclohexanone	-	0.75[a]	-	0.75[a]
1,2-Dichlorobenzene	6.2	-	6.0	-
Ethyl Acetate	33	-	33	-
Ethylbenzene	6.0	-	10	-
Ethyl Ether	160	-	160	-
Isobutanol	170	-	170	-
Methanol	-	0.75[a]	-	0.75[a]
Methylene Chloride	33	-	30	-
Methyl Ethyl Ketone	36	-	36	-
Methyl Isobutyl Ketone	33	-	33	-
Nitrobenzene	14	-	14	-
Pyridine	16	-	16	-
Tetrachloroethylene	5.6	-	6.0	-
Toluene	28	-	10	-
1,1,1-Trichloroethane	5.6	-	6.0	-
Trichloroethylene	5.6	-	6.0	-
1,1,2-Trichloro-1,2,2-trifluoroethane	28	-	30	-
Trichloromonofluoromethane	33	-	30	-
Xylenes (total)	28	-	30	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F006 (Treatment Standards Based on Stabilization)				
Cadmium	-	0.066	-	0.19
Chromium (total)	-	5.2	-	0.86
Lead	-	0.51	-	0.37
Nickel	-	0.32	-	5.0
Silver	-	0.072	-	0.30
Cyanides (total)	590	-	DE	-
Cyanides (amenable)	30	-	DE	-
F006 (Alternative Treatment Standards Based on HTMR)				
Antimony	-	2.1	-	2.1
Arsenic	-	0.055	-	5.0
Barium	-	7.6	-	7.6
Beryllium	-	0.014	-	0.014
Cadmium	-	0.19	-	0.19
Chromium (total)	-	0.33	-	0.86
Lead	-	0.37	-	0.37
Mercury	-	0.009	-	0.009[b]
			-	0.20[c]
			-	0.025[d]
Nickel	-	5.0	-	5.0
Selenium	-	0.16	-	0.16
Silver	-	0.30	-	0.30
Thallium	-	0.078	-	0.078
Zinc	-	5.3	-	5.3
Cyanides (total)	1.8	-	DE	-
F007				
Cadmium	-	0.066	-	0.19
Chromium (total)	-	5.2	-	0.86
Lead	-	0.51	-	0.37
Nickel	-	0.32	-	5.0
Silver	-	0.072	-	0.30
Cyanides (total)	590	-	DE	-
Cyanides (amenable)	30	-	DE	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F008				
Cadmium	-	0.066	-	0.19
Chromium (total)	-	5.2	-	0.86
Lead	-	0.51	-	0.37
Nickel	-	0.32	-	5.0
Silver	-	0.072	-	0.30
Cyanides (total)	590	-	DE	-
Cyanides (amenable)	30	-	DE	-
F009				
Cadmium	-	0.066	-	0.19
Chromium (total)	-	5.2	-	0.86
Lead	-	0.51	-	0.37
Nickel	-	0.32	-	5.0
Silver	-	0.072	-	0.30
Cyanides (total)	590	-	DE	-
Cyanides (amenable)	30	-	DE	-
F010				
Cyanides (total)	1.5	-	DE	-
F011				
Cadmium	-	0.066	-	0.19
Chromium (total)	-	5.2	-	0.86
Lead	-	0.51	-	0.37
Nickel	-	0.32	-	5.0
Silver	-	0.072	-	0.30
Cyanides (total)	110	-	DE	-
Cyanides (amenable)	9.1	-	DE	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F012				
Cadmium	-	0.066	-	0.19
Chromium (total)	-	5.2	-	0.86
Lead	-	0.51	-	0.37
Nickel	-	0.32	-	5.0
Silver	-	0.072	-	0.30
Cyanides (total)	110	-	DE	-
Cyanides (amenable)	9.1	-	DE	-
F019				
Chromium (total)	-	5.2	-	0.86
Cyanides (total)	590	-	DE	-
Cyanides (amenable)	30	-	DE	-
F020-F023 and F026-F028				
Hexachlorodibenzo-p-dioxins	-	<0.001	0.001	-
Hexachlorodibenzofurans	-	<0.001	0.001	-
Pentachlorodibenzo-p-dioxins	-	<0.001	0.001	-
Pentachlorodibenzofurans	-	<0.001	0.001	-
Tetrachlorodibenzo-p-dioxins	-	<0.001	0.001	-
Tetrachlorodibenzofurans	-	<0.001	0.001	-
2,4,5-Trichlorophenol	-	<0.001	7.4	-
2,4,6-Trichlorophenol	-	<0.05	7.4	-
2,3,4,6-Tetrachlorophenol	-	<0.05	7.4	-
Pentachlorophenol	-	<0.01	7.4	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F024				
2-Chloro-1,3-butadiene	0.28	-	0.28	-
3-Chloropropene	0.28	-	30	-
1,1-Dichloroethane	0.14	-	6.0	-
1,2-Dichloroethane	0.14	-	6.0	-
1,2-Dichloropropane	0.14	-	18	-
cis-1,3-Dichloropropene	0.14	-	18	-
trans-1,3-Dichloropropene	0.14	-	18	-
bis(2-Ethylhexyl) phthalate	1.8	-	28	-
Hexachloroethane	1.8	-	30	-
Chromium (total)	-	0.073	-	0.86
Nickel	-	0.088	-	5.0
F025 (Light Ends Subcategory)				
Carbon Tetrachloride	6.2	-	6.0	-
Chloroform	6.2	-	6.0	-
1,2-Dichloroethane	6.2	-	6.0	-
1,1-Dichloroethylene	6.2	-	6.0	-
Methylene Chloride	31	-	30	-
1,1,2-Trichloroethane	6.2	-	6.0	-
Trichloroethylene	5.6	-	6.0	-
Vinyl Chloride	33	-	6.0	-
F025 (Spent Filter Aids and Dessicants Subcategory)				
Carbon Tetrachloride	6.2	-	6.0	-
Chloroform	6.2	-	6.0	-
Hexachlorobenzene	37	-	10	-
Hexachlorobutadiene	28	-	5.6	-
Hexachloroethane	30	-	30	-
Methylene Chloride	31	-	30	-
1,1,2-Trichloroethane	6.2	-	6.0	-
Trichloroethylene	5.6	-	6.0	-
Vinyl Chloride	33	-	6.0	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F037				
Anthracene	28	-	3.4	-
Benzene	14	-	10	-
Benzo(a)anthracene	20	-	3.4	-
Benzo(a)pyrene	12	-	3.4	-
Bis(2-ethylhexyl)phthalate	7.3	-	28	-
Chrysene	15	-	3.4	-
Di-n-butyl phthalate	3.6	-	28	-
Ethylbenzene	14	-	10	-
Naphthalene	42	-	5.6	-
Phenanthrene	34	-	5.6	-
Phenol	3.6	-	6.2	-
Pyrene	36	-	8.2	-
Toluene	14	-	10	-
Xylene(s)	22	-	30	-
Cyanides (total)	1.8	-	DE	-
Chromium (total)	-	1.7	-	0.86
Nickel	-	0.20	-	5.0
F038				
Benzene	14	-	10	-
Benzo(a)pyrene	12	-	3.4	-
Bis(2-ethylhexyl)phthalate	7.3	-	28	-
Chrysene	15	-	3.4	-
Di-n-butyl phthalate	3.6	-	28	-
Ethylbenzene	14	-	10	-
Naphthalene	42	-	5.6	-
Phenanthrene	34	-	5.6	-
Phenol	3.6	-	6.2	-
Pyrene	36	-	8.2	-
Toluene	14	-	10	-
Xylene(s)	22	-	30	-
Cyanides (total)	1.8	-	DE	-
Chromium (total)	-	1.7	-	0.86
Nickel	-	0.20	-	5.0

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F039				
Acenaphthalene	3.4	-	3.4	-
Acenaphthene	4.0	-	3.4	-
Acetone	160	-	160	-
Acetophenone	9.7	-	9.7	-
2-Acetylaminofluorene	140	-	140	-
Acrylonitrile	84	-	84	-
Aldrin	0.066	-	0.066	-
Aniline	14	-	14	-
Anthracene	4.0	-	3.4	-
Aroclor 1016	0.92	-	NR[e]	-
Aroclor 1221	0.92	-	NR[e]	-
Aroclor 1232	0.92	-	NR[e]	-
Aroclor 1242	0.92	-	NR[e]	-
Aroclor 1248	0.92	-	NR[e]	-
Aroclor 1254	1.8	-	NR[e]	-
Aroclor 1260	1.8	-	NR[e]	-
Benz(a)anthracene	8.2	-	3.4	-
Benzene	36	-	10	-
Benzo(b)fluoranthene	3.4.	-	6.8[f]	-
Benzo(k)fluoranthene	3.4	-	6.8[f]	
Benzo(g,h,i)perylene	1.5	-	1.8	-
Benzo(a)pyrene	8.2	-	3.4	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F039 (continued)				
alpha-BHC	0.066	-	0.066	
beta-BHC	0.066	-	0.066	-
delta-BHC	0.066	-	0.066	-
gamma-BHC (Lindane)	0.066	-	0.066	-
Bromodichloromethane	15	-	15	-
Bromomethane (Methyl Bromide)	15	-	15	-
4-Bromophenyl Phenyl Ether	15	-	15	-
n-Butanol	2.6	-	2.6	-
Butyl Benzyl Phthalate	7.9	-	28	-
2-sec-Butyl-4,6-dinitrophenol (Dinoseb)	2.5	-	2.5	-
Carbon Tetrachloride	5.6	-	6.0	-
Chlordane (alpha & gamma isomers)	0.13	-	0.26	-
p-Chloroaniline	16	-	16	-
Chlorobenzene	5.7	-	6.0	-
Chlorodibromomethane	15	-	15	-
Chloroethane	6.0	-	6.0	-
bis(2-Chloroethoxy)methane	7.2	-	7.2	-
bis(2-Chloroethyl)ether	7.2	-	6.0	-
Chloroform	5.6	-	6.0	-
bis(2-Chloroisopropyl)ether	7.2	-	7.2	-
p-Chloro-m-cresol	14	-	14	
Chloromethane (Methyl Chloride)	33	-	30	-
2-Chloronaphthalene	5.6	-	5.6	-
2-Chlorophenol	5.7	-	5.7	-
3-Chloropropene	28	-	30	-
Chrysene	8.2	-	3.4	-
Cresol (m- and p- isomers)	3.2	-	5.6	-
o-Cresol	5.6	-	5.6	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F039 (continued)				
o,p'-DDD	0.087	-	0.087	-
p-p'-DDD	0.087	-	0.087	-
o,p'-DDE	0.087	-	0.087	-
p,p'-DDE	0.087	-	0.087	-
o,p'-DDT	0.087	-	0.087	-
p,p'-DDT	0.087	-	0.087	-
Dibenz(a,h)anthracene	8.2	-	8.2	-
1,2-Dibromo-3-chloropropane	15	-	15	-
1,2-Dibromomethane (Ethylene Dibromide)	15	-	15	-
Dibromomethane	15	-	15	-
m-Dichlorobenzene	6.2	-	6.0	-
o-Dichlorobenzene	6.2	-	6.0	-
p-Dichlorobenzene	6.2	-	6.0	-
Dichlorodifluoromethane	7.2	-	7.2	-
1,1-Dichloroethane	7.2	-	6.0	-
1,2-Dichloroethane	7.2	-	6.0	-
1,1-Dichloroethylene	33	-	6.0	-
trans-1,2-Dichloroethylene	33	-	30	-
2,4-Dichlorophenol	14	-	14	-
2,6-Dichlorophenol	14	-	14	-
2,4-Dichlorophenoxyacetic Acid (2,4-D)	10	-	10	-
1,2-Dichloropropane	18	-	18	-
cis-1,3-Dichloropropene	18	-	18	-
trans-1,3-Dichloropropene	18	-	18	-
Dieldrin	0.13	-	0.13	-
Diethyl Phthalate	28	-	28	-
2,4-Dimethylphenol	14	-	14	-
Dimethyl Phthalate	28	-	28	-
Di-n-butyl Phthalate	28	-	28	-
1,4-Dinitrobenzene	2.3	-	2.3	-
4,6-Dinitro-o-cresol	160	-	160	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F039 (continued)				
2,4-Dinitrophenol	160	-	160	-
2,4-Dinitrotoluene	140	-	140	-
2,6-Dinitrotoluene	28	-	28	-
Di-n-octyl Phthalate	28	-	28	-
Di-n-propylnitrosamine	14	-	14	-
1,4-Dioxane	170	-	170	-
Disulfoton	6.2	-	6.2	-
Endosulfan I	0.066	-	0.066	-
Endosulfan II	0.13	-	0.13	-
Endosulfan Sulfate	0.13	-	0.13	-
Endrin	0.13	-	0.13	-
Endrin Aldehyde	0.13	-	0.13	-
Ethyl Acetate	33	-	33	-
Ethyl Benzene	6.0	-	10	-
Ethyl Cyanide (Propanenitrile)	360	-	360	-
Ethyl Ether	160	-	160	-
bis(2-Ethylhexyl)phthalate	28	-	28	-
Ethyl Methacrylate	160	-	160	-
Famphur	15	-	15	-
Fluoranthene	8.2	-	3.4	-
Fluorene	4.0	-	3.4	-
Heptachlor	0.066	-	0.066	-
Heptachlor Epoxide	0.066	-	0.066	-
Hexachlorobenzene	37	-	10	-
Hexachlorobutadiene	28	-	5.6	-
Hexachlorocyclopentadiene	3.6	-	2.4	-
Hexachlorodibenzofurans	0.001	-	0.001	-
Hexachlorodibenzo-p-dioxins	0.001	-	0.001	-
Hexachloroethane	28	-	30	-
Hexachloropropene	28	-	30	-
Indeno(1,2,3-c,d)pyrene	8.2	-	3.4	-
Iodomethane	65	-	65	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F039 (continued)				
Isobutyl Alcohol	170	-	170	-
Isodrin	0.066	-	0.066	-
Isosafrole	2.6	-	2.6	-
Kepone	0.13	-	0.13	-
Methacrylonitrile	84	-	84	-
Methapyrilene	1.5	-	1.5	-
Methoxychlor	0.18	-	0.18	-
Methyl Ethyl Ketone	36	-	36	-
Methyl Isobutyl Ketone	33	-	33	-
Methyl Methacrylate	160	-	160	-
Methyl Parathion	4.6	-	4.6	-
3-Methylcholanthrene	15	-	15	-
4,4'-Methylene-bis (2-Chloroaniline)	35	-	30	-
Methylene Chloride	33	-	30	-
Naphthalene	3.1	-	5.6	-
p-Nitroaniline	28	-	28	-
Nitrobenzene	14	-	14	-
5-Nitro-o-toluidine	28	-	28	-
4-Nitrophenol	29	-	29	-
N-Nitrosodiethylamine	28	-	28	-
N-Nitrosodi-n-butylamine	17	-	17	-
N-Nitrosomethylethylamine	2.3	-	2.3	-
N-Nitrosomorpholine	2.3	-	2.3	-
N-Nitrosopiperidine	35	-	35	-
N-Nitrosopyrrolidine	35	-	35	-
Parathion	4.6	-	4.6	-
Pentachlorobenzene	37	-	10	-
Pentachlorodibenzofurans	0.001	-	0.001	-
Pentachlorodibenzo-p-dioxins	0.001	-	0.001	-
Pentachloronitrobenzene	4.8	-	4.8	-
Pentachlorophenol	7.4	-	7.4	-
Phenacetin	16	-	16	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F039 (continued)				
Phenanthrene	3.1	-	5.6	-
Phenol	6.2	-	6.2	-
Phorate	4.6	-	4.6	-
Pronamide	1.5	-	1.5	-
Pyrene	8.2	-	8.2	-
Pyridine	16	-	16	-
Safrole	22	-	22	-
Silvex (2,4,5-TP)	7.9	-	7.9	-
1,2,4,5-Tetrachlorobenzene	19	-	14	-
Tetrachlorodibenzofurans	0.001	-	0.001	-
Tetrachlorodibenzo-p-dioxins	0.001	-	0.001	-
1,1,1,2-Tetrachloroethane	42	-	6.0	-
1,1,2,2-Tetrachloroethane	42	-	6.0	-
Tetrachloroethylene	5.6	-	6.0	-
2,3,4,6-Tetrachlorophenol	37	-	7.4	-
Toluene	28	-	10	-
Total PCBs	NR	-	10[e]	-
Toxaphene	1.3	-	2.6	-
Tribromomethane (Bromoform)	15	-	15	-
1,2,4-Trichlorobenzene	19	-	19	-
1,1,1-Trichloroethane	5.6	-	6.0	-
1,1,2-Trichloroethane	5.6	-	6.0	-
Trichloroethylene	5.6	-	6.0	-
Trichloromonofluoromethane	33	-	30	-
2,4,5-Trichlorophenol	37	-	7.4	-
2,4,6-Trichlorophenol	37	-	7.4	-
2,4,5-Trichlorophenoxyacetic Acid	7.9	-	7.9	-
1,2,3-Trichloropropane	28	-	30	-
1,1,2-Trichloro-1,2,2-trifluoroethane	28	-	30	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
F039 (continued)				
Vinyl Chloride	33	-	6.0	-
Xylenes	28	-	30	-
Cyanides (total)	1.8	-	DE	-
Antimony	-	0.23	-	2.1
Arsenic	-	5.0	-	5.0
Barium	-	52	-	7.6
Cadmium	-	0.066	-	0.19
Chromium (total)	-	5.2	-	0.86
Lead	-	0.51	-	0.37
Mercury	-	0.025	-	0.025[b]
			-	0.20[c]
				0.025[d]
Nickel	-	0.32	-	5.0
Selenium	-	5.7	-	0.16
Silver	-	0.072	-	0.30
K001				
Naphthalene	1.5	-	5.6	-
Pentachlorophenol	7.4	-	7.4	-
Phenanthrene	1.5	-	5.6	-
Pyrene	1.5	-	8.2	-
Toluene	28	-	10	-
Xylenes (total)	33	-	30	-
Lead	-	0.51	-	0.37
K002				
Chromium (total)	-	0.094	-	0.86
Lead	-	0.37	-	0.37
K003				
Chromium (total)	-	0.094	-	0.86
Lead	-	0.37	-	0.37

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K004				
Chromium (total)	-	0.094	-	0.86
Lead	-	0.37	-	0.37
K005				
Chromium (total)	-	0.094	-	0.86
Lead	-	0.37	-	0.37
K006 (anhydrous)				
Chromium (total)	-	0.094	-	0.86
Lead	-	0.37	-	0.37
K006 (hydrated)				
Chromium (total)	-	5.2	-	0.86
K007				
Chromium (total)	-	0.094	-	0.86
Lead	-	0.37	-	0.37
K008				
Chromium (total)	-	0.094	-	0.86
Lead	-	0.37	-	0.37
K009				
Chloroform	6.0	-	6.0	-
K010				
Chloroform	6.0	-	6.0	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K011				
Acetonitrile	1.8	-	1.8	-
Acrylonitrile	1.4	-	84	-
Acrylamide	23	-	23	-
Benzene	0.03	-	10	-
Cyanide	57	-	DE	-
K013				
Acetonitrile	1.8	-	1.8	-
Acrylonitrile	1.4	-	84	-
Acrylamide	23	-	23	-
Benzene	0.03	-	10	-
Cyanide	57	-	DE	-
K014				
Acetonitrile	1.8	-	1.8	-
Acrylonitrile	1.4	-	84	-
Acrylamide	23	-	23	-
Benzene	0.03	-	10	-
Cyanide	57	-	DE	-
K015				
Anthracene	3.4	-	3.4	-
Benzal Chloride	6.2	-	6.0	-
Sum of Benzo(b)- and Benzo(k)fluoranthene	3.4	-	6.8[f]	-
Phenanthrene	3.4	-	5.6	-
Toluene	6.0	-	10	-
Chromium (total)	-	1.7	-	0.86
Nickel	-	0.2	-	5.0

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K016				
Hexachlorobenzene	28	-	10	-
Hexachlorobutadiene	5.6	-	5.6	-
Hexachlorocyclopentadiene	5.6	-	2.4	-
Hexachloroethane	28	-	30	-
Tetrachloroethylene	6.0	-	6.0	-
K017				
bis(2-Chloroethyl)ether	7.2	-	6.0	-
1,2-Dichloropropane	18	-	18	-
1,2,3-Trichloropropane	28	-	30	-
K018				
Chloroethane	6.0	-	6.0	-
1,1-Dichloroethane	6.0	-	6.0	-
1,2-Dichloroethane	6.0	-	6.0	-
Hexachlorobenzene	28	-	10	-
Hexachlorobutadiene	5.6	-	5.6	-
Hexachloroethane	28	-	30	-
Pentachloroethane	5.6	-	6.0	-
1,1,1-Trichloroethane	6.0	-	6.0	-
K019				
Chlorobenzene	6.0	-	6.0	-
bis(2-Chloroethyl)ether	5.6	-	6.0	-
Chloroform	6.0	-	6.0	-
1,2-Dichloroethane	6.0	-	6.0	-
Hexachloroethane	28	-	30	-
Naphthalene	5.6	-	5.6	-
Phenanthrene	5.6	-	5.6	-
Tetrachloroethylene	6.0	-	6.0	-
1,2,4-Trichlorobenzene	19	-	19	-
1,1,1-Trichloroethane	6.0	-	6.0	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K020				
1,2-Dichloroethane	6.0	-	6.0	-
1,1,2,2-Tetrachloroethane	5.6	-	6.0	-
Tetrachloroethylene	6.0		6.0	
K021				
Carbon Tetrachloride	6.2	-	6.0	-
Chloroform	6.2	-	6.0	-
Antimony	-	0.23	-	2.1
K022				
Acetophenone	19	-	9.7	-
Sum of Diphenylamine and Diphenylnitrosamine	13	-	13[g]	-
Phenol	12	-	6.2	-
Toluene	0.034	-	10	-
Chromium (total)	-	5.2	-	0.86
Nickel	-	0.32	-	5.0
K023				
Phthalic Anhydride (as measured by Phthalic acid)	28	-	28	-
K024				
Phthalic Anhydride (as measured by Phthalic acid)	28	-	28	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K028				
1,1-Dichloroethane	6.0	-	6.0	-
trans-1,2-Dichloroethane	6.0	-	6.0	-
Hexachlorobutadiene	5.6	-	5.6	-
Hexachloroethane	28	-	30	-
Pentachloroethane	5.6	-	6.0	-
1,1,1,2-Tetrachloroethane	5.6	-	6.0	-
1,1,2,2-Tetrachloroethane	5.6	-	6.0	-
Tetrachloroethylene	6.0	-	6.0	-
1,1,1-Trichloroethane	6.0	-	6.0	-
1,1,2-Trichloroethane	6.0	-	6.0	-
Chromium (total)	-	0.073	-	0.86
Lead	-	0.021	-	0.37
Nickel	-	0.088	-	5.0
K029				
Chloroform	6.0	-	6.0	-
1,2-Dichloroethane	6.0	-	6.0	-
1,1-Dichloroethylene	6.0	-	6.0	-
1,1,1-Trichloroethane	6.0	-	6.0	-
Vinyl Chloride	6.0	-	6.0	-
K030				
Hexachlorobutadiene	5.6	-	5.6	-
Hexachloroethane	28	-	30	-
Hexachloropropylene	19	-	30	-
Pentachlorobenzene	28	-	10	-
Pentachloroethane	5.6	-	6.0	-
1.2,4,5-Tetrachlorobenzene	14	-	14	-
Tetrachloroethylene	6.0	-	6.0	-
1.2,4-Trichlorobenzene	19	-	19	-
K031				
Arsenic	-	5.6	-	5.0

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K032				
Chlordane	0.26	-	0.26	-
Heptachlor	0.066	-	0.066	-
Heptachlor Epoxide	0.066	-	0.066	-
Hexachlorocyclopentadiene	2.4	-	2.4	-
K033				
Hexachlorocyclopentadiene	2.4	-	2.4	-
K034				
Hexachlorocyclopentadiene	2.4	-	2.4	-
K035				
Acenaphthene	3.4	-	3.4	-
Anthracene	3.4	-	3.4	-
Benz(a)anthracene	3.4	-	3.4	-
Benzo(a)pyrene	3.4	-	3.4	-
Chrysene	3.4	-	3.4	-
Dibenz(a,h)anthracene	3.4	-	8.2	-
Fluoranthene	3.4	-	3.4	-
Fluorene	3.4	-	3.4	-
Indeno(1,2,3-cd)pyrene	3.4	-	3.4	-
Naphthalene	3.4	-	5.6	-
Phenanthrene	3.4	-	5.6	-
Pyrene	8.2	-	8.2	-
K036				
Disulfoton	0.1	-	6.2	-
K037				
Disulfoton	0.1	-	6.2	-
Toluene	28	-	10	-
K038				
Phorate	0.1	-	4.6	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K040				
Phorate	0.1	-	4.6	-
K041				
Toxaphene	2.6	-	2.6	-
K042				
o-Dichlorobenzene	4.4	-	6.0	-
p-Dichlorobenzene	4.4	-	6.0	-
Pentachlorobenzene	4.4	-	10	-
1,2,4,5-Tetrachlorobenzene	4.4	-	14	-
1,2,4-Trichlorobenzene	4.4	-	19	-
K043				
2,4-Dichlorophenol	0.38	-	14	-
2,6-Dichlorophenol	0.34	-	14	-
2,4,5-Trichlorophenol	8.2	-	7.4	-
2,4,6-Trichlorophenol	7.6	-	7.4	-
Tetrachlorophenols	0.68	-	0.68	-
Pentachlorophenol	1.9	-	7.4	-
Tetrachloroethylene	1.7	-	6.0	-
Hexachlorodibenzofurans	0.001	-	0.001	-
Hexachlorodibenzo-p-dioxins	0.001	-	0.001	-
Pentachlorodibenzofurans	0.001	-	0.001	-
Pentachlorodibenzo-p-dioxins	0.001	-	0.001	-
Tetrachlorodibenzofurans	0.001	-	0.001	-
Tetrachlorodibenzo-p-dioxins	0.001	-	0.001	-
K046				
Lead	-	0.18	-	0.37

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K048				
Benzene	14	-	10	-
Benzo(a)pyrene	12	-	3.4	-
Bis(2-ethylhexyl)phthalate	7.3	-	28	-
Chrysene	15	-	3.4	-
Di-n-butyl phthalate	3.6	-	28	-
Ethylbenzene	14	-	10	-
Naphthalene	42	-	5.6	-
Phenanthrene	34	-	5.6	-
Phenol	3.6	-	6.2	-
Pyrene	36	-	8.2	-
Toluene	14	-	10	-
Xylene(s)	22	-	30	-
Cyanides (total)	1.8	-	DE	-
Chromium (total)	-	1.7	-	0.86
Nickel	-	0.20	-	5.0
K049				
Anthracene	28	-	3.4	-
Benzene	14	-	10	-
Benzo(a)pyrene	12	-	3.4	-
Bis(2-ethylhexyl)phthalate	7.3	-	28	-
Chrysene	15	-	3.4	-
Ethylbenzene	14	-	10	-
Naphthalene	42	-	5.6	-
Phenanthrene	34	-	5.6	-
Phenol	3.6	-	6.2	-
Pyrene	36	-	8.2	-
Toluene	14	-	10	-
Xylene(s)	22	-	30	-
Cyanides (total)	1.8	-	DE	-
Chromium (total)	-	1.7	-	0.86
Nickel	-	0.20	-	5.0

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K050				
Benzo(a)pyrene	12	-	3.4	-
Phenol	3.6	-	6.2	-
Cyanides (total)	1.8	-	DE	-
Chromium (total)	-	1.7	-	0.86
Nickel	-	0.20	-	5.0
K051				
Anthracene	28	-	3.4	-
Benzene	14	-	10	-
Benzo(a)anthracene	20	-	3.4	-
Benzo(a)pyrene	12	-	3.4	-
Bis(2-ethylhexyl)phthalate	7.3	-	28	-
Chrysene	15	-	3.4	-
Di-n-butyl phthalate	3.6	-	28	-
Ethylbenzene	14	-	10	-
Naphthalene	42	-	5.6	-
Phenanthrene	34	-	5.6	-
Phenol	3.6	-	6.2	-
Pyrene	36	-	8.2	-
Toluene	14	-	10	-
Xylene(s)	22	-	30	-
Cyanides (total)	1.8	-	DE	-
Chromium (total)	-	1.7	-	0.86
Nickel	-	0.20	-	5.0

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K052				
Benzene	14	-	10	-
Benzo(a)pyrene	12	-	3.4	-
o-Cresol	6.2	-	5.6	-
p-Cresol	6.2	-	3.2	-
Ethylbenzene	14	-	10	-
Naphthalene	42	-	5.6	-
Phenanthrene	34	-	5.6	-
Phenol	3.6	-	6.2	-
Toluene	14	-	10	-
Xylene(s)	22	-	30	-
Cyanides (total)	1.8	-	DE	-
Chromium (total)	-	1.7	-	0.86
Nickel	-	0.20	-	5.0
K060				
Benzene	0.071	-	10	-
Benzo(a)pyrene	3.6	-	3.4	-
Naphthalene	3.4	-	5.6	-
Phenol	3.4	-	6.2	-
Cyanides (total)	1.2	-	DE	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K061 (Low and High Zinc Subcategories)				
Antimony	-	2.1	-	2.1
Arsenic	-	0.055	-	5.0
Barium	-	7.6	-	7.6
Beryllium	-	0.014	-	0.014
Cadmium	-	0.19	-	0.19
Chromium (total)	-	0.33	-	0.86
Lead	-	0.37	-	0.37
Mercury	-	0.009	-	0.009[b]
			-	0.20[c]
				0.025[d]
Nickel	-	5.0	-	5.0
Selenium	-	0.16	-	0.16
Silver	-	0.30	-	0.30
Thallium	-	0.078	-	0.078
Zinc	-	5.3	-	5.3
K062 (Treatment Standards Based on Stabilization)				
Chromium (total)	-	0.094	-	0.86
Lead	-	0.37	-	0.37

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K062 (Alternative Treatment Standards Based on HTMR)				
Antimony	-	2.1	-	2.1
Arsenic	-	0.055	-	5.0
Barium	-	7.6	-	7.6
Beryllium	-	0.014	-	0.014
Cadmium	-	0.19	-	0.19
Chromium (total)	-	0.33	-	0.86
Lead	-	0.37	-	0.37
Mercury	-	0.009	-	0.009[b]
			-	0.20[c]
				0.025[d]
Nickel	-	5.0	-	5.0
Selenium	-	0.16	-	0.16
Silver	-	0.30	-	0.30
Thallium	-	0.078	-	0.078
Zinc	-	5.3	-	5.3
K069 (Calcium Sulfate Subcategory)				
Cadmium	-	0.14	-	0.19
Lead	-	0.24	-	0.37
K071				
Mercury	-	0.20[b]	-	0.20[b]
		0.025[c]	-	0.025[c]
K073				
Carbon Tetrachloride	6.2	-	6.0	-
Chloroform	6.2	-	6.0	-
Hexachloroethane	30	-	30	-
Tetrachloroethylene	6.2	-	6.0	-
1,1,1-Trichloroethane	6.2	-	6.0	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K083				
Aniline	14	-	14	-
Benzene	6.6	-	10	-
Sum of Diphenylamine and Diphenylnitrosamine	14	-	13[a]	-
Nitrobenzene	14	-	14	-
Phenol	5.6	-	6.2	-
Nickel	-	0.088	-	5.0
K084				
Arsenic	-	5.6	-	5.0
K085				
Benzene	4.4	-	10	-
Chlorobenzene	4.4	-	6.0	-
o-Dichlorobenzene	4.4	-	6.0	-
m-Dichlorobenzene	4.4	-	6.0	-
p-Dichlorobenzene	4.4	-	6.0	-
Hexachlorobenzene	4.4	-	10	-
Pentachlorobenzene	4.4	-	10	-
1,2,4,5-Tetrachlorobenzene	4.4	-	14	-
1,2,4-Trichlorobenzene	4.4	-	19	-
Aroclor 1016	0.92	-	NR[e]	-
Aroclor 1221	0.92	-	NR[e]	-
Aroclor 1232	0.92	-	NR[e]	-
Aroclor 1242	0.92	-	NR[e]	-
Aroclor 1248	0.92	-	NR[e]	-
Aroclor 1254	1.8	-	NR[e]	-
Aroclor 1260	1.8	-	NR[e]	-
Total PCBs	NR	-	10[e]	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K086				
Acetone	160	-	160	-
Acetophenone	9.7	-	9.7	-
Butanol (n-Butyl Alcohol)	2.6	-	2.6	-
Butyl Benzyl Phthalate	7.9	-	28	-
o-Dichlorobenzene	6.2	-	6.0	-
Diethyl Phthalate	28	-	28	-
Dimethyl Phthalate	28	-	28	-
Di-n-butyl Phthalate	28	-	28	-
Di-n-octyl Phthalate	28	-	28	-
Ethyl Acetate	33	-	33	-
Ethyl Benzene	6.0	-	10	-
bis(2-Ethylhexyl)phthalate	28	-	28	-
Methyl Ethyl Ketone	36	-	36	-
Methyl Isobutyl Ketone	33	-	33	-
Methylene Chloride	33	-	30	-
Naphthalene	3.1	-	5.6	-
Nitrobenzene	14	-	14	-
Toluene	28	-	10	-
1,1,1-Trichloroethane	5.6	-	6.0	-
Trichloroethylene	5.6	-	6.0	-
Xylenes (total)	28	-	30	-
Cyanides (total)	1.5	-	DE	-
Chromium (total)	-	0.094	-	0.86
Lead	-	0.37	-	0.37

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K087				
Acenaphthalene	3.4	-	3.4	-
Benzene	0.071	-	10	-
Chrysene	3.4	-	3.4	-
Fluoranthene	3.4	-	3.4	-
Indeno(1,2,3-cd)pyrene	3.4	-	3.4	-
Naphthalene	3.4	-	5.6	-
Phenanthrene	3.4	-	5.6	-
Toluene	0.65	-	10	-
Xylenes	0.07	-	30	-
Lead	-	0.51	-	0.37
K093				
Phthalic Anhydride (as measured by Phthalic Acid)	28	-	28	-
K094				
Phthalic Anhydride (as measured by Phthalic Acid)	28	-	28	-
K095				
Hexachloroethane	28	-	30	-
Pentachloroethane	5.6	-	6.0	-
1,1,1,2-Tetrachloroethane	5.6	-	6.0	-
1,1,2,2-Tetrachloroethane	5.6	-	6.0	-
Tetrachloroethylene	6.0	-	6.0	-
1,1,2-Trichloroethane	6.0	-	6.0	-
Trichloroethylene	5.6	-	6.0	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K096				
m-Dichlorobenzene	5.6	-	6.0	-
Pentachloroethane	5.6	-	6.0	-
1,1,1,2-Tetrachloroethane	5.6	-	6.0	-
1,1,2,2-Tetrachloroethane	5.6	-	6.0	-
Tetrachloroethylene	6.0	-	6.0	-
1,2,4-Trichlorobenzene	19	-	19	-
1,1,2-Trichloroethane	6.0	-	6.0	-
Trichloroethylene	5.6	-	6.0	-
K097				
Chlordane	0.26	-	0.26	-
Heptachlor	0.066	-	0.066	-
Heptachlor Epoxide	0.066	-	0.066	-
Hexachlorocyclopentadiene	2.4	-	2.4	-
K098				
Toxaphene	2.6	-	2.6	-
K099				
2,4-Dichlorophenoxyacetic acid (2,4-D)	1.0	-	10	-
Hexachlorodibenzofurans	0.001	-	0.001	-
Hexachlorodibenzo-p-dioxins	0.001	-	0.001	-
Pentachlorodibenzofurans	0.001	-	0.001	-
Pentachlorodibenzo-p-dioxins	0.001	-	0.001	-
Tetrachlorodibenzofurans	0.001	-	0.001	-
Tetrachlorodibenzo-p-dioxins	0.001	-	0.001	-
K100				
Cadmium	-	0.066	-	0.19
Chromium (total)	-	5.2	-	0.86
Lead	-	0.51	-	0.37

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K101				
o-Nitroaniline	14	-	14	-
Arsenic	-	5.6	-	5.6
K102				
o-Nitrophenol	13	-	13	-
Arsenic	-	5.6	-	5.6
K103				
Aniline	5.6	-	14	-
Benzene	6.0	-	10	-
2,4-Dinitrophenol	5.6	-	160	-
Nitrobenzene	5.6	-	14	-
Phenol	5.6	-	6.2	-
K104				
Aniline	5.6	-	14	-
Benzene	6.0	-	10	-
2,4-Dinitrophenol	5.6	-	160	-
Nitrobenzene	5.6	-	14	-
Phenol	5.6	-	6.2	-
Cyanides (total)	1.8	-	DE	-
K105				
Benzene	4.4	-	10	-
Chlorobenzene	4.4	-	6.0	-
2-Chlorophenol	4.4	-	5.7	-
o-Dichlorobenzene	4.4	-	6.0	-
p-Dichlorobenzene	4.4	-	6.0	-
Phenol	4.4	-	6.2	-
2,4,5-Trichlorophenol	4.4	-	7.4	-
2,4,6-Trichlorophenol	4.4	-	7.4	-
K106 (Low Mercury Subcategory-RMERC Residues)				
Mercury	-	0.20	-	0.20

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
K106 (Low Mercury Subcategory-Non-RMERC Residues)				
Mercury	-	0.025	-	0.025
K111				
2,4-Dinitrotoluene	140	-	140	-
2,6-Dinitrotoluene	28	-	28	-
K115				
Nickel	-	0.32	-	5.0
K117				
Ethylene Dibromide	15	-	15	-
Bromomethane	15	-	15	-
Chloroform	5.6	-	6.0	-
K118				
Ethylene Dibromide	15	-	15	-
Bromomethane	15	-	15	-
Chloroform	5.6	-	6.0	-
K131				
Bromomethane	15	-	15	-
K132				
Bromomethane	15	-	15	-
K136				
Ethylene Dibromide	15	-	15	-
Bromomethane	15	-	15	-
Chloroform	5.6	-	6.0	-
P004				
Aldrin	0.066	-	0.066	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
P010				
Arsenic	-	5.6	-	5.0
P011				
Arsenic	-	5.6	-	5.0
P012				
Arsenic	-	5.6	-	5.0
P013				
Barium	-	52	-	7.6
Cyanides (total)	110	-	DE	-
Cyanides (amenable)	9.1	-	DE	-
P020				
2-sec-Butyl-4,6-dinitrophenol (Dinoseb)	2.5	-	2.5	-
P021				
Cyanides (total)	110	-	DE	-
Cyanides (amenable)	9.1	-	DE	-
P024				
p-Chloroaniline	16	-	16	-
P029				
Cyanides (total)	110	-	DE	-
Cyanides (amenable)	9.1	-	DE	-
P030				
Cyanides (total)	110	-	DE	-
Cyanides (amenable)	9.1	-	DE	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
P036				
Arsenic	-	5.6	-	5.0
P037				
Dieldrin	0.13	-	0.13	-
P038				
Arsenic	-	5.6	-	5.0
P039				
Disulfoton	0.1	-	6.2	-
P047				
4,6-Dinitro-o-cresol	160	-	160	-
P048				
2,4-Dinitrophenol	160	-	160	-
P050				
Endosulfan I Endosulfan II Endosulfan Sulfate	0.066 0.13 0.13	- - -	0.066 0.13 0.13	- - -
P051				
Endrin Endrin Aldehyde	0.13 0.13	- -	0.13 0.13	- -
P059				
Heptachlor Heptachlor Epoxide	0.066 0.066	- -	0.066 0.066	- -
P060				
Isodrin	0.066	-	0.066	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
P063				
Cyanides (total)	110	-	DE	-
Cyanides (amenable)	9.1	-	DE	-
P065 (Low Mercury Subcategory - RMERC Residues)				
Mercury	-	0.20	-	0.20
P065 (Low Mercury Subcategory - Incinerator Residues)				
Mercury	-	0.025	-	0.025
P071				
Methyl Parathion	0.1	-	4.6	-
P073				
Nickel	-	0.32	-	5.0
P074				
Nickel	-	0.32	-	5.0
Cyanides (total)	110	-	DE	-
Cyanides (amenable)	9.1	-	DE	-
P077				
p-Nitroaniline	28	-	28	-
P084				
Parathion	0.1	-	4.6	-
P089				
Parathion	0.1	-	4.6	-
P092 (Low Mercury Subcategory - RMERC Residues)				
Mercury	-	0.20	-	0.20

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
P092 (Low Mercury Subcategory - Incinerator Residues)				
Mercury	-	0.025	-	0.025
P094				
Phorate	0.1	-	4.6	-
P097				
Famphur	0.1	-	15	-
P098				
Cyanides (total)	110	-	DE	-
Cyanides (amenable)	9.1	-	DE	-
P099				
Silver	-	0.072	-	0.30
Cyanides (total)	110	-	DE	-
Cyanides (amenable	9.1	-	DE	-
P101				
Ethyl Cyanide (Propanenitrile)	360	-	360	-
P103				
Selenium	-	5.7	-	0.16
P104				
Silver	-	0.072	-	0.30
Cyanides (total)	110	-	DE	-
Cyanides (amenable)	9.1	-	DE	-
P106				
Cyanides (total)	110	-	DE	-
Cyanides (amenable)	9.1	-	DE	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
P110				
Lead	-	0.51	-	0.37
P114				
Selenium	-	5.7	-	0.16
P121				
Cyanides (total) Cyanides (amenable)	110 9.1	- -	DE DE	- -
P123				
Toxaphene	1.3	-	2.6	-
U002				
Acetone	160	-	160	-
U004				
Acetophenone	9.7	-	9.7	-
U005				
2-Acetylaminofluorene	140	-	140	-
U009				
Acrylonitrile	84	-	84	-
U012				
Aniline	14	-	14	-
U018				
Benz(a)anthracene	8.2	-	3.4	-
U019				
Benzene	36	-	10	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
U022				
Benzo(a)pyrene	8.2	-	3.4	-
U024				
bis(2-Chloroethoxy)methane	7.2	-	7.2	-
U025				
bis(2-Chloroethyl)ether	7.2	-	6.0	-
U027				
bis(2-Chloroisopropyl)ether	7.2	-	7.2	-
U028				
bis(2-Ethylhexyl)phthalate	28	-	28	-
U029				
Bromomethane (Methyl Bromide)	15	-	15	-
U030				
4-Bromophenyl Phenyl Ether	15	-	15	-
U031				
n-Butyl Alcohol	2.6	-	2.6	-
U032				
Chromium (total)	-	0.094	-	0.86
U036				
Chlordane (alpha and gamma)	0.13	-	0.26	-
U037				
Chlorobenzene	5.7	-	6.0	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
U039				
p-Chloro-m-cresol	14	-	14	-
U043				
Vinyl Chloride	33	-	6.0	-
U044				
Chloroform	5.6	-	6.0	-
U045				
Chloromethane (Methyl Chloride)	33	-	30	-
U047				
2-Chloronaphthalene	5.6	-	5.6	-
U048				
2-Chlorophenol	5.7	-	5.7	-
U050				
Chrysene	8.2	-	3.4	-
U051				
Naphthalene	1.5	-	5.6	-
Pentachlorophenol	7.4	-	7.4	-
Phenanthrene	1.5	-	5.6	-
Pyrene	1.5	-	8.2	-
Toluene	28	-	10	-
Xylenes (total)	33	-	30	-
Lead	-	0.51	-	0.37
U052				
Cresol (m- and p- isomers)	3.2	-	5.6	-
o-Cresol	5.6	-	5.6	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
U060				
o,p'-DDD	0.087	-	0.087	-
p,p'-DDD	0.087	-	0.087	-
U061				
o,p'-DDD	0.087	-	0.087	-
p,p'-DDD	0.087	-	0.087	-
o,p'-DDE	0.087	-	0.087	-
p,p'-DDE	0.087	-	0.087	-
o,p'-DDT	0.087	-	0.087	-
p,p'-DDT	0.087	-	0.087	-
U063				
Dibenz(a,h)anthracene	8.2	-	8.2	-
U066				
1,2-Dibromo-3-chloropropane	15	-	15	-
U067				
1,2-Dibromoethane (Ethylene Dibromide)	15	-	15	-
U068				
Dibromomethane	15	-	15	-
U069				
Di-n-butyl phthalate	28	-	28	-
U070				
o-Dichlorobenzene	6.2	-	6.0	-
U071				
m-Dichlorobenzene	6.2	-	6.0	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
U072				
p-Dichlorobenzene	6.2	-	6.0	-
U075				
Dichlorodifluoromethane	7.2	-	7.2	-
U076				
1,1-Dichloroethane	7.2	-	6.0	-
U077				
1,2-Dichloroethane	7.2	-	6.0	-
U078				
1,1-Dichloroethylene	33	-	6.0	-
U079				
trans-1,2-Dichloroethylene	33	-	30	-
U080				
Methylene Chloride	33	-	30	-
U081				
2,4-Dichlorophenol	14	-	14	-
U082				
2,6-Dichlorophenol	14	-	14	-
U083				
1,2-Dichloropropane	18	-	18	-
U084				
cis-1,3-Dichloropropylene trans-1,3-Dichloropropylene	18 18	- -	18 18	- -

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
U088				
Diethyl phthalate	28	-	28	-
U101				
2,4-Dimethylphenol	14	-	14	-
U102				
Dimethyl phthalate	28	-	28	-
U105				
2,4-Dinitrotoluene	140	-	140	-
U106				
2,6-Dinitrotoluene	28	-	28	-
U107				
Di-n-octyl phthalate	28	-	28	-
U108				
1,4-Dioxane	170	-	170	-
U111				
Di-n-propylnitrosamine	14	-	14	-
U112				
Ethyl Acetate	33	-	33	-
U117				
Ethyl Ether	160	-	160	-
U118				
Ethyl Methacrylate	160	-	160	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
U120				
Fluoranthene	8.2	-	3.4	-
U121				
Trichloromonofluoromethane	33	-	30	-
U127				
Hexachlorobenzene	37	-	10	-
U128				
Hexachlorobutadiene	28	-	5.6	-
U129				
alpha-BHC	0.066	-	0.066	-
beta-BHC	0.066	-	0.066	-
delta-BHC	0.066	-	0.066	-
gamma-BHC (Lindane)	0.066	-	0.066	-
U130				
Hexachlorocyclopentadiene	3.6	-	2.4	-
U131				
Hexachloroethane	28	-	30	-
U136				
Arsenic	-	5.6	-	5.0
U137				
Indeno(1,2,3-c,d)pyrene	8.2	-	3.4	-
U138				
Iodomethane	65	-	65	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
U140				
Isobutyl Alcohol	170	-	170	-
U141				
Isosafrole	2.6	-	2.6	-
U142				
Kepone	0.13	-	0.13	-
U144				
Lead	-	0.51	-	0.37
U145				
Lead	-	0.51	-	0.37
U146				
Lead	-	0.51	-	0.37
U151 (Low Mercury Subcategory - RMERC Residues)				
Mercury	-	0.20	-	0.20
U151 (Low Mercury Subcategory - Non-RMERC Residues)				
Mercury	-	0.025	-	0.025
U152				
Methacrylonitrile	84	-	84	-
U155				
Methapyrilene	1.5	-	1.5	-
U157				
3-Methylcholanthrene	15	-	15	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
U158				
4,4'-Methylene-bis-(2-chloroaniline)	35	-	30	-
U159				
Methyl Ethyl Ketone	36	-	36	-
U161				
Methyl Isobutyl Ketone	33	-	33	-
U162				
Methyl Methacrylate	160	-	160	-
U165				
Naphthalene	3.1	-	5.6	-
U169				
Nitrobenzene	14	-	14	-
U170				
4-Nitrophenol	29	-	29	-
U172				
N-Nitrosodi-n-butylamine	17	-	17	-
U174				
N-Nitrosodiethylamine	28	-	28	-
U179				
N-Nitrosopiperidine	35	-	35	-
U180				
N-Nitrosopyrrolidine	35	-	35	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
U181				
5-Nitro-o-toluidine	28	-	28	-
U183				
Pentachlorobenzene	37	-	10	-
U185				
Pentachloronitrobenzene	4.8	-	4.8	-
U187				
Phenacetin	16	-	16	-
U188				
Phenol	6.2	-	6.2	-
U190				
Phthalic Anhydride	28	-	28	-
U192				
Pronamide	1.5	-	1.5	-
U196				
Pyridine	16	-	16	-
U203				
Safrole	22	-	22	-
U204				
Selenium	-	5.7	-	0.16
U205				
Selenium	-	5.7	-	0.16

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
U207				
1,2,4,5-Tetrachlorobenzene	19	-	14	-
U208				
1,1,1,2-Tetrachloroethane	42	-	6.0	-
U209				
1,1,2,2-Tetrachloroethane	42	-	6.0	-
U210				
Tetrachloroethylene	5.6	-	6.0	-
U211				
Carbon Tetrachloride	5.6	-	6.0	-
U220				
Toluene	28	-	10	-
U225				
Bromoform (Tribromoethane)	15	-	15	-
U226				
1,1,1-Trichloroethane	5.6	-	6.0	-
U227				
1,1,2-Trichloroethane	5.6	-	6.0	-
U228				
Trichloroethylene	5.6	-	6.0	-
U235				
tris(2,3-Dibromopropyl)-phosphate	0.10	-	0.10	-

Table ES-3

(Continued)

Regulated Hazardous Constituents	Previously Promulgated Treatment Standard		Revised Treatment Standard from the Application of Universal Standards	
	Total (mg/kg)	TCLP (mg/L)	Total (mg/kg)	TCLP (mg/L)
U239				
Xylenes (total)	28	-	30	-
U240				
2,4-Dichlorophenoxyacetic Acid (2,4-D)	10	-	10	-
U243				
Hexachloropropene	28	-	30	-
U247				
Methoxychlor	0.18	-	0.18	

[a]This treatment standard is applicable if the only listed hazardous constituents in the waste are carbon disulfide, cyclohexanone, or methanol. If a waste contains any of these constituents in addition to any of the other 26 constituents regulated in F001-F005 using treatment standards based on total constituent analysis, the TCLP analysis need not be performed.

[b]High-mercury subcategory wastes (listed wastes with mercury concentrations $\geq$ 260 mg/kg).

[c]Low-mercury subcategory wastes - RMERC residues.

[d]Low-mercury subcategory wastes - non-RMERC residues.

[e]The Agency is regulating PCBs (i.e., Aroclors) under universal standards in nonwastewater forms of wastes as total PCBs based on the sum of the individual Aroclors.

[f]This value represents the sum of benzo(b)fluoranthene and benzo(k)fluoranthene.

[g]This value represents the sum of diphenylamine and diphenylnitrosamine.

DE = Discussed Elsewhere
NR = Not Regulated

1.0 INTRODUCTION

The United States Environmental Protection Agency (EPA or the Agency) is establishing Best Demonstrated Available Technology (BDAT) universal treatment standards for listed hazardous wastes identified in Title 40, Code of Federal Regulations, Section 261.31 (40 CFR 261.31). These BDAT treatment standards are being established in accordance with the amendments to the Resource Conservation and Recovery Act (RCRA) of 1976, enacted by the Hazardous and Solid Waste Amendments (HSWA) of November 8, 1984.

A universal standard is a single treatment standard established for a specific constituent independent of the waste matrix. These universal standards will replace most of the previous BDAT treatment standards for constituents regulated in waste codes listed under the RCRA Land Disposal Restrictions Program (as discussed in Section 2.0 and presented in Table ES-3). In addition, these universal standards may be used in the future to promulgate treatment standards for the constituents of concern in newly listed hazardous wastes.

This background document provides the Agency's rationale and technical support for developing the universal treatment standards. This document also provides the Agency's application of universal standards and the general provisions for incorporating these standards into previously promulgated listed hazardous wastes, and wastes that may be listed as hazardous at a future date.

The Agency's legal authority and promulgated methodology for establishing treatment standards and the petition process necessary for requesting a variance from the treatment standards are summarized in EPA's Final Best Demonstrated Available Technology (BDAT) Background Document for Quality Assurance/Quality Control Procedures and Methodology (Methodology Background Document) (3). Section 1.1 of this document provides a discussion of the regulatory background for universal standards.

Section 1.2 of this document presents a brief explanation of universal standards and their application; a more in-depth discussion is included in Section 2.2 of this document. Section 1.3 presents a brief summary of the contents of this document.

1.1 Regulatory Background

Section 3004(m) of RCRA, as amended by HSWA, requires the Agency to promulgate treatment standards restricting the land disposal of hazardous wastes based on the application of BDAT for treatment of those wastes. HSWA set a strict and detailed schedule for establishing treatment standards, based on priorities related to the volume of waste generated and intrinsic hazards of different types of wastes.

In response to these requirements, the Agency promulgated six regulations corresponding to six different groups of wastes. The six groups and the respective dates for promulgation of treatment standards for these groups are listed below:

• Solvent and dioxin wastes	November 7, 1986
• "California List" wastes	July 8, 1987
• "First Third" wastes	August 8, 1988
• "Second Third" wastes	June 8, 1989
• "Third Third" wastes	May 8, 1990
• "Phase I" wastes	November 16, 1992

Generally, treatment standards are specified for both the wastewater and nonwastewater forms of each listed hazardous waste. These standards are applicable to the listed wastes as well as to any wastes generated by the management or treatment of the listed wastes. For the purpose of determining the applicability of treatment standards, wastewaters are defined as wastes containing less than 1% (weight basis) total suspended solids[2] and less than 1% (weight basis) total organic carbon (TOC). Wastes

[2]The term "total suspended solids" (TSS) clarifies EPA's previously used terminology of "total solids" and "filterable solids." Specifically, total suspended solids are measured by Method 209C (total suspended solids dried at 103 to 105°C) in Standard Methods for the Examination of Water and Wastewater (1).

not meeting the wastewater definition must comply with treatment standards for nonwastewaters.

Under the existing promulgated rules, facilities that land dispose organic- and metal-containing wastes must typically comply with individual treatment standards for a specific waste; in some instances, these treatment standards impose different concentration limits for the same constituent in different wastes. Section 2002(b) of RCRA authorizes the Administrator to revise, if necessary, at least every three years, each regulation promulgated under HSWA. Section 3004(m)(1) of RCRA likewise directs EPA to revise existing treatment standards as appropriate. As a result of this authority and the desire for a simplified regulatory framework, EPA is establishing regulations that would revise treatment standards and/or reduce administrative requirements.

The Agency is establishing universal standards for organic, metal, and inorganic constituents: one set of treatment standards for wastewater forms of listed hazardous wastes and one set of treatment standards for nonwastewater forms of listed hazardous wastes. The Agency's rationale and technical support for establishing universal treatment standards for cyanide is provided in a separate document.

EPA published an Advance Notice of Proposed Rulemaking (ANPRM) for universal standards and solicited comment on the advantages and disadvantages of the establishment of universal standards in the May 30, 1991 Federal Register (56 FR 24444). Commenters to the May 30, 1991 ANPRM generally supported the concept of the establishment of a universal set of BDAT treatment standards. The commenters agreed that universal standards could substantially simplify compliance and monitoring efforts, which were characterized as "complex and confusing."

1.2 Description of Universal Standards

A universal standard is a single treatment standard value for a specific constituent; a constituent has the same universal treatment standard in each and every waste code in which it is regulated. The Agency is establishing two different sets of universal standards: one for nonwastewater forms of wastes and another for wastewater forms of wastes. These two sets of treatment standards differ in the population of regulated constituents and the concentration values of the individual universal standards. When promulgated, these standards will replace most of the previously promulgated treatment standards for listed hazardous wastes and will be used as the treatment standards for listed hazardous wastes in the future.

Under universal standards, enforcement and compliance monitoring are simplified. Under the existing individual concentration-based treatment standards, the applicable standards vary between different wastes; however, under universal standards, the applicable concentrations (i.e., standards) are limited to those found in universal standards. Therefore, regulatory efforts are simplified since a regulated constituent will have the same treatment standard regardless of the waste code in which it is regulated. This approach is consistent with the fact that many wastes that are treatable by similar technologies are often appropriately commingled prior to treatment. The establishment of universal standards is not intended to modify current restrictions on the commingling of incompatible wastes, impermissible switching of treatability groups, or impermissible dilution.

1.3 Contents of This Document

This background document provides the Agency's rationale and technical support for identifying constituents for regulation and for developing the universal standards for nonwastewater forms of listed hazardous wastes. The universal standards for wastewater forms of listed hazardous wastes are similar to the treatment standards

for wastewater forms of listed hazardous wastes are similar to the treatment standards for wastewater forms of F039 wastes, with a few exceptions. The Agency's rationale and technical support for establishing universal standards for wastewater forms of wastes is provided in Volume B of this set, EPA's Final Best Demonstrated Available Technology (BDAT) Background Document for Universal Standards, Volume B: Universal Standards for Wastewater Forms of Listed Hazardous Wastes (2).

Section 2.0 presents a description of universal standards and how they will apply to previously promulgated listed hazardous wastes and wastes that may be listed as hazardous in the future. Additionally, this section includes an explanation of waste codes excluded from consideration under universal standards and the advantages of implementing a system of universal standards. Section 3.0 discusses the Agency's rationale for selecting constituents for regulation. The constituents selected for regulation in universal standards were determined based on an evaluation of the constituents for which nonwastewater treatment standards were previously promulgated in the RCRA Land Disposal Restrictions Program. Section 4.0 discusses the treatment technologies that are applicable and demonstrated for treatment of constituents in nonwastewater forms of listed hazardous wastes. This section also presents EPA's rationale for identifying BDAT for the constituents selected for regulation. Section 5.0 presents the treatment performance database the Agency used to determine BDAT, to select constituents for regulation, and to develop treatment standards for the constituents selected for regulation in universal standards for nonwastewater forms of listed hazardous wastes. Section 6.0 presents the development of the universal treatment standards for the organic and metal constituents selected for regulation in nonwastewater forms of listed hazardous wastes. Sections 7.0 and 8.0 present acknowledgments and references, respectively.

Tables 1-1 and 1-2 are cross-reference guides to this document, and list page numbers in this document, for organic and metal constituents, respectively, for discussions on selection of constituents for regulation, selection of BDAT, treatment

performance data, and calculation of universal standards for each constituent. All tables and figures are located at the end of each section. References used in preparation of this background document are cited throughout this document within parentheses (e.g., (1)).

Table 1-1

Cross-Reference Guide for Organic Constituents

Constituent	Selection for Regulation (page number)	Selection of BDAT (page number)	Treatment Performance Data (page number)	Calculation of Universal Standard (page numbers)
Acenaphthalene	3-29	4-15	5-38	6-52, 6-109
Acenaphthene	3-29	4-15	5-38	6-52, 6-109
Acetone	3-27	4-15	5-33	6-43, 6-104
Acetonitrile	3-25	4-15	5-29	6-35, 6-100
Acetophenone	3-27	4-15	5-33	6-43, 6-104
2-Acetylaminofluorene	3-25	4-15	5-29	6-35, 6-100
Acrylamide	3-25	4-15	5-29	6-35, 6-100
Acrylonitrile	3-25	4-15	5-29	6-36, 6-100
Aldrin	3-19	4-15	5-11	6-7, 6-87
Aniline	3-25	4-15	5-29	6-36, 6-100
Anthracene	3-29	4-15	5-38	6-52, 6-109
Benz(a)anthracene	3-29	4-15	5-39	6-53, 6-109
Benzal Chloride	3-22	4-15	5-20	6-20, 6-94
Benzene	3-19	4-15	5-9	6-4, 6-85
Benzo(b)fluoranthene	3-29	4-15	5-38	6-53, 6-109
Benzo(k)fluoranthene	3-29	4-15	5-38	6-53, 6-109
Benzo(ghi)perylene	3-29	4-15	5-38	6-54, 6-109
Benzo(a)pyrene	3-29	4-15	5-38	6-53, 6-109
alpha-BHC	3-19	4-15	5-11	6-7, 6-87
beta-BHC	3-19	4-15	5-11	6-7, 6-87
delta-BHC	3-19	4-15	5-11	6-7, 6-87
gamma-BHC (Lindane)	3-19	4-15	5-11	6-8, 6-87
Bromodichloromethane	3-24	4-15	5-28	6-33, 6-99
Bromoform (Tribromomethane)	3-24	4-15	5-28	6-33, 6-99

Table 1-1

(Continued)

Constituent	Selection for Regulation (page number)	Selection of BDAT (page number)	Treatment Performance Data (page number)	Calculation of Universal Standard (page numbers)
4-Bromophenyl Phenyl Ether	3-24	4-15	5-28	6-33, 6-99
Bromomethane (Methyl Bromide)	3-24	4-15	5-28	6-33, 6-99
n-Butanol	3-27	4-16	5-33	6-43, 6-104
Butyl Benzyl Phthalate	3-28	4-16	5-37	6-50, 6-108
2-sec-Butyl-4,6-dinitrophenol (Dinoseb)	3-24	4-16	5-26	6-30, 6-98
Carbon Disulfide	3-19	4-16	5-10	6-6, 6-86
Carbon Tetrachloride	3-22	4-16	5-20	6-20, 6-94
Chlordane	3-19	4-16	5-11	6-8, 6-87
p-Chloroaniline	3-25	4-16	5-29	6-36, 6-100
Chlorobenzene	3-21	4-16	5-17	6-16, 6-92
2-Chloro-1,3-butadiene	3-22	4-16	5-20	6-20, 6-94
Chlorodibromomethane	3-24	4-16	5-28	6-34, 6-99
Chloroethane	3-22	4-16	5-20	6-20, 6-94
bis(2-Chloroethoxy)methane	3-22	4-16	5-20	6-21, 6-94
bis(2-Chloroethyl)ether	3-22	4-16	5-20	6-21, 6-94
Chloroform	3-22	4-16	5-21	6-21, 6-94
bis(2-Chloroisopropyl)ether	3-22	4-16	5-21	6-21, 6-94
p-Chloro-m-cresol	3-21	4-16	5-15	6-13, 6-90
Chloromethane	3-22	4-16	5-21	6-22, 6-94
2-Chloronaphthalene	3-22	4-16	5-33	6-44, 6-104
2-Chlorophenol	3-21	4-16	5-15	6-13, 6-90
3-Chloropropene	3-22	4-16	5-21	6-22, 6-95
Chrysene	3-29	4-16	5-38	6-54, 6-109
Cresol (m- and p-isomers) (3-Methylphenol, 4-Methylphenol)	3-24	4-16	5-26	6-30, 6-98

Table 1-1

(Continued)

Constituent	Selection for Regulation (page number)	Selection of BDAT (page number)	Treatment Performance Data (page number)	Calculation of Universal Standard (page numbers)
o-Cresol (2-Methylphenol)	3-24	4-16	5-26	6-30, 6-98
Cyclohexanone	3-27	4-16	5-33	6-44, 6-104
o,p'-DDD	3-19	4-16	5-11	6-8, 6-87
p,p'-DDD	3-19	4-16	5-11	6-8, 6-87
o,p'-DDE	3-20	4-16	5-12	6-9, 6-87
p,p'-DDE	3-20	4-17	5-12	6-9, 6-88
o,p'-DDT	3-20	4-17	5-12	6-9, 6-88
p,p'-DDT	3-20	4-17	5-12	6-9, 6-88
Dibenz(a,h)anthracene	3-29	4-17	5-38	6-54, 6-109
1,2-Dibromo-3-chloropropane	3-24	4-17	5-28	6-34, 6-99
Dibromomethane	3-24	4-17	5-28	6-34, 6-99
tris-(2,3-Dibromopropyl)phosphate	3-24	4-17	5-28	6-34, 6-99
(m) 1,3-Dichlorobenzene	3-21	4-17	5-17	6-17, 6-92
(o) 1,2-Dichlorobenzene	3-21	4-17	5-17	6-17, 6-92
(p) 1,4-Dichlorobenzene	3-21	4-17	5-17	6-17, 6-92
Dichlorodifluoromethane	3-22	4-17	5-21	6-22, 6-95
1,1-Dichloroethane	3-22	4-17	5-21	6-22, 6-95
1,2-Dichloroethane	3-22	4-17	5-21	6-23, 6-95
1,1-Dichloroethylene	3-22	4-17	5-22	6-23, 6-95
trans-1,2-Dichloroethylene	3-22	4-17	5-22	6-24, 6-95
2,4-Dichlorophenol	3-21	4-17	5-15	6-14, 6-90
2,6-Dichlorophenol	3-21	4-17	5-15	6-14, 6-90
2,4-Dichlorophenoxyacetic Acid (2,4-D)	3-21	4-17	5-15	6-14, 6-90
1,2-Dichloropropane	3-23	4-17	5-22	6-24, 6-95

Table 1-1

(Continued)

Constituent	Selection for Regulation (page number)	Selection of BDAT (page number)	Treatment Performance Data (page number)	Calculation of Universal Standard (page numbers)
cis-1,3-Dichloropropene	3-23	4-17	5-22	6-24, 6-95
trans-1,3-Dichloropropene	3-23	4-17	5-22	6-24, 6-95
Dieldrin	3-20	4-17	5-12	6-9, 6-88
Diethyl Phthalate	3-28	4-17	5-37	6-50, 6-108
2,4-Dimethyl Phenol	3-24	4-17	5-26	6-31, 6-98
Dimethyl Phthalate	3-28	4-17	5-37	6-50, 6-108
Di-n-butyl Phthalate	3-28	4-17	5-37	6-51, 6-108
1,4-Dinitrobenzene	3-25	4-18	5-29	6-36, 6-100
4,6-Dinitro-o-cresol	3-24	4-18	5-26	6-31, 6-98
2,4-Dinitrophenol	3-24	4-18	5-26	6-31, 6-98
2,4-Dinitrotoluene	3-25	4-18	5-29	6-37, 6-100
2,6-Dinitrotoluene	3-25	4-18	5-29	6-37, 6-100
Di-n-octyl Phthalate	3-28	4-18	5-37	6-51, 6-108
1,4-Dioxane	3-27	4-18	5-33	6-44, 6-104
Diphenylamine	3-25	4-18	5-30	6-37, 6-101
Diphenylnitrosamine	3-25	4-18	5-30	6-37, 6-101
Di-n-propylnitrosamine	3-25	4-18	5-29	6-37, 6-100
Disulfoton	3-26	4-18	5-32	6-41, 6-103
Endosulfan I	3-20	4-18	5-12	6-10, 6-88
Endosulfan II	3-20	4-18	5-12	6-10, 6-88
Endosulfan Sulfate	3-20	4-18	5-12	6-10, 6-88
Endrin	3-20	4-18	5-12	6-10, 6-88
Endrin Aldehyde	3-20	4-18	5-12	6-10, 6-89
Ethyl Acetate	3-27	4-18	5-33	6-44, 6-104

Table 1-1

(Continued)

Constituent	Selection for Regulation (page number)	Selection of BDAT (page number)	Treatment Performance Data (page number)	Calculation of Universal Standard (page numbers)
Ethyl Ether	3-27	4-18	5-33	6-45, 6-104
bis(2-Ethylhexyl)phthalate	3-28	4-18	5-37	6-50, 6-108
Ethyl Methacrylate	3-27	4-18	5-33	6-45, 6-104
Ethylbenzene	3-19	4-18	5-9	6-5, 6-85
Ethylene Dibromide (1,2-Dibromoethane)	3-24	4-18	5-28	6-34, 6-99
Famphur	3-26	4-18	5-32	6-41, 6-103
Fluoranthene	3-29	4-18	5-39	6-55, 6-109
Fluorene	3-29	4-18	5-39	6-55, 6-109
Heptachlor	3-20	4-18	5-13	6-11, 6-89
Heptachlor Epoxide	3-20	4-18	5-13	6-11, 6-89
Hexachlorobenzene	3-21	4-19	5-18	6-18, 6-92
Hexachlorabutadiene	3-20	4-19	5-13	6-11, 6-89
Hexachlorocyclopentadiene	3-20	4-19	5-13	6-11, 6-89
Hexachlorodibenzo-p-dioxins	3-28	4-19	5-35	6-48, 6-106
Hexachlorodibenzofurans	3-28	4-19	5-35	6-48, 6-106
Hexachloroethane	3-23	4-19	5-22	6-25, 6-96
Hexachloropropene	3-23	4-19	5-22	6-25, 6-96
Indeno(1,2,3)pyrene	3-29	4-19	5-39	6-55, 6-109
Iodomethane	3-23	4-19	5-22	6-25, 6-96
Isobutanol	3-27	4-19	5-33	6-45, 6-104
Isodrin	3-20	4-19	5-13	6-12, 6-89
Isosafrole	3-27	4-19	5-33	6-45, 6-105
Kepone	3-20	4-19	5-13	6-12, 6-89
Methacrylonitrile	3-25	4-19	5-30	6-38, 6-101

Table 1-1

(Continued)

Constituent	Selection for Regulation (page number)	Selection of BDAT (page number)	Treatment Performance Data (page number)	Calculation of Universal Standard (page numbers)
Methanol	3-27	4-19	5-34	6-45, 6-105
Methapyrilene	3-25	4-19	5-30	6-38, 6-101
Methoxychlor	3-20	4-19	5-13	6-12, 6-89
Methyl Ethyl Ketone	3-27	4-19	5-34	6-46, 6-105
Methyl Isobutyl Ketone	3-27	4-19	5-34	6-46, 6-105
Methyl Methacrylate	3-27	4-19	5-34	6-46, 6-105
Methyl Parathion	3-26	4-19	5-32	6-42, 6-103
3-Methylcholanthrene	3-29	4-19	5-39	6-56, 6-109
Methylene Chloride	3-23	4-19	5-22	6-25, 6-96
4,4'-Methylene-bis(2-chloroaniline)	3-23	4-19	5-22	6-26, 6-96
Naphthalene	3-29	4-19	5-39	6-56, 6-110
o-Nitroaniline (2-Nitroaniline)	3-25	4-19	5-30	6-38, 6-101
p-Nitroaniline (4-Nitroaniline)	3-25	4-19	5-30	6-38, 6-101
Nitrobenzene	3-25	4-20	5-30	6-38, 6-101
N-Nitroso-di-n-butylamine	3-25	4-20	5-30	6-39, 6-101
N-Nitrosodiethylamine	3-25	4-20	5-31	6-39, 6-102
N-Nitrosodimethylamine	3-25	4-20	5-31	6-39, 6-101
N-Nitrosomethylethylamine	3-25	4-20	5-30	6-39, 6-101
N-Nitrosomorpholine	3-26	4-20	5-31	6-39, 6-102
N-Nitrosopiperidine	3-27	4-20	5-31	6-40, 6-102
N-Nitrosopyrrolidine	3-26	4-20	5-31	6-40, 6-102
o-Nitrophenol (2-Nitrophenol)	3-24	4-20	5-26	6-31, 6-98
p-Nitrophenol (4-Nitrophenol)	3-24	4-20	5-26	6-32, 6-98
5-Nitro-o-toluidine	3-25	4-20	5-30	6-39, 6-101

Table 1-1

(Continued)

Constituent	Selection for Regulation (page number)	Selection of BDAT (page number)	Treatment Performance Data (page number)	Calculation of Universal Standard (page numbers)
Parathion	3-26	4-20	5-32	6-42, 6-103
Pentachlorobenzene	3-21	4-20	5-18	6-18, 6-92
Pentachlorodibenzo-p-dioxins	3-28	4-20	5-36	6-49, 6-107
Pentachlorodibenzofurans	3-28	4-20	5-35	6-49, 6-107
Pentachloroethane	3-23	4-20	5-22	6-26, 6-96
Pentachloronitrobenzene	3-21	4-20	5-18	6-19, 6-92
Pentachlorophenol	3-21	4-20	5-15	6-14, 6-90
Phenacetin	3-26	4-20	5-31	6-40, 6-102
Phenanthrene	3-29	4-20	5-40	6-56, 6-110
Phenol	3-24	4-20	5-27	6-32, 6-98
Phorate	3-26	4-20	5-32	6-42, 6-103
Phthalic Anhydride	3-28	4-20	5-37	6-51, 6-108
Phthalic Anhydride (as measured by Phthalic Acid)	3-28	4-20	5-37	6-51, 6-108
Pronamide	3-26	4-20	5-31	6-40, 6-102
Propanenitrile (Ethyl Cyanide)	3-26	4-20	5-31	6-40, 6-102
Pyrene	3-29	4-20	5-40	6-56, 6-110
Pyridine	3-26	4-20	5-31	6-40, 6-102
Safrole	3-27	4-20	5-34	6-46, 6-105
Silvex (2,4,5-TP)	3-21	4-21	5-15	6-14, 6-90
1,2,4,5-Tetrachlorobenzene	3-21	4-21	5-18	6-19, 6-92
Tetrachlorodibenzo-p-dioxins	3-28	4-21	5-36	6-49, 6-107
Tetrachlorodibenzofurans	3-28	4-21	5-36	6-49, 6-107
1,1,1,2-Tetrachloroethane	3-23	4-21	5-22	6-26, 6-96
1,1,2,2-Tetrachloroethane	3-23	4-21	5-22	6-27, 6-96

Table 1-1

(Continued)

Constituent	Selection for Regulation (page number)	Selection of BDAT (page number)	Treatment Performance Data (page number)	Calculation of Universal Standard (page numbers)
Tetrachloroethylene	3-23	4-21	5-23	6-27, 6-97
2,3,4,6-Tetrachlorophenol	3-21	4-21	5-15	6-15, 6-90
Toluene (Methyl Benzene)	3-19	4-21	5-9	6-5, 6-85
Total PCBs	3-28	4-21	5-35	6-47, 6-107
Toxaphene	3-20	4-21	5-14	6-12, 6-89
1,2,4-Trichlorobenzene	3-21	4-21	5-19	6-19, 6-93
1,1,1-Trichloroethane	3-23	4-21	5-23	6-27, 6-97
1,1,2-Trichloroethane	3-23	4-21	5-23	6-28, 6-97
Trichloroethylene	3-23	4-21	5-23	6-28, 6-97
Trichloromonofluoromethane (Fluorotrichloromethane)	3-23	4-21	5-25	6-28, 6-97
2,4,5-Trichlorophenol	3-21	4-21	5-15	6-15, 6-91
2,4,6-Trichlorophenol	3-21	4-21	5-16	6-16, 6-91
2,4,5-Trichlorophenoxyacetic Acid (2,4,5-T)	3-21	4-21	5-15	6-15, 6-90
1,2,3-Trichloropropane	3-23	4-21	5-25	6-29, 6-97
1,1,2-Trichloro-1,2,2-trifluoroethane	3-23	4-21	5-25	6-29, 6-97
Vinyl Chloride	3-23	4-21	5-25	6-29, 6-97
Xylene(s) (total)	3-19	4-21	5-9	6-6, 6-85

Table 1-2

Cross-Reference Guide for Metal Constituents

Constituent	Selection for Regulation (page number)	Selection of BDAT (page number)	Treatment Performance Data (page number)	Calculation of Universal Standard (page number)
Antimony	3-30	4-22	5-45	6-60, 6-111
Arsenic	3-30	4-22	5-45	6-61, 6-111
Barium	3-30	4-22	5-45	6-61, 6-111
Beryllium	3-30	4-22	5-45	6-62, 6-111
Cadmium	3-30	4-22	5-45	6-62, 6-111
Chromium (total)	3-30	4-22	5-51	6-67, 6-111
Lead	3-30	4-22	5-46	6-62, 6-112
Mercury	3-30	4-22	5-47	6-63, 6-112
Nickel	3-30	4-22	5-48	6-64, 6-113
Selenium	3-30	4-22	5-48	6-64, 6-113
Silver	3-30	4-22	5-48	6-65, 6-113
Thallium	3-30	4-22	5-49	6-65, 6-113
Vanadium	3-30	4-22	5-50	6-66, 6-113
Zinc	3-30	4-22	5-49	6-65, 6-113

5

2.0 APPLICABILITY OF UNIVERSAL STANDARDS

In the present system of land disposal of hazardous wastes under RCRA, waste disposers must typically comply with individual treatment standards for a specific waste; in some instances, these treatment standards impose different concentration limits for the same constituent in different wastes. In order to simplify and streamline the land disposal restriction rules under 40 CFR Part 261, the Agency is establishing a set of treatment standards in which a specific constituent would have the same concentration limit, independent of the waste code in which the constituent is regulated. This concept of a uniform set of treatment standards is referred to as universal treatment standards (i.e., universal standards).

2.1 Description of Universal Standards

Universal standards are concentration limits established for specific constituents independent of the waste matrix; a constituent has the same treatment standard in each waste code in which it is regulated. The Agency is establishing two different sets of universal standards: one for nonwastewater forms of wastes, and another for wastewater forms of wastes. In some instances, a constituent can be readily analyzed in one waste form (e.g., wastewater) and not in the other waste form (e.g., nonwastewater). Similarly, the performance of applicable and demonstrated treatment technologies, and the analytical detection limits that can be achieved are dependent on the sample matrix. Therefore, these two sets of treatment standards differ in the population of regulated constituents as well as the individual universal standards. The Agency is establishing universal standards for organic, metal, and inorganic constituents; the universal standards will replace most existing promulgated treatment standards for listed hazardous wastes under the RCRA Land Disposal Restrictions Program. The treatment standards for those constituents currently regulated in a waste for which universal standards do not exist remain the same as those previously promulgated for those wastes.

Additionally, the Agency intends to use universal standards to develop BDAT treatment standards for newly listed wastes. The Agency plans to first characterize the listed hazardous waste and determine which constituents should be regulated, in accordance with EPA's Methodology Background Document (3). The Agency would then evaluate the universal standards for those constituents, possibly establishing them as BDAT treatment standards for the constituents selected for regulation.

2.2 Waste Codes Excluded from Universal Standards

Universal standards will not be applicable to wastes for which the Agency has promulgated a method of treatment as the treatment standard (40 CFR 268.42). Table 2-1 lists these waste codes and the standards promulgated as a method of treatment.

Although the proposed rule excluded F024 wastes from universal standards, the final Phase II rule establishes universal standards as applicable to all D, F, K, U, and P waste codes with previously promulgated numerical treatment standards. Universal standards, however, do not apply to TC metal wastes (D004-D011). Treatment standards for D004-D011 wastes remain the same as those promulgated in the Third Third final rule (June 1, 1990).

2.3 Advantages of Universal Standards

The EPA is establishing universal standards because of the advantages this type of treatment standard will provide. This section describes the advantages of universal standards.

The primary goal of universal standards is to simplify owner and operator compliance, as well as the Agency's enforcement efforts. Under a set of universal

standards, enforcement and compliance monitoring are simplified. Under the existing individual concentration-based treatment standards, the applicable standards vary among different wastes. Under universal standards, however, the treatment standards are limited to those found in universal standards. Therefore, the establishment of universal standards is expected to require less recordkeeping and simplify the testing required to comply with BDAT.

Universal standards will also simplify EPA's development of BDAT treatment standards for future wastes to be listed under 40 CFR Part 261. In most cases, new listings of hazardous wastes will have universal standards as land disposal restrictions.

Additionally, universal standards will facilitate the handling of waste mixtures which are encountered at both on- and off-site hazardous waste treatment and recovery facilities. Many wastes that are treatable by similar technologies are often commingled prior to treatment and/or recovery; a set of universal standards would simplify the monitoring and compliance requirements for these hazardous waste mixtures. For example, under the present regulatory system, facilities that commingle wastes must sometimes comply with more than one treatment standard for a specific constituent. Under universal standards, monitoring and compliance will be simplified since a specific constituent would have the same treatment standard in each waste code in which it is regulated.

Finally, a universal set of standards will provide facilities with concentration goals for individual constituents. The facilities will then have the information necessary to develop and implement alternative treatment technologies and to direct waste minimization investigations to reach these goals.

Table 2-1

Waste Codes With Treatment Standards Promulgated as Methods of Treatment[a]

F Wastes	F005 (2-Nitropropane, 2-Ethoxyethanol)	F024[b]
K Wastes	K025 K026 K027 K039 K045 K047 K069 (Non-Calcium Sulfate Subcategory: Nonwastewaters) K106 (High Mercury Subcategory: Nonwastewaters) K107 K108	K109 K110 K112 K113 K114 K115[b] K116 K123 K124 K125 K126
P Wastes	P001 P002 P003 (Nonwastewaters) P005 P006 P007 P008 P009 P014 P015 P016 P017 P018 P022 (Nonwastewaters) P023 P026 P027 P028 P031 P033 P034 P040 P041 P042	P043 P044 P045 P046 P047 (4,6-Dinitro-o-cresol salts) P049 P054 P056 (Nonwastewaters) P057 P058 P062 P064 P065 (Nonwastewaters that are not residues from incineration or RMERC) P065 (High Mercury Subcategory: Nonwastewaters) P066 P067 P068 P069 P070 P072 P075

[a]Unless otherwise specified, methods of treatment were specified for all regulated constituents in both nonwastewater and wastewater forms of the waste.

[b]The constituents in this waste also have concentration-based treatment standards.

Table 2-1

(Continued)

P Wastes (Cont.)	P076 P078 P081 P082 (Nonwastewaters) P084 P085 P087 P088 P092 (Nonwastewaters that are not residues from incineration or RMERC) P092 (High Mercury Subcategory: Nonwastewaters) P093	P095 P096 P102 P105 P108 P109 P112 P113 (Nonwastewaters) P115 (Nonwastewaters) P116 P118 P119 (Nonwastewaters) P120 (Nonwastewaters) P122
U Wastes	U001 U003 (Nonwastewaters) U006 U007 U008 U010 U011 U014 U015 U016 U017 U020 U021 U023 U026 U033 U034 U035 U038 (Nonwastewaters) U041 U042 (Nonwastewaters) U046 U049 U053 U055 U056 U057 (Nonwastewaters) U058 U059 U062	U064 U073 U074 U085 U086 U087 U089 U090 U091 U092 U093 (Nonwastewaters) U094 U095 U096 U097 U098 U099 U103 U108 (Wastewaters) U109 U110 U113 U114 U115 U116 U119 U122 U123 U124 U125

Table 2-1

(Continued)

U Wastes (Cont.)	U126 U132 U133 U134 (Nonwastewaters) U135 U143 U147 U148 U149 U150 U151 (High Mercury Subcategory: Nonwastewaters) U153 U154 U156 U160 U163 U164 U166 U167 U168 (Nonwastewaters) U171 U173 U176 U177 U178 U182 U184 U186 U189 U191	U193 U194 U197 U200 U201 U202 U206 U213 U214 (Nonwastewaters) U215 (Nonwastewaters) U216 (Nonwastewaters) U217 (Nonwastewaters) U218 U219 U221 U222 U223 U234 U236 U237 U238 U240 (2,4-D salts and esters) U244 U246 U248 U249 U328 U353 U359

3.0 CONSTITUENTS SELECTED FOR REGULATION UNDER UNIVERSAL STANDARDS

This section presents the Agency's methodology for selecting constituents for regulation under universal standards and identifies the constituents selected for regulation under universal standards for nonwastewater forms of listed hazardous wastes.

3.1 Constituents Considered for Regulation

The Agency created a population of constituents to be considered for regulation under universal standards by combining the BDAT List of hazardous constituents with other constituents regulated under the RCRA Land Disposal Restrictions Program. This population represents all constituents that are or could be regulated by EPA in listed hazardous wastes. Table 3-1 lists constituents considered for regulation under universal standards. Organic and metal constituents are discussed separately in this section.

3.1.1 Organic Constituents

For the purposes of a preliminary attempt to consider constituent chemistry in the development of universal standards, EPA divided the list of organic constituents considered for regulation under universal standards into fourteen treatability groups based on similarities in elemental composition and functional groups. The classification of constituents into the treatability groups presented in this section is one of several groupings EPA is considering. EPA reserves the right to modify these groups and to adjust constituent classifications in future rulemakings, which may use these groups as the basis for adjusting individual standards or for designating certain constituents as representative of their group.

Constituents were organized in treatability groups because the Agency expected constituents within each group to behave similarly when treated by an applicable technology; constituents within each group are generally analyzed using the same analytical methods, have similar detection levels, and are treated to similar concentration levels. The fourteen treatability groups are:

- Aromatic Hydrocarbons;
- Carbon Disulfide;
- Chlorinated Pesticides;
- Chlorinated Phenolics and Derivatives;
- Chlorobenzenes;
- Halogenated Volatiles;
- Non-Chlorinated Phenolics;
- Organo-Bromines;
- Organo-Nitrogen Compounds;
- Organo-Sulfur Pesticides;
- Oxygenated Hydrocarbons;
- PCBs and Dioxins;
- Phthalates; and
- Polynuclear Aromatic Hydrocarbons.

Table 3-1 presents the individual organic constituents within each treatability group. The Agency's criteria for determining a constituent's treatability group are presented below.

Aromatic Hydrocarbons

The constituents in this treatability group contain an aromatic ring and only the elements carbon and hydrogen.

Carbon Disulfide

This constituent contains sulfur and is non-halogenated. Since carbon disulfide is not classified as an organo-sulfur pesticide, this constituent is included in its own treatability group.

Chlorinated Pesticides

The constituents in this treatability group include the following general chemical structures: chlorinated norbornane or norbornene derivatives, chlorinated biphenyls, gamma-BHC, and hexachlorobutadiene. Most of these wastes are generated in the pesticides and agricultural chemicals industries.

Chlorinated Phenolics and Derivatives

The constituents in this treatability group include chlorinated phenols and chlorophenoxycarboxylic acids and their derivatives. All constituents in this group contain an aromatic ring with an oxygen-hydrogen single bond system attached. In addition, all constituents have at least one chlorine atom attached to the aromatic ring.

Chlorobenzenes

The constituents in this treatability group include chlorinated benzenes and their derivatives. All constituents in this group contain an aromatic ring with at least one chlorine atom attached.

Halogenated Volatiles

The constituents in this treatability group contain aliphatic and/or aromatic carbon-carbon bonds. Constituents in this group also have one or more halogen atoms substituted for hydrogen.

Non-Chlorinated Phenolics

The constituents in this treatability group include phenol, nitrophenol, and their non-chlorinated derivatives. All constituents in this group contain an aromatic ring

with an oxygen-hydrogen single bond system attached. The nitrophenols also have a nitro group (NO_2) attached to the ring.

Organo-Bromines

The constituents in this treatability group include brominated hydrocarbons. The Agency believes that the presence of bromine in the chemical structure may require a modified design and carefully controlled operating procedures in an incineration system.

Organo-Nitrogen Compounds

The Agency grouped all remaining non-halogenated constituents containing nitrogen in the organo-nitrogen treatability group. The constituents in this treatability group contain one or more of the following functional groups: nitrogenous heterocyclic rings, amines, amides, aminated diphenyls and biphenyls, nitriles, non-phenolic nitro compounds, and nitroso compounds.

Organo-Sulfur Pesticides

The Agency grouped all remaining non-halogenated constituents containing sulfur in the organo-sulfur pesticides treatability group. The constituents in this treatability group contain sulfur and are non-halogenated. Most of these wastes are generated in the pesticide and agricultural chemical industries.

Oxygenated Hydrocarbons

The Agency grouped all remaining constituents containing oxygen in the oxygenated hydrocarbons treatability group. This group includes alcohols, aldehydes, and ketones.

PCBs and Dioxins

The constituents in this treatability group contain two non-fused phenyl groups with multiple chlorine substitution. This group includes PCBs, dioxins, and furans.

Phthalates

The constituents in this treatability group contain two carboxyl groups attached to an aromatic ring.

Polynuclear Aromatic Hydrocarbons

The constituents in this treatability group contain at least two fused or bridged aromatic rings with one or more substituted positions. In some cases, one of the aromatic rings may be a heterocycle.

3.1.2 Metal Constituents

The Agency has selected the metals included on the BDAT List of hazardous constituents as the population of metal constituents considered for regulation under universal standards. This population represents the metal constituents that are or could be regulated by EPA under the Land Disposal Restrictions Program. Table 3-1 lists the metal constituents considered for regulation under universal standards.

3.2 Selection of Regulated Constituents

In the selection of regulated constituents under universal standards, the Agency followed the same constituent selection criteria found in EPA's Methodology Background Document (3) established for the RCRA listed hazardous wastes.

For the selection of regulated constituents under universal standards for nonwastewater forms of wastes, the Agency initially considered all constituents on the BDAT List and those other non-BDAT List constituents regulated in nonwastewater forms of wastes applicable to universal standards for potential regulation.

In the development of previously promulgated treatment standards under the Land Disposal Restrictions Program, for the constituent to be considered for regulation in the waste, it must have been present or suspected of being present in the untreated waste. From each group of constituents that were eligible for regulation, the EPA selected a subset of constituents which represented the broader group. For example, from a group of constituents that react similarly to treatment, the Agency selected for regulation those constituents that (1) were the most difficult to treat, based on waste characteristics affecting performance of treatment; (2) were representative of other constituents in the waste, based on structural similarities; and (3) were present in the untreated waste at the highest concentrations. The Agency selected a subset of constituents for regulation to facilitate implementation of the compliance and enforcement program.

All of the treatment performance data presented in Section 5.0 represent the data used as the basis of the treatment standards for wastes regulated to date under the Land Disposal Restrictions Program. The constituents represented by these performance data, therefore, are either present or believed to be present in a waste applicable to universal standards waste. The data also indicate statistically significant reductions in concentrations or, in the case of metals, reduction in mobility (i.e., leaching) resulting from treatment. Therefore, the Agency is selecting for regulation in universal standards those constituents, from the initial population, for which concentration-based nonwastewater treatment standards were promulgated in listed hazardous wastes.

Constituents on the BDAT List of hazardous constituents which are not being selected for regulation in universal standards are also presented in this section. These excluded constituents may still be regulated in wastes subject to universal standards, but no individual concentration-based treatment standard exists in this document. The treatment standards for those constituents currently regulated in a waste for which concentration-based universal standards do not exist remain the same as those previously promulgated for those wastes. In addition, for future rulemakings, general provisions for developing treatment standards for those BDAT List constituents identified as a constituent of concern in a waste, which do not have concentration-based universal standards are presented in EPA's Methodology Background Document (3).

3.2.1 Selection of Organic Constituents for Regulation Under Universal Standards

The Agency is regulating those organic constituents for which it has promulgated nonwastewater BDAT treatment standards based on the performance of incineration, fuel substitution, and sludge drying (defined in Section 4.1.1) under the Land Disposal Restrictions Program. All the organic constituents selected for regulation in universal standards have the potential to be in treatment residuals and effluents. Constituents excluded from universal standards were those with analytical quantification difficulties and those without a concentration-based treatment standard in nonwastewater forms of wastes applicable to universal standards. Table 3-2 lists the organic constituents selected for regulation under universal standards, as well as the excluded constituents and reasons for exclusion.

The Agency is regulating PCBs as a single sum (i.e., as total PCBs) in wastewaters and in nonwastewaters rather than as individual Aroclors. Regulating total PCBs is consistent with regulations promulgated by other EPA offices, such as those promulgated pursuant to the Toxic Substances Control Act (TSCA). Total PCBs represent many isomers of polychlorinated biphenyls. The Agency believes that

regulating total PCBs may eliminate the analytical difficulties in quantifying each of the individual Aroclors. Quantifying individual Aroclors requires recognition of a chromatographic pattern specific for each Aroclor. Chromatographic patterns of individual Aroclors often overlap, making it difficult to quantify each individual Aroclor, but the sum of the individual Aroclors can be quantified. These patterns are often difficult to interpret. Furthermore, quantification of individual Aroclors may be difficult in the case of wastes subject to degradation or treatment. The Agency recommends the use of SW-846, Methods 8080 or 8081, which require the use of a gas chromatograph/electron capture detector, for measurement of total PCBs.

The Agency is regulating benzo(b)fluoranthene and benzo(k)fluoranthene as a sum under universal standards. The Agency recommends the use of SW-846, Method 8270, which requires the use of a gas chromatograph (GC)/mass spectrometer, for measurement of the concentration of these compounds. When analyzing for these compounds using this method, these two stereo-isomers co-elute. Since the two constituents may not be accurately quantified separately, the Agency is regulating these constituents as a sum in nonwastewater forms of wastes. However, universal standards are presented separately for these two constituents on Table ES-1 and in the preamble for this rule to simplify commercially available computerized search programs that search by constituent name or CAS number.

Similarly, the Agency is regulating diphenylamine and diphenylnitrosamine as a sum under universal standards. The Agency also recommends the use of SW-846, Method 8270 for measurement of the concentration of these compounds. During the analysis of these compounds, diphenylnitrosamine may hydrolyze to diphenylamine. Since the two constituents may not be accurately quantified separately, the Agency is regulating these constituents as a sum in nonwastewater forms of wastes. However, universal standards are presented separately for these two constituents on Table ES-1 and in the preamble for this rule to simplify commercially available computerized search programs that search by constituent name or CAS number.

The Agency is establishing a universal standard for benzal chloride in nonwastewater forms of wastes. The K015 treatment standard for benzal chloride is the only concentration-based treatment standard the Agency has promulgated to date for this constituent in nonwastewater forms of wastes. Analytical difficulties may complicate accurate quantification of benzal chloride in nonwastewater forms of waste. However, because data available to the Agency indicated that benzal chloride comprises approximately 88% of K015 wastes, the Agency chose to regulate this constituent regardless of potential analytical difficulties. The K015 treatment standard was therefore promulgated to ensure that the land disposal of this waste minimized the risk to human health and environment. Likewise, the Agency is establishing a universal standard for benzal chloride for use in regulating wastes with high concentrations of this constituent.

EPA added nonwastewater universal standards for five constituents between proposal and promulgation: acetonitrile; acrylamide; 2-chloro-1,3-butadiene; and tris-(2,3-dibromopropyl) phosphate; and N-nitrosodimethylamine. The Agency is establishing universal standards for these constituents based on the only concentration-based treatment standard the Agency has promulgated to date for each of these constituents in nonwastewater forms of wastes (i.e., these universal standards are being established as "defacto" universal standards).

3.2.2 Selection of Metal Constituents for Regulation Under Universal Standards

The Agency is regulating those metal constituents for which it has promulgated nonwastewater BDAT treatment standards under the Land Disposal Restrictions Program. In addition, the Agency is developing a universal standard for vanadium based on the performance of High Temperature Metals Recovery (HTMR) (as discussed in Section 4.2.2, HTMR was selected as BDAT for most metal constituents in nonwastewater forms of wastes). These metal constituents represent 14 of the 16 metals on the BDAT list of hazardous constituents and are presented in Table 3-3. Because universal standards would apply to most listed wastes in the RCRA Land Disposal

Restrictions Program, all 14 metals have the potential to be in treatment residuals and effluents.

Additionally, selection of these 14 metals for regulation encourages the optimization of HTMR processes. Proper design and operation of many treatment processes for metals can be related directly to the metals content in the effluent or leachate of residuals. One example of this relationship can be illustrated by examining the amount of metals in the slag of a HTMR process. The partitioning of metals into products and/or residues from HTMR depends, at least in part, upon parameters such as the operating temperature of the various heat zones, composition of metals and other elements in the feed, zone residence times, flow rates, and oxidation/reduction conditions. When these factors are not optimized, the potential exists for metals to partition into the slag rather than to the molten metal bath or the off-gas phase.

The Agency is not selecting chromium (hexavalent) and copper for regulation under universal standards. To date, the Agency has not promulgated a treatment standard for copper in nonwastewater forms of wastes. Additionally, EPA is not developing a universal standard for chromium (hexavalent) since this constituent will be managed in universal standards by regulation as chromium (total).

3.2.3 Methods for the Analysis of Constituents Selected for Regulation Under Universal Standards

Appendix A presents analytical methods recommended by EPA for analyzing constituents selected for regulation under universal standards wastes. Appendix A identifies each constituent selected for regulation in universal standards wastes along with the appropriate EPA-approved measurement method, as described in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods: SW-846, Third Edition (68, 69, 70).

Prior to the selection of analytical methods, the specific SW-846 section or method should be consulted, as cited in Appendix A, for additional guidance on the use of analytical methods for a specific sample.

Table 3-1

Constituents Considered for Regulation Under Universal Standards

Organic Constituents

Aromatic Hydrocarbons

Benzene
Ethylbenzene
Toluene
Xylene(s)

Carbon Disulfide

Carbon disulfide

Chlorinated Pesticides

Aldrin
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC (Lindane)
Chlordane
Chlorobenzilate
o,p'-DDD
p,p'-DDD
o,p'-DDE
p,p'-DDE
o,p'-DDT
p,p'-DDT
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Heptachlor
Heptachlor epoxide
Hexachlorophene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Isodrin
Kepone
Methoxychlor
Toxaphene

Table 3-1

(Continued)

Chlorinated Phenolics and Derivatives

p-Chloro-m-cresol
2-Chlorophenol
2,4-Dichlorophenol
2,6-Dichlorophenol
2,4-Dichlorophenoxyacetic acid (2,4-D)
Pentachlorophenol
2,3,4,6-Tetrachlorophenol
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
Silvex (2,4,5-TP)
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)

Chlorobenzenes

Chlorobenzene
m-Dichlorobenzene
o-Dichlorobenzene
p-Dichlorobenzene
Hexachlorobenzene
Pentachlorobenzene
Pentachloronitrobenzene
1,2,4,5-Tetrachlorobenzene
1,2,4-Trichlorobenzene

Halogenated Volatiles

Aramite
Benzal chloride
Carbon tetrachloride
2-Chloro-1,3-butadiene
Chloroethane
2-Chloroethyl vinyl ether
bis(2-Chloroethyl)ether
bis(2-Chloroethoxy)methane
Chloroform
bis(2-Chloroisopropyl)ether
Chloromethane

Table 3-1

(Continued)

Halogenated Volatiles (cont.)

3-Chloropropene
2-Chloronaphthalene
3,3'-Dichlorobenzidine
cis-1,4-Dichloro-2-butene
trans-1,4-Dichloro-2-butene
Dichlorodifluoromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethylene
trans-1,2-Dichloroethylene
1,2-Dichloropropane
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Hexachloroethane
Hexachloropropene
Iodomethane
Methylene chloride
4,4'-Methylene-bis(2-chloroaniline)
Pentachloroethane
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
Trichloromonofluoromethane
1,2,3-Trichloropropane
1,1,2-Trichloro-1,2,2-trifluoroethane
Vinyl chloride

Table 3-1

(Continued)

Non-Chlorinated Phenolics

2-sec-Butyl-4,6-dinitrophenol (Dinoseb)
m-Cresol
o-Cresol
p-Cresol
2,4-Dimethylphenol
4,6-Dinitro-o-cresol
2,4-Dinitrophenol
o-Nitrophenol
p-Nitrophenol
Phenol
Resorcinol

Organo-Bromines

Bromodichloromethane
Bromoform (Tribromomethane)
4-Bromophenyl phenyl ether
Bromomethane (Methyl bromide)
Chlorodibromomethane
1,2-Dibromo-3-chloropropane
Dibromomethane
tris(2,3-Dibromopropyl)phosphate
Ethylene dibromide (1,2-Dibromoethane)

Organo-Nitrogen Compounds

Acetonitrile
2-Acetylaminofluorene
Acrylamide
Acrylonitrile
4-Aminobiphenyl
Aniline
p-Chloroaniline
3,3'-Dimethoxybenzidine
p-Dimethylaminoazobenzene
3,3'-Dimethylbenzidine
1,4-Dinitrobenzene
2,4-Dinitrotoluene
2,6-Dinitrotoluene

Table 3-1

(Continued)

Organo-Nitrogen Compounds (cont.)

Diphenylamine
1,2-Diphenylhydrazine
Diphenylnitrosamine
Di-n-propylnitrosamine
Methapyrilene
Methacrylonitrile
1-Naphthylamine
2-Naphthylamine
5-Nitro-o-toluidine
o-Nitroaniline
p-Nitroaniline
Nitrobenzene
N-Nitroso-di-n-butylamine
N-Nitrosodiethylamine
N-Nitrosodimethylamine
N-Nitrosodimethylethylamine
N-Nitrosomorpholine
N-Nitrosopiperidine
N-Nitropyrrolidine
Phenacetin
Pronamide
Propanenitrile (Ethyl cyanide)
Pyridine

Organo-Sulfur Pesticides

Benzenethiol (Thiophenol)
Disulfoton
Famphur
Methyl methanesulfonate
Methyl parathion
Parathion
Phorate

Table 3-1

(Continued)

Oxygenated Hydrocarbons

Acetone
Acetophenone
Acrolein
p-Benzoquinone
n-Butanol
Cyclohexanone
1,4-Dioxane
Ethyl acetate
Ethyl ether
Ethyl methacrylate
Ethylene oxide
Isobutanol
Isosafrole
Methanol
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl methacrylate
1,4-Naphthoquinone
Safrole

PCBs and Dioxins

Hexachlorodibenzo-p-dioxins
Hexachlorodibenzofurans
Pentachlorodibenzo-p-dioxins
Pentachlorodibenzofurans
Tetrachlorodibenzo-p-dioxins
Tetrachlorodibenzofurans
2,3,7,8-Tetrachlorodibenzo-p-dioxin

Phthalates

Butyl benzyl phthalate
Diethyl phthalate
Dimethyl phthalate
Di-n-butyl phthalate
Di-n-octyl phthalate
bis(2-Ethylhexyl)phthalate
Phthalic anhydride

Table 3-1

(Continued)

Polynuclear Aromatic Hydrocarbons

- Acenaphthalene
- Acenaphthene
- Anthracene
- Benz(a)anthracene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Benzo(ghi)perylene
- Benzo(a)pyrene
- Chrysene
- Dibenz(a,h)anthracene
- Dibenzo(a,e)pyrene
- Fluoranthene
- Fluorene
- Indeno(1,2,3)pyrene
- 3-Methylcholanthrene
- Naphthalene
- Phenanthrene
- Pyrene

Metal Constituents

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium (total)
- Chromium (hexavalent)
- Copper
- Lead
- Mercury
- Nickel
- Selenium
- Silver
- Thallium
- Vanadium
- Zinc

Table 3-2

Organic BDAT List Constituents Regulated and Not Regulated Under Universal Standards, by Treatability Group

Treatability Group	BDAT List Constituents Regulated Under Universal Standards	Non-BDAT List Constituents Added to Universal Standards Regulation	BDAT List Constituents Not Regulated Under Universal Standards	Reason for Not Regulating
Aromatic Hydrocarbons	Benzene Ethylbenzene Toluene Xylene(s)	-	-	-
Carbon Disulfide	Carbon disulfide	-	-	-
Chlorinated Pesticides	Aldrin alpha-BHC beta-BHC delta-BHC gamma-BHC (Lindane) Chlordane o,p'-DDD p,p'-DDD	-	Chlorobenzilate Hexachlorophene	A A

[A]Constituent is not selected for regulation using universal standards list because of analytical quantification difficulties. Nonwastewater BDAT treatment standards for these constituents have been previously promulgated as a method of treatment.

Table 3-2

(Continued)

Treatability Group	BDAT List Constituents Regulated Under Universal Standards	Non-BDAT List Constituents Added to Universal Standards Regulation	BDAT List Constituents Not Regulated Under Universal Standards	Reason for Not Regulating
Chlorinated Pesticides (Continued)	o,p'-DDE p,p'-DDE o,p'-DDT p,p'-DDT Dieldrin Endosulfan I Endosulfan II Endosulfan sulfate Endrin Endrin aldehyde Heptachlor Heptachlor epoxide Hexachlorobutadiene Hexachlorocyclopentadiene Isodrin Kepone Methoxychlor Toxaphene			

Table 3-2

(Continued)

Treatability Group	BDAT List Constituents Regulated Under Universal Standards	Non-BDAT List Constituents Added to Universal Standards Regulation	BDAT List Constituents Not Regulated Under Universal Standards	Reason for Not Regulating
Chlorinated Phenolics and Derivatives	p-Chloro-m-cresol 2-Chlorophenol 2,4-Dichlorophenol 2,6-Dichlorophenol 2,4-Dichlorophenoxyacetic acid (2,4-D) Pentachlorophenol 2,3,4,6-Tetrachlorophenol 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol Silvex (2,4,5-TP) 2,4,5-Trichlorophenoxy acetic acid	-	-	-
Chlorobenzenes	Chlorobenzene m-Dichlorobenzene o-Dichlorobenzene p-Dichlorobenzene Hexachlorobenzene Pentachlorobenzene Pentachloronitrobenzene 1,2,4,5-Tetrachlorobenzene 1,2,4-Trichlorobenzene	-	-	-

Table 3-2

(Continued)

Treatability Group	BDAT List Constituents Regulated Under Universal Standards	Non-BDAT List Constituents Added to Universal Standards Regulation	BDAT List Constituents Not Regulated Under Universal Standards	Reason for Not Regulating
Halogenated Volatiles	Benzal chloride	-	Aramite	B
	Carbon tetrachloride		2-Chloroethyl vinyl ether	A
	2-Chloro-1,3-butadiene		3,3'-Dichlorobenzidine	A
	Chloroethane		cis-1,4-Dichloro-2-butene	A
	bis(2-Chloroethyl)ether		trans-1,4-Dichloro-2-butene	A
	bis(2-Chloroethoxy)methane			
	Chloroform			
	bis(2-Chloroisopropyl)ether			
	Chloromethane			
	2-Chloronaphthalene			
	3-Chloropropene			
	Dichlorodifluoromethane			
	1,1-Dichloroethane			
	1,2-Dichloroethane			
	1,1-Dichloroethylene			
	trans-1,2-Dichloroethylene			

[A]Constituent is not selected for regulation using universal standards list because of analytical quantification difficulties. Nonwastewater BDAT treatment standards for these constituents have been previously promulgated as a method of treatment.
[B]Nonwastewater BDAT treatment standards have not been promulgated in waste codes applicable to universal standards for this constituent.

Table 3-2

(Continued)

Treatability Group	BDAT List Constituents Regulated Under Universal Standards	Non-BDAT List Constituents Added to Universal Standards Regulation	BDAT List Constituents Not Regulated Under Universal Standards	Reason for Not Regulating
Halogenated Volatiles (Continued)	1,2-Dichloropropane cis-1,3-Dichloropropene trans-1,3-Dichloropropene Hexachloroethane Hexachloropropene Iodomethane Methylene chloride 4,4'-Methylene-bis(2-chloroaniline) Pentachloroethane 1,1,1,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane Tetrachloroethylene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Trichloroethylene Trichloromonofluoromethane 1,2,3-Trichloropropane 1,1,2-Trichloro-1,2,2-trifluoroethane Vinyl chloride			

Table 3-2

(Continued)

Treatability Group	BDAT List Constituents Regulated Under Universal Standards	Non-BDAT List Constituents Added to Universal Standards Regulation	BDAT List Constituents Not Regulated Under Universal Standards	Reason for Not Regulating
Non-Chlorinated Phenolics	2-sec-Butyl-4,6-dinitrophenol (Dinoseb) m-Cresol o-Cresol p-Cresol 2,4-Dimethylphenol 4,6-Dinitro-o-cresol 2,4-Dinitrophenol p-Nitrophenol Phenol	o-Nitrophenol	Resorcinol	A
Organo-Bromines	Bromodichloromethane Bromoform (Tribromomethane) 4-Bromophenyl phenyl ether Bromomethane (Methyl bromide) Chlorodibromomethane 1,2-Dibromo-3-chloropropane Dibromomethane Ethylene dibromide (1,2-Dibromoethane) tris(2,3-Dibromopropyl) phosphate			

[A]Constituent is not selected for regulation using universal standards list because of analytical quantification difficulties. Nonwastewater BDAT treatment standards for these constituents have been previously promulgated as a method of treatment.

Table 3-2

(Continued)

Treatability Group	BDAT List Constituents Regulated Under Universal Standards	Non-BDAT List Constituents Added to Universal Standards Regulation	BDAT List Constituents Not Regulated Under Universal Standards	Reason for Not Regulating
Organo-Nitrogen Compounds	Acetonitrile	o-Nitroaniline	4-Aminobiphenyl	B
	2-Acetylaminofluorene		3,3-Dimethoxybenzidine	A
	Acrylamide		p-Dimethylaminoazobenzene	A
	Acrylonitrile		3,3'-Dimethylbenzidine	A
	Aniline		1,2-Diphenylhydrazine	B
	p-Chloroaniline		1-Naphthylamine	A
	1,4-Dinitrobenzene		2-Naphthylamine	A
	2,4-Dinitrotoluene			
	2,6-Dinitrotoluene			
	Diphenylamine			
	Diphenylnitrosamine			
	Di-n-propylnitrosamine			
	Methacrylonitrile			
	Methapyrilene			
	5-Nitro-o-toluidine			
	p-Nitroaniline			
	Nitrobenzene			
	N-Nitroso-di-n-butylamine			
	N-Nitrosodiethylamine			
	N-Nitrosodimethylamine			
	N-Nitrosodimethylethylamine			

[A]Constituent is not selected for regulation using universal standards list because of analytical quantification difficulties. Nonwastewater BDAT treatment standards for these constituents have been previously promulgated as a method of treatment.
[B]Nonwastewater BDAT treatment standards have not been promulgated in waste codes applicable to universal standards for this constituent.

Table 3-2

(Continued)

Treatability Group	BDAT List Constituents Regulated Under Universal Standards	Non-BDAT List Constituents Added to Universal Standards Regulation	BDAT List Constituents Not Regulated Under Universal Standards	Reason for Not Regulating
Organo-Nitrogen Compounds (Continued)	N-Nitrosomorpholine N-Nitrosopiperidine N-Nitropyrrolidine Phenacetin Pronamide Propanenitrile (Ethyl cyanide) Pyridine			
Organo-Sulfur Pesticides	Disulfoton Famphur Methyl parathion Parathion Phorate	-	Benzenethiol (Thiophenol) Methyl methanesulfonate	A B

[A]Constituent is not selected for regulation using universal standards list because of analytical quantification difficulties. Nonwastewater BDAT treatment standards for these constituents have been previously promulgated as a method of treatment.
[B]Nonwastewater BDAT treatment standards have not been promulgated in waste codes applicable to universal standards for this constituent.

Table 3-2

(Continued)

Treatability Group	BDAT List Constituents Regulated Under Universal Standards	Non-BDAT List Constituents Added to Universal Standards Regulation	BDAT List Constituents Not Regulated Under Universal Standards	Reason for Not Regulating
Oxygenated Hydrocarbons	Acetone Acetophenone n-Butanol Cyclohexanone 1,4-Dioxane Ethyl acetate Ethyl ether Ethyl methacrylate Isobutanol Isosafrole Methanol Methyl ethyl ketone Methyl isobutyl ketone Methyl methacrylate Safrole		Acrolein p-Benzoquinone Ethylene oxide 1,4-Naphthoquinone	A A B A

[A]Constituent is not selected for regulation using universal standards list because of analytical quantification difficulties. Nonwastewater BDAT treatment standards for these constituents have been previously promulgated as a method of treatment.
[B]Nonwastewater BDAT treatment standards have not been promulgated in waste codes applicable to universal standards for this constituent.

Table 3-2

(Continued)

Treatability Group	BDAT List Constituents Regulated Under Universal Standards	Non-BDAT List Constituents Added to Universal Standards Regulation	BDAT List Constituents Not Regulated Under Universal Standards	Reason for Not Regulating
PCBs and Dioxins	Hexachlorodibenzo-p-dioxins Hexachlorodibenzofurans Pentachlorodibenzo-p-dioxins Pentachlorodibenzofurans Tetrachlorodibenzo-p-dioxins Tetrachlorodibenzofurans	Total PCBs	2,3,7,8-Tetrachlorodibenzo-p-dioxin Aroclor 1016 Aroclor 1221 Aroclor 1232 Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260	C D D D D D D D
Phthalates	Butyl benzyl phthalate Diethyl phthalate Dimethyl phthalate Di-n-butyl phthalate Di-n-octyl phthalate bis(2-Ethylhexyl)phthalate Phthalic anhydride			

[C]This constituent is regulated under tetrachlorodibenzo-p-dioxins.
[D]These constituents are regulated under total PCBs.

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Table 3-2

(Continued)

Treatability Group	BDAT List Constituents Regulated Under Universal Standards	Non-BDAT List Constituents Added to Universal Standards Regulation	BDAT List Constituents Not Regulated Under Universal Standards	Reason for Not Regulating
Polynuclear Aromatic Hydrocarbons	Acenaphthalene Acenaphthene Anthracene Benz(a)anthracene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(ghi)perylene Benzo(a)pyrene Chrysene Dibenz(a,h)anthracene Fluoranthene Fluorene Indeno(1,2,3)pyrene 3-Methylcholanthrene Naphthalene Phenanthrene Pyrene		Dibenzo(a,e)pyrene	B

[B]Constituents have never had promulgated nonwastewater BDAT treatment standards.

Table 3-3

Metal BDAT List Constituents Regulated and Not Regulated Under Universal Standards

BDAT List Constituents Regulated Under Universal Standards	BDAT List Constituents Not Regulated Under Universal Standards	Reason for Not Regulating
Antimony	Chromium (hexavalent)	A
Arsenic	Copper	B
Barium		
Beryllium		
Cadmium		
Chromium (total)		
Lead		
Mercury		
Nickel		
Selenium		
Silver		
Thallium		
Vanadium		
Zinc		

[A]Constituent is managed by regulation as chromium (total).
[B]The Agency has never promulgated nonwastewater BDAT treatment standards for this constituent under the Land Disposal Restrictions Program.

4.0 TREATMENT TECHNOLOGIES FOR NONWASTEWATERS

This section discusses the Agency's rationale for determining Best Demonstrated Available Technology (BDAT) for nonwastewater forms of wastes for which EPA is establishing universal standards. The Agency has determined that BDAT for organic constituents is incineration (rotary kiln, fluidized-bed, and liquid injection), fuel substitution (for diphenylamine and diphenylnitrosamine), and "sludge drying" (for disulfoton, famphur, methyl parathion, parathion, and phorate). BDAT for metal constituents is High Temperature Metals Recovery (HTMR), vitrification (for arsenic), stabilization (for chromium), and acid leaching (for mercury).

In determining BDAT, the Agency first determines which technologies are potentially "applicable" for treatment of the waste(s) of interest. The Agency then determines which of the applicable technologies are "demonstrated" for treatment of the waste(s) of interest. The next step is to determine which of the demonstrated technologies is "best" for the purposes of establishing BDAT. Finally, the Agency determines whether the best demonstrated technology is "available" for treatment of the waste(s) of interest. Integral to the determination of BDAT is the evaluation of all available treatment performance data. The treatment performance data that were evaluated to determine BDAT for these wastes are presented in Section 5.0.

4.1 Applicable and Demonstrated Technologies

This section describes the technologies that are both applicable and demonstrated for treatment of nonwastewater forms of listed hazardous wastes for which EPA is establishing universal standards (hereafter referred to as universal standards wastes). To be considered applicable, a technology must theoretically be able to treat the waste of interest or a waste that is judged to be similar in terms of the parameters that affect treatment selection. Detailed descriptions of applicable technologies for treating listed hazardous wastes were obtained from EPA's Treatment Technology

Background Document (5). To be considered demonstrated, a technology must be in full-scale operation for treatment of the waste of interest or a similar waste. Technologies available only at pilot- or bench-scale operations were not considered in identifying demonstrated technologies and, therefore, were not included in this summary.

The identification of technologies that are applicable and demonstrated for treating universal standards wastes is based on current waste treatment practices, current literature sources, treatment performance data from field testing, treatment performance data submitted by equipment manufacturers and industrial concerns, and the engineering judgement of EPA technical staff.

4.1.1 Applicable and Demonstrated Technologies for Organic Constituents

Applicable treatment technologies for organic constituents include those that destroy or reduce the total amount of organic constituents in a waste. The technologies listed below are applicable and have been demonstrated to treat organic constituents in nonwastewater forms of universal standards wastes. These technologies are commonly used to treat wastes that contain the organic constituents regulated under universal standards.

Fuel Substitution

Fuel substitution is a destruction technology in which heat is transferred to a waste to destabilize chemical bonds and destroy organic constituents. Fuel substitution involves using hazardous waste as fuel in industrial furnaces or boilers. The hazardous waste may be blended with other nonhazardous wastes (e.g., municipal sludge) and/or fossil fuels. Fuel substitution has been used in the treatment of industrial waste solvents, refinery wastes, synthetic fibers/petrochemical wastes, waste oils, and wastes produced during the manufacture of pharmaceuticals, pulp and paper, and pesticides. Fuel substitution generates two residuals: ash and scrubber water.

Solvent Extraction

Solvent extraction is a separation and recovery technology that removes organic constituents from a waste by mixing the waste with a solvent that preferentially dissolves and removes the constituents of concern from the waste. Wastes commonly treated by this technology have a broad range of total organic content; selection of an appropriate solvent depends on the relative solubilities of the constituents to be removed and the other organic compounds in the waste. Organics are removed from the waste due to greater constituent solubility in the solvent phase than in the waste phase. Solvent extraction generates two residuals: a treated waste residual and an extract. The extract is often recycled or treated by incineration.

Critical Fluid Extraction

Critical fluid extraction is a separation and recovery technology in which a solvent is brought to its critical state (liquefied gas) to extract organic constituents from a waste. The solvents used are usually gases at ambient conditions. The solvent is then pressurized, converting it from a gas to a liquid. As a liquid, it dissolves the organic constituents and extracts them from the waste matrix. After the extraction, the solvent is returned to its normal gaseous state; a small volume of extract remains that contains high concentrations of organic constituents. This technology generates two residuals: a treated waste residual and an extract. The extract is often recycled or treated by incineration.

Pressure Filtration

Pressure filtration, also known as sludge filtration, sludge dewatering, or cake-formation filtration, is a separation and recovery technology used for wastes that contain high concentrations (>1%) of suspended solids. Filtration separates particles from a fluid/particle mixture by passing the fluid through a medium that permits the

flow of the fluid but retains the particles. Sludge filtration is commonly applied to waste sludges such as clarifier sludges; typically, these sludges can be dewatered to 20 to 50% solids concentration using this technology. Pressure filtration generates two residuals: dewatered sludge and water.

High Temperature Thermal Distillation

High temperature thermal distillation is a separation and recovery technology that subjects hydrocarbon-bearing wastewaters to indirect, electrically generated heat in an inert atmosphere. The process removes all toxic volatilized hydrocarbon constituents from a waste; the constituents can be subsequently recovered in a reusable form by cooling the hydrocarbon-bearing inert gases at high pressure. This process generates two residuals: a treated waste residual and an extract.

Thermal Drying of Biological Treatment Sludge

The Agency has identified the treatment train of biological treatment followed by thermal drying of the resulting sludge (sludge drying) as an applicable and demonstrated technology for five pesticide constituents selected for regulation in nonwastewater forms of universal standards wastes: disulfoton, famphur, methyl parathion, parathion, and phorate. The initial stage in the sludge drying treatment train is the biological treatment of the waste. The resulting treatment sludge is then transported to a sludge thickener before it is dewatered in a filter press. The dewatered sludge is loaded into a sludge dryer. "Sludge drying" is a destruction technology which uses controlled flame combustion or indirect heat transfer to elevate the temperature of the waste and, thereby, volatilize organic constituents from the waste. The Agency believes that the definition of a "sludge dryer" limits the maximum thermal input to the treatment system to 1,500 BTU per pound of waste treated. During the drying process, the sludge volume is substantially reduced and the total solids content is substantially increased. The off-gas from the dryer is sent to an afterburner to complete combustion

of the dryer exhaust gas. The exhaust gas is then sent to a scrubber system for particulate removal before being vented. This technology generates two residuals: a treated waste residual and scrubber water.

Thermal Desorption

Thermal desorption is a separation and recovery technology in which heat is used to volatilize organic constituents from wastes. Thermal desorption has been defined as a thermal treatment that uses direct or indirect heat exchange to elevate the temperature of a waste, thereby volatilizing the organic constituents. Thermal desorption differs from thermal destruction (incineration) in the way in which the organic constituents are treated. The objective of thermal desorption is to sufficiently elevate the temperature of the organic constituents to effect a phase separation to a gaseous state without combustion; the objective of incineration is to combust the organic constituents. Thermal desorption units function by creating steam from the volatilization of the moisture in the waste from heating. The steam tends to strip organic compounds from the waste and aids in the volatilization of organic compounds. Generally, this technology generates two residuals: a treated waste residual and an extract.

Total Recycle or Reuse

Total recycle or reuse of a waste within the same process or an external process eliminates the generation of the waste and subsequently generates no treatment residuals.

Incineration

Incineration is a destruction technology in which heat is transferred to the waste to destabilize chemical bonds and destroy hazardous organic constituents. Three

incineration technologies are applicable and demonstrated for organics in nonwastewaters: liquid injection, rotary kiln, and fluidized-bed.

In a liquid injection incinerator, liquid wastes are atomized and injected into the incinerator, where additional heat is supplied to destabilize chemical bonds in the presence of air or oxygen. Once the chemical bonds are broken, these constituents react with oxygen to form carbon dioxide and water vapor. Liquid injection is applicable to wastes with low viscosity values, small waste particle size, and low suspended solids content. Since only wastes with low or negligible ash contents are amenable to liquid injection incineration, this technology does not normally generate an ash residual, but does generate a scrubber water residual.

In a rotary kiln incinerator, solid and/or semi-solid wastes are fed into the elevated slope-end of the kiln. The rotation of the kiln mixes the waste with hot gases. Eventually, the waste reaches its ignition temperature, and the waste is converted to gas and ash through volatilization and combustion reactions. Ash is removed from the lower slope-end of the kiln. Combustion gases from the kiln, containing volatilized and partially combusted waste constituents, enter an afterburner for further combustion to complete the destruction of the organic waste constituents. Other wastes may also be injected into the afterburner.

In a fluidized-bed incinerator, solid and/or semi-solid wastes are injected into a fluidized material (generally sand and/or incinerator ash), where they are heated to their ignition temperature. In the incinerator, the waste is converted to gas and ash through volatilization and combustion reactions. Heat energy from the combustion reaction is then transferred back to the fluidized-bed. The velocity of the combustion gases is reduced in a wider space above the bed, known as the "freeboard", allowing larger ash and unburned waste particles to fall back into the bed. Ash is removed periodically both during operation and during bed change-outs.

Combustion gases from incineration are fed into a scrubber system for cooling and removal of any entrained particles and acid gases. In general, with the exception of liquid injection incineration, two residuals are generated by incineration processes: ash and scrubber water.

4.1.2 Applicable and Demonstrated Technologies for Metals

Applicable treatment technologies for metals include those that immobilize or reduce the total amount of metal constituents in a waste. The technologies listed below are applicable and have been demonstrated to treat metal constituents in nonwastewater forms of universal standards wastes. These technologies are commonly used to treat wastes which contain the metal constituents regulated under universal standards.

Stabilization

Stabilization is a broad class of treatment technologies that reduce the mobility of metal constituents in a waste; the metals are chemically bound into a solid matrix that resists leaching when water or a mild acid solution comes into contact with the waste material. Organic materials usually are not stabilized effectively and may, in fact, inhibit the stabilization of metals. Hence, stabilization is applicable to nonwastewaters only after the organics have been removed by other treatment.

Pyrometallurgical Recovery Processes (High Temperature Metals Recovery)

Pyrometallurgical recovery processes are those treatment technologies that use physical and chemical reactions at elevated temperatures for extraction/ separation of metals, ores, salts, and other materials. For the purposes of the Land Disposal Restrictions Program, pyrometallurgical processes are referred to as High Temperature

Metals Recovery (HTMR). Some examples of HTMR systems include rotary kilns, flame reactors, electric furnaces, plasma arc furnaces, slag reactors, and rotary hearth/electric furnaces. These thermal reduction processes use carbon, limestone, and silica (sand) as raw materials. The carbon acts as a reducing agent and reacts with metal oxides in a high temperature processing unit (e.g., kiln, furnace) to produce carbon dioxide and a free metal. This process yields a metal product for reuse and reduces the concentration of metals in the residuals.

Hydrometallurgical Recovery Processes

Hydrometallurgical recovery processes extract and recover materials by using acidic solutions. These processes are most effective with wastes containing high concentrations of metals that are soluble in a strong acid solution or that can be converted by reaction with a strong acid to a soluble form. Some hydrometallurgical processes include chemical precipitation, leaching, ion exchange, solvent extraction, and electrowinning.

The Agency is aware that some facilities are using a series of technologies, including chemical precipitation, ion exchange, and electrowinning, to recover metals from various metal-bearing waste streams. Some of these facilities claim that these hydrometallurgical processes, unlike other processes, generate no residuals for land disposal.

Recycling

For some metal-bearing wastes, recycling may be an applicable technology. An example is nonwastewater forms of K061 wastes, electric arc furnace dust, which may be recycled directly back into the electric furnaces from which it was originally produced. Such practices facilitate the recovery of metals in steelmaking while reducing or eliminating the material to be land disposed.

4.2 Identification of BDAT

The Agency determines BDAT based on a thorough review of all of the performance data available on treatment of the waste of concern or wastes judged to be similar.

Section 5.0 presents the treatment performance data that were evaluated in determining BDAT for universal standards. The treatment performance data are first screened to determine:

- Whether the data represent operation of a well-designed and well-operated treatment system;
- Whether sufficient analytical quality assurance/quality control measures were used to ensure the accuracy of the data;
- Whether the appropriate level of performance (i.e., TCLP or total composition analysis) was used to assess the performance of the particular treatment technology.

Following the identification of the "best" demonstrated technology, the Agency determines whether the technology is "available." An available treatment technology is one that (1) is not a proprietary or patented process that cannot be purchased or licensed from the proprietor (i.e., it must be commercially available), and (2) substantially diminishes the toxicity of the waste or substantially reduces the likelihood of migration of hazardous constituents from the waste.

The Agency notes, however, that when it establishes concentration-based treatment standards, the regulated community may use any non-prohibited technology to treat the waste to meet the treatment standards. Compliance with a concentration-based treatment standard requires only that the effluent concentration be achieved; once achieved, the waste may be land disposed. The waste need not be treated by the technology identified as BDAT; in fact, concentration-based treatment standards provide

flexibility in the choice of a treatment technology. Any treatment, including recycling or any combination of treatment technologies, unless prohibited (e.g., impermissible dilution) or defined as land disposal (e.g., land treatment), may be used to achieve these standards.

Tables 4-1 and 4-2 present the technologies selected as BDAT for each organic and metal constituent, respectively, selected for regulation in nonwastewater forms of universal standards wastes.

4.2.1 BDAT for Organic Constituents

The Agency has identified incineration as BDAT for all organic constituents selected for regulation in nonwastewaters except for the following seven constituents: disulfoton, famphur, methyl parathion, parathion, phorate, diphenylamine, and diphenylnitrosamine. All of the incineration performance data included in Section 5.2 represent BDAT treatment of wastes included in previous rulemakings and therefore previously have been judged to meet the conditions listed above. Therefore, rotary kiln, fluidized-bed, and liquid injection incineration are all "best" for treatment of these organic constituents in universal standards waste codes.

Incineration is commercially available. Treatment performance data included in Section 5.0 show substantial treatment by incineration for waste constituents of concern and other similar constituents. Thus, incineration is "available", and therefore BDAT for treatment of organic constituents included in universal standards wastes. Legislative history indicates a strong preference for treatment technologies, such as incineration, that destroy hazardous constituents. Senator Chaffee stated, introducing the amendment that became Section 3004(m) of RCRA, "for wastes with a high organic content, incineration should be required in lieu of land disposal" (see 130 Cong. Rec., S9179, daily ed. July 25, 1984).

The Agency has identified five organic constituents (disulfoton, famphur, methyl parathion, parathion, and phorate) for which sludge drying, rather than incineration is identified as the "best" technology. The existing BDAT treatment standards for these constituents are based on the treatment performance of sludge drying. These data represent treatment of the constituents of concern to the analytical detection limits by the thermal drying of a wastewater treatment sludge generated from the biological treatment of multi-source leachate. Because the sludge drying performance data included in Section 5.0 represent BDAT for wastes included in previous rulemakings, these data have been judged previously to meet the criteria for "best" treatment technology.

The sludge drying treatment train, identified as the "best" technology for these five organic constituents, is also commercially available. The sludge drying treatment performance data included in Section 5.0 show substantial treatment for the waste constituents of concern and other similar constituents. Thus, the sludge drying treatment train is "available" and therefore is identified as BDAT for treatment of disulfoton, famphur, methyl parathion, parathion, and phorate in universal standards waste codes.

The Agency has identified two organic constituents (diphenylamine and diphenylnitrosamine) for which fuel substitution, rather than incineration, is identified as the "best" technology. The fuel substitution treatment performance data presented in Section 5.0 of this document represent the "best" available treatment performance data for these constituents.

Fuel substitution, identified as the "best" technology for these two organic constituents, is also commercially available. The fuel substitution treatment performance data included in Section 5.0 show substantial treatment for the waste constituents of concern and other similar constituents. Thus, fuel substitution is "available" and;

therefore, is identified as BDAT for treatment of diphenylamine and diphenylnitrosamine in universal standards.

4.2.2 BDAT for Metal Constituents

The Agency has identified high temperature metals recovery (HTMR) as BDAT for metal constituents in nonwastewater forms of listed hazardous wastes, with the exceptions of arsenic, mercury in low-mercury subcategory wastes (i.e., wastes containing less than 260 mg/kg mercury), and chromium. HTMR processes include rotary kilns, flame reactors, electric furnaces, plasma arc furnaces, slag reactors, and rotary hearth/electric furnaces.

BDAT for arsenic is slag vitrification, rather than HTMR, because this technology is demonstrated, commercially available, and achieves substantial treatment of arsenic. The vitrification process is capable of managing a wide variety of arsenic-bearing wastes. At the temperatures at which the vitrification process is normally operable (1,100 to 1,400°C), organoarsenic compounds will be combusted to arsenic oxide, carbon dioxide, and water. The arsenic oxide formed will react with the other glass-forming constituents and become immobilized in the glass formed. The Agency has data indicating that arsenic can be vitrified into slag at concentrations of up to 24 percent arsenic, and that the slag so generated will pass the EP-toxicity test for arsenic (50).

BDAT for mercury in low-mercury subcategory wastes is acid leaching, rather than HTMR, because this technology is demonstrated, commercially available, and achieves substantial treatment of mercury in low-mercury subcategory wastes. The acid leaching treatment performance data presented in Section 5.0 of this document represent the "best" available treatment performance data for mercury in low-mercury subcategory wastes. Because the acid leaching performance data included in Section 5.0 represent

BDAT for wastes included in previous rulemakings, these data have been judged previously to meet the criteria for "best" treatment technology.

BDAT for chromium is stabilization, rather than HTMR, because this technology is demonstrated, commercially available, and achieves concentration levels that the Agency believes may be routinely achieved by industry for the treatment of chromium-bearing wastes. EPA evaluated treatment performance data from several sources, including data on the performance of HTMR and stabilization technologies. EPA selected a set of stabilization treatment performance data upon which to calculate the universal standard for chromium because these data represented treatment of difficult to treat wastes, including stripping liquids, plating and pelletizing operation wastes, and cleanout wastes from plating tanks. These stabilization data, presented in Section 5.0 of this document, represent the "best" available treatment performance data for chromium.

The Agency used the following rationale for identifying HTMR as BDAT for most metal constituents in nonwastewater forms of listed hazardous wastes. Since metals cannot be destroyed, treatment options for metal-bearing wastes are limited. Typically, these options include technologies that either can recover the metal or incorporate the metal into a stable matrix resistant to leaching. The Agency believes that the "best" treatment for metal constituents is recovery, especially in cases of high waste metal concentrations. Of the applicable technologies, HTMR appears to be the most matrix-independent (i.e., it consistently achieves the same levels of treatment performance regardless of influent matrix composition). HTMR also generally decreases the amount of material sent for land disposal, recovers valuable resources, and incorporates metals that are not recoverable into a stable slag matrix.

The Agency's review of the HTMR performance data indicated that the slag residues for land disposal leach concentrations of metals that are comparable to (and, for most metals, less than) residues from stabilization of similar wastes.

Furthermore, the use of HTMR is consistent with the national policy, identified in HSWA, to reduce the quantity of hazardous constituents disposed in landfills (this is in contrast to non-recovery technologies, such as stabilization, which are not intended to reduce the total concentration or quantity of hazardous constituents in the waste and, in fact, can increase the volume being sent to landfills). In addition, because metals are recovered instead of land disposed, ore processing is reduced, thus saving energy and pollution from those processes. All of the HTMR data included in Section 5.3 represent BDAT for wastes included in previous rulemakings and therefore previously have been judged to meet the conditions listed above for identification of "best" technology.

EPA recommends, however, that if recovery is not feasible because the metal content in the waste is too low or the material contains constituents that may adversely affect recovered products, then the generator should investigate alternative ways to generate wastes that are amenable to recovery (e.g., segregation) or to substitute materials that are suitable for recovery for those unrecoverable materials that eventually become wastes. As a last resort, technologies such as stabilization and chemical conversion to less leachable metal compounds should be used to treat metal-containing wastes.

The Agency realizes that recovery of metals from all wastes is not practical; at some level of metal concentration (EPA believes this to be approximately 1% total BDAT List metal constituents), recovery efforts typically cease, and the remaining metals must be incorporated into a leach-resistant matrix for safe disposal. The Agency has data indicating that most of the treatment standards for individual metals can be achieved by using stabilization as well as HTMR (see Tables 6-4 and 6-5).

Table 4-1

BDAT Technologies for Organic Constituents Selected for Regulation in Nonwastewater Forms of Wastes

Constituent Selected for Regulation	BDAT Technology Basis
Acenaphthalene	Incineration
Acenaphthene	Incineration
Acetone	Incineration
Acetonitrile	Incineration
Acetophenone	Incineration
2-Acetylaminofluorene	Incineration
Acrylamide	Incineration
Acrylonitrile	Incineration
Aldrin	Incineration
Aniline	Incineration
Anthracene	Incineration
Benz(a)anthracene	Incineration
Benzal Chloride	Incineration
Benzene	Incineration
Benzo(b)fluoranthene	Incineration
Benzo(k)fluoranthene	Incineration
Benzo(ghi)perylene	Incineration
Benzo(a)pyrene	Incineration
alpha-BHC	Incineration
beta-BHC	Incineration
delta-BHC	Incineration
gamma-BHC (Lindane)	Incineration
Bromodichloromethane	Incineration
Bromoform (Tribromomethane)	Incineration
4-Bromophenyl Phenyl Ether	Incineration
Bromomethane (Methyl Bromide)	Incineration

Table 4-1

(Continued)

Constituent Selected for Regulation	BDAT Technology Basis
n-Butanol	Incineration
Butyl Benzyl Phthalate	Incineration
2-sec-Butyl-4,6-dinitrophenol (Dinoseb)	Incineration
Carbon Disulfide	Incineration
Carbon Tetrachloride	Incineration
Chlordane	Incineration
p-Chloroaniline	Incineration
Chlorobenzene	Incineration
2-Chloro-1,3-butadiene	Incineration
Chlorodibromomethane	Incineration
Chloroethane	Incineration
bis(2-Chloroethoxy)methane	Incineration
bis(2-Chloroethyl)ether	Incineration
Chloroform	Incineration
bis(2-Chloroisopropyl)ether	Incineration
p-Chloro-m-cresol	Incineration
Chloromethane	Incineration
2-Chloronaphthalene	Incineration
2-Chlorophenol	Incineration
3-Chloropropene	Incineration
Chrysene	Incineration
Cresol (m- and p-isomers) (3-Methylphenol, 4-Methylphenol)	Incineration
o-Cresol (2-Methylphenol)	Incineration
Cyclohexanone	Incineration
o,p'-DDD	Incineration
p,p'-DDD	Incineration

Table 4-1

(Continued)

Constituent Selected for Regulation	BDAT Technology Basis
o,p'-DDE	Incineration
p,p'-DDE	Incineration
o,p'-DDT	Incineration
p,p'-DDT	Incineration
Dibenz(a,h)anthracene	Incineration
1,2-Dibromo-3-chloropropane	Incineration
Dibromomethane	Incineration
tris-(2,3-Dibromopropyl)phosphate	Incineration
m-Dichlorobenzene	Incineration
o-Dichlorobenzene	Incineration
p-Dichlorobenzene	Incineration
Dichlorodifluoromethane	Incineration
1,1-Dichloroethane	Incineration
1,2-Dichloroethane	Incineration
1,1-Dichloroethylene	Incineration
trans-1,2-Dichloroethylene	Incineration
2,4-Dichlorophenol	Incineration
2,6-Dichlorophenol	Incineration
2,4-Dichlorophenoxyacetic Acid (2,4-D)	Incineration
1,2-Dichloropropane	Incineration
cis-1,3-Dichloropropene	Incineration
trans-1,3-Dichloropropene	Incineration
Dieldrin	Incineration
Diethyl Phthalate	Incineration
2,4-Dimethyl Phenol	Incineration
Dimethyl Phthalate	Incineration
Di-n-butyl Phthalate	Incineration

Table 4-1

(Continued)

Constituent Selected for Regulation	BDAT Technology Basis
1,4-Dinitrobenzene	Incineration
4,6-Dinitro-o-cresol	Incineration
2,4-Dinitrophenol	Incineration
2,4-Dinitrotoluene	Incineration
2,6-Dinitrotoluene	Incineration
Di-n-octyl Phthalate	Incineration
1,4-Dioxane	Incineration
Diphenylamine	Fuel Substitution
Diphenylnitrosamine	Fuel Substitution
Di-n-propylnitrosamine	Incineration
Disulfoton	Sludge Drying
Endosulfan I	Incineration
Endosulfan II	Incineration
Endosulfan Sulfate	Incineration
Endrin	Incineration
Endrin Aldehyde	Incineration
Ethyl Acetate	Incineration
Ethyl Ether	Incineration
bis(2-Ethylhexyl)phthalate	Incineration
Ethyl Methacrylate	Incineration
Ethylbenzene	Incineration
Ethylene Dibromide (1,2-Dibromoethane)	Incineration
Famphur	Sludge Drying
Fluoranthene	Incineration
Fluorene	Incineration
Heptachlor	Incineration
Heptachlor Epoxide	Incineration

Table 4-1

(Continued)

Constituent Selected for Regulation	BDAT Technology Basis
Hexachlorobenzene	Incineration
Hexachlorabutadiene	Incineration
Hexachlorocyclopentadiene	Incineration
Hexachlorodibenzo-p-dioxins	Incineration
Hexachlorodibenzofurans	Incineration
Hexachloroethane	Incineration
Hexachloropropene	Incineration
Indeno(1,2,3)pyrene	Incineration
Iodomethane	Incineration
Isobutanol	Incineration
Isodrin	Incineration
Isosafrole	Incineration
Kepone	Incineration
Methacrylonitrile	Incineration
Methanol	Incineration
Methapyrilene	Incineration
Methoxychlor	Incineration
Methyl Ethyl Ketone	Incineration
Methyl Isobutyl Ketone	Incineration
Methyl Methacrylate	Incineration
Methyl Parathion	Sludge Drying
3-Methylcholanthrene	Incineration
Methylene Chloride	Incineration
4,4'-Methylene-bis(2-chloroaniline)	Incineration
Naphthalene	Incineration
o-Nitroaniline (2-Nitroaniline)	Incineration
p-Nitroaniline (4-Nitroaniline)	Incineration

Table 4-1

(Continued)

Constituent Selected for Regulation	BDAT Technology Basis
Nitrobenzene	Incineration
N-Nitroso-di-n-butylamine	Incineration
N-Nitrosodiethylamine	Incineration
N-Nitrosodimethylamine	Incineration
N-Nitrosomethylethylamine	Incineration
N-Nitrosomorpholine	Incineration
N-Nitrosopiperidine	Incineration
N-Nitrosopyrrolidine	Incineration
o-Nitrophenol (2-Nitrophenol)	Incineration
p-Nitrophenol (4-Nitrophenol)	Incineration
5-Nitro-o-toluidine	Incineration
Parathion	Sludge Drying
Pentachlorobenzene	Incineration
Pentachlorodibenzo-p-dioxins	Incineration
Pentachlorodibenzofurans	Incineration
Pentachloroethane	Incineration
Pentachloronitrobenzene	Incineration
Pentachlorophenol	Incineration
Phenacetin	Incineration
Phenanthrene	Incineration
Phenol	Incineration
Phorate	Sludge Drying
Phthalic Anhydride	Incineration
Pronamide	Incineration
Propanenitrile (Ethyl Cyanide)	Incineration
Pyrene	Incineration
Pyridine	Incineration

Table 4-1

(Continued)

Constituent Selected for Regulation	BDAT Technology Basis
Safrole	Incineration
Silvex (2,4,5-TP)	Incineration
1,2,4,5-Tetrachlorobenzene	Incineration
Tetrachlorodibenzo-p-dioxins	Incineration
Tetrachlorodibenzofurans	Incineration
1,1,1,2-Tetrachloroethane	Incineration
1,1,2,2-Tetrachloroethane	Incineration
Tetrachloroethylene	Incineration
2,3,4,6-Tetrachlorophenol	Incineration
Toluene (Methyl Benzene)	Incineration
Total PCBs	Incineration
Toxaphene	Incineration
1,2,4-Trichlorobenzene	Incineration
1,1,1-Trichloroethane	Incineration
1,1,2-Trichloroethane	Incineration
Trichloroethylene	Incineration
Trichloromonofluoromethane (Fluorotrichloromethane)	Incineration
2,4,5-Trichlorophenol	Incineration
2,4,6-Trichlorophenol	Incineration
2,4,5-Trichlorophenoxyacetic Acid (2,4,5-T)	Incineration
1,2,3-Trichloropropane	Incineration
1,1,2-Trichloro-1,2,2-trifluoroethane	Incineration
Vinyl Chloride	Incineration
Xylene(s) (total)	Incineration

Table 4-2

BDAT Technologies for Metal Constituents Selected for Regulation in Nonwastewater Forms of Wastes

Constituent Selected for Regulation	BDAT Technology Basis
Antimony	High Temperature Metals Recovery
Arsenic	Slag Vitrification
Barium	High Temperature Metals Recovery
Beryllium	High Temperature Metals Recovery
Cadmium	High Temperature Metals Recovery
Chromium (total)	Stabilization
Lead	High Temperature Metals Recovery
Mercury	Acid Leaching
Nickel	High Temperature Metals Recovery
Selenium	High Temperature Metals Recovery
Silver	High Temperature Metals Recovery
Thallium	High Temperature Metals Recovery
Vanadium	High Temperature Metals Recovery
Zinc	High Temperature Metals Recovery

5.0 NONWASTEWATER TREATMENT PERFORMANCE DATA

This section discusses the treatment performance data used in determining universal standards for nonwastewater forms of listed hazardous wastes (i.e., the nonwastewater treatment performance data). These treatment performance data are used elsewhere in this document to select constituents for regulation (Section 3.0), to determine which technologies represent BDAT (Section 4.0) and to develop universal standards for those constituents (Section 6.0).

To account for the wide range of physical forms and chemical compositions of wastes, the Agency examined all available BDAT treatment performance data used to develop nonwastewater treatment standards for listed hazardous wastes regulated to date under the Land Disposal Restrictions Program. The data included in Tables 5-1 and 5-3 represent the treatment performance data used to develop the treatment standards for constituents in nonwastewater forms of listed hazardous wastes applicable to universal standards. Tables 5-2 and 5-6 present the treatment tests from which the treatment performance data for organic and metal constituents, respectively, were used.

In addition, the Agency is developing a universal standard for vanadium based on HTMR treatment performance data that were used to determine treatment standards for nonwastewater forms of K061 wastes and is developing a universal standard for chromium based on industry-submitted stabilization data for nonwastewater forms of D007. These data are presented in Tables 5-4 and 5-5.

The treatment performance data included in Tables 5-1, 5-3, 5-4, and 5-5 represent BDAT for nonwastewater forms of wastes in previous rulemakings, and, therefore, represent BDAT for universal standards. The Agency believes that these data are preferable for determining universal standards because the data represent BDAT treatment, indicate substantial treatment of constituents of concern, are matrix independent (i.e., achievable on a routine and consistent basis), and indicate treatment

of constituents present or believed to be present in the untreated waste. Treatment performance data are presented separately for organic constituents and metal constituents.

5.1 Treatment Performance Data Associated with BDAT Treatment Standards

Tables 5-1 and 5-3 include the treatment performance data used in determining universal standards. The Agency selected an appropriate universal standard after evaluating the available treatment performance data for each constituent. This process is described in Section 6.0.

Tables 5-1 and 5-3 also contain all of the data that are applicable to the calculation of treatment standards for each constituent selected for regulation under universal standards. Columns 1 and 2 show the treatment standard for each constituent and the waste code(s) to which this treatment standard applies, respectively.

Treatment standards are calculated using three values: the concentration in the treated waste, an accuracy correction factor, and a variability factor. These factors account for analytical limitations in available treatment performance data and variability related to waste treatment, sampling, and analytical techniques and procedures.

5.1.1 Concentration in the Treated Waste

The concentration in the treated waste residual, shown in Column 3 of Tables 5-1 and 5-3, was used in calculating treatment standards for nonwastewater forms of listed hazardous wastes. For most organic constituents treated by incineration, a detection limit in the residual ash generally represented the concentration. That is, the constituent was treated to a concentration below that which could be detected using the appropriate analytical methods. For metals, the constituent was usually detected in the treated waste residual.

Rather than testing the performance of BDAT on every waste in previous rulemakings, in certain cases, the Agency transferred treatment performance data from a tested waste to a similar untested waste. To develop treatment standards for wastes for which the Agency does not have treatment performance data, the Agency determined that the constituents present in the untested waste can be treated to the same performance levels as those observed in other wastes for which treatment data exist. EPA believes such transfers are technically valid in cases where the untested wastes are generated from similar industries or processing steps, or have similar waste characteristics affecting performance and treatment selection.

The transfer of treatment performance data to similar wastes or wastes from similar processing steps was based on a detailed comparison of the constituents of concern in the tested and untested wastes. If the parameters that affect treatment performance for these constituents indicated that the untreated waste can be treated as effectively as the tested waste, then the transfer could be made. Column 4 of Tables 5-1 and 5-3 shows the treatment test from which the concentration in the treated waste, accuracy correction factor, and variability factor were transferred.

Additionally, in cases where adequate treatment performance data for a constituent of concern were unavailable, the Agency transferred data from a constituent determined to be similar in a similar waste. The Agency divided the organic constituents into treatability groups in which constituents were expected to behave similarly during treatment by an applicable technology. The division of organic constituents into treatability groups is described in Section 3.1.1. Column 5 of Tables 5-1 and 5-3 shows the constituent from which the concentration in the treated waste and variability factor were transferred.

5.1.2 Accuracy Correction Factors

Accuracy correction factors account for analytical interferences associated with the chemical matrices of the samples. The concentration in the treated waste that was used to calculate a treatment standard was corrected using matrix spike recovery data, as follows:

(1) A matrix spike recovery (percent) was determined for each waste constituent. Matrix spike recovery data were transferred from the same test from which the concentration in the treated waste was taken. In cases where matrix spike recovery data were not available, data were transferred from treatment of a similar waste.

(2) If a matrix spike was not performed for the waste constituent of concern, matrix spike recovery data from a similar constituent were transferred. The source of recovery data used for each constituent is indicated in Column 6 of Tables 5-1 and 5-3.

(3) In cases where data were not available for a specific constituent, but were available for a similar class of constituents (e.g., volatile organics, acid-extractable semivolatile organics), matrix spike recovery data for the class of constituents were transferred. All recovery values greater than or equal to 20% were averaged; the constituent concentration was then adjusted by the averaged value. Matrix spike percent recovery data are shown in parentheses in Column 7 of Tables 5-1 and 5-3. This column also indicates whether the matrix spike recovery of the constituent represents an averaged value or actual result.

(4) An accuracy correction factor was determined for each of the constituents by dividing 100 by the matrix spike recovery (percent) for that constituent. The accuracy correction factors are presented in Column 7 of Tables 5-1 and 5-3.

(5) Concentrations in the treated waste for each of the waste constituents were corrected by multiplying the treated concentration for each constituent by its corresponding accuracy correction factor.

5.1.3 Variability Factors

Variability factors account for the variability inherent in treatment performance, treatment residual collection, and analysis of the treated waste samples. If a constituent was detected in the treated residual, then a variability factor was calculated. In instances where variability factors could not be calculated because waste constituents were not detected in the incinerator ash residuals, a variability factor of 2.8 was used as discussed in EPA's Methodology Background Document (3). This factor represents EPA's generic variability factor calculated assuming a lognormal distribution of treated waste concentrations and an order of magnitude difference between the highest and lowest treated waste values. Variability factors are shown in Column 8 of Tables 5-1 and 5-3.

5.1.4 Calculation of the Treatment Standard

Calculation of BDAT treatment standards involves three steps: (1) accuracy correction of the treatment performance data to account for any analytical interferences associated with the chemical make-up of the samples; (2) determination of a variability factor specific to each constituent in a treatment performance data set to correct for normal variations in the performance of a particular technology over time; and (3) calculation of the treatment standard, which is equal to the average concentration in the treated waste multiplied by the accuracy correction factor multiplied by the variability factor. The treatment standards are shown in Column 1 of Tables 5-1 and 5-3.

5.2 Treatment Performance Data for Organic Constituents

Table 5-1 presents the constituent-specific treatment performance data for organic constituents in nonwastewater forms of listed hazardous wastes. As explained in Section 3.1, the organic constituents are divided into treatability groups. Table 3-2 lists

the organic constituents selected for regulation in universal standards by treatability group; the treatment performance data in Table 5-1 are also organized by treatability group.

For each constituent in Table 5-1, the nonwastewater treatment performance data represent data used to calculate each nonwastewater treatment standard that has been promulgated to date for that constituent in a listed waste under the Land Disposal Restrictions Program.

In the incorporation of treatment data into Table 5-1, the Agency chose to use other available treatment performance data in preference to data from F024, F037, F038, K011, K013, K014, K043, K048, K049, K050, K051, K052, and K099 wastes. The Agency believes that other treatment performance data are more appropriate for representing treatment of "universal" wastes. However, the Agency chose to use data for these 13 wastes when the data were used to develop the only nonwastewater treatment standard promulgated to date for a constituent regulated under universal standards.

The Agency is aware of only one facility in the United States that produces 2,4-dichlorophenoxyacetic acid (2,4-D) and consequently generates K043 and K099 wastes. This facility submitted treatment performance data for these wastes; these data were used to develop the promulgated K043 and K099 treatment standards. Since these wastes are unique to this facility, and since the promulgated treatment standards were based on treatment performance data from this facility, the Agency believes that the promulgated K043 and K099 treatment standards may not be appropriate for other waste matrices.

The data included in Table 5-1 represent treatment performance data from the incineration, fuel substitution, and sludge drying tests listed in Table 5-2. In addition to using data from full-scale operations, data developed at research facilities or obtained

at less than full-scale operations were included, provided that the technology was demonstrated in full-scale operation for the waste or similar wastes.

5.3 Treatment Performance Data for Metal Constituents

Tables 5-3, 5-4, and 5-5 present the constituent-specific treatment performance data for metal constituents in nonwastewater forms of listed hazardous waste. The metal constituents selected for regulation in nonwastewater forms of waste are listed in Table 3-3.

For each constituent in Table 5-3, the nonwastewater treatment performance data represent data used to calculate each treatment standard that has been promulgated to date for that constituent in a listed waste under the Land Disposal Restrictions Program.

Although a treatment standard for vanadium has not been promulgated to date, the Agency is developing a universal standard for vanadium in this rulemaking, based on the HTMR treatment performance data presented in Table 5-4.

The data presented in Table 5-4 represent HTMR data that were previously used to promulgate treatment standards for metal constituents in nonwastewater forms of K061 wastes and alternative BDAT treatment standards for metal constituents in nonwastewater forms of F006 and K062 wastes. Since the only BDAT data for HTMR performance available to the Agency were for the treatment of nonwastewater forms of K061, F006, and K062 wastes, these data were selected to develop the universal standard for vanadium. EPA used only Toxicity Characteristic Leachate Procedure (TCLP) HTMR data from well-designed and well-operated HTMR processes. These data are presented in further detail in EPA's Final Best Demonstrated Available Technology (BDAT) Background Document (Addendum) for All

Nonwastewater Forms of K061 and Alternative BDAT Treatment Standards for F006 and K062 Nonwastewaters (61).

The Agency is developing a universal standard for chromium based on the stabilization treatment performance data presented in Table 5-5. EPA evaluated waste characterization and treatment performance data for chromium from several sources, including data on the performance of HTMR and stabilization technologies for chromium. As discussed in Section 4.2.2, these stabilization data represent the "best" available treatment performance data for chromium. EPA selected the stabilization data presented in Table 5-5 to develop the universal standard for chromium because these data represent treatment of chromium in difficult to treat wastes, including stripping liquids, plating and pelletizing operation wastes, and cleanout wastes from plating tanks. These data, along with all of the treatment performance data for chromium evaluated by EPA, are presented in further detail in EPA's Final Best Demonstrated Available Technology (BDAT) Background Document for Chromium Wastes (D007 and U032) (52), and in a memorandum included in the Administrative Record (76).

The data included in Tables 5-3, 5-4, and 5-5 represent treatment performance data from the treatment tests listed in Table 5-6. In addition to using data from full-scale operations, data developed at research facilities or obtained at less than full-scale operations were included, provided that the technology was demonstrated in full-scale operation for the waste or similar wastes.

Table 5-1

Treatment Performance Database for Organic Constituents (Nonwastewaters)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Aromatic Hydrocarbons								
Benzene	0.071	K060, K087	<0.025	K087	Benzene	Benzene	1.02 (98)[c]	2.8
	4.4	K085, K105	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	6.0	K103, K104	<2.0	K019	1,2-Dichloroethane	1,2-Dichloroethane	1.06 (94)	2.8
	6.6	K083	<2.0	K019	Benzene	Benzene	1.18 (85)[c]	2.8
	36	F039, U019, F001-F005	<10.0	K001-C	Benzene	Benzene	1.28 (78)[c]	2.8
Ethylbenzene	6.0	F039, K086, F001-F005	<2.0	K019	Ethylbenzene	Ethylbenzene	1.06 (94)	2.8
Toluene	0.034	K022	<0.012	K022	Toluene	Toluene	1 (106)[c]	2.8
	0.65	K087	0.095	K087	Toluene	Toluene	1 (104)[c]	6.85
	6.0	K015	<2.0	K019	Toluene	Toluene	1.06 (94)	2.8
	28	U051, U220, F001-F005, F039, K001, K086	<10.0	K001-C	Toluene	Toluene	1.01 (99)[c]	2.8
	28	K037	<10.0	K037	Toluene	Toluene	1 (165)[c]	2.8
Xylene(s) (total)	0.07	K087	<0.025	K087	Xylenes	Xylenes	1 (107)	2.8
	28	F039, K086, U239	<10.0	K001-C	Xylenes	Chlorobenzene	1 (102)[c]	2.8
	33	K001, U051, F001-F005	<10.0	K001-C	Xylenes	Xylenes	1.16 (86)	2.8

< - Indicates a detection limit value.

[a]See Table 5-2 for more information on treatment tests.

[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[c]This number represents a constituent-specific matrix spike.

[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test From Which the Performance Data[a] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Carbon Disulfide								
Carbon Disulfide	4.8[d]	F001-F005	0.90[d]	F001-F005	Carbon Disulfide	No accuracy correction data were used	-	5.34

< - Indicates a detection limit value.
[a]See Table 5-2 for more information on treatment tests.
[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.
[c]This number represents a constituent-specific matrix spike.
[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test From Which the Performance Data[a] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Chlorinated Pesticides								
Aldrin	0.066	F039, P004	<0.0066	3rd 3rd Test Burn (Test 2)	Aldrin	Heptachlor	3.57 (28)[c]	2.8
alpha-BHC	0.066	F039, U129	<0.0066	3rd 3rd Test Burn (Test 2)	alpha-BHC	Heptachlor	3.57 (28)[c]	2.8
beta-BHC	0.066	F039, U129	<0.0066	3rd 3rd Test Burn (Test 2)	beta-BHC	Heptachlor	3.57 (28)[c]	2.8
delta-BHC	0.066	F039, U129	<0.0066	3rd 3rd Test Burn (Test 2)	delta-BHC	Heptachlor	3.57 (28)[c]	2.8
gamma-BHC (Lindane)	0.066	F039, U129	<0.0066	3rd 3rd Test Burn (Test 2)	gamma-BHC	Heptachlor	3.57 (28)[c]	2.8
Chlordane	0.13	F039, U036	<0.013	3rd 3rd Test Burn (Test 2)	Chlordane	Heptachlor	3.57 (28)[c]	2.8
	0.26[d]	K032, K097	<0.026	3rd 3rd Test Burn (Test 2)	Chlordane (alpha and gamma)	Chlordane	3.57 (28)	2.8
o,p'-DDD	0.087	F039, U060, U061	<0.013	3rd 3rd Test Burn (Test 1)	o,p'-DDD	Methoxychlor	2.38 (42)[c]	2.8
p,p'-DDD	0.087	F039, U060, U061	<0.013	3rd 3rd Test Burn (Test 1)	p,p'-DDD	Methoxychlor	2.38 (42)[c]	2.8

< - Indicates a detection limit value.
[a]See Table 5-2 for more information on treatment tests.
[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.
[c]This number represents a constituent-specific matrix spike.
[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test From Which the Performance Data[a] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Chlorinated Pesticides (Cont'd.)								
o,p'-DDE	0.087	F039, U061	<0.013	3rd 3rd Test Burn (Test 1)	o,p'-DDE	Methoxychlor	2.38 (42)[c]	2.8
p,p'-DDE	0.087	F039, U061	<0.013	3rd 3rd Test Burn (Test 1)	p,p'-DDE	Methoxychlor	2.38 (42)[c]	2.8
o,p'-DDT	0.087	F039, U061	<0.013	3rd 3rd Test Burn (Test 1)	o,p'-DDT	Methoxychlor	2.38 (42)[c]	2.8
p,p'-DDT	0.087	F039, U061	<0.013	3rd 3rd Test Burn (Test 1)	p,p'-DDT	Methoxychlor	2.38 (42)[c]	2.8
Dieldrin	0.13	F039, P037	<0.013	3rd 3rd Test Burn (Test 2)	Dieldrin	Heptachlor	3.57 (28)[c]	2.8
Endosulfan I	0.066	F039, P050	<0.0066	3rd 3rd Test Burn (Test 2)	Endosulfan I	Heptachlor	3.57 (28)[c]	2.8
Endosulfan II	0.13	F039, P050	<0.013	3rd 3rd Test Burn (Test 2)	Endosulfan II	Heptachlor	3.57 (28)[c]	2.8
Endosulfan Sulfate	0.13	F039, P050	<0.013	3rd 3rd Test Burn (Test 2)	Endosulfan Sulfate	Heptachlor	3.57 (28)[c]	2.8
Endrin	0.13	F039, P051	<0.013	3rd 3rd Test Burn (Test 2)	Endrin	Heptachlor	3.57 (28)[c]	2.8
Endrin Aldehyde	0.13	F039, P051	<0.013	3rd 3rd Test Burn (Test 2)	Endrin Aldehyde	Heptachlor	3.57 (28)[c]	2.8

< - Indicates a detection limit value.

[a]See Table 5-2 for more information on treatment tests.

[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[c]This number represents a constituent-specific matrix spike.

[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test From Which the Performance Data[a] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Chlorinated Pesticides (Cont'd.)								
Heptachlor	0.066	F039, P059, K032, K097	<0.0066	3rd 3rd Test Burn (Test 2)	Heptachlor	Heptachlor	3.57 (28)[c]	2.8
Heptachlor Epoxide	0.066	F039, P059, K032, K097	<0.0066	3rd 3rd Test Burn (Test 2)	Heptachlor	Heptachlor	3.57 (28)[c]	2.8
Hexachlorobutadiene	5.6	K016, K018, K028, K030	<2.0	K019	Naphthalene	Naphthalene	1 (103)	2.8
	28	F025, F039, U128	<10.0	K019	Hexachlorobutadiene	Trichloroethylene	1 (107)[c]	2.8
Hexachlorocyclo-pentadiene	2.4	K032, K033, K034, K097	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorocyclo-pentadiene	Hexachlorocyclo-pentadiene	2.6 (38)	2.8
	3.6	F039, U130	<0.36	3rd 3rd Test Burn (Test 2)	Hexachlorocyclo-pentadiene	Heptachlor	3.57 (28)[c]	2.8
	5.6	K016	<2.0	K019	Phenanthrene	Phenanthrene	1 (103)	2.8
Isodrin	0.066	F039, P060	<0.0066	3rd 3rd Test Burn (Test 2)	Isodrin	Heptachlor	3.57 (28)[c]	2.8
Kepone	0.13	F039, U142	<2.0	K001-C	Kepone	Heptachlor epoxide	1.33 (75)[c]	2.8
Methoxychlor	0.18	F039, U247	<0.013	3rd 3rd Test Burn (Test 2)	Methoxychlor	Methoxychlor	5.0 (20)[c,d]	2.8

< - Indicates a detection limit value.
[a]See Table 5-2 for more information on treatment tests.
[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.
[c]This number represents a constituent-specific matrix spike.
[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test From Which the Performance Data[a] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Chlorinated Pesticides (Cont'd.)								
Toxaphene	1.3	F039, P123	<0.13[d]	3rd 3rd Test Burn (Test 2)	Chlordane	Heptachlor	3.57 (28)[c]	2.8
	2.6	K041, K098	<0.26[d]	3rd 3rd Test Burn (Test 2)	Chlordane (alpha and gamma)	Chlordane	3.57 (28)	2.8

< - Indicates a detection limit value.
[a]See Table 5-2 for more information on treatment tests.
[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.
[c]This number represents a constituent-specific matrix spike.
[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Chlorinated Phenolics and Derivatives								
p-Chloro-m-cresol	14	F039, U039	<5.0	K019	p-Chloro-m-cresol	p-Chloro-m-cresol	1 (110)[c]	2.8
2-Chlorophenol	4.4	K105	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	5.7	F039, U048	<2.0	K019	2-Chlorophenol	2-Chlorophenol	1.02 (98)[c]	2.8
2,4-Dichlorophenol	14	F039, U081	<5.0	K019	2,4-Dichlorophenol	2-Chlorophenol	1.02 (98)[c]	2.8
2,6-Dichlorophenol	14	F039, U082	<5.0	K019	2,6-Dichlorophenol	2-Chlorophenol	1.02 (98)[c]	2.8
2,4-Dichlorophenoxy-acetic Acid (2,4-D)	10	F039, U240	0.2	3rd 3rd Test Burn (Test 2)	2,4-Dichloro-phenoxyacetic Acid	2,4-Dichloro-phenoxyacetic Acid	5 (20)[c,d]	10.13
Pentachlorophenol	7.4	F039, K001, U051	<2.5	K001-PCP	Pentachlorophenol	Pentachlorophenol	1.05 (95)[c]	2.8
Silvex (2,4,5-TP)	7.9	F039	<0.155	3rd 3rd Test Burn (Test 2)	2,4-Dichloro-phenoxyacetic Acid	2,4-Dichloro-phenoxyacetic Acid	5 (20)[c,d]	10.13
2,4,5-T	7.9	F039	<0.155	3rd 3rd Test Burn (Test 2)	2,4-Dichloro-phenoxyacetic Acid	2,4-Dichloro-phenoxyacetic Acid	5 (20)[c,d]	10.13
2,3,4,6-Tetrachloro-phenol	37[d]	F039	<12.5	K001-PCP	Pentachlorophenol	Pentachlorophenol	1.05 (95)[c]	2.8
2,4,5-Trichlorophenol	4.4	K105	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	37[d]	F039	<12.5	K001-PCP	Pentachlorophenol	Pentachlorophenol	1.05 (95)[c]	2.8

< - Indicates a detection limit value.

[a]See Table 5-2 for more information on treatment tests.

[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[c]This number represents a constituent-specific matrix spike.

[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Chlorinated Phenolics and Derivatives (Cont'd.)								
2,4,6-Trichlorophenol	4.4	K105	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	37[d]	F039	<12.5	K001-PCP	Pentachlorophenol	Pentachlorophenol	1.05 (95)[c]	2.8

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[a]See Table 5-2 for more information on treatment tests.
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Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Chlorobenzenes								
Chlorobenzene	4.4	K085, K105	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	5.7	F039, U037, F001-F005	<2.0	K019	Chlorobenzene	Chlorobenzene	1.01 (99)[c]	2.8
	6.0[d]	K019	<2.0	K019	Chlorobenzene	Chlorobenzene	1.01 (99)[c]	2.8
m-Dichlorobenzene	4.4	K085	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	5.6	K096	<2.0	K019	bis(2-Chloroethyl)ether	bis(2-Chloroethyl)ether	1 (103)	2.8
	6.2	F039, U071	<2.0	K019	m-Dichlorobenzene	p-Dichlorobenzene	1.11 (90)[c]	2.8
o-Dichlorobenzene	4.4	K042, K085, K105	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	6.2	F039, K086, U070, F001-F005	<2.0	K019	o-Dichlorobenzene	p-Dichlorobenzene	1.11 (90)[c]	2.8
p-Dichlorobenzene	4.4	K042, K085, K105	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	6.2	F039, U072	<2.0	K019	p-Dichlorobenzene	p-Dichlorobenzene	1.11 (90)[c]	2.8

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Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Chlorobenzenes (Cont'd.)								
Hexachlorobenzene	4.4	K085	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	28	K016, K018	<10.0	K019	Hexachlorobenzene	Hexachlorobenzene	1 (103)	2.8
	37	F025, F039, U127	<10.0	K019	Hexachlorobenzene	1,2,4-Trichlorobenzene	1.33 (75)[c]	2.8
Pentachlorobenzene	4.4	K042, K085	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	28	K030	<10.0	K019	Pentachlorobenzene	Pentachlorobenzene	1 (103)	2.8
	37	F039, U183	<10.0	K019	Pentachlorobenzene	1,2,4-Trichlorobenzene	1.33 (75)[c]	2.8
Pentachloronitro-benzene	4.8	F039, U185	<0.36	3rd 3rd Test Burn (Test 2)	Pentachloronitro-benzene	Hexachlorobenzene	4.76 (21)[c]	2.8
1,2,4,5-Tetrachloro-benzene	4.4	K042, K085	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	19	F039, U207	<5.0	K019	1,2,4,5-Tetrachlorobenzene	1,2,4-Trichlorobenzene	1.33 (75)[c]	2.8
	14	K030	<5.0	K019	1,2,4,5-Tetrachlorobenzene	1,2,4,5-Tetrachlorobenzene	1 (103)	2.8

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[c]This number represents a constituent-specific matrix spike.

[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Chlorobenzenes (Cont'd.)								
1,2,4-Trichlorobenzene	4.4	K042, K085	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	19	F039, K019, K030, K096	<5.0	K019	1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzene	1.33 (75)[c]	2.8

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[a]See Table 5-2 for more information on treatment tests.
[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.
[c]This number represents a constituent-specific matrix spike.
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Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Halogenated Volatiles								
Benzal Chloride	6.2	K015	<2.0	K019	Benzal Chloride	p-Dichlorobenzene	1.1 (90)[c]	2.
Carbon Tetrachloride	5.6	F039, U211, F001-F005	<2.0	K019	Carbon Tetrachloride	Trichloroethylene	1 (107)[c]	2.
	6.2[d]	F025	<2.0	K019	1,1,1-Trichloroethane	1,1,1-Trichloroethane	1.1 (91)[d]	2.
	6.2[d]	K021, K073	<2.0	K019	Carbon Tetrachloride	Carbon Tetrachloride	1.1 (91)[d]	2.
2-Chloro-1,3-butadiene	0.28	F024	<0.10	F024	2-Chloro-1,3-butadiene	2-Chloro-1,3-butadiene	1 (129)	2.
Chloroethane	6.0	F039	<2.0	K019	1,2-Dichloroethane	1,2-Dichloroethane	1.06 (94)	2.
	6.0	K018	<2.0	K019	Chloroform	Chloroform	1.06 (94)	2.
bis(2-Chloroethoxy) Methane	7.2	F039, U024	<2.0	K019	bis(2-Chloroethoxy) methane	1,1-Dichloroethylene	1.28 (78)[c]	2.
bis(2-Chloroethyl)ether	5.6	K019	<2.0	K019	bis(2-Chloroethyl)ether	bis(2-Chloroethyl)ether	1 (103)	2.
	7.2	F039, K017, U025	<2.0	K019	bis(2-Chloroethyl)ether	1,1-Dichloroethylene	1.28 (78)[c]	2.

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[a]See Table 5-2 for more information on treatment tests.
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[c]This number represents a constituent-specific matrix spike.
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Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Halogenated Volatiles (Cont'd.)								
Chloroform	5.6	F039, U044, K117, K118, K136	<2.0	K019	Chloroform	Trichloroethylene	1 (107)[c]	2.8
	6.0	K009, K010, K019, K029	<2.0	K019	Chloroform	Chloroform	1.06 (94)	2.8
	6.2[d]	F025, K021, K073	<2.0	K019	Chloroform	Chloroform	1.1 (91)[d]	2.8
bis(2-Chloroisopropyl) Ether	7.2	F039, U027	<2.0	K019	bis(2-Chloroisopropyl) ether	1,1-Dichloroethylene	1.28 (78)[c]	2.8
Chloromethane	33	F039, U045	<10.0	K001-C	Chloromethane	1,1,-Dichloroethylene	1.16 (86)[c]	2.8
3-Chloropropene	28	F039	<10.0	K019	Hexachloroethane	Hexachloroethane	1 (103)	2.8
Dichlorodifluoro-methane	7.2	F039, U075	<2.0	K019	Dichlorodifluoro-methane	1,1-Dichloroethylene	1.28 (78)[c]	2.8
1,1-Dichloroethane	6.0	K018, K028	<2.0	K019	1,1-Dichloroethane	1,1-Dichloroethane	1.06 (94)	2.8
	7.2	F039, U076	<2.0	K019	1,1-Dichloroethane	1,1-Dichloroethylene	1.28 (78)[c]	2.8
1,2-Dichloroethane	6.0	K018, K019, K020, K029	<2.0	K019	1,2-Dichloroethane	1,2-Dichloroethane	1.06 (94)	2.8
	6.2[d]	F025	<2.0	K019	1,2-Dichloroethane	1,2-Dichloroethane	1.1 (91)[d]	2.8
	7.2	F039, U077	<2.0	K019	1,2-Dichloroethane	1,1-Dichloroethylene	1.28 (78)[c]	2.8

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Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Halogenated Volatiles (Cont'd.)								
1,1-Dichloroethylene	6.0	K029	<2.0	K019	1,1-Dichloroethane	1,1-Dichloroethane	1.06 (94)	2.8
	6.2[d]	F025	<2.0	K019	1,1-Dichloroethylene	1,1-Dichloroethane	1.1 (91)[d]	2.8
	33	F039, U078	<10.0	K001-C	1,1-Dichloroethylene	1,1-Dichloroethylene	1.16 (86)[c]	2.8
trans-1,2-Dichloro-ethylene	33	F039, U079	<10.0	K001-C	trans-1,2-Dichloro-ethylene	1,1,-Dichloroethylene	1.16 (86)[c]	2.8
1,2-Dichloropropane	18	F039, K017, U083	<5.0	K019	1,2-Dichloropropane	1,1-Dichloroethylene	1.28 (78)[c]	2.8
cis-1,3-Dichloropropene	18	F039, U084	<5.0	K019	cis-1,3-Dichloropropane	1,1-Dichloroethylene	1.28 (78)[c]	2.8
trans-1,3-Dichloropropene	18	F039, U084	<5.0	K019	trans-1,3-Dichloropropene	1,1-Dichloroethylene	1.28 (78)[c]	2.8
Hexachloroethane	28	F039, U131	<10.0	K019	Hexachloroethane	Trichloroethylene	1 (107)[c]	2.8
	28	K016, K018, K095, K019, K028, K030	<10.0	K019	Hexachloroethane	Hexachloroethane	1 (103)	2.8
	30	F025, K073	<10.0	K019	Hexachloroethane	Hexachloroethane	1 (103)	2.8
Hexachloropropene	19	K030	<5.0	K019	1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzene	1.33 (75)[c]	2.8
	28	F039, U243	<10.0	K019	Hexachloropropene	Trichloroethylene	1 (107)[c]	2.8
Iodomethane	65	F039, U138	<20	K001-C	Iodomethane	1,1-Dichloroethylene	1.16 (86)[c]	2.8

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Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Halogenated Volatiles (Cont'd.)								
Methylene Chloride	31[d]	F025	<10.0	K019	Methylene chloride	1,1-Dichloroethane	1.1 (91)[d]	2.8
	33	F039, K086, U080, F001-F005	<10.0	K001-PCP	Methylene chloride	Trichloroethylene	1.19 (84)[c]	2.8
4,4-Methylene-bis-2-chloroaniline	35	F039, U158	<10.0	K001-PCP	4,4-Methylene-bis-2-chloroaniline	Di-n-propylnitrosamine	1.23 (81)[c]	2.8
Pentachloroethane	5.6	K018, K028, K030, K095, K096	<2.0	K019	bis(2-Chloroethyl) ether	bis(2-Chloroethyl) ether	1 (103)	2.8
1,1,1,2-Tetrachloro-ethane	5.6	K028, K095, K096	<2.0	K019	bis(2-Chloroethyl)ether	bis(2-Chloroethyl)ether	1 (103)	2.8
	42	F039, U208	<10.0	K001-C	1,1,1,2-Tetrachloroethane	Trichloroethylene	1.49 (67)[c]	2.8
1,1,2,2-Tetrachloroethane	5.6	K020, K028, K095, K096	<2.0	K019	bis(2-Chloroethyl)ether	bis(2-Chloroethyl)ether	1 (103)	2.8
	42	F039, U209	<10.0	K001-C	1,1,2,2-Tetrachloroethane	Trichloroethylene	1.49 (67)[c]	2.8

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[c]This number represents a constituent-specific matrix spike.

[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Halogenated Volatiles (Cont'd.)								
Tetrachloroethylene	5.6	F039, U210, F001-F005	<2.0	K019	Tetrachloroethylene	Trichloroethylene	1 (107)[c]	2.8
	6.0	K016, K019, K020, K028, K030, K095, K096	<2.0	K019	Tetrachloroethylene	Tetrachloroethylene	1.06 (94)	2.8
	6.2[d]	K073	<2.0	K019	Tetrachloroethylene	Tetrachloroethylene	1.1 (91)[d]	2.8
1,1,1-Trichloroethane	5.6	F039, K086, U226, F001-F005	<2.0	K019	1,1,1-Trichloroethane	Trichloroethylene	1 (107)[c]	2.8
	6.0	K018, K019, K028, K029	<2.0	K019	1,1,1-Trichloroethane	1,1,1-Trichloroethane	1.06 (94)	2.8
	6.2[d]	K073	<2.0	K019	1,1,1-Trichloroethane	1,1,1-Trichloroethane	1.1 (91)[d]	2.8
1,1,2-Trichloroethane	5.6	F039, U227, F001-F005	<2.0	K019	1,1,2-Trichloroethane	Trichloroethylene	1 (107)[c]	2.8
	6.0	K028, K095, K096	<2.0	K019	Tetrachloroethylene	Tetrachloroethylene	1.06 (94)	2.8
	6.2[d]	F025	<2.0	K019	1,1,2-Trichloroethane	1,1,2-Trichloroethane	1.1 (91)[d]	2.8
Trichloroethylene	5.6	F001-F005, F025, F039, K086, U228, K095, K096	<2.0	K019	Trichloroethylene	Trichloroethylene	1 (107)[c]	2.8

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[d] See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Halogenated Volatiles (Cont'd.)								
Trichloromonofluoro-methane	33	F039, U121, F001-F005	<10.0	K001-C	Trichloromonofluoro-methane	1,1-Dichloroethylene	1.16 (86)[c]	2.8
1,2,3-Trichloropropane	28	F039, K017	<10.0	K019	Hexachloroethane	Hexachloroethane	1 (103)	2.8
1,1,2-Trichloro-1,2,2-trifluoroethane	28	F001-F005, F039	<10.0	K019	Hexachloroethane	Hexachloroethane	1 (103)	2.8
Vinyl Chloride	6.0	K029	<2.0	K019	Chloroform	Chloroform	1.06 (94)	2.8
	33	F025, F039, U043	<10.0	K001-C	Vinyl Chloride	1,1-Dichloroethylene	1.16 (86)[c]	2.8

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Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Nonchlorinated Phenolics								
2-sec-Butyl-4,6-dinitrophenol (Dinoseb)	2.5	F039, P020	<0.36	3rd 3rd Test Burn (Test 1)	Dinoseb	Dinoseb	2.44 (41)[c]	2.8
Cresol (m- and p-isomers)	3.2	F039, U052, F001-F005	<1.0	K087	Cresol (m- and p-)	p-Chloro-m-cresol	1.15 (87)[c]	2.8
o-Cresol	5.6	F039, U052, F001-F005	<2.0	K019	o-Cresol	p-Chloro-m-cresol	1 (110)[c]	2.8
2,4-Dimethyl phenol	14	F039, U101	<5.0	K019	2,4-Dimethyl phenol	p-Chloro-m-cresol	1 (110)[c]	2.8
4,6-Dinitro-o-cresol	160	F039, P047	<50	K019	4,6-Dinitro-o-cresol	Phenol	1.11 (90)[c]	2.8
2,4-Dinitrophenol	5.6	K103, K104	<2.0	K019	bis(2-Chloroethyl)ether	bis(2-Chloroethyl)ether	1 (103)	2.8
	160	F039, P048	<50	K019	2,4-Dinitrophenol	Phenol	1.11 (90)[c]	2.8
(o)2-Nitrophenol	13	K102	<1.0	K102	(o)2-Nitrophenol	(p)4-Nitrophenol	4.76 (21)[c]	2.8
(p)4-Nitrophenol	29	F039, U170	<10.0	K019	(p)4-Nitrophenol	(p)4-Nitrophenol	1.03 (97)[c]	2.8

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[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Nonchlorinated Phenolics (Cont'd.)								
Phenol	3.4[d]	K060	<1.0	K087	Phenol	Phenol	1.21 (77)[c]	2.8
	4.4	K105	<0.33	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	Hexachlorobenzene	4.76 (21)[c]	2.8
	5.6[d]	K083	<2.0	K019	Phenol	Phenol	1 (103)	2.8
	5.6	K103, K104	<2.0	K019	Naphthalene	Naphthalene	1 (103)	2.8
	6.2	F039, U188	<2.0	K019	Phenol	Phenol	1.11 (90)[c]	2.8
	12	K022	<2.2	K022	Phenol	Phenol	1.96 (51)[c]	2.8

< - Indicates a detection limit value.
[a]See Table 5-2 for more information on treatment tests.
[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.
[c]This number represents a constituent-specific matrix spike.
[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Organo-Bromines								
Bromodichloromethane	15	F039	<5.0	EDB Test Burn	Ethylene Dibromide	Ethylene Dibromide	1.08 (93)[c]	2.8
Bromoform (Tribromomethane)	15	F039, U225	<5.0	EDB Test Burn	Ethylene Dibromide	Ethylene Dibromide	1.08 (93)[c]	2.8
Bromomethane	15	F039, U029, K117, K118, K131, K132, K136	<5.0	EDB Test Burn	Ethylene Dibromide	Ethylene Dibromide	1.08 (93)[c]	2.8
4-Bromophenyl phenyl ether	15	F039, U030	<5.0	EDB Test Burn	Ethylene Dibromide	Ethylene Dibromide	1.08 (93)[c]	2.8
Chlorodibromomethane	15	F039	<5.0	EDB Test Burn	Ethylene Dibromide	Ethylene Dibromide	1.08 (93)[c]	2.8
1,2-Dibromo-3-chloropropane	15	F039, U066	<5.0	EDB Test Burn	Ethylene Dibromide	Ethylene Dibromide	1.08 (93)[c]	2.8
Dibromomethane	15	F039, U068	<5.0	EDB Test Burn	Ethylene Dibromide	Ethylene Dibromide	1.08 (93)[c]	2.8
tris-(2,3-Dibromopropyl) phosphate	0.10	U235	<0.034	K037	Disulfoton	Disulfoton	1.10 (91)[c]	2.8
Ethylene Dibromide (1,2-Dibromoethane)	15	F039, U067, K117, K118, K136	<5.0	EDB Test Burn	Ethylene Dibromide	Ethylene Dibromide	1.08 (93)[c]	2.8

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[a]See Table 5-2 for more information on treatment tests.

[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[c]This number represents a constituent-specific matrix spike.

[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Organo-Nitrogen Compounds								
Acetonitrile	1.8	K011, K013, K014	<0.5	K011, K013, K014	Acetonitrile	Acetonitrile	1.27 (79)[c]	2.8
2-Acetylaminofluorene	140	F039, U005	<50	K001-PCP	2-Acetylaminofluorene	Acenaphthene	1 (120)[c]	2.8
Acrylamide	23	K011, K013, K014	<6.5	K011, K013, K014	Acrylamide	Acrylamide	1.27 (79)[c]	2.8
Acrylonitrile	84	F039, U009	<30	K102	Acrylonitrile	1,1-Dichloroethylene	1 (126)[c]	2.8
Aniline	5.6	K103, K104	<2.0	K019	Naphthalene	Naphthalene	1 (103)	2.8
	14	F039, U012	<5.0	K019	Aniline	4-Nitrophenol	1.03 (97)[c]	2.8
	14	K083	<5.0	K019	Aniline	Nitrobenzene	1 (103)	2.8
p-Chloroaniline	16	F039, P024	<5.0	K001-PCP	p-Chloroaniline	4-Nitrophenol	1.11 (90)[c]	2.8
1,4-Dinitrobenzene	2.3	F039	<0.3375	3rd 3rd Test Burn (Test 1)	1,4-Dinitrobenzene	Dinoseb	2.44 (41)[c]	2.8
2,4-Dinitrotoluene	140	F039, U105, K111	<50	K019	2,4-Dinitrotoluene	2,4-Dinitrotoluene	1 (107)[c]	2.8
2,6-Dinitrotoluene	28	F039, U106, K111	<10.0	K019	2,6-Dinitrotoluene	2,4-Dinitrotoluene	1 (107)[c]	2.8
Di-n-propylnitrosamine	14	F039, U111	<5.0	K019	Di-n-propylnitrosamine	Di-n-propylnitrosamine	1 (120)[c]	2.8

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[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[c]This number represents a constituent-specific matrix spike. .

[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Organo-Nitrogen Compounds (Cont'd.)								
Diphenylamine/ Diphenylnitrosamine	14	K083	<5.0	K019	Nitrobenzene	Nitrobenzene	1 (103)	2.8
	13	K022	<3.1	K022	Diphenylamine/ Diphenylnitrosamine	Diphenylamine/ Diphenylnitrosamine	1.54 (65)	2.8
Methacrylonitrile	84	F039, U152	<30	K102	Methacrylonitrile	1,1-Dichloroethylene	1 (126)[c]	2.8
Methapyrilene	1.5	F039, U155	<0.36	3rd 3rd Test Burn (Test 2)	Methapyrilene	Pronamide	1.45 (69)[c]	2.8
(o)2-Nitroaniline	14	K101	<2.0	K101	(o)2-Nitroaniline	(o)2-Nitroaniline	2.5 (40)	2.8
(p)4-Nitroaniline	28	F039, P077	<10.0	K019	(p)4-Nitroaniline	2,4-Dinitrotoluene	1 (107)[c]	2.8
Nitrobenzene	5.6	K103, K104	<2.0	K019	Naphthalene	Naphthalene	1 (103)	2.8
	14	F039, K086, U169, F001-F005	<5.0	K019	Nitrobenzene	4-Nitrophenol	1.03 (97)[c]	2.8
	14	K083	<5.0	K019	Nitrobenzene	Nitrobenzene	1 (103)	2.8
5-Nitro-o-toluidine	28	F039, U181	<10.0	K001-PCP	5-Nitro-o-toluidine	2,4-Dinitrotoluene	1 (120)[c]	2.8
N-Nitroso-di-n-butylamine	17	F039, U172	<5.0	K001-PCP	N-Nitroso-di-n-butylamine	Di-n-propylnitrosamine	1.23 (81)[c]	2.8
N-Nitrosomethyl-ethylamine	2.3	F039	<0.3375	3rd 3rd Test Burn (Test 1)	N-Nitrosomethyl-ethylamine	Dinoseb	2.44	2.8

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[a]See Table 5-2 for more information on treatment tests.
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[c]This number represents a constituent-specific matrix spike.
[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variabil Facto
Organo-Nitrogen Compounds (Cont'd.)								
N-Nitrosomorpholine	2.3	F039	<0.3375	3rd 3rd Test Burn (Test 1)	N-Nitrosomorpholine	Dinoseb	2.44	2.8
N-Nitrosopiperidine	35	F039, U179	<10.0	K001-PCP	N-Nitrosopiperidine	Di-n-propylnitrosamine	1.23 (81)[c]	2.8
N-Nitrosopyrrolidine	35	F039, U180	<10.0	K001-PCP	N-Nitrosopyrrolidine	Di-n-propylnitrosamine	1.23 (81)[c]	2.8
N-Nitrosodiethylamine	28	F039, U174	<10.0	K019	N-Nitrosodiethylamine	Di-n-propylnitrosamine	1 (120)[c]	2.8
Phenacetin	16	F039, U187	<5.0	K001-PCP	Phenacetin	4-Nitrophenol	1.11 (90)[c]	2.8
Pronamide	1.5	F039, U192	<0.33	3rd 3rd Test Burn (Test 2)	Pronamide	Pronamide	1.45 (69)[c]	2.8
Propanenitrile (Ethyl Cyanide)	360	F039, P101	<100	K019	Propanenitrile (Ethyl Cyanide)	1,1-Dichloroethylene	1.28 (78)[c]	2.8
Pyridine	16	F039, U196, F001-F005	<5.0	K001-PCP	Pyridine	Benzene	1.14 (88)[c]	2.8

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[c]This number represents a constituent-specific matrix spike.

[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Organo-Sulfur Pesticides								
Disulfoton	0.1	K036, K037, P039	<0.0335	K037	Disulfoton	Disulfoton	1.1 (91)[c]	2.8
	6.2	F039	<2.0	Leachate Data	Disulfoton	Disulfoton	1.09	2.8
Famphur	15	F039	<5.0	Leachate Data	Famphur	Famphur	1.09	2.8
	0.1	P097	<0.0335	K037	Disulfoton	Disulfoton	1.1 (91)[c]	2.8
Methyl Parathion	4.6	F039	<1.5	Leachate Data	Methyl Parathion	Parathion	1.09	2.8
	0.1	P071	<0.0335	K037	Disulfoton	Disulfoton	1.1 (91)[c]	2.8
Parathion	4.6	F039	<1.5	Leachate Data	Parathion	Parathion	1.09	2.8
	0.1	P089	<0.0335	K037	Disulfoton	Disulfoton	1.1 (91)[c]	2.8
Phorate	0.1	K038, K040, P094	<0.0335	K037	Disulfoton	Disulfoton	1.1 (91)[c]	2.8
	4.6	F039	<1.5	Leachate Data	Phorate	Phorate	1.09	2.8

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[c]This number represents a constituent-specific matrix spike.

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Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Oxygenated Hydrocarbons								
Acetone	160	F039, K086, U002, F001-F005	<50	K001-C	Acetone	1,1-Dichloroethylene	1.16 (86)[c]	2.8
Acetophenone	9.7	F039, U004, K086	<2.0	K102	Acetophenone	2,4-Dinitrotoluene	1.72 (58)[c]	2.8
	19	K022	<4.4	K022	Acetophenone	Acetophenone	1.54 (65)	2.8
n-Butanol	2.6	F039, K086, U031, F001-F005	<0.4	3rd 3rd Test Burn (Test 1)	n-Butanol	Methyl Isobutyl Ketone	2.33 (43)[c]	2.8
2-Chloronaphthalene	5.6	F039, U047	<2.0	K019	2-Chloronaphthalene	Acenaphthene	1 (110)[c]	2.8
Cyclohexanone	0.75[d]	F001-F005	0.14[d]	F001-F005	Methyl Ethyl Ketone	No accuracy correction data were used	-	5.34
1,4-Dioxane	170	F039, U108	<60	K102	1,4-Dioxane	Benzene	1 (104)[c]	2.8
Ethyl Acetate	33	F039, K086, U112, F001-F005	<10.0	K001-C	Ethyl Acetate	1,1-Dichloroethylene	1.16 (86)[c]	2.8
Ethyl Ether	160	F039, U117, F001-F005	<50	K001-PCP	Ethyl Ether	1,1-Dichloroethylene	1.16 (86)[c]	2.8
Ethyl Methacrylate	160	F039, U118	<50	K001-C	Ethyl Methacrylate	1,1-Dichloroethylene	1.16 (86)[c]	2.8
Isobutanol	170	F039, U140, F001-F005	<60	K102	Isobutanol	1,1-Dichloroethylene	1 (126)[c]	2.8
Isosafrole	2.6	F039, U141	<0.36	3rd 3rd Test Burn (Test 1)	Isosafrole	Isosafrole	2.56 (39)[c]	2.8

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Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Oxygenated Hydrocarbons (Cont'd.)								
Methanol	0.75[d]	F001-F005	0.14[d]	F001-F005	Methyl Ethyl Ketone	No accuracy correction data were used	-	5.34
Methyl Ethyl Ketone	36	F039, K086, U159, F001-F005	<10.0	K019	Methyl Ethyl Ketone	1,1-Dichloroethylene	1.28 (78)[c]	2.8
Methyl Isobutyl Ketone	33	F039, K086, U161, F001-F005	<10.0	K001-PCP	Methyl Isobutyl Ketone	Trichloroethylene	1.19 (84)[c]	2.8
Methyl Methacrylate	160	F039, U162	<50	K001-C	Methyl Methacrylate	1,1-Dichloroethylene	1.16 (86)[c]	2.8
Safrole	22	F039, U203	<5.0	K102	Safrole	p-Chloro-m-cresol	1.56 (64)[c]	2.8

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Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
PCBs and Dioxins								
Aroclor 1016	0.92	F039, K085	<0.065	3rd 3rd Test Burn (Test 2)	Methoxychlor	Methoxychlor	5 (20)[c,d]	2.8
Aroclor 1221	0.92	F039, K085	<0.065	3rd 3rd Test Burn (Test 2)	Methoxychlor	Methoxychlor	5 (20)[c,d]	2.8
Aroclor 1232	0.92	F039, K085	<0.065	3rd 3rd Test Burn (Test 2)	Methoxychlor	Methoxychlor	5 (20)[c,d]	2.8
Aroclor 1242	0.92	F039, K085	<0.065	3rd 3rd Test Burn (Test 2)	Methoxychlor	Methoxychlor	5 (20)[c,d]	2.8
Aroclor 1248	0.92	F039, K085	<0.065	3rd 3rd Test Burn (Test 2)	Methoxychlor	Methoxychlor	5 (20)[c,d]	2.8
Aroclor 1254	1.8	F039, K085	<0.13	3rd 3rd Test Burn (Test 2)	Methoxychlor	Methoxychlor	5 (20)[c,d]	2.8
Aroclor 1260	1.8	F039, K085	<0.13	3rd 3rd Test Burn (Test 2)	Methoxychlor	Methoxychlor	5 (20)[c,d]	2.8
Hexachlorodibenzo-furans	0.001	F039	<0.001	Dioxins Rule	-	-	-	-
Hexachlorodibenzo-p-dioxins	0.001	F039	<0.001	Dioxins Rule	-	-	-	-
Pentachlorodibenzo-furans	0.001	F039	<0.001	Dioxins Rule	-	-	-	-

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[c]This number represents a constituent-specific matrix spike.
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Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
PCBs and Dioxins (Cont'd.)								
Pentachlorodibenzo-p-dioxins	0.001	F039	<0.001	Dioxins Rule	-	-	-	-
Tetrachlorodibenzo-furans	0.001	F039	<0.001	Dioxins Rule	-	-	-	-
Tetrachlorodibenzo-p-dioxins	0.001	F039	<0.001	Dioxins Rule	-	-	-	-

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Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Phthalates								
Butyl Benzyl Phthalate	7.9	F039, K086	3.67	K019	bis(2-Ethylhexyl) phthalate	bis(2-Ethylhexyl) phthalate	1 (103)	2.16
Diethyl Phthalate	28	F039, K086, U088	<8.2	K024	Phthalic Anhydride	Phthalic Anhydride	1.19 (84)	2.8
Dimethyl Phthalate	28	F039, K086, U102	<8.2	K024	Phthalic Anhydride	Phthalic Anhydride	1.19 (84)	2.8
Di-n-butyl Phthalate	28	F039, K086, U069	<8.2	K024	Phthalic Anhydride	Phthalic Anhydride	1.19 (84)	2.8
Di-n-octyl Phthalate	28	F039, K086, U107	<8.2	K024	Phthalic Anhydride	Phthalic Anhydride	1.19 (84)	2.8
bis(2-Ethylhexyl) phthalate	28	F039, K086, U028	<8.2	K024	Phthalic Anhydride	Phthalic Anhydride	1.19 (84)	2.8
Phthalic Anhydride (as measured by phthalic acid)	28	K023, K024, K093, K094, U190	<8.2	K024	Phthalic Anhydride	Phthalic Anhydride	1.19 (84)	2.8

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[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.
[c]This number represents a constituent-specific matrix spike.
[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Polynuclear Aromatic Hydrocarbons								
Acenaphthalene	3.4	F039, K087	<1.0	K087	Acenaphthalene	Acenaphthalene	1.22 (82)	2.8
Acenaphthene	3.4	K035	<1.0	K087	Fluorene	Fluorene	1.22 (82)	2.8
	4.0[d]	F039	<0.65	K001-C	Acenaphthene	Acenaphthene	2.17 (46)	2.8
Anthracene	3.4	K015, K035	<1.0	K087	Anthracene	Anthracene	1.22 (82)	2.8
	4.0[d]	F039	<0.65	K001-C	Anthracene	Anthracene	2.17 (46)	2.8
Benz(a)anthracene	3.4	K035	<1.0	K087	Benz(a)anthracene	Benz(a)anthracene	1.22 (82)	2.8
	8.2	F039, U018	<1.0	K087	Benz(a)anthracene	Pyrene	2.94 (34)[c]	2.8
Benzo(a)pyrene	3.6[d]	K060	<1.0	K087	Benzo(a)pyrene	Benzo(a)pyrene	1.29 (82)	2.8
	3.4	K035	<1.0	K087	Benzo(a)pyrene	Benzo(a)pyrene	1.22 (82)	2.8
	8.2	F039, U022	<1.0	K087	Benzo(a)pyrene	Pyrene	2.94 (34)[c]	2.8
Benzo(b)fluoranthene	3.4	F039, K015	<1.0	K087	Benzo(b)fluoranthene	Benzo(b)fluoranthene	1.22 (82)	2.8
Benzo(k)fluoranthene	3.4	F039, K015	<1.0	K087	Benzo(k)fluoranthene	Benzo(k)fluoranthene	1.22 (82)	2.8
Benzo(g,h,i)perylene	1.5[d]	F039	<0.336	F024	Benzo(g,h,i)perylene	Benzo(g,h,i)perylene	1.61 (62)	2.8
Chrysene	3.4	K035, K087	<1.0	K087	Chrysene	Chrysene	1.22 (82)	2.8
	8.2	F039, U050	<1.0	K087	Chrysene	Pyrene	2.94 (34)[c]	2.8
Dibenz(a,h)anthracene	3.4	K035	<1.0	K087	Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	1.22 (82)	2.8
	8.2	F039, U063	<1.0	K087	Dibenz(a,h)anthracene	Pyrene	2.94 (34)[c]	2.8

< - Indicates a detection limit value.

[a]See Table 5-2 for more information on treatment tests.

[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[c]This number represents a constituent-specific matrix spike.

[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Polynuclear Aromatic Hydrocarbons (Cont'd.)								
Fluoranthene	3.4	K035, K087	<1.0	K087	Fluoranthene	Fluoranthene	1.22 (82)	2.8
	8.2	F039, U120	<1.0	K087	Fluoranthene	Pyrene	2.94 (34)[c]	2.8
Fluorene	3.4	K035	<1.0	K087	Fluorene	Fluorene	1.22 (82)	2.8
	4.0[d]	F039	<0.65	K001-C	Fluorene	Fluorene	2.17 (46)	2.8
Indeno(1,2,3-c,d)pyrene	3.4	K035, K087	<1.0	K087	Indeno(1,2,3-c,d)pyrene	Indeno(1,2,3-c,d)pyrene	1.22 (82)	2.8
	8.2	F039, U137	<1.0	K087	Indeno(1,2,3-c,d)pyrene	Pyrene	2.94 (34)[c]	2.8
3-Methylcholanthrene	15	F039, U157	<5.0	K001-PCP	3-Methylcholanthrene	Pyrene	1.04 (96)[c]	2.8
Naphthalene	1.5	K001, U051	<0.5	K001-PCP	Naphthalene	Naphthalene	1.06 (94)	2.8
	3.1	K086, F039, U165	<1.0	K087	Naphthalene	Acenaphthene	1.1 (91)[c]	2.8
	3.4	K035, K060, K087	<1.0	K087	Naphthalene	Naphthalene	1.22 (82)	2.8
	5.6	K019	<2.0	K019	Naphthalene	Naphthalene	1 (103)	2.8

< - Indicates a detection limit value.
[a]See Table 5-2 for more information on treatment tests.
[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.
[c]This number represents a constituent-specific matrix spike.
[d]See notes at end of this table.

Table 5-1 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard (mg/kg)	(2) Waste Code(s)	(3) Concentration in Treated Waste (mg/kg)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Polynuclear Aromatic Hydrocarbons (Cont'd.)								
Phenanthrene	1.5	K001, U051	<0.5	K001-PCP	Phenanthrene	Phenanthrene	1.06 (94)	2.8
	3.1	F039	<1.0	K087	Phenanthrene	Acenaphthene	1.1 (91)[c]	2.8
	3.4	K015, K035, K087	<1.0	K087	Phenanthrene	Phenanthrene	1.22 (82)	2.8
	5.6	K019	<2.0	K019	Phenanthrene	Phenanthrene	1 (103)	2.8
Pyrene	1.5	K001, U051	<0.5	K001-PCP	Pyrene	Pyrene	1.04 (96)[c]	2.8
	8.2	K035, F039	<1.0	K087	Pyrene	Pyrene	2.94 (34)[c]	2.8

< - Indicates a detection limit value.
[a]See Table 5-2 for more information on treatment tests.
[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.
[c]This number represents a constituent-specific matrix spike.
[d]See notes at end of this table.

Table 5-1 (Continued)

Notes:

Acenaphthene	In calculating the F039 treatment standard, the practical quantification limit (PQL) was used instead of the method detection limit. Since the PQL is characteristically five times greater than the detection limit, the F039 treatment standard is high by a factor of five, and should have been 0.8 mg/kg.
Anthracene	In calculating the F039 treatment standard, the PQL was used instead of the method detection limit. Since the PQL is characteristically five times greater than the detection limit, the F039 treatment standard is high by a factor of five, and should have been 0.8 mg/kg.
Aroclor 1016-1260	The matrix spike percent recovery for methoxychlor in the 3rd 3rd Test Burn Test 2 was below 20%. Matrix spike recoveries of less than 20% are no acceptable and are not used to correct detection limits. Since acceptable recoveries were not available for this constituent or any phenoxyacetic acid herbicides from 3rd 3rd Test Burn Test 2, a recovery of 20% was used for methoxychlor.
Benzo(a)pyrene	The accuracy correction factor used in the K060 treatment standard was transferred incorrectly from the K087 treatment test. The accuracy correcti factor was incorrectly transferred from phenol (1.29) instead of from the average of the semivolatile constituents (1.21). The correct K060 treatmen standard should have been 3.4 mg/kg.
Benzo(ghi)perylene	In calculating the F039 treatment standard, the incorrect accuracy correction factor was used (1.61). The correct accuracy correction factor was fro the semivolatile base/neutral constituents (1.90), yielding a treatment standard of 1.8 mg/kg.
Carbon Disulfide	The concentration in the treated waste and treatment standard for F001-F005 wastes represents the concentration in the TCLP extract.
Carbon Tetrachloride	The accuracy correction factors used in the F025, K021, and K073 treatment standards were transferred incorrectly from the K019 treatment test. accuracy correction factor for the average of the semivolatile constituents was incorrectly transferred as 1.1 instead of 1.06. The correct treatment standard should have been 6.0 mg/kg.
Chlordane	To account for both the alpha and gamma isomers of chlordane, the concentration in the treated waste was doubled in calculating the K032 and K0 treatment standards. This accounts for the K032 and K097 treatment standards of 0.26 mg/kg as opposed to the F039 and U036 treatment standar of 0.13 mg/kg.
Chlorobenzene	In calculating the treatment standard for K019 wastes, the variability factor, accuracy correction factor, and concentration in treated waste were incorrectly multiplied. The correct K019 treatment standard should have been 5.7 mg/kg.
Chloroform	The accuracy correction factors used in the F025, K021, and K073 treatment standards were transferred incorrectly from the K019 treatment test. accuracy correction factor for the average of the semivolatile constituents was incorrectly transferred as 1.1 instead of 1.06. The correct treatment standard should have been 6.0 mg/kg.
Cyclohexanone	The concentration in the treated waste and treatment standard for F001-F005 wastes represents the concentration in the TCLP extract.

Table 5-1 (Continued)

2,4-D	The matrix spike percent recovery for 2,4-D in the 3rd 3rd Test Burn Test was below 20%. Matrix spike recoveries of less than 20% are not acceptable and are not used to correct detection limits. Since acceptable recoveries were not available for this constituent or any phenoxyacetic acid herbicides from 3rd 3rd Test Burn Test 2, a recovery of 20% was used for 2,4-D.
1,2-Dichloroethane	The accuracy correction factor used in the F025 treatment standard was transferred incorrectly from the K019 treatment test. The accuracy correction factor for the average of the semivolatile constituents was incorrectly transferred as 1.1 instead of 1.06. The correct treatment standard should have been 6.0 mg/kg.
1,1-Dichloroethylene	The accuracy correction factor used in the F025 treatment standard was transferred incorrectly from the K019 treatment test. The accuracy correction factor for the average of the semivolatile constituents was incorrectly transferred as 1.1 instead of 1.06. The correct treatment standard should have been 6.0 mg/kg.
Fluorene	In calculating the F039 treatment standard, the PQL was used instead of the method detection limit. Since the PQL is characteristically five times greater than the detection limit, the F039 treatment standard is high by a factor of five, and should have been 0.8 mg/kg.
Methanol	The concentration in the treated waste and treatment standard for F001-F005 wastes represents the concentration in the TCLP extract.
Methoxychlor	The matrix spike percent recovery for this constituent in the 3rd 3rd Test Burn Test 2 was below 20%. Matrix spike recoveries of less than 20% are not acceptable and are not used to correct detection limits. Since acceptable recoveries were not available for this constituent or any phenoxyacetic acid herbicides from 3rd 3rd Test Burn Test 2, a recovery of 20% was used for methoxychlor.
Methylene Chloride	The accuracy correction factor used in the F025 treatment standard was transferred incorrectly from the K019 treatment test. The accuracy correction factor for the average of the semivolatile constituents was incorrectly transferred as 1.1 instead of 1.06. The correct treatment standard should have been 3.0 mg/kg.
Phenol	The accuracy correction factor used in the K060 treatment standard was transferred incorrectly from the K087 treatment test. The accuracy correction factor was incorrectly transferred from the average of the semivolatile constituents (1.21) instead of from phenol (1.29). The correct K060 treatment standard should have been 3.6 mg/kg.
Phenol	The accuracy correction factor used in the K083 treatment standard was transferred incorrectly from the K019 treatment test. The accuracy correction factor was incorrectly transferred as 1 when the correct value was 1.11. The correct K083 treatment standard should have been 6.2 mg/kg.
Silvex (2,4,5-TP)	The matrix spike percent recovery for 2,4-D in the 3rd 3rd Test Burn Test was below 20%. Matrix spike recoveries of less than 20% are not acceptable and are not used to correct detection limits. Since acceptable recoveries were not available for this constituent or any phenoxyacetic acid herbicides from 3rd 3rd Test Burn Test 2, a recovery of 20% was used for 2,4-D.
2,4,5-T	The matrix spike percent recovery for 2,4-D in the 3rd 3rd Test Burn Test was below 20%. Matrix spike recoveries of less than 20% are not acceptable and are not used to correct detection limits. Since acceptable recoveries were not available for this constituent or any phenoxyacetic acid herbicides from 3rd 3rd Test Burn Test 2, a recovery of 20% was used for 2,4-D.

Table 5-1 (Continued)

Tetrachloroethylene	The accuracy correction factor used in the K073 treatment standard was transferred incorrectly from the K019 treatment test. The accuracy correction factor for the average of the semivolatile constituents was incorrectly transferred as 1.1 instead of 1.06. The correct treatment standard should have been 6.0 mg/kg.
2,3,4,6-Tetrachloro-phenol	In calculating the F039 treatment standard, the PQL was used instead of the method detection limit. Since the PQL is characteristically five times greater than the detection limit, the F039 treatment standard is high by a factor of five, and should have been 0.8 mg/kg.
1,1,1-Trichloroethane	The accuracy correction factor used in the K073 treatment standard was transferred incorrectly from the K019 treatment test. The accuracy correction factor for the average of the semivolatile constituents was incorrectly transferred as 1.1 instead of 1.06. The correct treatment standard should have been 6.0 mg/kg.
1,1,2-Trichloroethane	The accuracy correction factor used in the F025 treatment standard was transferred incorrectly from the K019 treatment test. The accuracy correction factor for the average of the semivolatile constituents was incorrectly transferred as 1.1 instead of 1.06. The correct treatment standard should have been 6.0 mg/kg.
2,4,5-Trichlorophenol	In calculating the F039 treatment standard, the PQL was used instead of the method detection limit. Since the PQL is characteristically five times greater than the detection limit, the F039 treatment standard is high by a factor of five, and should have been 0.8 mg/kg.
2,4,6-Trichlorophenol	In calculating the F039 treatment standard, the PQL was used instead of the method detection limit. Since the PQL is characteristically five times greater than the detection limit, the F039 treatment standard is high by a factor of five, and should have been 0.8 mg/kg.
Toxaphene	Treatment standards for toxaphene were based on the transfer of performance data from chlordane from the 3rd 3rd Test Burn Test 2. Because the detection limits for toxaphene are typically ten times greater than chlordane, the concentration in the treated waste for chlordane was multiplied by ten to calculate the treatment standard for toxaphene. In calculating the K032 and K097 treatment standards, the concentration in the treated waste was doubled to account for both the alpha and gamma isomers of chlordane. This accounts for the K032 and K097 treatment standards of 2.6 mg/kg as opposed to the F039 and P123 treatment standards of 0.13 mg/kg.

Table 5-2

Treatment Tests from Which Treatment Performance Data for Organic Constituents Were Used

Waste Tested	Technology Used	On-Site Engineering Report Reference(s)[a]	Background Document Reference(s)
K001-PCP (Pentachlorophenol)	Rotary Kiln Incineration	6	28
K001-C (Creosote)	Rotary Kiln Incineration	7	28
K011, K013, K014	Rotary Kiln Incineration	74	71
K019	Rotary Kiln Incineration	8	31
K022	Fuel Substitution[b]	-	73
K024	Rotary Kiln Incineration	9	34
K037	Rotary Kiln Incineration	10	38
K087	Rotary Kiln Incineration	11	44
K101	Rotary Kiln Incineration	12	45
K102	Rotary Kiln Incineration	13	45
F001-F005	Incineration	14	47
F024	Rotary Kiln Incineration	15	75
3rd 3rd Multi-constituent Pesticide Test Burn, Test 1 (U141, U028, P020, U122, U226, U239, U080, U220, U166, U161, U188)	Rotary Kiln Incineration	16	-
3rd 3rd Multi-constituent Pesticide Test Burn, Test 2 (D014, D016, F059, U127, U192)	Rotary Kiln Incineration	16	-
Ethylene Dibromide (EDB) Test Burn	Rotary Kiln Incineration	17	-
Leachate Data from Treated Bio-Solids	Thermal Drying	18	-

[a]See list of references in Section 8.0.
[b]Incineration was also identified as BDAT for K022.

Table 5-3

Treatment Performance Database for Metal Constituents (Nonwastewaters)

Constituent Selected for Regulation	(1) Treatment Standard: Concentration in TCLP Extract (mg/L)	(2) Waste Code(s)	(3) Concentration in TCLP Extract of Treated Waste (mg/L)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Factor Was Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Antimony	2.1	K061	0.655	K061-HRD	Antimony	Antimony	1.09 (92)	2.9
	0.23	K021, F039	<0.060	K019	Antimony	Antimony	1.35 (74)	2.8
Arsenic	0.055	K061	0.013	K061-IMS	Arsenic	Arsenic	1.14 (88)	3.9
	5.6	K031, K084, K101, K102, P010, P011, P036, P038, U136	1.79	D004	Arsenic	Arsenic	1.11 (90)	2.8
	5.0	F039	-	Characteristic Level for Arsenic (D004)	-	-	-	-
Barium	7.6	K061	2.51	K061-SKF	Barium	Barium	1.08 (93)	2.8
	52	F039, P013	12.8	D005	Barium	Barium	1.18 (85)	3.5
Beryllium	0.014	K061	0.0073	K061-INMETCO	Beryllium	Beryllium	1 (100)	1.9
Cadmium	0.19	K061	<0.060	K061-HRD	Cadmium	Cadmium	1.15 (87)	2.8
	0.066	F006, F007, F008, F009, F011, F012, F039, K100	0.017	F006	Cadmium	Cadmium	1.02 (97.9), 1.06 (94.3)	3.72
	0.14	K069	0.052	K061 (Stabilization)	Cadmium	Cadmium	1.04 (96)	2.41

< - Indicates a value less than the detection limit.

[a]See Table 5-5 for more information on treatment tests.

[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

Table 5-3 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard: Concentration in TCLP Extract (mg/L)	(2) Waste Code(s)	(3) Concentration in TCLP Extract of Treated Waste (mg/L)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Factor Was Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Chromium (Total)	0.33	K061	<0.080	K061-HRD	Chromium	Chromium	1.47 (68)	2.8
	5.2	F006, F007, F008, F009, F011, F012, F019, F039, K100, K061 (Stabilization), K006 (Hydrated)	0.57	F006	Chromium	Chromium	1.17 (85.8), 1.15 (86.6)	7.94
	0.094	K002-K008, K062, K086, U032	0.052	K062	Chromium	Chromium	1.47 (68)	1.29
	1.7	K015, K048-K052	1.14	K048-K052	Chromium	Chromium	1.30 (77)	1.14
	0.073	F024, K028	0.018	F024	Chromium	Chromium	1.15 (87.2)	3.5
Lead	0.37	K061	<0.10	K061-HRD	Lead	Lead	1.32 (76)	2.8
	0.51	K001, K087, K100, F006, F007, F008, F009, F011, F012, F039, U051, U144, U145, U146, P110	0.35	F006	Lead	Lead	1.08 (92.9)	1.37

< - Indicates a value less than the detection limit.

[a]See Table 5-5 for more information on treatment tests.

[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

Table 5-3 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard: Concentration in TCLP Extract (mg/L)	(2) Waste Code(s)	(3) Concentration in TCLP Extract of Treated Waste (mg/L)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Factor Was Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Lead (Continued)	0.37	K002-K008, K062, K086	<0.10	K062	Lead	Lead	1.32 (76)	2.8
	0.24	K069	0.095	K061 (Stabilization)	Lead	Lead	1.56 (68)	2.74
	0.18	K046	0.078	K046	Lead	Lead	1.30 (77)	1.76
	0.021	K028	0.008	F024	Lead	Lead	1.28 (78.4)	2.0
Mercury	0.009	K061	<0.0030	K061-HRD	Mercury	Mercury	1.05 (95)	2.8
	0.025	K071, F039, K106 and U151 (Low mercury, non-RMERC residues), P065, P092 (Low mercury, incinerator residues)	0.0043	K071	Mercury	Mercury	1.05 (95)	5.4
	0.20	K106, U151, P065 and P092 (Low mercury, RMERC residues)	-	Characteristic Level for Mercury (D009)	-	-	-	-

< - Indicates a value less than the detection limit.

[a]See Table 5-5 for more information on treatment tests.

[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

Table 5-3 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard: Concentration in TCLP Extract (mg/L)	(2) Waste Code(s)	(3) Concentration in TCLP Extract of Treated Waste (mg/L)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Factor Was Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Nickel	5.0	K061	2.54	K061-INMETCO	Nickel	Nickel	1.05 (95)	1.9
	0.32	F006, F007, F008, F009, F011, F012, F039, K115, K061 (Stabilization) P073, P074	0.063	F006	Nickel	Nickel	1.11 (90.3), 1.15 (86.6)	4.47
	0.2	K015, K048-K052	0.0733	K048-K052	Nickel	Nickel	-	2.77
	0.088	F024, K028, K083	0.025	F024	Nickel	Nickel	1.26 (79.7)	2.8
Selenium	0.16	K061	<0.05	K061-SKF	Selenium	Selenium	1.11 (90)	2.8
	5.7	F039, P103, P114, U204, U205	0.67	D010	Selenium	Selenium	1.18 (85)	7.15
Silver	0.30	K061	<0.080	K061-HRD	Silver	Silver	1.32 (76)	2.8
	0.072	F006, F007, F008, F009, F011, F012, P099, P104	0.048	F006	Silver	Silver	1.18 (84.8)	1.29

< - Indicates a value less than the detection limit.

[a]See Table 5-5 for more information on treatment tests.

[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

Table 5-3 (Continued)

Constituent Selected for Regulation	(1) Treatment Standard: Concentration in TCLP Extract (mg/L)	(2) Waste Code(s)	(3) Concentration in TCLP Extract of Treated Waste (mg/L)	(4) Treatment Test[a] From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Factor Was Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Thallium	0.078	K061	<0.024	K061-INMETCO	Thallium	Thallium	1.16 (86)	2.8
Zinc	5.3	K061	0.602	K061-IMS	Zinc	Zinc	1.02 (98)	8.6

< - Indicates a value less than the detection limit.

[a]See Table 5-5 for more information on treatment tests.

[b]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

Table 5-4

Treatment Performance Database for Vanadium (Nonwastewaters)

Constituent Selected for Regulation	(1) Potential Treatment Standard (mg/L)	(2) Waste Code	(3) Concentration in TCLP Extract of Treated Waste (mg/L)	(4) Treatment Test(s) From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
HTMR Performance Data from Horsehead Resource Development Company (HRD)								
Vanadium	0.20	K061	0.50	K061-HRD	Vanadium	Vanadium	1.19 (84)[a]	3.4
HTMR Performance Data from International Mills Service (IMS)								
Vanadium	0.23	K061	0.0944	K061-IMS	Vanadium	Vanadium	1.02 (98)[a]	2.4
HTMR Performance Data from SKF Plasma Technologies (SKF)								
Vanadium	0.056	K061	<0.020	K061-SKF, IMS[1]	Vanadium	Vanadium	1.02 (98)[a]	2.8
HTMR Performance Data from International Metals Reclamation Company (INMETCO)								
Vanadium	0.11	K061	<0.040	K061-INMETCO, IMS[1]	Vanadium	Vanadium	1.02 (98)[a]	2.8

[1]Matrix spike data were transferred from the IMS plasma furnace matrix spike slag data since no matrix spiked data were available for these data.
< - Indicates a detection limit value.
[a]This number represents a constituent-specific matrix spike.
[b]Performance consists of concentration in treated waste, accuracy correction factor, and variability factor.

Source: Reference 61.

Table 5-5

Treatment Performance Database for Chromium (Nonwastewaters)

Constituent Selected for Regulation	(1) Potential Treatment Standard (mg/L)	(2) Waste Code	(3) Concentration in TCLP Extract of Treated Waste (mg/L)	(4) Treatment Test(s) From Which the Performance Data[b] Were Transferred	(5) Constituent From Which the Concentration in Treated Waste Was Transferred	(6) Constituent From Which the Accuracy Correction Data Were Transferred	(7) Accuracy Correction Factor (Matrix Spike % Recovery)	(8) Variability Factor
Stabilization Performance Data from Cyanokem Corporation								
Chromium	0.86	D007	0.16	D007-Cyanokem	Chromium	Chromium	1 (105)[a]	5.4

[a]This number represents a constituent-specific matrix spike.
[b]Performance consists of concentration in treated waste, accuracy correction factor, and variability factor.

Source: Reference 52.

Table 5-6

Treatment Tests from Which Treatment Performance Data for Metal Constituents Were Used

Waste Tested	Technology Used	On-Site Engineering Report Reference(s)	Background Document Reference(s)
D004	Slag Vitrification	-	50
D005	Stabilization	-	51
D007-Cyanokem	Stabilization	-	52
D010	Stabilization	-	50
F006	Stabilization	-	56
F024	Stabilization	19	75
K019	Incineration	8	31
K046	Stabilization	20	58
K048-K052	Stabilization	21, 22	59, 60
K061 - Horsehead Resource Development Company (HRD)	HTMR	23	61
K061 - International Metals Reclamation Company (INMETCO)	HTMR	-	61
K061 - International Mills Service (IMS)	HTMR	-	61
K061 - SKF Plasma Technologies (SKF)	HTMR	-	61
K061	Stabilization	24	-
K062	Chromium Reduction Followed by Chemical Precipitation and Filtration	25	62
K071	Acid Leaching	26	64

6.0 DEVELOPMENT OF NONWASTEWATER UNIVERSAL STANDARDS

This section presents the development of nonwastewater treatment standards for the organic and metal constituents selected for regulation using the available treatment performance data presented in Section 5.0.

Table 6-1 presents the universal standard, treatability group, and waste code upon which the universal standard was based for each constituent selected for regulation. This table also includes a cross-reference guide for locating the constituent-specific discussions of the determination of universal standards.

6.1 Determination of Universal Standards for Organic Constituents

The Agency identified universal standards for organic constituents using the following methodology:

(1) The Agency selected organic constituents for regulation;

(2) For each organic constituent selected, the Agency listed BDAT treatment performance data (i.e., data used to develop BDAT nonwastewater treatment standards in previous rulemakings) by waste code in Table 5-1; data included the concentration of the constituent in the treated waste, the accuracy correction factor used (and its basis), and the variability factor used; and

(3) The Agency evaluated the data on a constituent-by-constituent basis to determine the data most appropriate to establish a universal standard.

These steps are described in more detail below.

The development of universal standards for organic constituents began with the selection of organic constituents selected for regulation from constituents on the BDAT List and other hazardous constituents regulated under the Land Disposal Restrictions Program. Section 3.0 explains the process for the selection of regulated constituents for universal standards.

This list of constituents was organized into treatability groups that categorize the organic constituents by similarities in elemental composition and functional groups. Because of these similarities, constituents within each treatability group were expected to be treated to similar levels. The organic constituents were divided into the following fourteen treatability groups:

- Aromatic Hydrocarbons
- Carbon Disulfide
- Chlorinated Pesticides
- Chlorinated Phenolics and Derivatives
- Chlorobenzenes
- Halogenated Volatiles
- Non-Chlorinated Phenolics
- Organo-Bromines
- Organo-Nitrogen Compounds
- Organo-Sulfur Pesticides
- Oxygenated Hydrocarbons
- PCBs and Dioxins
- Phthalates
- Polynuclear Aromatic Hydrocarbons

Universal standards were determined utilizing treatment performance data that had been used to develop nonwastewater treatment standards in the First, Second, and Third Thirds and Phase I Land Disposal Restrictions rulemakings.

To determine a universal standard for a specific constituent, it was necessary to examine the data used in calculating each promulgated treatment standard for that constituent. Table 5-1 presents the constituent-specific BDAT treatment

performance data for each waste code to which universal standards are applicable. The data used to compute the treatment standard include the concentration of the constituent in the treated waste, an accuracy correction factor, and a variability factor.

When treatment performance data were not available for treatment of a specific waste code, data were transferred from treatment of a similar waste. Table 5-1 presents the constituent and treatment test from which the concentration in the treated waste were transferred. The basis for the transfer of an accuracy correction factor is also included in this table.

The data in Table 5-1 were examined to determine trends within each treatability group. Notable trends included data transfers from specific constituents, similar detection levels, similar treatment standards among constituents, and use of performance data from the same treatment test. In general, the various treatment standards for constituents in a specific treatability group were comparable in magnitude; individual standards with values substantially higher than the majority usually signified a waste that was more difficult to treat or analyze.

Universal standards for organic constituents in nonwastewater forms of listed wastes were chosen on a constituent-by-constituent basis. Six factors were considered in selecting a treatment standard value:

(1) Where possible, the Agency preferred to use treatment performance data (i.e., the matrix spike recovery data, detection limit, and variability factor shown in Table 5-1) for the constituent of concern.

(2) When treatment performance data for the constituent of concern were unavailable. the Agency used treatment performance data from a constituent in the same treatability group.

(3) The Agency evaluated the matrix spike recovery data to determine whether the recoveries were within the acceptable range of values, as identified in EPA's Generic Quality Assurance Project Plan for Land Disposal Restrictions Program (BDAT) (66).

(4) When evaluating the matrix spike recovery data, the Agency preferred to use a matrix spike recovery for a specific constituent instead of a value averaged over a group of constituents (e.g., volatile organics).

(5) The Agency examined the method detection limit to determine if it could be met routinely by industry.

(6) The Agency compared the treatment standard corresponding to the "best" data to the detection limits obtained for other waste codes to determine if the constituent could be treated to similar levels in similar waste codes.

Table 6-2 summarizes the data used as the basis of the universal standards for regulated organic constituents in nonwastewater forms of listed hazardous wastes. This table includes the waste code and treatment performance data from which each organic nonwastewater universal standard was transferred, and the universal standard.

6.1.1 Determination of Nonwastewater Universal Standards for Aromatic Hydrocarbons

Nonwastewater treatment performance data for the regulated constituents in the aromatic hydrocarbons treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the determination of the universal standards is given below.

Benzene

The universal standard for benzene was determined to be 10 mg/kg, based upon the K083 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The universal standard for benzene was not based upon the F039 and U019 treatment standard data because the detection limit was considered to be an outlier compared to detection limits from other incineration tests.

Likewise, the Agency believes that the K060 and K087 standard of 0.071 mg/kg is not reasonable for a universal standard based on other incineration test detection limits. The Agency believes that a universal standard of 10 mg/kg can be routinely met by industry, considering the detection limits reported for benzene in other waste codes.

Ethylbenzene

The universal standard for ethylbenzene was determined to be 10 mg/kg, based upon the F001-F005, F039, and K086 treatment standards, which represent the only concentration-based standards the Agency has promulgated for this constituent based on the performance of incineration. The Agency believes that a universal standard of 10 mg/kg can be routinely met by industry, considering the detection limits reported for ethylbenzene in other waste codes.

Toluene

The universal standard for toluene was determined to be 10 mg/kg, based upon the K015 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The universal standard for toluene was not based upon the F001-F005, F039, K001, K037, K086, U051, and U220 treatment standards because the detection limit was considered to be an outlier compared to detection limits from other incineration tests. Likewise, the Agency believes that the K087 standard of 0.65 mg/kg and K022 standard of 0.034 mg/kg are not reasonable for a universal standard based on other incineration test detection limits. The universal standard was established at 10 mg/kg so that the treatment standard could be routinely met by industry, considering the detection limits reported for toluene in other waste codes.

Xylenes (Total)

The universal standard for total xylenes was determined to be 30 mg/kg, based upon the F001-F005, K001, and U051 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency believes that the K087 standard of 0.070 mg/kg is not reasonable for a universal standard based on other incineration test detection limits. The universal standard was established at 30 mg/kg to maintain consistency within the treatability group.

6.1.2 Determination of the Nonwastewater Universal Standard for Carbon Disulfide

Nonwastewater treatment performance data for carbon disulfide is presented in Table 5-1. The discussion of the determination of the universal standard is given below.

Carbon Disulfide

The universal standard for carbon disulfide was determined to be 4.8 mg/L (as measured by the concentration in the TCLP waste extract) based on the F001-F005 treatment standard, which represents the only concentration-based treatment standard the Agency has promulgated to date for this constituent. Because the treatment of carbon disulfide, cyclohexanone, and methanol is expected to be controlled by the regulation of other organic compounds, the universal standard is applicable only if these constituents are the only regulated hazardous constituents identified in the waste.

6.1.3 Determination of Nonwastewater Universal Standards for Chlorinated Pesticides

Nonwastewater treatment performance data for the regulated constituents in the chlorinated pesticides treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the determination of the universal standards is given below.

Aldrin

The universal standard for aldrin was determined to be 0.066 mg/kg, based upon the F039 and P004 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

alpha-BHC

The universal standard for alpha-BHC was determined to be 0.066 mg/kg, based upon the F039 and U129 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

beta-BHC

The universal standard for beta-BHC was determined to be 0.066 mg/kg, based upon the F039 and U129 treatment standards, which represent the only concentration-based standard the Agency has promulgated to date for this constituent.

delta-BHC

The universal standard for delta-BHC was determined to be 0.066 mg/kg, based upon the F039 and U129 treatment standards, which represent the only concentration-based standard the Agency has promulgated to date for this constituent.

gamma-BHC (Lindane)

The universal standard for gamma-BHC was determined to be 0.066 mg/kg, based upon the F039 and U129 treatment standards, which represent the only concentration-based standard the Agency has promulgated to date for this constituent.

Chlordane

The universal standard for chlordane was determined to be 0.26 mg/kg, based upon the K032 and K097 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The two isomers of chlordane, alpha and gamma, were also considered in calculating the K032 and K097 treatment standards.

o,p'-DDD

The universal standard for o,p'-DDD was determined to be 0.087 mg/kg, based upon the F039, U060, and U061 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

p,p'-DDD

The universal standard for p,p'-DDD was determined to be 0.087 mg/kg, based upon the F039, U060, and U061 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

o,p'-DDE

The universal standard for o,p'-DDE was determined to be 0.087 mg/kg, based upon the F039 and U061 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

p,p'-DDE

The universal standard for p,p'-DDE was determined to be 0.087 mg/kg, based upon the F039 and U061 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

o,p'-DDT

The universal standard for o,p'-DDT was determined to be 0.087 mg/kg, based upon the F039 and U061 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

p,p'-DDT

The universal standard for p,p'-DDT was determined to be 0.087 mg/kg, based upon the F039 and U061 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Dieldrin

The universal standard for dieldrin was determined to be 0.13 mg/kg, based upon the F039 and P037 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Endosulfan I

The universal standard for endosulfan I was determined to be 0.066 mg/kg, based upon the F039 and P050 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Endosulfan II

The universal standard for endosulfan II was determined to be 0.13 mg/kg, based upon the F039 and P050 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Endosulfan Sulfate

The universal standard for endosulfan sulfate was determined to be 0.13 mg/kg, based upon the F039 and P050 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Endrin

The universal standard for endrin was determined to be 0.13 mg/kg, based upon the F039 and P051 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Endrin Aldehyde

The universal standard for endrin aldehyde was determined to be 0.13 mg/kg, based upon the F039 and P051 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Heptachlor

The universal standard for heptachlor was determined to be 0.066 mg/kg, based upon the F039, P059, K032, and K097 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Heptachlor Epoxide

The universal standard for heptachlor epoxide was determined to be 0.066 mg/kg, based upon the F039, P059, K032, and K097 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Hexachlorobutadiene

The universal standard for hexachlorobutadiene was determined to be 5.6 mg/kg, based upon the K016, K018, K028, and K030 treatment standard data. The Agency chose to use the K016, K018, K028, and K030 treatment standard data rather than the F025, F039, and U128 treatment standard data because the detection limit used in calculating the F025, F039, and U128 standards was considered to be an outlier compared to detection limits from other incineration tests. The Agency believes that a universal standard of 5.6 mg/kg may be reasonably achieved based on the detection limits reported for hexachlorobutadiene in other waste codes.

Hexachlorocyclopentadiene

The universal standard for hexachlorocyclopentadiene was determined to be 2.4 mg/kg, based upon the K032, K033, K034, and K097 treatment standard data. The Agency chose to use the K032, K033, K034, and K097 treatment standard data since

these data represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency believes that a universal standard of 2.4 mg/kg may be reasonably achieved based on detection limits reported for hexachlorocyclopentadiene in other waste codes.

Isodrin

The universal standard for isodrin was determined to be 0.066 mg/kg, based upon the F039 and P060 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Kepone

The universal standard for kepone was determined to be 0.13 mg/kg, based upon the F039 and U142 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Methoxychlor

The universal standard for methoxychlor was determined to be 0.18 mg/kg, based on the F039 and U247 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Toxaphene

The universal standard for toxaphene was determined to be 2.6 mg/kg, based upon the K041 and K098 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from a characteristically similar constituent. The detection limit transferred in these standards was 10 times that of chlordane to account for the characteristic differences

between the two compounds. The Agency believes that the transfer of data which incorporate the characteristic differences between toxaphene and chlordane is appropriate.

6.1.4 Determination of Nonwastewater Universal Standards for Chlorinated Phenolics and Derivatives

Nonwastewater treatment performance data for the regulated constituents in the chlorinated phenolics and derivatives treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the determination of the universal standards is given below.

p-Chloro-m-cresol

The universal standard for p-chloro-m-cresol was determined to be 14 mg/kg, based upon the F039 and U039 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

2-Chlorophenol

The universal standard for 2-chlorophenol was determined to be 5.7 mg/kg, based upon the F039 and U048 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency believes that a universal standard of 5.7 mg/kg may be reasonably achieved based on detection limits reported for 2-chlorophenol in other waste codes.

2,4-Dichlorophenol

The universal standard for 2,4-dichlorophenol was determined to be 14 mg/kg, based upon the F039 and U081 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

2,6-Dichlorophenol

The universal standard for 2,6-dichlorophenol was determined to be 14 mg/kg, based upon the F039 and U082 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

2,4-Dichlorophenoxyacetic acid (2,4-D)

The universal standard for 2,4-D was determined to be 10 mg/kg, based upon the F039 and U240 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Pentachlorophenol

The universal standard for pentachlorophenol was determined to be 7.4 mg/kg, based upon the F039, K001, and U051 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Silvex (2,4,5-TP)

The universal standard for 2,4,5-TP was determined to be 7.9 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard promulgated to date for this constituent.

2,4,5-T

The universal standard for 2,4,5-T was determined to be 7.9 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard promulgated to date for this constituent.

2,3,4,6-Tetrachlorophenol

The universal standard for 2,3,4,6-tetrachlorophenol was determined to be 7.4 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard promulgated to date for this constituent.

The treatment standard for F039 was calculated incorrectly from the practical quantification limit, which is five times higher than the detection limit (this discrepancy is explained in Table 5-1). The treatment performance data transferred for the universal standard are correct.

2,4,5-Trichlorophenol

The universal standard for 2,4,5-trichlorophenol was determined to be 7.4 mg/kg, based upon the F039 treatment standard data. The Agency chose not to use the K105 data because EPA believes that the K105 standard of 4.4 mg/kg is not reasonable for a universal standard based on other incineration test detection limits.

The treatment standard for F039 was calculated incorrectly from the practical quantification limit, which is five times higher than the detection limit (this discrepancy is explained in Table 5-1). The treatment performance data transferred for the universal standard are correct.

2,4,6-Trichlorophenol

The universal standard for 2,4,6-trichlorophenol was determined to be 7.4 mg/kg, based upon the F039 treatment standard data. The Agency chose not to use the K105 data because EPA believes that the K105 standard of 4.4 mg/kg is not reasonable for a universal standard based on other incineration test detection limits.

The treatment standard for F039 was calculated incorrectly from the practical quantification limit, which is five times higher than the detection limit (this discrepancy is explained in Table 5-1). The treatment performance data transferred for the universal standard are correct.

6.1.5 Determination of Nonwastewater Universal Standards for Chlorobenzenes

Nonwastewater treatment performance data for the regulated constituents in the chlorobenzene treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the determination of the universal standards is given below.

Chlorobenzene

The universal standard for chlorobenzene was determined to be 6.0 mg/kg based upon the K019, F039, U037, and F001-F005 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The universal standard was established at 6.0 mg/kg to maintain consistency within the treatability group. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for chlorobenzene in other waste codes.

m-Dichlorobenzene

The universal standard for m-dichlorobenzene was determined to be 6.0 mg/kg, based upon the F039 and U071 treatment standard data. The Agency chose to use these data because they represent the use of a detection limit from the same constituent as the constituent of concern and the accuracy correction factor from p-dichlorobenzene, a constituent with similar composition and structure. The universal standard was established at 6.0 mg/kg to maintain consistency within the treatability group. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for m-dichlorobenzene in other waste codes.

o-Dichlorobenzene

The universal standard for o-dichlorobenzene was determined to be 6.0 mg/kg, based upon the F001-F005, F039, U070, and K086 treatment standard data. The Agency chose to use these data because they represent the use of a detection limit from the same constituent as the constituent of concern and the accuracy correction factor from p-dichlorobenzene, a constituent with similar composition and structure. The universal standard was established at 6.0 mg/kg to maintain consistency within the treatability group. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for o-dichlorobenzene in other waste codes.

p-Dichlorobenzene

The universal standard for p-dichlorobenzene was determined to be 6.0 mg/kg, based upon the F039 and U072 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The universal

standard was established at 6.0 mg/kg to maintain consistency within the treatability group. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for p-dichlorobenzene in other waste codes.

Hexachlorobenzene

The universal standard for hexachlorobenzene was determined to be 10 mg/kg, based upon the K085 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The universal standard for hexachlorobenzene was not based upon the K016, K018, F025, F039, and U127 treatment standard data because the detection limit was considered to be an outlier compared to detection limits from other incineration tests. The universal standard was established at 10 mg/kg in order that the treatment standard could be routinely met by industry, considering the detection limits reported for hexachlorobenzene in other waste codes.

Pentachlorobenzene

The universal standard for pentachlorobenzene was determined to be 10 mg/kg, based upon the K042 and K085 treatment standard data. The universal standard for pentachlorobenzene was not based upon the K030, F039, and U183 treatment standard data because the detection limit was considered to be an outlier compared to detection limits from other incineration tests. The universal standard was established at 10 mg/kg in order that the treatment standard could be routinely met by industry, considering the detection limits reported for pentachlorobenzene in other waste codes. Further, the Agency chose to use the K042 and K085 treatment standard data because these data represent the use of an actual matrix spike recovery as opposed to an averaged value.

Pentachloronitrobenzene

The universal standard for pentachloronitrobenzene was determined to be 4.8 mg/kg, based upon the F039 and U185 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

1,2,4,5-Tetrachlorobenzene

The universal standard for 1,2,4,5-tetrachlorobenzene was determined to be 14 mg/kg, based upon the K030 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern.

1,2,4-Trichlorobenzene

The universal standard for 1,2,4-trichlorobenzene was determined to be 19 mg/kg based upon the K019, F039, K030, K096 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern.

6.1.6 Determination of Nonwastewater Universal Standards for Halogenated Volatiles

Nonwastewater treatment performance data for the regulated constituents in the halogenated volatiles treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the determination of the universal standards is given below.

Benzal Chloride

The universal standard for benzal chloride was determined to be 6.0 mg/kg, based upon the K015 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent. The universal standard was established at 6.0 mg/kg to maintain consistency within the treatability group.

Carbon Tetrachloride

The universal standard for carbon tetrachloride was determined to be 6.0 mg/kg, based on the K021 and K073 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The universal standard was established at 6.0 mg/kg to maintain consistency within the treatability group. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for carbon tetrachloride in other waste codes.

2-Chloro-1,3-butadiene

The universal standard for 2-chloro-1,3-butadiene was determined to be 0.28 mg/kg, based upon the F024 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent.

Chloroethane

The universal standard for chloroethane was determined to be 6.0 mg/kg, based upon the F039 and K018 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

bis(2-Chloroethoxy) Methane

The universal standard for bis (2-chloroethoxy) methane was determined to be 7.2 mg/kg, based upon the F039 and U024 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

bis(2-Chloroethyl) Ether

The universal standard for bis(2-chloroethyl) ether was determined to be 6.0 mg/kg, based upon the K019 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The universal standard was established at 6.0 mg/kg to maintain consistency within the treatability group. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for bis(2-chloroethyl) ether in other waste codes.

Chloroform

The universal standard for chloroform was determined to be 6.0 mg/kg, based upon the K019, K009, K010, K029, F025, K021, and K073 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for chloroform in other waste codes.

bis(2-Chloroisopropyl) Ether

The universal standard for bis(2-chloroisopropyl) ether was determined to be 7.2 mg/kg, based upon the F039 and U027 treatment standards, which represent the

only concentration-based standard the Agency has promulgated to date for this constituent.

Chloromethane

The universal standard for chloromethane was determined to be 30 mg/kg, based upon the F039 and U045 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent. The universal standard was established at 30 mg/kg to maintain consistency within the treatability group.

3-Chloropropene

The universal standard for 3-chloropropene was determined to be 30 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent. The universal standard was established at 30 mg/kg to maintain consistency within the treatability group.

Dichlorodifluoromethane

The universal standard for dichlorodifluoromethane was determined to be 7.2 mg/kg, based upon the F039 and U075 treatment standards, which represent the only concentration-based standard the Agency has promulgated to date for this constituent.

1,1-Dichloroethane

The universal standard for 1,1-dichloroethane was determined to be 6.0 mg/kg, based on the K018 and K028 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection

limit from the same constituent as the constituent of concern. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for 1,1-dichloroethane in other waste codes.

1,2-Dichloroethane

The universal standard for 1,2-dichloroethane was determined to be 6.0 mg/kg, based upon the K018, K019, K020, K029, and F025 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for 1,2-dichloroethane in other waste codes.

1,1-Dichloroethylene

The universal standard for 1,1-dichloroethylene was determined to be 6.0 mg/kg, based on the K029 and F025 treatment standard data. The Agency chose to use these data rather than the F039 and U078 treatment standard data because the detection limit used in calculating the F039 and U078 treatment standards were considered to be an outlier compared to the magnitude of the detection limits from other incineration tests. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for 1,1-dichloroethylene in other waste codes.

The F025 treatment standard was calculated from the incorrect accuracy correction factor, 1.10, which should have been 1.06, yielding a treatment standard of 6.0 mg/kg (this discrepancy is explained in Table 5-1). The treatment performance data transferred for the universal standard are correct.

trans-1,2-Dichloroethylene

The universal standard for trans-1,2-dichloroethylene was determined to be 30 mg/kg, based upon the F039 and U079 treatment standards, which represent the only concentration-based standard the Agency has promulgated to date for this constituent. The universal standard was established at 30 mg/kg to maintain consistency within the treatability group.

1,2-Dichloropropane

The universal standard for 1,2-dichloropropane was determined to be 18 mg/kg, based upon the F039, U083, and K017 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

cis-1,3-Dichloropropene

The universal standard for cis-1,3-dichloropropene was determined to be 18 mg/kg, based upon the F039 and U084 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

trans-1,3-Dichloropropene

The universal standard for trans-1,3-dichloropropene was determined to be 18 mg/kg, based upon the F039 and U084 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Hexachloroethane

The universal standard for hexachloroethane was determined to be 30 mg/kg, based upon the F025, F039, K016, K018, K019, K028, K030, K073, K095, and U131 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent. The universal standard was established at 30 mg/kg to maintain consistency within the treatability group.

Hexachloropropene

The universal standard for hexachloropropene was determined to be 30 mg/kg, based upon the F039 and U243 treatment standard data. The Agency chose to use these data because they represent the use of a detection limit from the same constituent as the constituent of concern and an accuracy correction factor from a constituent in the same treatability group. The universal standard was established at 30 mg/kg to maintain consistency within the treatability group.

Iodomethane

The universal standard for iodomethane was determined to be 65 mg/kg, based upon the F039 and U138 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Methylene Chloride

The universal standard for methylene chloride was determined to be 30 mg/kg, based upon the F001-F005, F039, U080, and K086 treatment standard data. The Agency chose to use these data because they represent the use of actual matrix spike data as opposed to an averaged value. The universal standard was established at 30 mg/kg to maintain consistency within the treatability group.

4,4-Methylene-bis-2-chloroaniline

The universal standard for 4,4-methylene-bis-2-chloroaniline was determined to be 30 mg/kg, based upon the F039 and U158 treatment standards, which represent the only concentration-based standard the Agency has promulgated to date for this constituent. The universal standard was established at 30 mg/kg to maintain consistency within the treatability group.

Pentachloroethane

The universal standard for pentachloroethane was determined to be 6.0 mg/kg, based upon the K018, K028, K030, K095, and K096 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent. The universal standard was established at 6.0 mg/kg to maintain consistency within the treatability group.

1,1,1,2-Tetrachloroethane

The universal standard for 1,1,1,2-tetrachloroethane was determined to be 6.0 mg/kg, based upon the K028, K095, and K096 treatment standard data. The Agency chose to use these data rather than transferring other treatment standard data. The universal standard for 1,1,1,2-tetrachloroethane was not based upon the F039 and U208 treatment standard data because the detection limit was considered to be an outlier compared to the detection limits from other incineration tests. The universal standard was established at 6.0 mg/kg to maintain consistency within the treatability group. The Agency believes that the universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for 1,1,1,2-tetrachloroethane in other waste codes.

1,1,2,2-Tetrachloroethane

The universal standard for 1,1,2,2-tetrachloroethane was determined to be 6.0 mg/kg, based upon the K020, K028, K095, and K096 treatment standard data. The Agency chose to use these data rather than transferring other treatment standard data. The universal standard for 1,1,2,2-tetrachloroethane was not based upon the F039 and U209 treatment standard data because the detection limit was considered to be an outlier compared to the detection limits from other incineration tests. The universal standard was established at 6.0 mg/kg to maintain consistency within the treatability group. The Agency believes that the universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for 1,1,2,2-tetrachloroethane in other waste codes.

Tetrachloroethylene

The universal standard for tetrachloroethylene was determined to be 6.0 mg/kg, based on the K019, K016, K020, K028, K030, K073, K095, K096 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for tetrachloroethylene in other waste codes.

1,1,1-Trichloroethane

The universal standard for 1,1,1-trichloroethane was determined to be 6.0 mg/kg, based upon the K019, K018, K028, K029, K073 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The

Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for 1,1,1-trichloroethane in other waste codes.

1,1,2-Trichloroethane

The universal standard for 1,1,2-trichloroethane was determined to be 6.0 mg/kg, based upon the F025 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for 1,1,2-trichloroethane in other waste codes.

The F025 treatment standard was calculated from the incorrect accuracy correction factor (this discrepancy is explained in Table 5-1). The treatment performance data transferred for the universal standard are correct.

Trichloroethylene

The universal standard for trichloroethylene was determined to be 6.0 mg/kg, based upon the F001-F005, F025, F039, K086, U228, K095, and K096 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent. The universal standard was established at 6.0 mg/kg to maintain consistency within the treatability group.

Trichloromonofluoromethane

The universal standard for trichloromonofluoromethane was determined to be 30 mg/kg, based upon the F001-F005, F039, and U121 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

1,2,3-Trichloropropane

The universal standard for 1,2,3-trichloropropane was determined to be 30 mg/kg, based upon the F039 and K017 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent. The universal standard was established at 30 mg/kg to maintain consistency within the treatability group.

1,1,2-Trichloro-1,2,2-trifluoroethane

The universal standard for 1,1,2-trichloro-1,2,2-trifluoroethane was determined to be 30 mg/kg, based on the F001-F005 and F039 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent. The universal standard was established at 30 mg/kg to maintain consistency within the treatability group.

Vinyl Chloride

The universal standard for vinyl chloride was determined to be 6.0 mg/kg, based on the K029 treatment standard data. The Agency chose to use the K029 treatment standard data rather than transferring other treatment standard data. The universal standard for vinyl chloride was not based upon the F025, F039, and U043 treatment standard data because the detection limit was considered to be an outlier compared to the magnitude of the detection limits from other incineration tests. The universal standard was established at 6.0 mg/kg to maintain consistency within the treatability group. The Agency believes that a universal standard of 6.0 mg/kg may be reasonably achieved based on the detection limits reported for vinyl chloride in other waste codes.

6.1.7 Determination of Nonwastewater Universal Standards for Nonchlorinated Phenolics

Nonwastewater treatment performance data for the regulated constituents in the nonchlorinated phenolics treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the determination of the universal standards is given below.

2-sec-Butyl-4,6-dinitrophenol (Dinoseb)

The universal standard for dinoseb was determined to be 2.5 mg/kg, based upon the F039 and P020 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Cresol (m- and p- isomers)

The universal standard for m- and p-cresol was determined to be 5.6 mg/kg based upon the F001-F005, F039, and U052 treatment standard data. The Agency chose to use the F001-F005, F039, and U052 data since these data represent the only concentration-based treatment standards promulgated to date for this constituent based upon the performance of incineration. The Agency believes that the detection limit reported for m- and p-cresol in the K019 treatment test of 2.0 mg/kg is representative of the detection limits that may be reasonably achieved for m- and p-cresol. In addition, a universal standard of 5.6 mg/kg is consistent with the universal standard established for a constiutent similar in elementeal composition and functional groups, o-cresol.

o-Cresol

The universal standard for o-cresol was determined to be 5.6 mg/kg, based upon the F001-F005, F039, and U052 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

2,4-Dimethylphenol

The universal standard for 2,4-dimethylphenol was determined to be 14 mg/kg, based upon the F039 and U101 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

4,6-Dinitro-o-cresol

The universal standard for 4,6-dinitro-o-cresol was determined to be 160 mg/kg, based upon the F039 and P047 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

2,4-Dinitrophenol

The universal standard for 2,4-dinitrophenol was determined to be 160 mg/kg, based upon the F039 and P048 treatment standard data. The Agency chose to use these data because they represent the use of a detection limit from the same constituent as the constituent of concern and an accuracy correction factor from a constituent in the same treatability group.

(o) 2-Nitrophenol

The universal standard for (o) 2-nitrophenol was determined to be 13 mg/kg, based upon the K102 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent.

(p) 4-Nitrophenol

The universal standard for (p) 4-nitrophenol was determined to be 29 mg/kg, based upon the F039 and U170 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Phenol

The universal standard for phenol was determined to be 6.2 mg/kg, based upon the F039, K083, and U188 treatment standard data. The Agency chose to use these data because they represent the transfer of an accuracy correction factor and detection limit from the same constituent as the constituent of concern and the use of an actual matrix spike recovery. The Agency did not use the K022 treatment standard data because the treatment standard was considered to be an outlier compared to the magnitude of the detection limits from other incineration tests. The Agency believes that a universal standard of 6.2 mg/kg may be reasonably achieved based on detection limits reported for phenol in other waste codes.

The K083 treatment standard was calculated from the incorrect accuracy correction factor (this discrepancy is explained in Table 5-1). The treatment performance data transferred for the universal standard are correct.

6.1.8 Determination of Nonwastewater Universal Standards for Organo-Bromines

Nonwastewater treatment performance data for the regulated constituents in the organo-bromines treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the determination of the universal standards is given below.

Bromodichloromethane

The universal standard for bromodichloromethane was determined to be 15 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent.

Bromoform (Tribromomethane)

The universal standard for bromoform was determined to be 15 mg/kg, based upon the F039 and U225 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Bromomethane

The universal standard for bromomethane was determined to be 15 mg/kg, based upon the F039, K117, K118, K131, K132, K136, and U029 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

4-Bromophenyl phenyl ether

The universal standard for 4-bromophenyl phenyl ether was determined to be 15 mg/kg, based upon the F039 and U030 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Chlorodibromomethane

The universal standard for chlorodibromomethane was determined to be 15 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent.

1,2-Dibromo-3-chloropropane

The universal standard for 1,2-dibromo-3-chloropropane was determined to be 15 mg/kg, based upon the F039 and U066 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Dibromomethane

The universal standard for dibromomethane was determined to be 15 mg/kg, based upon the F039 and U068 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

tris-(2,3-Dibromopropyl) phosphate

The universal standard for tris-(2,3-dibromopropyl) phosphate was determined to be 0.10 mg/kg, based upon the U235 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent.

Ethylene Dibromide (1,2-Dibromoethane)

The universal standard for ethylene dibromide was determined to be 15 mg/kg, based upon the F039, K117, K118, K136, and U067 treatment standards, which

represent the only concentration-based standards the Agency has promulgated to date for this constituent.

6.1.9 Determination of Nonwastewater Universal Standards for Organo-Nitrogen Compounds

Nonwastewater treatment performance data for the regulated constituents in the organo-nitrogen compounds treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the determination of the universal standards is given below.

Acetonitrile

The universal standard for acetonitrile was determined to be 1.8 mg/kg, based upon the K011, K013, and K014 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

2-Acetylaminofluorene

The universal standard for 2-acetylaminofluorene was determined to be 140 mg/kg, based upon the F039 and U005 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Acrylamide

The universal standard for acrylamide was determined to be 23 mg/kg, based upon the K011, K013, and K014 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Acrylonitrile

The universal standard for acrylonitrile was determined to be 84 mg/kg, based upon the F039 and U009 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Aniline

The universal standard for aniline was determined to be 14 mg/kg, based upon the F039, U012, and K083 treatment standard data. The Agency chose to use these data because they represent the use of a detection limit from the same constituent as the constituent of concern and an accuracy correction factor from a similar constituent. A universal standard of 14 mg/kg was chosen to account for regulatory flexibility based on variations in treatment of this constituent.

p-Chloroaniline

The universal standard for p-chloroaniline was determined to be 16 mg/kg, based upon the F039 and P024 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

1,4-Dinitrobenzene

The universal standard for 1,4-dinitrobenzene was determined to be 2.3 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent.

2,4-Dinitrotoluene

The universal standard for 2,4-dinitrotoluene was determined to be 140 mg/kg, based upon the F039, K111, and U105 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

2,6-Dinitrotoluene

The universal standard for 2,6-dinitrotoluene was determined to be 28 mg/kg, based upon the F039, K111, and U106 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Di-n-propylnitrosamine

The universal standard for di-n-propylnitrosamine was determined to be 14 mg/kg, based upon the F039 and U111 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Diphenylamine/Diphenylnitrosamine

The universal standard for the sum of diphenylamine and diphenylnitrosamine was determined to be 13 mg/kg, based upon the K022 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituents as the constituents of concern. As explained in Section 3.2.1, these constituents are regulated as a sum in universal standards to account for analytical difficulties in distinguishing the two compounds.

Methacrylonitrile

The universal standard for methacrylonitrile was determined to be 84 mg/kg, based upon the F039 and U152 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Methapyriline

The universal standard for methapyriline was determined to be 1.5 mg/kg, based upon the F039 and U155 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

(o) 2-Nitroaniline

The universal standard for (o) 2-nitroaniline was determined to be 14 mg/kg, based upon the K101 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent.

(p) 4-Nitroaniline

The universal standard for (p) 4-nitroaniline was determined to be 28 mg/kg, based upon the F039 and P077 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Nitrobenzene

The universal standard for nitrobenzene was determined to be 14 mg/kg, based upon the F001-F005, F039, U169, K086, and K083 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same or similar constituent.

The universal standard for N-nitrosodimethylamine was determined to be 2.3 mg/kg, based upon the F039 treatment standard data for N-nitroso-methylethylamine. The Agency chose to transfer these data to develop the universal standard for N-nitrosodimethylamine because these constituents are similar in chemical composition and functional groups.

5-Nitro-o-toluidine

The universal standard for 5-nitro-o-toluidine was determined to be 28 mg/kg, based upon the F039 and U181 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

N-Nitrosodi-n-butylamine

The universal standard for N-nitrosodi-n-butylamine was determined to be 17 mg/kg, based upon the F039 and U172 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

N-Nitrosodiethylamine

The universal standard for N-nitrosodiethylamine was determined to be 28 mg/kg, based upon the F039 and U174 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

N-Nitrosomethylethylamine

The universal standard for N-nitrosomethylethylamine was determined to be 2.3 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent.

N-Nitrosomorpholine

The universal standard for N-nitrosomorpholine was determined to be 2.3 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent.

N-Nitrosopiperidine

The universal standard for N-nitrosopiperidine was determined to be 35 mg/kg, based upon the F039 and U179 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

N-Nitrosopyrrolidine

The universal standard for N-nitrosopyrrolidine was determined to be 35 mg/kg, based upon the F039 and U180 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Phenacetin

The universal standard for phenacetin was determined to be 16 mg/kg, based upon the F039 and U187 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Pronamide

The universal standard for pronamide was determined to be 1.5 mg/kg, based upon the F039 and U192 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Propanenitrile (Ethyl Cyanide)

The universal standard for propanenitrile was determined to be 360 mg/kg, based upon the F039 and P101 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Pyridine

The universal standard for pyridine was determined to be 16 mg/kg, based upon the F001-F005, F039, and U196 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

6.1.10 Determination of Nonwastewater Universal Standards for Organo-Sulfur Pesticides

Nonwastewater treatment performance data for the regulated constituents in the organo-sulfur pesticides treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the development of the universal standards is given below.

Disulfoton

The universal standard for disulfoton was determined to be 6.2 mg/kg, based upon the F039 treatment standard data. The Agency chose to use these data rather than transferring other treatment standard data because the Agency believes the detection limit from the F039 treatment standard is representative of detection limits for this treatability group. The universal standard of 6.2 mg/kg was chosen to account for regulatory flexibility based on variations in treatment of this constituent.

Famphur

The universal standard for famphur was determined to be 15 mg/kg, based upon the F039 treatment standard data. The Agency chose to use these data rather than transferring other treatment standard data because the Agency believes the detection limit from the F039 treatment standard is representative of detection limits for this

treatability group. The universal standard of 15 mg/kg was chosen to account for regulatory flexibility based on variations in treatment of this constituent.

Methyl Parathion

The universal standard for methyl parathion was determined to be 4.6 mg/kg, based upon the F039 treatment standard data. The Agency chose to use these data rather than transferring other treatment standard data because the Agency believes the detection limit from the F039 treatment standard is representative of detection limits for this treatability group. The universal standard of 4.6 mg/kg was chosen to account for regulatory flexibility based on variations in treatment of this constituent.

Parathion

The universal standard for parathion was determined to be 4.6 mg/kg, based upon the F039 treatment standard data. The Agency chose to use these data rather than transferring other treatment standard data because the Agency believes the detection limit from F039 treatment standard is representative of detection limits for this treatability group. The universal standard of 4.6 mg/kg was chosen to account for regulatory flexibility based on variations in treatment of this constituent.

Phorate

The universal standard for phorate was determined to be 4.6 mg/kg, based upon the F039 treatment standard data. The Agency chose to use these data rather than transferring other treatment standard data because the Agency believes the detection limit from the F039 treatment standard is representative of detection limits for this treatability group. The universal standard of 4.6 mg/kg was chosen to account for regulatory flexibility based on variations in treatment of this constituent.

6.1.11 Determination of Nonwastewater Universal Standards for Oxygenated Hydrocarbons

Nonwastewater treatment performance data for the regulated constituents in the oxygenated hydrocarbons treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the determination of the universal standards is given below.

Acetone

The universal standard for acetone was determined to be 160 mg/kg, based upon the F001-F005, F039, K086, and U002 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Acetophenone

The universal standard for acetophenone was determined to be 9.7 mg/kg, based upon the F039, K086, and U004 treatment standard data. The universal standard for acetophenone was not based upon the K022 treatment standard data because the detection limit was considered to be an outlier considering detection limits reported for acetophenone in other incineration tests.

n-Butanol (n-Butyl Alcohol)

The universal standard for n-butanol was determined to be 2.6 mg/kg, based upon the F001-F005, F039, K086, and U031 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

2-Chloronaphthalene

The universal standard for 2-chloronaphthalene was determined to be 5.6 mg/kg, based upon the F039 and U047 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Cyclohexanone

The universal standard for cyclohexanone was determined to be 0.75 mg/L (as measured by the concentration in the TCLP waste extract), based on the F001-F005 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent. Because the treatment of carbon disulfide, cyclohexanone, and methanol is expected to be ensured by the regulation of other organic compounds, the universal standard is applicable only if these constituents are the only regulated hazardous constituents identified in the waste.

1,4-Dioxane

The universal standard for 1,4-dioxane was determined to be 170 mg/kg, based upon the F039 and U108 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Ethyl Acetate

The universal standard for ethyl acetate was determined to be 33 mg/kg, based upon the F001-F005, F039, K086, and U112 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Ethyl Ether

The universal standard for ethyl ether was determined to be 160 mg/kg, based upon the F001-F005, F039, and U117 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Ethyl Methacrylate

The universal standard for ethyl methacrylate was determined to be 160 mg/kg, based upon the F039 and U118 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Isobutanol

The universal standard for isobutanol was determined to be 170 mg/kg, based upon the F001-F005, F039, and U140 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Isosafrole

The universal standard for isosafrole was determined to be 2.6 mg/kg, based upon the F039 and U141 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Methanol

The universal standard for methanol was determined to be 0.75 mg/L (as measured by the concentration in the TCLP waste extract), based on the F001-F005 treatment standard, which represents the only concentration-based standard the Agency has promulgated to date for this constituent. Because the treatment of carbon disulfide,

cyclohexanone, and methanol is expected to be ensured by the regulation of other organic compounds, the universal standard is applicable only if these constituents are the only regulated hazardous constituents identified in the waste.

Methyl Ethyl Ketone

The universal standard for methyl ethyl ketone was determined to be 36 mg/kg, based upon the F001-F005, F039, K086, and U159 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Methyl Isobutyl Ketone

The universal standard for methyl isobutyl ketone was determined to be 33 mg/kg, based upon the F001-F005, F039, K086, and U161 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Methyl Methacrylate

The universal standard for methyl methacrylate was determined to be 160 mg/kg, based upon the F039 and U162 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

Safrole

The universal standard for safrole was determined to be 22 mg/kg, based upon the F039 and U203 treatment standards, which represent the only concentration-based standards promulgated to date for this constituent.

6.1.12 Determination of Nonwastewater Universal Standards for PCBs and Dioxins

Nonwastewater treatment performance data for the regulated constituents in the PCBs and dioxins treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the determination of the universal standards is given below.

Total PCBs

The universal standard for total PCBs was determined to be 10 mg/kg, based upon the sum of the F039 and K085 treatment standards for individual Aroclors. The Agency has not promulgated a treatment standard for total PCBs to date under the LDR program. However, the Agency has promulgated treatment standards for individual Aroclors in F039 and K085 wastes, which represent the only concentration-based standards promulgated to date for these constituents. This universal standard is established as 10 mg/kg in order that the treatment standard can be routinely met by industry. The universal standard for total PCBs was determined based on the sum of the following seven individual Aroclor standards:

1) **Aroclor 1016:** The treatment standard for Aroclor 1016 was determined to be 0.92 mg/kg, based upon the F039 and K085 treatment standards, which represent the only concentration-based standard promulgated to date for this constituent.

2) **Aroclor 1221:** The treatment standard for Aroclor 1221 was determined to be 0.92 mg/kg, based upon the F039 and K085 treatment standards, which represent the only concentration-based standard promulgated to date for this constituent.

3) **Aroclor 1232:** The treatment standard for Aroclor 1232 was determined to be 0.92 mg/kg, based upon the F039 and K085 treatment standards, which represent the only concentration-based standard promulgated to date for this constituent.

4) **Aroclor 1242:** The treatment standard for Aroclor 1242 was determined to be 0.92 mg/kg, based upon the F039 and K085 treatment standards, which represent the only concentration-based standard promulgated to date for this constituent.

5) **Aroclor 1248:** The treatment standard for Aroclor 1248 was determined to be 0.92 mg/kg, based upon the F039 and K085 treatment standards, which represent the only concentration-based standard promulgated to date for this constituent.

6) **Aroclor 1254:** The treatment standard for Aroclor 1254 was determined to be 1.8 mg/kg, based upon the F039 and K085 treatment standards, which represent the only concentration-based standard promulgated to date for this constituent.

7) **Aroclor 1260:** The treatment standard for Aroclor 1260 was determined to be 1.8 mg/kg, based upon the F039 and K085 treatment standards, which represent the only concentration-based standard promulgated to date for this constituent.

Hexachlorodibenzofurans

The universal standard for hexachlorodibenzofurans was determined to be 0.001 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard promulgated to date for this constituent.

Hexachlorodibenzo-p-dioxins

The universal standard for hexachlorodibenzo-p-dioxins was determined to be 0.001 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard promulgated to date for this constituent.

Pentachlorodibenzofurans

The universal standard for pentachlorodibenzofurans was determined to be 0.001 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard promulgated to date for this constituent.

Pentachlorodibenzo-p-dioxins

The universal standard for pentachlorodibenzo-p-dioxins was determined to be 0.001 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard promulgated to date for this constituent.

Tetrachlorodibenzofurans

The universal standard for tetrachlorodibenzofurans was determined to be 0.001 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard promulgated to date for this constituent.

Tetrachlorodibenzo-p-dioxins

The universal standard for tetrachlorodibenzo-p-dioxins was determined to be 0.001 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based standard promulgated to date for this constituent.

6.1.13 Determination of Nonwastewater Universal Standards for Phthalates

Nonwastewater treatment performance data for the regulated constituents in the phthalate treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the determination of the universal standards is given below.

bis(2-Ethylhexyl) Phthalate

The universal standard for bis(2-ethylhexyl) phthalate was determined to be 28 mg/kg, based upon the F039, K086, and U028 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Butyl Benzyl Phthalate

The universal standard for butyl benzyl phthalate was determined to be 28 mg/kg, based upon the F039 and K086 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent. The universal standard was established at 28 mg/kg to maintain consistency within the treatability group because the Agency believes that, in the analysis of butyl benzyl phthalate, other phthalates may mask the correct concentration of this constituent in the waste.

Diethyl Phthalate

The universal standard for diethyl phthalate was determined to be 28 mg/kg, based upon the F039, U088, and K086 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Dimethyl Phthalate

The universal standard for dimethyl phthalate was determined to be 28 mg/kg, based upon the F039, U102, and K086 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Di-n-butyl Phthalate

The universal standard for di-n-butyl phthalate was determined to be 28 mg/kg, based upon the F039, U069, and K086 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent based on the performance of incineration.

Di-n-octyl Phthalate

The universal standard for di-n-octyl phthalate was determined to be 28 mg/kg, based upon the F039, U107, and K086 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Phthalic Anhydride (as measured by Phthalic Acid)

The universal standard for phthalic anhydride (as measured by phthalic acid) was determined to be 28 mg/kg, based upon the K023, K024, K093, K094, and U190 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Phthalic Anhydride (as measured by Phthalic Anhydride)

The universal standard for phthalic anhydride (as measured by phthalic anhydride) was determined to be 28 mg/kg based upon the universal standard for phthalic anhydride (as measured by phthalic acid). As discussed in Section 3.2.1, the Agency is establishing a universal standard for phthalic anhydride (as measured by phthalic anhydride) for use in cases where the concentration of phthalic anhydride in the waste may not be accurately quantified by measuring the concentration of phthalic acid.

6.1.14 Determination of Nonwastewater Universal Standards for Polynuclear Aromatic Hydrocarbons

Nonwastewater treatment performance data for the regulated constituents in the polynuclear aromatic hydrocarbon treatability group are presented in Table 5-1. A constituent-by-constituent discussion of the determination of the universal standards is given below.

Acenaphthalene

The universal standard for acenaphthalene was determined to be 3.4 mg/kg, based upon the F039 and K087 treatment standards, which represent the only concentration-based standards the Agency has promulgated to date for this constituent.

Acenaphthene

The universal standard for acenaphthene was determined to be 3.4 mg/kg, based upon the K035 treatment standard data. The Agency chose to use the K035 treatment standard data rather than the F039 treatment standard data because the F039 treatment standard was promulgated incorrectly as 4.0 mg/kg instead of 0.8 mg/kg (this discrepancy is explained in Table 5-1). The Agency believes that a standard of 0.8 mg/kg may not be reasonably achieved based on detection limits reported for acenaphthene in other incineration tests.

Anthracene

The universal standard for anthracene was determined to be 3.4 mg/kg, based upon the K015 and K035 treatment standard data. The universal standard for anthracene was not based upon the F039 treatment standard data because the F039 standard was promulgated incorrectly as 4.0 mg/kg instead of 0.8 mg/kg (this

discrepancy is explained in Table 5-1). The Agency believes that a standard of 0.8 mg/kg may not be reasonably achieved based upon detection limits reported for anthracene from other incineration tests.

Benz(a)anthracene

The universal standard for benz(a)anthracene was determined to be 3.4 mg/kg, based upon the K035 treatment standard data. The Agency chose to use these data because they represent a transfer of the accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency believes that a universal standard of 3.4 mg/kg may be reasonably achieved based upon detection limits reported for benz(a)anthracene in other waste codes.

Benzo(a)pyrene

The universal standard for benzo(a)pyrene was determined to be 3.4 mg/kg, based upon the K035 and K060 treatment standard data. The Agency chose to use these data because they represent the use of both an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency believes that a universal standard of 3.4 mg/kg may be reasonably achieved based upon the detection limits reported for benzo(a)pyrene in other waste codes.

The K060 treatment standard was calculated from the incorrect accuracy correction factor (this discrepancy is explained in Table 5-1). The treatment performance data transferred for the universal standard are correct.

Benzo(b)fluoranthene/Benzo(k)fluoranthene

The universal standard for the sum of benzo(b)fluoranthene and benzo(k)fluoranthene was determined to be 6.8 mg/kg, based upon the F039 treatment

standard, which represents the sum of the only concentration-based standards the Agency has promulgated to date for these constituents. As explained in Section 3.2.1, these constituents are regulated as a sum in universal standards to account for analytical problems in distinguishing the two compounds.

Benzo(g,h,i)perylene

The universal standard for benzo(g,h,i)perylene was determined to be 1.8 mg/kg, based upon the F039 treatment standard, which represents the only concentration-based treatment standard the Agency has promulgated to date for this constituent.

The F039 treatment standard was calculated from the incorrect accuracy correction factor (this discrepancy is explained in Table 5-1). The treatment performance data transferred for the universal standard are correct.

Chrysene

The universal standard for chrysene was determined to be 3.4 mg/kg, based upon the K087 and K035 treatment standard data. The Agency chose to use these data because they represent the use of both an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency believes that a universal standard of 3.4 mg/kg may be reasonably achieved based upon detection limits reported for chrysene in other waste codes.

Dibenz(a,h)anthracene

The universal standard for dibenz(a,h)anthracene was determined to be 8.2 mg/kg, based upon the F039 and U063 treatment standard data. The Agency chose to use these data because they represent the use of an actual matrix spike recovery. The

Agency believes that a treatment standard of 8.2 mg/kg may be reasonably achieved based upon detection limits reported for dibenz(a,h)anthracene in other waste codes.

Fluoranthene

The universal standard for fluoranthene was determined to be 3.4 mg/kg, based upon the K035 and K087 treatment standard data. The Agency chose to use these data because they represent the use of both the accuracy correction factor and detection limit from the same constituent as the constituent of concern.

Fluorene

The universal standard for fluorene was determined to be 3.4 mg/kg, based upon the K035 treatment standard data. The Agency chose to use these data rather than the F039 treatment standard data. The F039 standard was promulgated incorrectly as 4.0 mg/kg instead of 0.8 mg/kg (this discrepancy is explained in Table 5-1). The Agency believes that a standard of 0.8 mg/kg may not be reasonably achieved based on detection limits for fluorene from other incineration tests.

Indeno(1,2,3-cd)pyrene

The universal standard for indeno(1,2,3-cd)pyrene was determined to be 3.4 mg/kg, based upon the K035 and K087 treatment standard data. The Agency chose to use these data because they represent the transfer of both the accuracy correction factor and detection limit from the same constituent as the constituent of concern.

3-Methylcholanthrene

The universal standard for 3-methylcholanthrene was determined to be 15 mg/kg, based upon the F039 and U157 treatment standards, which represent the only concentration-based standard the Agency has promulgated to date for this constituent.

Naphthalene

The universal standard for naphthalene was determined to be 5.6 mg/kg, based upon the K019 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency chose a universal standard of 5.6 mg/kg to account for regulatory flexibility based on variations in treatment of this constituent.

Phenanthrene

The universal standard for phenanthrene was determined to be 5.6 mg/kg, based upon the K019 treatment standard data. The Agency chose to use these data because they represent the use of an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency chose a universal standard of 5.6 mg/kg to account for regulatory flexibility based on variations in treatment of this constituent.

Pyrene

The universal standard for pyrene was determined to be 8.2 mg/kg, based upon the K035 and F039 treatment standard data. The Agency chose to use these data because they represent the use of both an accuracy correction factor and detection limit from the same constituent as the constituent of concern. The Agency believes that

transfer of data from K001 and U051, with a treatment standard of 1.5 mg/kg, is not reasonable for a universal standard based on detection limits from other incineration tests.

6.2 Determination of Universal Standards for Metal Constituents, Except Vanadium and Chromium

The Agency determined universal standards for metal constituents using the following methodology:

(1) The Agency selected metal constituents for regulation as presented in Section 3.0;

(2) For each metal constituent selected, the Agency listed BDAT treatment performance data according to waste code in Table 5-3; data included the concentration in the TCLP leachate or the detection limit of the constituent in the treated waste, the accuracy correction factor used (and its basis), and the variability factor; and

(3) The Agency evaluated the data on a constituent by constituent basis to determine the data most appropriate to establish a universal standard.

These steps are described in more detail below.

The development of universal standards for metal constituents began with the selection of metal constituents selected for regulation from the BDAT List of hazardous constituents. Section 3.0 explains the process for the selection of regulated constituents for universal standards.

Universal standards for metal constituents, except chromium and vanadium, were determined utilizing treatment performance data that had been used to develop nonwastewater treatment standards in the First, Second, and Third Thirds and Phase I rulemaking efforts. The Agency developed a universal standard for vanadium based on

available HTMR treatment performance data as discussed in Section 6.3. The Agency developed a universal standard for chromium based on stabilization treatment performance data as discussed in Section 6.4.

To determine a universal standard for a particular constituent, it was necessary to examine the data used in calculating each promulgated treatment standard for that constituent. Table 5-3 presents the constituent-specific BDAT treatment performance data for each waste code. The data used to compute the treatment standard include the concentration of the constituent in the treated waste, an accuracy correction factor, and a variability factor.

When treatment performance data were not available for treatment of a specific waste code, data were transferred from treatment of a similar waste. Table 5-3 presents the constituent and treatment test from which the concentration in the treated waste were transferred. This table also includes the basis for the transfer of an accuracy correction factor.

Table 6-3 presents the determination of the universal standards for metal constituents in nonwastewater forms of listed wastes. These universal standards were chosen on a constituent-by-constituent basis. Five factors were considered in selecting a treatment standard value for metal constituents, except for vanadium and chromium:

(1) Where possible, the Agency preferred to use treatment performance data from the technology believed to be "best" for treatment of metal constituents in universal standards wastes, HTMR;

(2) Where possible, the Agency preferred to use treatment performance data (i.e., the concentration in the TCLP extract of the treated waste, matrix spike recovery data, and variability factor (shown in Table 5-3)) for the constituent of concern;

(3) The Agency evaluated the matrix spike recovery data to determine whether the recoveries were within the acceptable range of values as

identified in EPA's Generic Quality Assurance Project Plan for Land Disposal Restrictions Program ("BDAT") (66);

(4) The Agency examined the concentration in the TCLP extract of the treated waste to determine if it could be routinely met by industry; and

(5) The Agency compared the treatment standard corresponding to the "best" data to the concentration in the TCLP extracts of the treated waste obtained for other waste codes to determine if the constituent could be treated to similar levels in similar waste codes.

The Agency preferred to use data from the performance of HTMR processes to develop the universal standards for metal constituents in nonwastewater forms of wastes, except arsenic, chromium, and mercury (as discussed in Section 4.2.2). Since metals cannot be destroyed, treatment options are limited and typically include technologies that can either recover the metal(s) or incorporate the metals in a stable matrix resistant to leaching. The Agency believes that the "best" treatment for metal constituents (except chromium, arsenic, and mercury) is recovery, especially in cases of high waste metal concentrations. HTMR appears to be the most matrix-independent of the applicable technologies (i.e., it consistently achieves the same levels of treatment performance regardless of influent matrix compositions). HTMR also generally decreases the amount of material sent for land disposal, and incorporates metals that are not recoverable into a stable slag matrix.

The use of HTMR is consistent with the national policy, identified in the Hazardous and Solid Waste Amendments (HSWA) to RCRA, to reduce the quantity of hazardous constituents disposed (this is in contrast to non-recovery technologies, such as stabilization, which are not intended to reduce the total metal concentration or metal volume in the waste and in fact, can increase volumes being sent to landfills). In addition, because metals are recovered instead of land disposed, ore processing is reduced, thus saving energy and pollution of another source.

The Agency reviewed characterization and treatment performance data for HTMR and stabilization of certain metal-bearing wastes to determine if universal standards for metals based on HTMR would be technology forcing. These data, shown in Tables 6-4 and 6-5, indicate that universal standards for most metals could be achieved by stabilization for a wide variety of nonwastewater matrices, and therefore, EPA believes that universal standards for metals that are based on HTMR would not be technology forcing. Additional characterization and performance data for metal constituents selected for regulation in universal standards may be found in the Final Data Document for Characterization and Performance of High Temperature Metals Recovery Treatment and Stabilization for Metal-Bearing Nonwastewaters (67).

Table 6-3 summarizes the determination of the universal standards for the metal constituents selected for regulation in nonwastewater forms of listed hazardous wastes. This table includes the waste code, treatment performance data, and technology from which the universal standard was transferred.

Table 5-3 presents nonwastewater treatment performance for the metal constituents selected for regulation in universal standards, except vanadium and chromium. A constituent-by-constituent discussion of the determination of the universal standards is given below.

Antimony

The universal standard for antimony was determined to be 2.1 mg/L in the TCLP extract based upon the K061-HTMR treatment standard data. The Agency chose to use these data because they represent the treatment performance of a HTMR process. The universal standard for antimony was not based upon the K021 and F039 treatment standard data because these data represent the performance of incineration, which is not considered a demonstrated technology for metal constituents in nonwastewater forms of universal standard wastes.

Arsenic

The universal standard for arsenic was determined to be 5.0 mg/L in the TCLP extract based upon the F039 treatment standard. The F039 treatment standard was established as equivalent to the toxicity characteristic (TC) regulatory level for arsenic (D004).

The Agency established BDAT for arsenic as slag vitrification, as explained in Section 4.2.2. The universal standard was not based upon K061-HTMR data because the Agency believes that this technology is not "best" for treatment of arsenic in universal standards wastes. The available slag vitrification treatment standard data (K031, K084, K101, K102, P010, P011, P036, P038, and U136) show treatment to a leachate concentration of 1.8 mg/L (using the Extraction Procedure (EP) toxicity test). The universal standard based on this value would yield a standard of 5.6 mg/L using the EP toxicity test. Because the characteristic level for arsenic of 5.0 mg/L in the TCLP extract is similar in magnitude to the standard calculated from slag vitrification, the Agency believes that it is valid to default to the characteristic level for the universal standard for arsenic.

Barium

The universal standard for barium was determined to be 7.6 mg/L in the TCLP extract based upon the K061-HTMR treatment standard data. The Agency chose to use these data because they represent the treatment performance of a HTMR process. The Agency believes that an universal standard based upon K061-HTMR treatment standard data could be routinely met by industry using HTMR because the applicability of the HTMR process is matrix-independent (i.e., the technology consistently achieves the same levels of treatment performance regardless of influent matrix compositions). Additionally, the Agency reviewed stabilization data and determined that the universal standard for barium could be achieved by stabilization for a wide variety of waste

matrices. The Agency, therefore, does not believe that the universal standard would be technology forcing.

Beryllium

The universal standard for beryllium was determined to be 0.014 mg/L in the TCLP extract based upon the K061-HTMR treatment standard data. The Agency chose to use these data because they represent the only concentration-based nonwastewater treatment standards the Agency has promulgated to date for this constituent. Additionally, these data represent the treatment performance of a HTMR process.

Cadmium

The universal standard for cadmium was determined to be 0.19 mg/L in the TCLP extract based upon the K061-HTMR treatment standard data. The Agency chose to use these data because they represent the treatment performance of a HTMR process. The Agency believes that a universal standard based upon K061-HTMR treatment standard data could be routinely met by industry because the applicability of the HTMR process is matrix-independent (i.e., the technology consistently achieves the same levels of treatment performance regardless of influent matrix compositions). Additionally, the Agency reviewed stabilization treatment standard data for cadmium and determined that the universal standard could be achieved by stabilization for a wide variety of waste matrices. The Agency, therefore, does not believe that the universal standard would be technology forcing.

Lead

The universal standard for lead was determined to be 0.37 mg/L in the TCLP extract based upon the K061-HTMR treatment standard data. The Agency chose

to use these data because they represent the treatment performance of a HTMR process. The Agency believes that an universal standard based upon K061-HTMR treatment standard data could be routinely met by industry because the applicability of the HTMR process is matrix-independent (i.e., the technology consistently achieves the same levels of treatment performance regardless of influent matrix compositions). Additionally, the Agency reviewed the stabilization treatment standard data for lead and determined that the universal standard could be achieved by stabilization for a wide variety of waste matrices. The Agency, therefore, does not believe that the universal standard would be technology forcing.

Mercury

The Agency is establishing two universal standards for mercury, 0.20 mg/L in the TCLP extract for low-mercury subcategory RMERC residues and 0.025 mg/L in the TCLP extract for low-mercury subcategory non-RMERC residues. Low-mercury subcategory wastes are mercury wastes containing concentrations of mercury less than 260 mg/kg. RMERC is the recovery of mercury by roasting/retorting.

The universal standard for mercury in low-mercury subcategory RMERC residues was determined to be 0.20 mg/L in the TCLP extract. This determination was based upon the K106, U151, P065, and P092 treatment standards for low-mercury subcategory RMERC residues, which were established as equivalent to the TC regulatory level for mercury (D009).

The universal standard for mercury in low-mercury subcategory non-RMERC residues was determined to be 0.025 mg/L in the TCLP extract. This determination was based upon the K071, F039, K106, and U151 treatment standard data for low-mercury subcategory non-RMERC residues. The Agency chose to use these data because they represent the treatment performance of the technology selected as BDAT for mercury in low-mercury subcategory wastes, acid leaching.

Nickel

The universal standard for nickel was determined to be 5.0 mg/L in the TCLP extract based upon the K061-HTMR treatment standard data. The Agency chose to use these data because they represent the treatment performance of a HTMR process. The Agency believes that an universal standard based upon K061-HTMR treatment standard data could be routinely met by industry because the applicability of the HTMR process is matrix-independent (i.e., the technology consistently achieves the same levels of treatment performance regardless of influent matrix compositions). Additionally, the Agency reviewed stabilization treatment standard data for nickel and determined that the universal standard could be achieved by stabilization for a wide variety of waste matrices. The Agency, therefore, does not believe that the universal standard would be technology forcing.

The Agency recognizes the difference in magnitude between the universal standard for nickel and the universal standards for other metals and will further evaluate this at a later time.

Selenium

The universal standard for selenium was determined to be 0.16 mg/L in the TCLP extract based upon the K061-HTMR treatment standard data. The Agency chose to use these data because they represent the treatment performance of a HTMR process. The Agency believes that a universal standard based upon K061-HTMR treatment standard data could be routinely met by industry because the applicability of the HTMR process is matrix-independent (i.e., the technology consistently achieves the same levels of treatment performance regardless of influent matrix compositions). Additionally, the Agency reviewed stabilization data and determined that the universal standard for selenium could be achieved by stabilization for a wide variety of waste matrices. The Agency, therefore, does not believe that the universal standard would be technology forcing.

Silver

The universal standard for silver was determined to be 0.30 mg/L in the TCLP extract based upon the K061-HTMR treatment standard data. The Agency chose to use these data because they represent the treatment performance of a HTMR process. The Agency believes that an universal standard based upon K061-HTMR treatment standard data could be routinely met by industry because the applicability of the HTMR process is matrix-independent (i.e., the technology consistently achieves the same levels of treatment performance regardless of influent matrix compositions). Additionally, the Agency reviewed stabilization treatment standard data for silver and determined that the universal standard could be achieved by stabilization for a wide variety of waste matrices. The Agency, therefore, does not believe that the universal standard would be technology forcing.

Thallium

The universal standard for thallium was determined to be 0.078 mg/L in the TCLP extract based upon the K061-HTMR treatment standard data. The Agency chose to use these data because they represent the only concentration-based nonwastewater treatment standards the Agency has promulgated to date for this constituent. Additionally, these data represent the treatment performance of a HTMR process.

Zinc[3]

The universal standard for zinc was determined to be 5.3 mg/L in the TCLP extract based upon the K061-HTMR treatment standard data. The Agency chose to use these data because they represent the only concentration-based nonwastewater treatment standards the Agency has promulgated to date for this constituent. Additionally, these data represent the treatment performance of a HTMR process.

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[3]Zinc is not an underlying hazardous constituent in characteristic wastes.

6.3 Calculation of Universal Standard for Vanadium

The Agency has not promulgated a treatment standard for vanadium in nonwastewater forms of a listed hazardous waste to date. However, the Agency believes that this constituent has the potential to be listed as a constituent of concern in a waste code applicable to universal standards in the future. Therefore, the Agency is developing a universal standard for vanadium using available HTMR treatment performance data.

Table 5-4 presents the available HTMR treatment performance data for vanadium. The HTMR performance data represent HTMR treatment of K061 used in the development of K061-HTMR treatment standards.

The Agency is developing a universal standard for vanadium using the following methodology:

(1) Four sets of HTMR treatment performance data were selected as representative of well-designed and well-operated processes.

(2) BDAT treatment performance data for vanadium (from HTMR of K061, F006, K062) were reviewed, as presented in Table 5-4. These data include the concentration in the TCLP leachate or detection limit of the constituent in the treated waste, accuracy correction factor used (and its basis), and the variability factor.

(3) Treatment standards were determined individually for each of the four sets of data representing a different HTMR process (as presented in Table 5-4). The four sets of standards were then compared to one another. Based on this comparison, the Agency selected the highest standard for vanadium from each of the four processes to allow for process variability and potential detection limit differences.

Table 6-3 summarizes the determination of the universal standard for vanadium in nonwastewater forms of wastes. This table includes the waste code,

treatment performance data, and technology from which the universal standard was transferred.

Table 5-4 presents nonwastewater treatment performance for vanadium. The universal standard for vanadium was determined to be 0.23 mg/L in the TCLP extract based upon the treatment standard developed from the International Mills Service (IMS) HTMR treatment performance data. These data represent the highest potential treatment standard for vanadium from each of the four processes to allow for process variability and potential detection limit differences in treatment. The Agency notes that although vanadium has not been previously regulated, universal treatment standards for vanadium are being established based on the performance of HTMR that was determined to be BDAT for vanadium in K061 nonwastewaters.

6.4 Calculation of Universal Standard for Chromium

As discussed in Section 5.3, the Agency is developing a universal standard for chromium based on the stabilization treatment performance data presented in Table 5-5. EPA evaluated waste characterization and treatment performance data for chromium from several sources, including data on the performance of HTMR and stabilization technologies for treating chromium. EPA selected the stabilization data presented in Table 5-5 to develop the universal standard for chromium because these data represent treatment of chromium in difficult to treat wastes, including stripping liquids, plating and pelletizing operation wastes, and cleanout wastes from plating tanks. The Agency believes that these data represent effluent values that can be routinely achieved by industry.

Table 6-3 summarizes the determination of the universal standard for chromium in nonwastewater forms of wastes. This table includes the waste code, treatment performance data, and technology from which the universal standard was transferred. The universal standard for chromium was determined to be 0.86 mg/L in

the TCLP extract based upon the treatment standard developed from the stabilization treatment performance data presented in Table 5-5.

6.5 Application of Universal Standards to Petroleum Refining Wastes

In the Third Third rulemaking, the Agency developed BDAT treatment standards for the petroleum refining wastes, K048, K049, K050, K051, and K052, based on solvent extraction treatment performance data. Additionally, in the Phase I rulemaking, the Agency promulgated BDAT treatment standards for the petroleum refining waste codes F037 and F038 based upon a transfer of the K048, K049, K050, K051, and K052 treatment standards for the corresponding regulated constituents. Under this rulemaking, the Agency is applying universal standards to the regulated constituents in K048, K049, K050, K051, K052, F037, and F038 wastes.

The Agency determined the universal standards for the regulated constituents in the petroleum refining wastes based upon the treatment performance of incineration. Both solvent extraction and incineration were determined to be BDAT for these wastes in the previous rulemakings. The Agency's application of the universal standards to petroleum refining wastes is based on the expectation that these wastes can be treated to the universal standards by non-combustion technologies, including solvent extraction.

The Agency believes that the regulated community may be able to achieve the universal standards using solvent extraction treatment based on its evaluation of the available solvent extraction treatment performance data, summarized in Table 6-6. Appendix B of EPA's Final Best Demonstrated Available Technology (BDAT) Background Document for Newly Listed Refinery Wastes F037 and F038 (72) presents more detail on these treatment data.

The Agency has determined that eleven of the twenty data sets presented in Table 6-6 indicated treatment of petroleum wastes using solvent extraction to levels below the universal standards. The other nine data sets indicate treatment of petroleum wastes using solvent extraction to below the universal standards for most of the regulated constituents (benzene, o-cresol, p-cresol, di-n-butyl phthalate, ethylbenzene, bis(2-ethylhexyl) phthalate, phenol, toluene, and total xylenes). These nine data sets, however, did not represent solvent extraction treatment to below the universal standards for the following constituents: anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, naphthalene, phenanthrene, and pyrene.

As part of its evaluation of the solvent extraction data, the Agency considered the influence of the waste matrix on the effectiveness of solvent extraction treatment. As explained in EPA's Treatment Technology Background Document (5), the performance of solvent extraction treatment is somewhat matrix dependent. Based on an evaluation of the untreated waste matrices corresponding to the solvent extraction treatment performance data in Table 6-6, the Agency believes that the solvent that is used will "dissolve" constituents for which it has the most affinity in the waste matrix, including non-regulated waste constituents. Once saturated, the solvent is not physically or chemically able to remove additional constituents. Therefore, high loadings of organic compounds in the untreated waste matrix, regardless of whether these compounds are the regulated constituents, could produce treated waste residuals with concentrations of the regulated constituents at levels higher than the universal standards.

The Agency believes, however, that the regulated community can adjust the solvent extraction treatment system, in these cases, to generate treatment residuals with concentrations of regulated constituents that are lower than the universal standards. The Agency has identified three possible methods for modifying solvent extraction systems to meet the universal standards.

First, facilities could conduct multiple runs of the waste through the treatment system. Because this increases the contact time between the waste and solvent, a greater quantity of the regulated constituents may be removed from the waste.

Second, facilities could adjust the design and operation of the solvent extraction treatment units. More rigorous extraction conditions, such as operating at higher temperatures and pressures, may improve the solvent extraction system's efficiency. Longer residence times in the system may increase the contact time between the waste and the solvent, thereby resulting in more effective treatment. Finally, more rigorous mixing may ensure better contact between the waste and the solvent, and longer settling times, thereby achieving greater separation of the solvent-extracted constituents from the waste.

Third, the percentage of water, solids, and oil and grease in the waste may also significantly impact solvent extraction performance. The Agency believes that it may be possible to increase the efficiency of the solvent extraction treatment system by pretreating the waste to reduce the amount of water, solids, and oil and grease.

Therefore, the Agency believes that a well-designed and well-operated solvent extraction treatment system can treat petroleum refining wastes to below the universal standards. The Agency believes that by replacing the previously promulgated treatment standards for the petroleum refining wastes with the universal standards for the corresponding regulated constituents, it is avoiding the mandate of a technology-forcing approach to regulating these wastes. This assertion is supported by the available solvent extraction treatment performance data which indicate that this treatment technology can meet the universal standards.

Table 6-1

Summary of Universal Standards and Guide to Locating Constituent-Specific Discussions of the Determination of Universal Standards

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents				
Acenaphthalene	Polynuclear Aromatic Hydrocarbons	F039, K087	3.4	6-52, 6-109
Acenaphthene	Polynuclear Aromatic Hydrocarbons	K035	3.4	6-52, 6-109
Acetone	Oxygenated Hydrocarbons	F039, K086, U002, F001-F005	160	6-43, 6-104
Acetonitrile	Organo-Nitrogen Compounds	K011, K013, K014	1.8	6-35, 6-100
Acetophenone	Oxygenated Hydrocarbons	F039, U004, K086	9.7	6-43, 6-104
2-Acetylaminofluorene	Organo-Nitrogen Compounds	F039, U005	140	6-35, 6-100
Acrylamide	Organo-Nitrogen Compounds	K011, K013, K014	23	6-35, 6-100
Acrylonitrile	Organo-Nitrogen Compounds	F039, U009	84	6-36, 6-100
Aldrin	Chlorinated Pesticides	F039, P004	0.066	6-7, 6-87
Aniline	Organo-Nitrogen Compounds	F039, U012, K083	14	6-36, 6-100
Anthracene	Polynuclear Aromatic Hydrocarbons	K015, K035	3.4	6-52, 6-109
Benz(a)anthracene	Polynuclear Aromatic Hydrocarbons	K035	3.4	6-53, 6-109
Benzal Chloride	Halogenated Volatiles	K015	6.0	6-20, 6-94
Benzene	Aromatic Hydrocarbons	K083	10	6-4, 6-85
Benzo(b)fluoranthene/Benzo(k)fluoranthene	Polynuclear Aromatic Hydrocarbons	F039	6.8 (sum)	6-53, 6-109

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents (Cont'd.)				
Benzo(ghi)perylene	Polynuclear Aromatic Hydrocarbons	F039	1.8	6-54, 6-109
Benzo(a)pyrene	Polynuclear Aromatic Hydrocarbons	K035, K060	3.4	6-53, 6-109
alpha-BHC	Chlorinated Pesticides	F039, U129	0.066	6-7, 6-87
beta-BHC	Chlorinated Pesticides	F039, U129	0.066	6-7, 6-87
delta-BHC	Chlorinated Pesticides	F039, U129	0.066	6-7, 6-87
gamma-BHC (Lindane)	Chlorinated Pesticides	F039, U129	0.066	6-8, 6-87
Bromodichloromethane	Organo-Bromines	F039	15	6-33, 6-99
Bromoform (Tribromomethane)	Organo-Bromines	F039, U225	15	6-33, 6-99
4-Bromophenyl Phenyl Ether	Organo-Bromines	F039, U030	15	6-33, 6-99
Bromomethane (Methyl Bromide)	Organo-Bromines	F039, U029, K117, K118, K131, K132, K136	15	6-33, 6-99
n-Butanol	Oxygenated Hydrocarbons	F039, K086, U031, F001-F005	2.6	6-43, 6-104
Butyl Benzyl Phthalate	Phthalates	F039, K086	28	6-50, 6-108
2-sec-Butyl-4,6-dinitrophenol (Dinoseb)	Nonchlorinated Phenolics	F039, P020	2.5	6-30, 6-98
Carbon Disulfide	Carbon Disulfide	F001-F005	4.8 mg/L (TCLP)	6-6, 6-86

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents (Cont'd.)				
Carbon Tetrachloride	Halogenated Volatiles	K021, K073	6.0	6-20, 6-94
Chlordane	Chlorinated Pesticides	K032, K097	0.26	6-8, 6-87
p-Chloroaniline	Organo-Nitrogen Compounds	F039, P024	16	6-36, 6-100
Chlorobenzene	Chlorobenzenes	K019, F039, U037, F001-F005	6.0	6-16, 6-92
2-Chloro-1,3-butadiene	Halogenated Volatiles	F024	0.28	6-20, 6-94
Chlorodibromomethane	Organo-Bromines	F039	15	6-34, 6-99
Chloroethane	Halogenated Volatiles	F039, K018	6.0	6-20, 6-94
bis(2-Chloroethoxy)methane	Halogenated Volatiles	F039, U024	7.2	6-21, 6-94
bis(2-Chloroethyl)ether	Halogenated Volatiles	K019	6.0	6-21, 6-94
Chloroform	Halogenated Volatiles	K009, K010, K019, K029, F025, K021, K073	6.0	6-21, 6-94
bis(2-Chloroisopropyl)ether	Halogenated Volatiles	F039, U027	7.2	6-21, 6-94
p-Chloro-m-cresol	Chlorinated Phenolics and Derivatives	F039, U039	14	6-13, 6-90
Chloromethane	Halogenated Volatiles	F039, U045	30	6-22, 6-94
2-Chloronaphthalene	Oxygenated Hydrocarbons	F039, U047	5.6	6-44, 6-104

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents (Cont'd.)				
2-Chlorophenol	Chlorinated Phenolics and Derivatives	F039, U048	5.7	6-13, 6-90
3-Chloropropene	Halogenated Volatiles	F039	30	6-22, 6-95
Chrysene	Polynuclear Aromatic Hydrocarbons	K035, K087	3.4	6-54, 6-109
Cresol (m- and p-isomers) (3-Methylphenol, 4-Methylphenol)	Nonchlorinated Phenolics	F039, U052, F001-F005	5.6	6-30, 6-98
o-Cresol (2-Methylphenol)	Nonchlorinated Phenolics	F039, U052, F001-F005	5.6	6-30, 6-98
Cyclohexanone	Oxygenated Hydrocarbons	F001-F005	0.75 mg/L (TCLP)	6-44, 6-104
o,p'-DDD	Chlorinated Pesticides	F039, U060, U061	0.087	6-8, 6-87
p,p'-DDD	Chlorinated Pesticides	F039, U060, U061	0.087	6-8, 6-87
o,p'-DDE	Chlorinated Pesticides	F039, U061	0.087	6-9, 6-87
p,p'-DDE	Chlorinated Pesticides	F039, U061	0.087	6-9, 6-88
o,p'-DDT	Chlorinated Pesticides	F039, U061	0.087	6-9, 6-88
p,p'-DDT	Chlorinated Pesticides	F039, U061	0.087	6-9, 6-88
Dibenz(a,h)anthracene	Polynuclear Aromatic Hydrocarbons	F039, U063	8.2	6-54, 6-109
1,2-Dibromo-3-chloropropane	Organo-Bromines	F039, U066	15	6-34, 6-99

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents (Cont'd.)				
Dibromomethane	Organo-Bromines	F039, U068	15	6-34, 6-99
tris-(2,3-Dibromopropyl) phosphate	Organo-Bromines	U235	0.10	6-34, 6-99
m-Dichlorobenzene	Chlorobenzenes	F039, U071	6.0	6-17, 6-92
o-Dichlorobenzene	Chlorobenzenes	F039, K086, U070, F001-F005	6.0	6-17, 6-92
p-Dichlorobenzene	Chlorobenzenes	F039, U072	6.0	6-17, 6-92
Dichlorodifluoromethane	Halogenated Volatiles	F039, U075	7.2	6-22, 6-95
1,1-Dichloroethane	Halogenated Volatiles	K018, K028	6.0	6-22, 6-95
1,2-Dichloroethane	Halogenated Volatiles	K018, K019, K020, F025, K029	6.0	6-23, 6-95
1,1-Dichloroethylene	Halogenated Volatiles	K029, F025	6.0	6-23, 6-95
trans-1,2-Dichloroethylene	Halogenated Volatiles	F039, U079	30	6-24, 6-95
2,4-Dichlorophenol	Chlorinated Phenolics and Derivatives	F039, U081	14	6-14, 6-90
2,6-Dichlorophenol	Chlorinated Phenolics and Derivatives	F039, U082	14	6-14, 6-90
2,4-Dichlorophenoxyacetic Acid (2,4-D)	Chlorinated Phenolics and Derivatives	F039, U240	10	6-14, 6-90

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents (Cont'd.)				
1,2-Dichloropropane	Halogenated Volatiles	F039, K017, U083	18	6-24, 6-95
cis-1,3-Dichloropropene	Halogenated Volatiles	F039, U084	18	6-24, 6-95
trans-1,3-Dichloropropene	Halogenated Volatiles	F039, U084	18	6-24, 6-95
Dieldrin	Chlorinated Pesticides	F039, P037	0.13	6-9, 6-88
Diethyl Phthalate	Phthalates	F039, K086, U088	28	6-50, 6-108
2,4-Dimethyl Phenol	Nonchlorinated Phenolics	F039, U101	14	6-31, 6-98
Dimethyl Phthalate	Phthalates	F039, K086, U102	28	6-50, 6-108
Di-n-butyl Phthalate	Phthalates	F039, K086, U069	28	6-51, 6-108
1,4-Dinitrobenzene	Organo-Nitrogen Compounds	F039	2.3	6-36, 6-100
4,6-Dinitro-o-cresol	Nonchlorinated Phenolics	F039, P047	160	6-31, 6-98
2,4-Dinitrophenol	Nonchlorinated Phenolics	F039, P048	160	6-31, 6-98
2,4-Dinitrotoluene	Organo-Nitrogen Compounds	F039, U105, K111	140	6-37, 6-100
2,6-Dinitrotoluene	Organo-Nitrogen Compounds	F039, U106, K111	28	6-37, 6-100
Di-n-octyl Phthalate	Phthalates	F039, K086, U107	28	6-51, 6-108
1,4-Dioxane	Oxygenated Hydrocarbons	F039, U108	170	6-44, 6-104
Diphenylamine/Diphenylnitrosamine	Organo-Nitrogen Compounds	K022	13 (sum)	6-37, 6-101

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents (Cont'd.)				
Di-n-propylnitrosamine	Organo-Nitrogen Compounds	F039, U111	14	6-37, 6-100
Disulfoton	Organo-Sulfur Pesticides	F039	6.2	6-41, 6-103
Endosulfan I	Chlorinated Pesticides	F039, P050	0.066	6-10, 6-88
Endosulfan II	Chlorinated Pesticides	F039, P050	0.13	6-10, 6-88
Endosulfan Sulfate	Chlorinated Pesticides	F039, P050	0.13	6-10, 6-88
Endrin	Chlorinated Pesticides	F039, P051	0.13	6-10, 6-88
Endrin Aldehyde	Chlorinated Pesticides	F039, P051	0.13	6-10, 6-89
Ethyl Acetate	Oxygenated Hydrocarbons	F039, K086, U112, F001-F005	33	6-44, 6-104
Ethyl Ether	Oxygenated Hydrocarbons	F039, U117, F001-F005	160	6-45, 6-104
bis(2-Ethylhexyl)phthalate	Phthalates	F039, K086	28	6-50, 6-108
Ethyl Methacrylate	Oxygenated Hydrocarbons	F039, U118	160	6-45, 6-104
Ethylbenzene	Aromatic Hydrocarbons	F039, K086, F001-F005	10	6-5, 6-85
Ethylene Dibromide (1,2-Dibromoethane)	Organo-Bromines	F039,U067, K117, K118, K136	15	6-34, 6-99
Famphur	Organo-Sulfur Pesticides	F039	15	6-41, 6-103
Fluoranthene	Polynuclear Aromatic Hydrocarbons	K035, K087	3.4	6-55, 6-109

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents (Cont'd.)				
Fluorene	Polynuclear Aromatic Hydrocarbons	K035	3.4	6-55, 6-109
Heptachlor	Chlorinated Pesticides	F039, P059, K032, K097	0.066	6-11, 6-89
Heptachlor Epoxide	Chlorinated Pesticides	F039, P059, K032, K097	0.066	6-11, 6-89
Hexachlorobenzene	Chlorobenzenes	K085	10	6-18, 6-92
Hexachlorabutadiene	Chlorinated Pesticides	K016, K018, K028, K030	5.6	6-11, 6-89
Hexachlorocyclopentadiene	Chlorinated Pesticides	K032, K033, K034, K097	2.4	6-11, 6-89
Hexachlorodibenzo-p-dioxins	PCBs and Dioxins	F039	0.001	6-48, 6-106
Hexachlorodibenzofurans	PCBs and Dioxins	F039	0.001	6-48, 6-106
Hexachloroethane	Halogenated Volatiles	F025, F039, U131, K016, K018, K019, K028, K073, K095	30	6-25, 6-96
Hexachloropropene	Halogenated Volatiles	F039, U243	30	6-25, 6-96
Indeno(1,2,3)pyrene	Polynuclear Aromatic Hydrocarbons	K035, K087	3.4	6-55, 6-109
Iodomethane	Halogenated Volatiles	F039, U138	65	6-25, 6-96
Isobutanol	Oxygenated Hydrocarbons	F039, U140, F001-F005	170	6-45, 6-104
Isodrin	Chlorinated Pesticides	F039, P060	0.066	6-12, 6-89
Isosafrole	Oxygenated Hydrocarbons	F039, U141	2.6	6-45, 6-105

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents (Cont'd.)				
Kepone	Chlorinated Pesticides	P039, U142	0.13	6-12, 6-89
Methacrylonitrile	Organo-Nitrogen Compounds	F039, U152	84	6-38, 6-101
Methanol	Oxygenated Hydrocarbons	F001-F005	0.75 mg/L (TCLP)	6-45, 6-105
Methapyrilene	Organo-Nitrogen Compounds	F039, U155	1.5	6-38, 6-101
Methoxychlor	Chlorinated Pesticides	F039, U247	0.18	6-12, 6-89
Methyl Ethyl Ketone	Oxygenated Hydrocarbons	F039, K086, U159, F001-F005	36	6-46, 6-105
Methyl Isobutyl Ketone	Oxygenated Hydrocarbons	F039, K086, U161, F001-F005	33	6-46, 6-105
Methyl Methacrylate	Oxygenated Hydrocarbons	F039, U162	160	6-46, 6-105
Methyl Parathion	Organo-Sulfur Pesticides	F039	4.6	6-42, 6-103
3-Methylcholanthrene	Polynuclear Aromatic Hydrocarbons	F039, U157	15	6-55, 6-109
Methylene Chloride	Halogenated Volatiles	F039, K086, U080, F001-F005	30	6-25, 6-96
4,4'-Methylene-bis(2-chloroaniline)	Halogenated Volatiles	F039, U158	30	6-26, 6-96
Naphthalene	Polynuclear Aromatic Hydrocarbons	K019	5.6	6-56, 6-110
o-Nitroaniline	Organo-Nitrogen Compounds	K101	14	6-32, 6-101

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents (Cont'd.)				
p-Nitroaniline	Organo-Nitrogen Compounds	F039, P077	28	6-38, 6-101
Nitrobenzene	Organo-Nitrogen Compounds	F039, K086, U169, K083, F001-F005	14	6-38, 6-101
N-Nitroso-di-n-butylamine	Organo-Nitrogen Compounds	F039, U172	17	6-39, 6-101
N-Nitrosodiethylamine	Organo-Nitrogen Compounds	F039, U174	28	6-39, 6-102
N-Nitrosodimethylamine	Organo-Nitrogen Compounds	F039	2.3	6-39, 6-101
N-Nitrosomethylethylamine	Organo-Nitrogen Compounds	F039	2.3	6-39, 6-101
N-Nitrosomorpholine	Organo-Nitrogen Compounds	F039	2.3	6-39, 6-102
N-Nitrosopiperidine	Organo-Nitrogen Compounds	F039, U179	35	6-40, 6-102
N-Nitrosopyrrolidine	Organo-Nitrogen Compounds	F039, U180	35	6-40, 6-102
o-Nitrophenol	Nonchlorinated Phenolics	K102	13	6-31, 6-98
p-Nitrophenol	Nonchlorinated Phenolics	F039, U170	29	6-32, 6-98
5-Nitro-o-toluidine	Organo-Nitrogen Compounds	F039, U181	28	6-39, 6-101
Parathion	Organo-Sulfur Pesticides	F039	4.6	6-42, 6-103
Pentachlorobenzene	Chlorobenzenes	K042, K085	10	6-18, 6-92
Pentachlorodibenzo-p-dioxins	PCBs and Dioxins	F039	0.001	6-49, 6-107
Pentachlorodibenzofurans	PCBs and Dioxins	F039	0.001	6-49, 6-107

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents (Cont'd.)				
Pentachloroethane	Halogenated Volatiles	K018, K028, K030, K095, K096	6.0	6-26, 6-96
Pentachloronitrobenzene	Chlorobenzenes	F039, U185	4.8	6-19, 6-92
Pentachlorophenol	Chlorinated Phenolics and Derivatives	F039, K001, U051	7.4	6-14, 6-90
Phenacetin	Organo-Nitrogen Compounds	F039, U187	16	6-40, 6-102
Phenanthrene	Polynuclear Aromatic Hydrocarbons	K019	5.6	6-56, 6-110
Phenol	Nonchlorinated Phenolics	F039, U188, K083	6.2	6-32, 6-98
Phorate	Organo-Sulfur Pesticides	F039	4.6	6-42, 6-103
Phthalic Anhydride	Phthalates	K023, K024, K093, K094, U190	28	6-51, 6-108
Phthalic Anhydride (as measured by Phthalic Acid)	Phthalates	K023, K024, K093, K094, U190	28	6-51, 6-108
Pronamide	Organo-Nitrogen Compounds	F039, U192	1.5	6-40, 6-102
Propanenitrile (Ethyl Cyanide)	Organo-Nitrogen Compounds	F039, P101	360	6-40, 6-102
Pyrene	Polynuclear Aromatic Hydrocarbons	K035, F039	8.2	6-56, 6-110
Pyridine	Organo-Nitrogen Compounds	F039, U196, F001-F005	16	6-40, 6-102
Safrole	Oxygenated Hydrocarbons	F039, U203	22	6-46, 6-105

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents (Cont'd.)				
Silvex (2,4,5-TP)	Chlorinated Phenolics and Derivatives	F039	7.9	6-14, 6-90
1,2,4,5-Tetrachlorobenzene	Chlorobenzenes	K030	14	6-19, 6-92
Tetrachlorodibenzo-p-dioxins	PCBs and Dioxins	F039	0.001	6-49, 6-107
Tetrachlorodibenzofurans	PCBs and Dioxins	F039	0.001	6-49, 6-107
1,1,1,2-Tetrachloroethane	Halogenated Volatiles	K028, K095, K096	6.0	6-26, 6-96
1,1,2,2-Tetrachloroethane	Halogenated Volatiles	K020, K028, K095, K096	6.0	6-27, 6-96
Tetrachloroethylene	Halogenated Volatiles	K016, K019, K020, K028, K030, K073, K095, K096	6.0	6-27, 6-97
2,3,4,6-Tetrachlorophenol	Chlorinated Phenolics and Derivatives	F039	7.4	6-15, 6-90
Toluene (Methyl Benzene)	Aromatic Hydrocarbons	K015	10	6-5, 6-85
Total PCBs	PCBs and Dioxins	F039, K085	10	6-47, 6-107
Toxaphene	Chlorinated Pesticides	K041, K098	2.6	6-12, 6-89
1,2,4-Trichlorobenzene	Chlorobenzene	F039, K019, K030, K096	19	6-19, 6-93
1,1,1-Trichloroethane	Halogenated Volatiles	K018, K019, K028, K029, K073	6.0	6-27, 6-97
1,1,2-Trichloroethane	Halogenated Volatiles	F025	6.0	6-28, 6-97

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/kg)	Location of Constituent-Specific Discussion (page numbers)
Organic Constituents (Cont'd.)				
Trichloroethylene	Halogenated Volatiles	F001-F005, F025, F039, K086, U228, K095, K096	6.0	6-28, 6-97
Trichloromonofluoromethane (Fluorotrichloromethane)	Halogenated Volatiles	F039, U121, F001-F005	30	6-28, 6-97
2,4,5-Trichlorophenol	Chlorinated Phenolics and Derivatives	F039	7.4	6-15, 6-91
2,4,6-Trichlorophenol	Chlorinated Phenolics and Derivatives	F039	7.4	6-16, 6-91
2,4,5-Trichlorophenoxyacetic Acid (2,4,5-T)	Chlorinated Phenolics and Derivatives	F039	7.9	6-15, 6-90
1,2,3-Trichloropropane	Halogenated Volatiles	F039, K017	30	6-29, 6-97
1,1,2-Trichloro-1,2,2-trifluoroethane	Halogenated Volatiles	F039, F001-F005	30	6-29, 6-97
Vinyl Chloride	Halogenated Volatiles	K029	6.0	6-29, 6-97
Xylene(s) (total)	Aromatic Hydrocarbons	K001, U051, F001-F005	30	6-6, 6-85

Table 6-1

(Continued)

Constituent Selected for Regulation	Treatability Group	Waste Code from Which Universal Standard Data Were Transferred	Universal Standard (mg/L (TCLP))	Location of Constituent-Specific Discussion (page numbers)
Metal Constituents				
Antimony	Metal Constituents	K061	2.1	6-60, 6-111
Arsenic	Metal Constituents	D004	5.0	6-61, 6-111
Barium	Metal Constituents	K061	7.6	6-61, 6-111
Beryllium	Metal Constituents	K061	0.014	6-62, 6-111
Cadmium	Metal Constituents	K061	0.19	6-62, 6-111
Chromium (total)	Metal Constituents	D007	0.86	6-67, 6-111
Lead	Metal Constituents	K061	0.37	6-62, 6-112
Mercury	Metal Constituents	D009	0.20 (Low-mercury subcategory wastes[a] -RMERC[b] residues)	6-63, 6-112
		K071	0.025 (Low-mercury subcategory wastes[a] - Non-RMERC[b] residues)	
Nickel	Metal Constituents	K061	5.0	6-64, 6-113
Selenium	Metal Constituents	K061	0.16	6-64, 6-113
Silver	Metal Constituents	K061	0.30	6-65, 6-113
Thallium	Metal Constituents	K061	0.078	6-65, 6-113
Vanadium	Metal Constituents	K061	0.23	6-66, 6-113
Zinc	Metal Constituents	K061	5.3	6-65, 6-113

[a]Low-mercury subcategory wastes = Mercury wastes containing concentrations of mercury less than 260 mg/kg.
[b]RMERC = Mercury recovery by roasting/retorting.

Table 6-2

Determination of Universal Treatment Standards for Organic Constituents (Nonwastewaters)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Aromatic Hydrocarbons								
Benzene	K083	K019	Benzene	<2.0	Benzene	1.18 (85)[b]	2.8	10
Ethylbenzene	F039, K086, F001-F005	K019	Ethylbenzene	<2.0	Ethylbenzene	1.06 (94)	2.8	10
Toluene	K015	K019	Toluene	<2.0	Toluene	1.06 (94)	2.8	10
Xylene(s) (total)	K001, U051, F001-F005	K001-C	Xylenes	<10.0	Xylenes	1.16 (86)	2.8	30

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Carbon Disulfide								
Carbon Disulfide	F001-F005	F001-F005	Carbon Disulfide	0.90[c]	-	-	5.34	4.8[c]

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Univers Treatm Standa (mg/k
Chlorinated Pesticides								
Aldrin	F039, P004	3rd 3rd Test Burn (Test 2)	Aldrin	<0.0066	Heptachlor	3.57 (28)[b]	2.8	0.06
alpha-BHC	F039, U129	3rd 3rd Test Burn (Test 2)	alpha-BHC	<0.0066	Heptachlor	3.57 (28)[b]	2.8	0.06
beta-BHC	F039, U129	3rd 3rd Test Burn (Test 2)	beta-BHC	<0.0066	Heptachlor	3.57 (28)[b]	2.8	0.06
delta-BHC	F039, U129	3rd 3rd Test Burn (Test 2)	delta-BHC	<0.0066	Heptachlor	3.57 (28)[b]	2.8	0.0
gamma-BHC	F039, U129	3rd 3rd Test Burn (Test 2)	gamma-BHC	<0.0066	Heptachlor	3.57 (28)[b]	2.8	0.0
Chlordane	K032, K097	3rd 3rd Test Burn (Test 2)	Chlordane (alpha and gamma)	<0.026	Chlordane	3.57 (28)	2.8	0.26
o,p'-DDD	F039, U060, U061	3rd 3rd Test Burn (Test 1)	o,p'-DDD	<0.013	Methoxychlor	2.38 (42)[b]	2.8	0.08
p,p'-DDD	F039, U060, U061	3rd 3rd Test Burn (Test 1)	p,p'-DDD	<0.013	Methoxychlor	2.38 (42)[b]	2.8	0.08
o,p'-DDE	F039, U061	3rd 3rd Test Burn (Test 1)	o,p'-DDE	<0.013	Methoxychlor	2.38 (42)[b]	2.8	0.08

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Chlorinated Pesticides (Cont'd.)								
p,p'-DDE	F039, U061	3rd 3rd Test Burn (Test 1)	p,p'-DDE	<0.013	Methoxychlor	2.38 (42)[b]	2.8	0.087
o,p'-DDT	F039, U061	3rd 3rd Test Burn (Test 1)	o,p'-DDT	<0.013	Methoxychlor	2.38 (42)[b]	2.8	0.087
p,p'-DDT	F039, U061	3rd 3rd Test Burn (Test 1)	p,p'-DDT	<0.013	Methoxychlor	2.38 (42)[b]	2.8	0.087
Dieldrin	F039, P037	3rd 3rd Test Burn (Test 2)	Dieldrin	<0.013	Heptachlor	3.57 (28)[b]	2.8	0.13
Endosulfan I	F039, P050	3rd 3rd Test Burn (Test 2)	Endosulfan I	<0.0066	Heptachlor	3.57 (28)[b]	2.8	0.066
Endosulfan II	F039, P050	3rd 3rd Test Burn (Test 2)	Endosulfan II	<0.013	Heptachlor	3.57 (28)[b]	2.8	0.13
Endosulfan Sulfate	F039, P050	3rd 3rd Test Burn (Test 2)	Endosulfan sulfate	<0.013	Heptachlor	3.57 (28)[b]	2.8	0.13
Endrin	F039, P051	3rd 3rd Test Burn (Test 2)	Endrin	<0.013	Heptachlor	3.57 (28)[b]	2.8	0.13

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Chlorinated Pesticides (Cont'd.)								
Endrin Aldehyde	F039, P051	3rd 3rd Test Burn (Test 2)	Endrin aldehyde	<0.013	Heptachlor	3.57 (28)[b]	2.8	0.13
Heptachlor	F039, P059, K032, K097	3rd 3rd Test Burn (Test 2)	Heptachlor	<0.0066	Heptachlor	3.57 (28)[b]	2.8	0.06
Heptachlor Epoxide	F039, P059, K032, K097	3rd 3rd Test Burn (Test 2)	Heptachlor	<0.0066	Heptachlor	3.57 (28)[b]	2.8	0.06
Hexachlorobutadiene	K016, K018, K028, K030	K019	Naphthalene	<2.0	Naphthalene	1 (103)	2.8	5.6
Hexachlorocyclo-pentadiene	K032, K033, K034, K097	3rd 3rd Test Burn (Test 2)	Hexachlorocyclo-pentadiene	<0.33	Hexachlorocyclo-pentadiene	2.6 (38)	2.8	2.4
Isodrin	F039, P060	3rd 3rd Test Burn (Test 2)	Isodrin	<0.0066	Heptachlor	3.57 (28)[b]	2.8	0.06
Kepone	F039, U142	K001-C	Kepone	<2.0	Heptachlor epoxide	1.33 (75)[b]	2.8	0.13
Methoxychlor	F039, U247	3rd 3rd Test Burn (Test 2)	Methoxychlor	<0.013	Methoxychlor	5.0 (20)[b]	2.8	0.18
Toxaphene	K041, K098	3rd 3rd Test Burn (Test 2)	Chlordane (alpha and gamma)	<0.26	Chlordane (alpha and gamma)	3.57 (28)[b]	2.8	2.6

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Chlorinated Phenolics and Derivatives								
p-Chloro-m-cresol	F039, U039	K019	p-Chloro-m-cresol	<5.0	p-Chloro-m-cresol	1 (110)[b]	2.8	14
2-Chlorophenol	F039, U048	K019	2-Chlorophenol	<2.0	2-Chlorophenol	1.02 (98)[b]	2.8	5.7
2,4-Dichlorophenol	F039, U081	K019	2,4-Dichlorophenol	<5.0	2-Chlorophenol	1.02 (98)[b]	2.8	14
2,6-Dichlorophenol	F039, U082	K019	2,6-Dichlorophenol	<5.0	2-Chlorophenol	1.02 (98)[b]	2.8	14
2,4-Dichlorophenoxyacetic Acid (2,4-D)	F039, U240	3rd 3rd Test Burn (Test 2)	2,4-Dichlorophenoxy-acetic acid	0.2	2,4-Dichlorophenoxy-acetic acid	5 (20)[b]	10.13	10
Pentachlorophenol	F039, K001, U051	K001-PCP	Pentachlorophenol	<2.5	Pentachlorophenol	1.05 (95)[b]	2.8	7.4
Silvex (2,4,5-TP)	F039	3rd 3rd Test Burn (Test 2)	2,4-Dichloro-phenoxyacetic acid	<0.155	2,4-Dichloro-phenoxyacetic acid	5 (20)[b]	10.13	7.9
2,4,5-T	F039	3rd 3rd Test Burn (Test 2)	2,4-Dichloro-phenoxyacetic acid	<0.155	2,4-Dichloro-phenoxyacetic acid	5 (20)[b]	10.13	7.9
2,3,4,6-Tetrachloro-phenol	F039	K001-PCP	Pentachlorophenol	<12.5	Pentachlorophenol	1.05 (95)[b]	2.8	7.4

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Univers Treatme Standar (mg/kg
Chlorinated Phenolics and Derivatives (Cont'd.)								
2,4,5-Trichlorophenol	F039	K001-PCP	Pentachlorophenol	<12.5	Pentachlorophenol	1.05 (95)[b]	2.8	7.4
2,4,6-Trichlorophenol	F039	K001-PCP	Pentachlorophenol	<12.5	Pentachlorophenol	1.05 (95)[b]	2.8	7.4

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Chlorobenzenes								
Chlorobenzene	K019, F039, U037, F001-F005	K019	Chlorobenzene	<2.0	Chlorobenzene	1.01 (99)[b]	2.8	6.0
m-Dichlorobenzene	F039, U071	K019	m-Dichlorobenzene	<2.0	p-Dichlorobenzene	1.11 (90)[b]	2.8	6.0
o-Dichlorobenzene	F039, K086, U070, F001-F005	K019	o-Dichlorobenzene	<2.0	p-Dichlorobenzene	1.11 (90)[b]	2.8	6.0
p-Dichlorobenzene	F039, U072	K019	p-Dichlorobenzene	<2.0	p-Dichlorobenzene	1.11 (90)[b]	2.8	6.0
Hexachlorobenzene	K085	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	<0.33	Hexachlorobenzene	4.76 (21)[b]	2.8	10
Pentachlorobenzene	K042, K085	3rd 3rd Test Burn (Test 2)	Hexachlorobenzene	<0.33	Hexachlorobenzene	4.76 (21)[b]	2.8	10
Pentachloronitro-benzene	F039, U185	3rd 3rd Test Burn (Test 2)	Pentachloronitro-benzene	<0.36	Hexachlorobenzene	4.76 (21)[b]	2.8	4.8
1,2,4,5-Tetrachloro-benzene	K030	K019	1,2,4,5-Tetrachlorobenzene	<5.0	1,2,4,5-Tetrachlorobenzene	1 (103)	2.8	14

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Chlorobenzenes (Cont'd.)								
1,2,4-Trichlorobenzene	F039, K019, K030, K096	K019	1,2,4-Trichlorobenzene	<5.0	1,2,4-Trichlorobenzene	1.33 (75)[b]	2.8	19

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Halogenated Volatiles								
Benzal Chloride	K015	K019	Benzal Chloride	<2.0	p-Dichlorobenzene	1.1 (90)[b]	2.8	6.0
Carbon Tetrachloride	K021, K073	K019	Carbon Tetrachloride	<2.0	Carbon Tetrachloride	1.06 (94)	2.8	6.0
2-Chloro-1,3-butadiene	F024	F024	2-Chloro-1,3-butadiene	<0.10	2-Chloro-1,3-butadiene	1 (129)	2.8	0.28
Chloroethane	F039	K019	1,2-Dichloroethane	<2.0	1,2-Dichloroethane	1.06 (94)	2.8	6.0
	K018	K019	Chloroform	<2.0	Chloroform	1.06 (94)	2.8	
bis(2-Chloroethoxy) Methane	F039, U024	K019	bis(2-Chloroethoxy) methane	<2.0	1,1-Dichloroethylene	1.28 (78)[b]	2.8	7.2
bis(2-Chloroethyl)ether	K019	K019	bis(2-Chloroethyl)ether	<2.0	bis(2-Chloroethyl)ether	1 (103)	2.8	6.0
Chloroform	K009, K010, K019, K029, F025, K021, K073	K019	Chloroform	<2.0	Chloroform	1.06 (94)	2.8	6.0
bis(2-Chloroisopropyl) ether	F039, U027	K019	bis(2-Chloroisopropyl) ether	<2.0	1,1-Dichloroethylene	1.28 (78)[b]	2.8	7.2
Chloromethane	F039, U045	K001-C	Chloromethane	<10.0	1,1,-Dichloroethylene	1.16 (86)[b]	2.8	30

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Halogenated Volatiles (Cont'd.)								
3-Chloropropene	F039	K019	Hexachloroethane	<10.0	Hexachloroethane	1 (103)	2.8	30
Dichlorodifluoro-methane	F039, U075	K019	Dichlorodifluoro-methane	<2.0	1,1-Dichloroethylene	1.28 (78)[b]	2.8	7.2
1,1-Dichloroethane	K018, K028	K019	1,1-Dichloroethane	<2.0	1,1-Dichloroethane	1.06 (94)	2.8	6.0
1,2-Dichloroethane	K018, K019, K020, K029, F025	K019	1,2-Dichloroethane	<2.0	1,2-Dichloroethane	1.06 (94)	2.8	6.0
1,1-Dichloroethylene	K029, F025	K019	1,1-Dichloroethylene	<2.0	1,1-Dichloroethane	1.06 (94)	2.8	6.0
trans-1,2-Dichloro-ethylene	F039, U079	K001-C	trans-1,2-Dichloro-ethylene	<10.0	1,1,-Dichloroethylene	1.16 (86)[b]	2.8	30
1,2-Dichloropropane	F039, K017, U083	K019	1,2-Dichloropropane	<5.0	1,1-Dichloroethylene	1.28 (78)[b]	2.8	18
cis-1,3-Dichloropropene	F039, U084	K019	cis-1,3-Dichloropropane	<5.0	1,1-Dichloroethylene	1.28 (78)[b]	2.8	18
trans-1,3-Dichloropropene	F039, U084	K019	trans-1,3-Dichloropropene	<5.0	1,1-Dichloroethylene	1.28 (78)[b]	2.8	18

< - indicates a detection limit value

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Halogenated Volatiles (Cont'd.)								
Hexachloroethane	F025, F039, K016, K018, K019, K028, K030, K073, K095, U131	K019	Hexachloroethane	<10.0	Hexachloroethane	1 (103)	2.8	30
Hexachloropropene	F039, U243	K019	Hexachloropropene	<10.0	Trichloroethylene	1 (107)[b]	2.8	30
Iodomethane	F039, U138	K001-C	Iodomethane	<20	1,1-Dichloroethylene	1.16 (86)[b]	2.8	65
Methylene Chloride	F039, K086, U080, F001-F005	K001-PCP	Methylene Chloride	<10.0	Trichloroethylene	1.19 (84)[b]	2.8	30
4,4-Methylene-bis-2-chloroaniline	F039, U158	K001-PCP	4,4-Methylene-bis-2-chloroaniline	<10.0	Di-n-propylnitrosamine	1.23 (81)[b]	2.8	30
Pentachloroethane	K018, K028, K030, K095, K096	K019	bis(2-Chloroethyl) ether	<2.0	bis(2-Chloroethyl) ether	1 (103)	2.8	6.0
1,1,1,2-Tetrachloro-ethane	K028, K095, K096	K019	bis(2-Chloroethyl)ether	<2.0	bis(2-Chloroethyl)ether	1 (103)	2.8	6.0
1,1,2,2-Tetrachloroethane	K020, K028, K095, K096	K019	bis(2-Chloroethyl)ether	<2.0	bis(2-Chloroethyl)ether	1 (103)	2.8	6.0

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Halogenated Volatiles (Cont'd.)								
Tetrachloroethylene	K016, K019, K020, K028, K030, K073, K095, K096	K019	Tetrachloroethylene	<2.0	Tetrachloroethylene	1.06 (94)	2.8	6.0
1,1,1-Trichloroethane	K018, K019, K028, K029, K073	K019	1,1,1-Trichloroethane	<2.0	1,1,1-Trichloroethane	1.06 (94)	2.8	6.0
1,1,2-Trichloroethane	F025	K019	1,1,2-Trichloroethane	<2.0	1,1,2-Trichloroethane	1.06 (94)	2.8	6.0
Trichloroethylene	F001-F005, F025, F039, K086, U228, K095, K096	K019	Trichloroethylene	<2.0	Trichloroethylene	1 (107)[b]	2.8	6.0
Trichloromonofluoro-methane	F039, U121, F001-F005	K001-C	Trichloromono-fluoromethane	<10.0	1,1-Dichloroethylene	1.16 (86)[b]	2.8	30
1,2,3-Trichloropropane	F039, K017	K019	Hexachloroethane	<10.0	Hexachloroethane	1 (103)	2.8	30
1,1,2-Trichloro-1,2,2-trifluoroethane	F039, F001-F005	K019	Hexachloroethane	<10.0	Hexachloroethane	1 (103)	2.8	30
Vinyl Chloride	K029	K019	Chloroform	<2.0	Chloroform	1.06 (94)	2.8	6.0

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[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Nonchlorinated Phenolics								
Cresol (m- and p-)	F039, U052, F001-F005	K019	Cresol (m- and p-)	<2.0	p-Chloro-m-cresol	1 (110)[b]	2.8	5.6
o-Cresol	F039, U052, F001-F005	K019	o-Cresol	<2.0	p-Chloro-m-cresol	1 (110)[b]	2.8	5.6
2,4-Dimethylphenol	F039, U101	K019	2,4-Dimethylphenol	<5.0	p-Chloro-m-cresol	1 (110)[b]	2.8	14
4,6-Dinitro-o-cresol	F039, P047	K019	4,6-Dinitro-o-cresol	<50	Phenol	1.11 (90)[b]	2.8	160
Dinoseb (2-sec-Butyl-4,6-dinitrophenol)	F039, P020	3rd 3rd Test Burn	Dinoseb	<0.36	Dinoseb	2.44 (41)[b]	2.8	2.5
2,4-Dinitrophenol	F039, P048	K019	2,4-Dinitrophenol	<50	Phenol	1.11 (90)[b]	2.8	160
(o)2-Nitrophenol	K102	K102	(o)2-Nitrophenol	<1.0	(p)4-Nitrophenol	4.76 (21)[b]	2.8	13
(p)4-Nitrophenol	F039, U170	K019	(p)4-Nitrophenol	<10.0	(p)4-Nitrophenol	1.03 (97)[b]	2.8	29
Phenol	F039, U188, K083	K019	Phenol [c]	<2.0	Phenol	1.11 (90)[b]	2.8	6.2

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[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Unive Treat Stan (mg/
Organo-Bromines								
Bromodichloromethane	F039	EDB Test Burn	Ethylene Dibromide	<5.0	Ethylene Dibromide	1.08 (93)[b]	2.8	15
Bromoform	F039, U225	EDB Test Burn	Ethylene Dibromide	<5.0	Ethylene Dibromide	1.08 (93)[b]	2.8	15
Bromomethane	F039, U029, K117, K118, K131, K132, K136	EDB Test Burn	Ethylene Dibromide	<5.0	Ethylene Dibromide	1.08 (93)[b]	2.8	15
4-Bromophenyl phenyl ether	F039, U030	EDB Test Burn	Ethylene Dibromide	<5.0	Ethylene Dibromide	1.08 (93)[b]	2.8	15
Chlorodibromomethane	F039	EDB Test Burn	Ethylene Dibromide	<5.0	Ethylene Dibromide	1.08 (93)[b]	2.8	15
1,2-Dibromo-3-chloropropane	F039, U066	EDB Test Burn	Ethylene Dibromide	<5.0	Ethylene Dibromide	1.08 (93)[b]	2.8	15
Dibromomethane	F039, U068	EDB Test Burn	Ethylene Dibromide	<5.0	Ethylene Dibromide	1.08 (93)[b]	2.8	15
tris-(2,3-Dibromopropyl) phosphate	U235	K037	Disulfoton	<0.034	Disulfoton	1.10 (91)[b]	2.8	0.
Ethylene Dibromide	F039, U067, K117, K118, K136	EDB Test Burn	Ethylene Dibromide	<5.0	Ethylene Dibromide	1.08 (93)[b]	2.8	15

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[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Organo-Nitrogen Compounds								
Acetonitrile	K011, K013, K014	K011, K013, K014	Acetonitrile	<0.5	Acetonitrile	1.27 (79)[b]	2.8	1.8
2-Acetylaminofluorene	F039, U005	K001-PCP	2-Acetylaminofluorene	<50	Acenaphthene	1 (120)[b]	2.8	140
Acrylamide	K011, K013, K014	K011, K013, K014	Acrylamide	<6.5	Acrylamide	1.27 (79)[b]	2.8	23
Acrylonitrile	F039, U009	K102	Acrylonitrile	<30	1,1-Dichloroethylene	1 (126)[b]	2.8	84
Aniline	F039, U012	K019	Aniline	<5.0	4-Nitrophenol	1.03 (97)[b]	2.8	14
	K083	K019	Aniline	<5.0	Nitrobenzene	1 (103)	2.8	
p-Chloroaniline	F039, P024	K001-PCP	p-Chloroaniline	<5.0	4-Nitrophenol	1.11 (90)[b]	2.8	16
1,4-Dinitrobenzene	F039	3rd 3rd Test Burn (Test 1)	1,4-Dinitrobenzene	<0.3375	Dinoseb	2.44 (41)[b]	2.8	2.3
2,4-Dinitrotoluene	F039, U105, K111	K019	2,4-Dinitrotoluene	<50	2,4-Dinitrotoluene	1 (107)[b]	2.8	140
2,6-Dinitrotoluene	F039, U106, K111	K019	2,6-Dinitrotoluene	<10.0	2,4-Dinitrotoluene	1 (107)[b]	2.8	28
Di-n-propylnitrosamine	F039, U111	K019	Di-n-propylnitrosamine	<5.0	Di-n-propylnitrosamine	1 (120)[b]	2.8	14

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Organo-Nitrogen Compounds (Cont'd.)								
Diphenylamine and Diphenylnitrosamine	K022	K022	Diphenylamine and Diphenylnitrosamine	<3.1	Diphenylamine and Diphenylnitrosamine	1.54 (65)	2.8	13 (sum)
Methacrylonitrile	F039, U152	K102	Methacrylonitrile	<30	1,1-Dichloroethylene	1 (126)[b]	2.8	84
Methapyrilene	F039, U155	3rd 3rd Test Burn (Test 2)	Methapyrilene	<0.36	Pronamide	1.45 (69)[b]	2.8	1.5
(o)2-Nitroaniline	K101	K101	(o)2-Nitroaniline	<2.0	(o)2-Nitroaniline	2.5 (40)	2.8	14
(p)4-Nitroaniline	F039, P077	K019	(p)4-Nitroaniline	<10.0	2,4-Dinitrotoluene	1 (107)[b]	2.8	28
Nitrobenzene	F039, K086, U169, F001-F005	K019	Nitrobenzene	<5.0	4-Nitrophenol	1.03 (97)[b]	2.8	14
	K083	K019	Nitrobenzene	<5.0	Nitrobenzene	1 (103)	2.8	
5-Nitro-o-toluidine	F039, U181	K001-PCP	5-Nitro-o-toluidine	<10.0	2,4-Dinitrotoluene	1 (120)[b]	2.8	28
N-Nitroso-di-n-butylamine	F039, U172	K001-PCP	N-Nitroso-di-n-butylamine	<5.0	Di-n-propylnitrosamine	1.23 (81)[b]	2.8	17
N-Nitrosodimethylamine	F039	3rd 3rd Test Burn (Test 1)	N-Nitrosomethyl-ethylamine	<0.3375	Dinoseb	2.44	2.8	2.3

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Organo-Nitrogen Compounds (Cont'd.)								
N-Nitrosomethyl-ethylamine	F039	3rd 3rd Test Burn (Test 1)	N-Nitrosomethyl-ethylamine	<0.3375	Dinoseb	2.44	2.8	2.3
N-Nitrosomorpholine	F039	3rd 3rd Test Burn (Test 1)	N-Nitrosomorpholine	<0.3375	Dinoseb	2.44	2.8	2.3
N-Nitrosopiperidine	F039, U179	K001-PCP	N-Nitrosopiperidine	<10.0	Di-n-propylnitrosamine	1.23 (81)[b]	2.8	35
N-Nitrosopyrrolidine	F039, U180	K001-PCP	N-Nitrosopyrrolidine	<10.0	Di-n-propylnitrosamine	1.23 (81)[b]	2.8	35
N-Nitrosodiethylamine	F039, U174	K019	N-Nitrosodiethylamine	<10.0	Di-n-propylnitrosamine	1 (120)[b]	2.8	28
Phenacetin	F039, U187	K001-PCP	Phenacetin	<5.0	4-Nitrophenol	1.11 (90)[b]	2.8	16
Pronamide	F039, U192	3rd 3rd Test Burn (Test 2)	Pronamide	<0.33	Pronamide	1.45 (69)[b]	2.8	1.5
Propanenitrile (Ethyl Cyanide)	F039, P101	K019	Propanenitrile (Ethyl Cyanide)	<100	1,1-Dichloroethylene	1.28 (78)[b]	2.8	360
Pyridine	F039, U196, F001-F005	K001-PCP	Pyridine	<5.0	Benzene	1.14 (88)[b]	2.8	16

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Univ Treat Stan (mg
Organo-Sulfur Pesticides								
Disulfoton	F039	Leachate Data	Disulfoton	<2.0	Disulfoton	1.09	2.8	6
Famphur	F039	Leachate Data	Famphur	<5.0	Famphur	1.09	2.8	15
Methyl Parathion	F039	Leachate Data	Methyl Parathion	<1.5	Parathion	1.09	2.8	4
Parathion	F039	Leachate Data	Parathion	<1.5	Parathion	1.09	2.8	4
Phorate	F039	Leachate Data	Phorate	<1.5	Phorate	1.09	2.8	4

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Oxygenated Hydrocarbons								
Acetone	F039, K086, U002, F001-F005	K001-C	Acetone	<50	1,1-Dichloroethylene	1.16 (86)[b]	2.8	160
Acetophenone	F039, U004, K086	K102	Acetophenone	<2.0	2,4-Dinitrotoluene	1.72 (58)[b]	2.8	9.7
n-Butanol	F039, K086, U031, F001-F005	3rd 3rd Test Burn (Test 1)	n-Butanol	<0.4	Methyl Isobutyl Ketone	2.33 (43)[b]	2.8	2.6
2-Chloronaphthalene	F039, U047	K019	2-Chloronaphthalene	<2.0	Acenaphthene	1 (110)[b]	2.8	5.6
Cyclohexanone	F001-F005	F001-F005	Methyl ethyl ketone	0.14[c]	-	-	5.34	0.75[c]
1,4-Dioxane	F039, U108	K102	1,4-Dioxane	<60	Benzene	1 (104)[b]	2.8	170
Ethyl acetate	F039, K086, U112, F001-F005	K001-C	Ethyl acetate	<10.0	1,1-Dichloroethylene	1.16 (86)[b]	2.8	33
Ethyl ether	F039, U117, F001-F005	K001-PCP	Ethyl ether	<50	1,1-Dichloroethylene	1.16 (86)[b]	2.8	160
Ethyl methacrylate	F039, U118	K001-C	Ethyl methacrylate	<50	1,1-Dichloroethylene	1.16 (86)[b]	2.8	160
Isobutanol	F039, U140, F001-F005	K102	Isobutanol	<60	1,1-Dichloroethylene	1 (126)[b]	2.8	170

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Oxygenated Hydrocarbons (Cont'd.)								
Isosafrole	F039, U141	3rd 3rd Test Burn (Test 1)	Isosafrole	<0.36	Isosafrole	2.56 (39)[b]	2.8	2.6
Methanol	F001-F005	F001-F005	Methyl ethyl ketone	0.14[c]	-	-	5.34	0.75[c]
Methyl ethyl ketone	F039, K086, U159, F001-F005	K019	Methyl ethyl ketone	<10.0	1,1-Dichloroethylene	1.28 (78)[b]	2.8	36
Methyl isobutyl ketone	F039, K086, U161, F001-F005	K001-PCP	Methyl isobutyl ketone	<10.0	Trichloroethylene	1.19 (84)[b]	2.8	33
Methyl methacrylate	F039, U162	K001-C	Methyl methacrylate	<50	1,1-Dichloroethylene	1.16 (86)[b]	2.8	160
Safrole	F039, U203	K102	Safrole	<5.0	p-Chloro-m-cresol	1.56 (64)[b]	2.8	22

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
PCBs and Dioxins								
Aroclor 1016	F039, K085	3rd 3rd Test Burn (Test 2)	Methoxychlor	<0.065	Methoxychlor	5 (20)[c]	2.8	0.92[d]
Aroclor 1221	F039, K085	3rd 3rd Test Burn (Test 2)	Methoxychlor	<0.065	Methoxychlor	5 (20)[c]	2.8	0.92[d]
Aroclor 1232	F039, K085	3rd 3rd Test Burn (Test 2)	Methoxychlor	<0.065	Methoxychlor	5 (20)[c]	2.8	0.92[d]
Aroclor 1242	F039, K085	3rd 3rd Test Burn (Test 2)	Methoxychlor	<0.065	Methoxychlor	5 (20)[c]	2.8	0.92[d]
Aroclor 1248	F039, K085	3rd 3rd Test Burn (Test 2)	Methoxychlor	<0.065	Methoxychlor	5 (20)[c]	2.8	0.92[d]
Aroclor 1254	F039, K085	3rd 3rd Test Burn (Test 2)	Methoxychlor	<0.13	Methoxychlor	5 (20)[c]	2.8	1.8[d]
Aroclor 1260	F039, K085	3rd 3rd Test Burn (Test 2)	Methoxychlor	<0.13	Methoxychlor	5 (20)[c]	2.8	1.8[d]
Hexachlorodibenzo-furans	F039	Dioxins Rule	-	<0.001	-	-	-	0.001
Hexachlorodibenzo-p-dioxins	F039	Dioxins Rule	-	<0.001	-	-	-	0.001

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

[d]The treatment standards shown for Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260 are not universal treatment standards. As discussed in Section 3.2.1, the Agency is promulgating a single treatment standard for total PCBs in nonwastewaters. The universal treatment standard for total PCBs was developed by summing the treatment standards originally calculated for the individual Aroclors shown above. The treatment performance data for these Aroclors are presented here for completeness.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
PCBs and Dioxins (Cont'd.)								
Pentachlorodibenzo-furans	F039	Dioxins Rule	-	<0.001	-	-	-	0.001
Pentachlorodibenzo-p-dioxins	F039	Dioxins Rule	-	<0.001	-	-	-	0.001
Tetrachlorodibenzo-furans	F039	Dioxins Rule	-	<0.001	-	-	-	0.001
Tetrachlorodibenzo-p-dioxins	F039	Dioxins Rule	-	<0.001	-	-	-	0.001
Total PCBs	-	-	-	-	-	-	-	10

< - indicates a detection limit value.
[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.
[b]This number represents a constituent specific matrix spike.
[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Phthalates								
Butyl benzyl phthalate	F039, K086	K019	bis(2-Ethylhexyl) phthalate	3.67	bis(2-Ethylhexyl) phthalate	1 (103)	2.16	28
Diethyl phthalate	F039, K086, U088	K024	Phthalic anhydride	<8.2	Phthalic anhydride	1.19 (84)	2.8	28
Dimethyl phthalate	F039, K086, U102	K024	Phthalic anhydride	<8.2	Phthalic anhydride	1.19 (84)	2.8	28
Di-n-butyl phthalate	F039, K086, U069	K024	Phthalic anhydride	<8.2	Phthalic anhydride	1.19 (84)	2.8	28
Di-n-octyl phthalate	F039, K086, U107	K024	Phthalic anhydride	<8.2	Phthalic anhydride	1.19 (84)	2.8	28
bis(2-Ethylhexyl) phthalate	F039, K086	K024	Phthalic anhydride	<8.2	Phthalic anhydride	1.19 (84)	2.8	28
Phthalic Anhydride	K023, K024, K093, K094, U190	K024	Phthalic anhydride	<8.2	Phthalic anhydride	1.19 (84)	2.8	28
Phthalic Anhydride (as measured by Phthalic Acid)	K023, K024, K093, K094, U190	K024	Phthalic anhydride	<8.2	Phthalic anhydride	1.19 (84)	2.8	28

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Univers Treatm Standa (mg/k
Polynuclear Aromatic Hydrocarbons								
Acenaphthalene	F039, K087	K087	Acenaphthalene	<1.0	Acenaphthalene	1.22 (82)	2.8	3.4
Acenaphthene	K035	K087	Fluorene	<1.0	Fluorene	1.22 (82)	2.8	3.4
Anthracene	K015, K035	K087	Anthracene	<1.0	Anthracene	1.22 (82)	2.8	3.4
Benz(a)anthracene	K035	K087	Benz(a)anthracene	<1.0	Benz(a)anthracene	1.22 (82)	2.8	3.4
Benzo(a)pyrene	K035, K060	K087	Benzo(a)pyrene	<1.0	Benzo(a)pyrene	1.22 (82)	2.8	3.4
Benzo(b)fluoranthene and Benzo(k)fluoranthene	F039	K087	Benzo(b)fluoranthene and Benzo(k)fluoranthene	<1.0 + <1.0 = <2.0	Benzo(b)fluoranthene and Benzo(k)fluoranthene	1.22 (82)	2.8	6.8 (sum
Benzo(g,h,i)perylene	F039	F024	Benzo(g,h,i)perylene	<0.336	Benzo(g,h,i)perylene	1.61 (62)	2.8	1.8
Chrysene	K035, K087	K087	Chrysene	<1.0	Chrysene	1.22 (82)	2.8	3.4
Dibenz(a,h)anthracene	F039, U063	K087	Dibenz(a,h)anthracene	<1.0	Pyrene	2.94 (34)[b]	2.8	8.2
Fluoranthene	K035, K087	K087	Fluoranthene	<1.0	Fluoranthene	1.22 (82)	2.8	3.4
Fluorene	K035	K087	Fluorene	<1.0	Fluorene	1.22 (82)	2.8	3.4
Indeno(1,2,3-c,d)pyrene	K035, K087	K087	Indeno(1,2,3-c,d)pyrene	<1.0	Indeno(1,2,3-c,d)pyrene	1.22 (82)	2.8	3.4
3-Methylcholanthrene	F039, U157	K001-PCP	3-Methylcholanthrene	<5.0	Pyrene	1.04 (96)[b]	2.8	15

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-2

(Continued)

Constituent Selected for Regulation	Waste Code from Which Universal Standard Data Were Transferred	Treatment Test from Which Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Concentration in Treated Waste (mg/kg)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/kg)
Polynuclear Aromatic Hydrocarbons (Cont'd.)								
Naphthalene	K019	K019	Naphthalene	<2.0	Naphthalene	1 (103)	2.8	5.6
Phenanthrene	K019	K019	Phenanthrene	<2.0	Phenanthrene	1 (103)	2.8	5.6
Pyrene	K035, F039	K087	Pyrene	<1.0	Pyrene	2.94 (34)[b]	2.8	8.2

< - indicates a detection limit value.

[a]Performance data consist of the concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent specific matrix spike.

[c]This value represents the concentration in the TCLP waste extract.

Table 6-3

Determination of Universal Treatment Standards for Metal Constituents (Nonwastewaters)

Constituent Selected for Regulation	Waste Code from Which the Universal Standard Data Were Transferred	Treatment Test from Which the Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Average Concentration in Treated Waste (mg/L)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/L)
Metal Constituents								
Antimony	K061	K061-HRD	Antimony	0.655	Antimony	1.09 (92)[b]	2.9	2.1
Arsenic	D004	-	Arsenic	-	Arsenic	-	-	5.0
Barium	K061	K061-SKF,IMS[f]	Barium	2.51	Barium	1.08 (93)[b]	2.8	7.6
Beryllium	K061	K061-INMETCO, IMS[f]	Beryllium	0.0073	Beryllium	1 (100)[b]	1.9	0.014
Cadmium	K061	K061-HRD	Cadmium	<0.060	Cadmium	1.15 (87)[b]	2.8	0.19
Chromium (total)	-	D007-Cyanokem	Chromium	0.16	Chromium	1 (105)[b]	5.4	0.86

< - indicates a detection limit value.

[f] No matrix spike data were available for these data.
Matrix spike data were transferred from the IMS test.

[a]Performance data consists of concentration in treated waste, accuracy correction factor, and variability factor.

[b]This number represents a constituent-specific matrix spike.

[c]Low-mercury subcategory wastes = Mercury wastes with mercury concentrations less than 260 mg/kg.

[d]RMERC = Mercury recovery by roasting/retorting.

HRD - Horsehead Resource Development Co. HTMR data
SKF - SKF Plasma Technologies HTMR data
IMS - International Mill Service HTMR data
INMETCO - International Metals Reclamation Company HTMR data

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Table 6-3

(Continued)

Constituent Selected for Regulation	Waste Code from Which the Universal Standard Data Were Transferred	Treatment Test from Which the Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Average Concentration in Treated Waste (mg/L)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/L)
Metal Constituents (Cont'd.)								
Lead	K061	K061-HRD	Lead	<0.10	Lead	1.32 (76)[b]	2.8	0.37
Mercury	K106, U151, P065, and P092 (Low mercury[c], RMERC[d] residues)	Characteristic Level for Mercury (D009)	-	-	-	-	-	0.20 (Low-mercury subcategory wastes[c] - RMERC[d] residues)
	K071, F039, K106, and U151 (Low-mercury[c], non-RMERC[d] residues), P065 and P092 (Low mercury[c] incinerator residues)	K071	Mercury	0.0043	Mercury	1.05 (95)	5.47	0.025 (Low-mercury subcategory wastes[c] - non-RMERC[d] residues)

< - indicates a detection limit value.
[1] - No matrix spike data were available for these data. Matrix spike data were transferred from the IMS test.

HRD - Horsehead Resource Development Co. HTMR data
SKF - SKF Plasma Technologies HTMR data
IMS - International Mill Service HTMR data
INMETCO - International Metals Reclamation Company HTMR data

[a]Performance data consists of concentration in treated waste, accuracy correction factor, and variability factor.
[b]This number represents a constituent-specific matrix spike.
[c]Low-mercury subcategory wastes = Mercury wastes with mercury concentrations less than 260 mg/kg.
[d]RMERC = Mercury recovery by roasting/retorting.

Table 6-3

(Continued)

Constituent Selected for Regulation	Waste Code from Which the Universal Standard Data Were Transferred	Treatment Test from Which the Performance Data[a] Were Transferred	Constituent from Which the Concentration in Treated Waste Was Transferred	Average Concentration in Treated Waste (mg/L)	Constituent from Which the Accuracy Correction Data Were Transferred	Accuracy Correction Factor (Matrix Spike % Recovery)	Variability Factor	Universal Treatment Standard (mg/L)
Metal Constituents (Cont'd.)								
Nickel	K061	K061-INMETCO, IMS[f]	Nickel	2.54	Nickel	1.05 (95)[b]	1.9	5.0
Selenium	K061	K061-SKF,IMS[f]	Selenium	<0.05	Selenium	1.11 (90)[b]	2.8	0.16
Silver	K061	K061-HRD	Silver	<0.080	Silver	1.32 (76)[b]	2.8	0.30
Thallium	K061	K061-INMETCO, IMS[f]	Thallium	<0.024	Thallium	1.16 (86)[b]	2.8	0.078
Vanadium	K061	K061-IMS	Vanadium	0.0944	Vanadium	1.02 (98)[b]	2.4	0.23
Zinc	K061	K061-IMS	Zinc	0.602	Zinc	1.02 (98)[b]	8.6	5.3

< - indicates a detection limit value.
[f] - No matrix spike data were available for these data.
Matrix spike data were transferred from the IMS test.

[a]Performance data consists of concentration in treated waste, accuracy correction factor, and variability factor.
[b]This number represents a constituent-specific matrix spike.
[c]Low-mercury subcategory wastes = Mercury wastes with mercury concentrations less than 260 mg/kg.
[d]RMERC = Mercury recovery by roasting/retorting.

HRD - Horsehead Resource Development Co. HTMR data
SKF - SKF Plasma Technologies HTMR data
IMS - International Mill Service HTMR data
INMETCO - International Metals Reclamation Company HTMR data

Table 6-4
Characterization Data and Treatment Performance Data for HTMR for Certain Metal-Bearing Wastes

	Untreated F006, K061, and K062 (HTMR)[1]		Treated F006, K061, and K062 (HTMR)[2]		Untreated K061 (HTMR)[3]		Treated K061 (HTMR)[3]		Untreated K061 (HTMR)[4]		Treated K061 (HTMR)[4]		Untreated K061 (HTMR)[5]		Treated K061 (HTMR)[5]	
BDAT List Constituent	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)
Antimony	<6-31	<0.06	<3-391	<0.06	-	-	-	-	73-80	-	155-405	0.34-0.853	50-150	-	<20	-
Barium	<0.01-690	0.04-1.41	3.8-285	.44-3.17	-	-	-	0.39-2.15	184-204	-	346-467	2.93-4.32	-	-	<3,000	2.5
Beryllium	-		<0.5-6.7	<0.005-0.135	-	-	-	-	<0.5-1.5	-	1.7-4.0	<0.001-0.0018	-	-	-	-
Cadmium	<2-17,900	<0.005-17.1	<0.5-17.8	0.006-0.104	-	-	-	<0.01-0.02	290-808	-	<1.5-15	<0.003-<0.06	200-900	-	<10-500	<0.005
Chromium	1,500-171,000	<0.01-99.5	930-32,500	<0 03-2.17	-	-	-	<0.01-0.06	903-1,190	-	476-978	<0.04-<0.08	400-5,000	-	2,000-12,000	0.013
Lead	500-46,600	0.1-76	<4-86.1	<0.04-0.38	-	-	-	<0.1	6,400-20,800	-	365-2,370	<0.005-0.0053	24,000-50,000	-	50-1,500	<0.05
Nickel	1,000-416,000	0.2-920	<1.6-289	<0.04-1.93	-	-	-	<0.02-0.11	261-449	-	579-952	0.024-0.153	1,000-3,000	-	200-1,000	0.22
Selenium	<1-260	<0.004	<1.5-53.2	<0.003-<0.015	-	-	-	<0.01-0.02	5.2-20	-	4.2-8.8	<0.005	-	-	-	<0.05
Silver	<1.8-150	0.012-0.038	<0.5-9.75	0.005-0.048	-	-	-	<0.02-0.03	23-44	-	39-59	<0.04-0.08	-	-	-	0.014
Thallium	-	-	<0.6-<3	<0.006	-	-	-	-	<1.0-1.5	-	<0.5-<1.0	<0.010	-	-	-	-
Vanadium	-	-	<1.1-190	<0.011-0.07	-	-	-	-	25-37	-	32-44	0.03-<0.06	-	-	-	<0.02
Zinc	190-405,100	0.1-1,475	<0.4-217	0.098-1.25	170,000-185,000	-	-	-	135,000-155,000	-	4,550-11,200	0.08-0.241	150,000-320,000	-	50-2,000	-

- No data.

[1]Source: International Metals Reclamation Company (INMETCO) characterization data for metal-bearing waste treated at INMETCO and submitted to EPA in 1988.

[2]Source: INMETCO treatment performance data submitted to EPA (October 1991).

[3]Source: Horsehead Resource Development Company (HRD), data submitted to EPA in September 1990.

[4]Source: Onsite Engineering Report for Horsehead Resource Development Company for K061 (data from well-designed and well-operated processes), March 29, 1988.

[5]Source: SKF Plasma Technologies, data submitted to EPA in the First Third rulemaking.

Table 6-4 (Continued)

BDAT List Constituent	Untreated K061 (HTMR)[6]		Treated K061 (HTMR)[6]		Untreated K061 (HTMR)[7]		Treated K061 (HTMR)[7]	
	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)
Antimony	-	-	-	<0.01-0.076	-	-	-	<0.3
Barium	-	-	-	0.41-3.78	-	-	-	0.180-0.540
Beryllium	-	-	-	<0.001-<0.003	-	-	-	<0.006-0.010
Cadmium	-	-	-	<0.004-0.012	-	-	-	<0.010
Chromium	-	-	-	<0.011-0.054	-	-	-	<0.03
Lead	-	-	-	<0.11-0.20	-	-	-	0.0036-0.0114
Nickel	-	-	-	<0.026	-	-	-	2.04-3.41
Selenium	-	-	-	<0.005-<0.05	-	-	-	<0.03
Silver	-	-	-	0.012-0.024	-	-	-	<0.010
Thallium	-	-	-	<0.005-0.005	-	-	-	<0.012-<0.024
Vanadium	-	-	-	0.042-0.17	-	-	-	<0.04
Zinc	>150,000	-	-	0.024-6.42	-	-	-	0.114-0.24

- No data.

[6]Source: International Mill Service (IMS), data submitted to EPA for the proposed rule for K061 (high zinc subcategory) nonwastewaters.

[7]Source: International Metals Reclamation Company (INMETCO), data submitted to EPA for the proposed rule for K061 (high zinc subcategory) nonwastewaters.

Table 6-5
Characterization Data and Treatment Performance Data for Stabilization for Certain Metal-Bearing Wastes

	Untreated K061 (Stabilization)[1]		Treated K061 (Stabilization)[1]		Untreated K061 (Stabilization)[2]		Treated K061 (Stabilization)[2]		Untreated F024 (Stabilization)[3]		Treated F024 (Stabilization)[3]		Untreated F006 (Stabilization)[4]		Treated F006 (Stabilization)[4]	
BDAT List Constituent	Value Total (mg/kg)	Value(s) TCLP (mg/l)	Value Total (mg/kg)	Value(s) TCLP (mg/l)	Value(s) Total (mg/kg)	Value(s) TCLP (mg/l)	Value Total (mg/kg)	Value(s) TCLP (mg/l)	Value Total (mg/kg)	Value(s) TCLP (mg/l)	Value Total (mg/kg)	Value(s) TCLP (mg/l)	Value Total (mg/kg)	Value TCLP (mg/l)	Value Total (mg/kg)	Value(s) TCLP (mg/l)
Antimony	-	<0.01-0.03	-	<0.01	-	-	-	-	8.69	<0.11	<5.61	0.068-0.11	-	-	-	-
Barium	-	<1-4.33	-	<1	-	-	-	-	360	1.67-1.99	213-307	0.34-4.62	0.74-85.5	0.04-1.41	-	0.04-1.18
Beryllium	-	<0.001-0.001	-	<0.001	-	-	-	-	0.1	0.002	<0.1-0.69	<0.002	-	-	-	-
Cadmium	-	<0.01-11.1	-	<0.01	256-661	0.01-7.15	-	<0.01-0.01	1.05	0.021	0.46-1.23	<0.004	1.3-720	0.01-23.6	-	<0.01-3.23
Chromium	-	<0.05-0.61	-	<0.05 0.08	1,100-1,640	0.060-0.580	-	<0.01-0.6	217	0.4-0.42	123-163	<0.003-0.19	12.9-42,900	0.01-360	-	0.03-1.21
Lead	-	<0.05-82.4	-	<0.05	9,240-38,000	5.51-334	-	<0.01-0.22	245	14.9-63.3	186-302	0.006-0.3	11.4-24,500	0.26-50.2	-	0.20-2.39
Nickel	-	<0.05-0.84	-	<0.05-<0.2	118-163	0.01-0.12	-	<0.01-0.01	351	3.93-4.39	245-397	<0.042-0.84	37-23,700	0.52-730	-	0.02-16.5
Selenium	-	<0.01-0.35	-	<0.02-0.093	-	-	-	-	0.8	<0.002	<0.1	<0.002-0.006	-	<0.01-<0.45	-	<0.01-0.20
Silver	-	<0.05-<0.07	-	<0.05	34.9	<0.01	-	<0.01	4.04	<0.006	1.42-3.49	<0.006	2.3-39	<0.01-1.64	-	<0.01-0.2
Thallium	-	<0.01-0.051	-	<0.01	-	-	-	-	<0.21	<0.004	<0.21-0.46	<0.004	-	-	-	-
Vanadium	-	<0.05	-	<0.05	-	-	-	-	10.2	<0.008	14.7-36.3	<0.008	-	-	-	-
Zinc	-	<0.05	-	<0.05	-	-	-	-	138	2.06-2.07	88.5-120	0.041-0.65	120-90,200	0.16-2,030	-	<0.01-36.9

- No data.
[1]Source: Conversion Systems Incorporated, data submitted to EPA in 1992 for the K061/F006/K062 nonwastewaters proposed rule.
[2]Source: Chemical Waste Management, data submitted to EPA in 1992 for the K061/F006/K062 nonwastewaters proposed rule.
[3]Source: Final Onsite Engineering Report (OER) for Treatment Technology Performance and Operation for Waterways Experiment Station, Vicksburg, Mississippi (December 1989).
[4]Source: Final BDAT Background Document for F006 (August 1988).

Table 6-5 (Continued)

BDAT List Constituent	Untreated K061 (Stabilization)[5] Value(s) Total (mg/kg)	Untreated K061 (Stabilization)[5] Value(s) TCLP (mg/l)	Treated K061 (Stabilization)[5] Value(s) Total (mg/kg)	Treated K061 (Stabilization)[5] Value(s) TCLP (mg/l)	Untreated Mixture of K062, D002, D003, and F006 (Solidification)[6] Value(s) Total (mg/kg)	Untreated Mixture of K062, D002, D003, and F006 (Solidification)[6] Value(s) TCLP (mg/l)	Treated Mixture of K062, D002, D003, and F006 (Solidification)[6] Value(s) Total (mg/kg)	Treated Mixture of K062, D002, D003, and F006 (Solidification)[6] Value(s) TCLP (mg/l)
Antimony	294	0.04	-	<0.05	<10-30	-	<10-30	-
Barium	238	0.733	-	0.431-0.67	20-40	<0.01-0.17	<10-60	0.13-0.21
Beryllium	0.15	<0.001	-	<0.001	<2	-	<2	-
Cadmium	481	12.8	-	0.033-3.64	10-20	<0.02-0.27	<5-21	<0.02-<0.05
Chromium	1,370	<0.007	-	0.027-0.093	473-5,000	<0.05-0.63	1,100-7,500	<0.05-0.15
Lead	20,300	45.1	-	0.066-1.3	134-2,400	<0.05-0.34	85-1,500	<0.05-<0.1
Nickel	243	0.027	-	<0.012-0.024	288-7,300	-	508-4,900	-
Selenium	<5.0	<0.05	-	<0.01-<0.025	<10	<0.02-<0.4	<10	<0.02-<0.2
Silver	59	0.021	-	<0.003	<2-5	<0.02-0.16	<2-8	<0.02
Thallium	<1.0	0.038	-	<0.007-0.015	<10	-	<10	-
Vanadium	25	<0.006	-	0.0084-0.29	-	-	-	-
Zinc	244,000	445	-	0.179-23.5	68-6,500	-	3,700-11,000	-

- No data.

[5]Source: Final BDAT Background Document for K061 (August 1988).

[6]Source: Onsite Engineering Report (OER) of Treatment Technology Performance and Operation for Envirite Corporation (December 1986).

Table 6-6

Comparison of Treatment Performance Data for Solvent Extraction of K048, K049, K050, K051, and K052 Wastes with Universal Standards

Constituent Regulated in K048-K052, F037, and/or F038	Universal Standard (mg/kg)	Treatment Standard in K048-K052, F037, and/or F038 (mg/kg)	Concentration in Treated Waste from Plant Q (mg/kg)	Concentration in Treated Wastes from Plant R (mg/kg)	Concentration in Treated Wastes from Plant T (mg/kg)
Anthracene	3.4	28	<0.33, <0.33, <0.33, <0.33	1.5, <1.3, 7.8, 7.6	-, 10.0[a], -, 18.0, 14.0, 10.2, 13.0, 13.0, -, -, -, -
Benzene	10	14	0.22, 0.09, 0.13, 0.1	<0.65, <5.0[a], <1.0, <0.5	0.29, 0.05, 0.06, 0.09, -, -, -, -, <0.1, <0.1, <2.0, <0.1
Benz(a)anthracene	3.4	20	<0.33, <0.33, <0.33, <0.33	1.6, <1.3, 7.2[a], 6.8	NO DATA
Benzo(a)pyrene	3.4	12	<0.33, <0.33, <0.33, <0.33	1.7, <1.3, 4.3[a], 3.9	NO DATA
Chrysene	3.4	15	0.42, <0.33, <0.33, <0.33	2.3, <1.3, 5.2[a], 4.8	-, -, -, 0.28, -, -, -, -, -, -, -
o-Cresol	5.6	6.2	<0.33, <0.33, <0.33, <0.33	<0.99, <1.3, <1.3, <2.2[a]	NO DATA
p-Cresol	5.6	6.2	2.6, 1.9, 2.3, 1.1	<0.99, <1.3, <1.3, <2.2[a]	NO DATA
Di-n-butyl phthalate	28	3.6	<0.33, <0.33, <0.33, <0.33	<0.99, <1.3[a], <1.3[a], <2.2	0.25, -, -, -, -, -, -, -, -, -, -
Ethylbenzene	10	14	0.06, <0.05, <0.05, <0.05	<0.65, <5.0[a], <1.0, <0.5	-, 0.06, 13.0, -, <0.1, -, <0.1, -, <0.1, 13.0, <0.1, <0.1
bis-(2-Ethylhexyl) phthalate	28	7.3	<0.33, <0.33, <0.33, <0.33	<0.99, <1.3, 2.61[a], 2.5	0.25, -, -, 1.12, -, -, -, -, -, -, -
Naphthalene	5.6	42	0.38, <0.33, <0.33, <0.33	3.0, 1.8, 15[a], 14.0	0.3, -, 0.1, <0.28, -, -, -, -, -, -, 0.2
Phenanthrene	5.6	34	0.46, 0.4, <0.33, 0.35	4.7, 1.8, 25.0, 24.0	0.38, 12.0, 0.16, 0.26, 9.6, -, 2.6, -, <1.0, -, -, <0.2

< - Indicates a detection limit value

[a]Treatment performance data used to develop K048-K052, F037, F038 treatment standard.

Table 6-6

(Continued)

Constituent Regulated in K048-K052, F037, and/or F038	Universal Standard (mg/kg)	Treatment Standard in K048-K052, F037, and/or F038 (mg/kg)	Concentration in Treated Waste from Plant Q (mg/kg)	Concentration in Treated Wastes from Plant R (mg/kg)	Concentration in Treated Wastes from Plant T (mg/kg)
Phenol	6.2	3.6	1.1, 1.2, 1.8, 0.74	<0.99, <1.3, <1.3[a], <2.2	NO DATA
Pyrene	8.2	36	0.67, <0.33, <0.33, 0.48	3.3, 1.8, 14.0, 13.0[a]	0.33, 3.0, -, 0.19, 5.4, -, 3.7, 2.7, -, -, -, -
Toluene	10	14	0.94, 0.37, 0.45, 0.27	<0.65, <5.0[a], 2.0, 0.5	1.46, <0.05, 0.04, 0.04, 0.1, -, -, -, <0.1, <0.1, <0.1, <0.1
Xylenes (total)	33	22	0.19, 0.09, 0.09, 0.09	1.2, 7.9[a], 4.1, 0.5	3.36, 0.24, 0.59, 0.34, 0.1, -, 0.13, 0.1, <0.1, <0.1, <0.1, <0.1

< - Indicates a detection limit value

[a]Treatment performance data used to develop K048-K052, F037, F038 treatment standard.

7.0 ACKNOWLEDGEMENTS

Radian Corporation provided technical support for the development of this document to the U.S. Environmental Protection Agency, Office of Solid Waste under Contract Numbers 68-W9-0072, 68-W0-0025, and 68-W3-0001. This document was prepared under the direction of Richard Kinch, Chief, Waste Treatment Branch; Larry Rosengrant, Section Chief, Treatment Technology Section; and Angela Wilkes and David Levy, Project Officers. Mary Cunningham served as the Project Manager for the first draft of the Proposed Rule document. Lisa Jones served as Project Manager for the final document. Steve Silverman served as EPA legal advisor.

The following personnel from Radian Corporation supported the development of this document: Tom Ferguson and Gayle Kline, Program Managers; Richard Weisman and Mary Willett, Project Directors; and the Radian Project team, Julian Bentley, Chrisanti Haretos, Robyn Flanders, Nancy Johnson, Tim Meeks, Laurie Morgan, and Lori Myers.

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Appendix A

Analytical Methods for Constituents Selected for Regulation Under Universal Standards

Appendix A

Analytical Methods for Constituents Selected for Regulation Under Universal Standards

This appendix presents analytical methods for the analysis of constituents selected for regulation in nonwastewater forms of universal standards wastes. All methods are from Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods (SW-846) (68, 69, 70). The Agency believes that these methods are appropriate for nonwastewater and wastewater forms of listed hazardous wastes.

Table A-1 presents the constituents selected for regulation and the SW-846 methods that are used to analyze for the constituents. The first method listed for each constituent is the most common method of analysis. Additional guidance on which approved method is appropriate for a specific sample is found in each SW-846 method. Table A-2 lists the SW-846 methods and the instrument used for analyses.

Table A-1

Analytical Methods[a] for Constituents Selected for Regulation in Nonwastewater Forms of Universal Standards Wastes

Treatability Group	Constituent Selected for Regulation	Analytical Method
Aromatic Hydrocarbons	Benzene	8240, 8020
	Ethylbenzene	8240, 8020
	Toluene	8240, 8020
	Xylene(s) (total)	8240, 8020
Carbon Disulfide	Carbon Disulfide	8240, 8015
Chlorinated Pesticides	Aldrin	8080
	alpha-BHC	8080
	beta-BHC	8080
	delta-BHC	8080
	gamma-BHC (Lindane)	8080
	Chlordane	8080
	o,p'-DDD	8080
	p,p'-DDD	8080
	o,p'-DDE	8080
	p,p'-DDE	8080
	o,p'-DDT	8080
	p,p'-DDT	8080

Table A-1

(Continued)

Treatability Group	Constituent Selected for Regulation	Analytical Method
Chlorinated Pesticides (Continued)	Dieldrin	8080
	Endosulfan I	8080
	Endosulfan II	8080
	Endosulfan sulfate	8080
	Endrin	8080
	Endrin aldehyde	8080
	Heptachlor	8080
	Heptachlor epoxide	8080
	Hexachlorobutadiene	8270, 8250, 8120
	Hexachlorocyclopentadiene	8270, 8250, 8120
	Isodrin	8080
	Kepone	8080
	Methoxychlor	8080
	Toxaphene	8080
Chlorinated Phenolics and Derivatives	p-Chloro-m-cresol	8270, 8040
	2-Chlorophenol	8270, 8250, 8040
	2,4-Dichlorophenol	8270, 8040

Table A-1

(Continued)

Treatability Group	Constituent Selected for Regulation	Analytical Method
Chlorinated Phenolics and Derivatives (Continued)	2,6-Dichlorophenol	8270
	2,4-Dichlorophenoxyacetic acid (2,4-D)	8150
	Pentachlorophenol	8270, 8250, 8040
	2,3,4,6-Tetrachlorophenol	8270, 8250, 8040
	2,4,5-Trichlorophenol	8270, 8250, 8040
	2,4,6-Trichlorophenol	8270, 8250, 8040
	Silvex (2,4,5-TP)	8150
	2,4,5-Trichlorophenoxy acetic acid	8150
Chlorobenzenes	Chlorobenzene	8240, 8020
	m-Dichlorobenzene	8270, 8250, 8010
	o-Dichlorobenzene	8270, 8250, 8120, 8010
	p-Dichlorobenzene	8270, 8250, 8120, 8010
	Hexachlorobenzene	8270, 8250, 8120
	Pentachlorobenzene	8270
	Pentachloronitrobenzene	8270
	1,2,4,5-Tetrachlorobenzene	8270, 8250, 8120
	1,2,4-Trichlorobenzene	8270

Table A-1

(Continued)

Treatability Group	Constituent Selected for Regulation	Analytical Method
Halogenated Volatiles	Benzal chloride	8270
	Carbon tetrachloride	8240, 8010
	2-Chloro-1,3-butadiene	8270
	Chloroethane	8240, 8010
	bis(2-Chloroethyl)ether	8270, 8250, 8110
	bis(2-Chloroethoxy)methane	8270, 8110
	Chloroform	8240, 8010
	bis(2-Chloroisopropyl)ether	8270, 8110
	Chloromethane	8240, 8010
	2-Chloronaphthalene	8270, 8120
	3-Chloropropene	8240, 8010
	Dichlorodifluoromethane	8240, 8010
	1,1-Dichloroethane	8240, 8010
	1,2-Dichloroethane	8240, 8010
	1,1-Dichloroethylene	8240, 8010
	trans-1,2-Dichloroethylene	8240, 8010
	1,2-Dichloropropane	8240, 8010

Table A-1

(Continued)

Treatability Group	Constituent Selected for Regulation	Analytical Method
Halogenated Volatiles (Continued)	cis-1,3-Dichloropropene	8240, 8010
	trans-1,3-Dichloropropene	8240, 8010
	Hexachloroethane	8270, 8120
	Hexachloropropene	8270
	Iodomethane	8240, 8010
	Methylene chloride	8240, 8010
	4,4'-Methylene-bis(2-chloroaniline)	8270
	Pentachloroethane	8270
	1,1,1,2-Tetrachloroethane	8240, 8010
	1,1,2,2-Tetrachloroethane	8240, 8010
	Tetrachloroethylene	8240, 8010
	1,1,1-Trichloroethane	8240
	1,1,2-Trichloroethane	8240, 8010
	Trichloroethylene	8240, 8010
	Trichloromonofluoromethane	8240, 8010
	1,2,3-Trichloropropane	8240, 8010
	1,1,2-Trichloro-1,2,2-trifluoroethane	8240

Table A-1

(Continued)

Treatability Group	Constituent Selected for Regulation	Analytical Method
Halogenated Volatiles (Continued)	Vinyl chloride	8240, 8010
Non-Chlorinated Phenolics	2-sec-Butyl-4,6-dinitrophenol (Dinoseb)	8270, 8015
	m-Cresol	8270, 8250, 8040
	o-Cresol	8270, 8250, 8040
	p-Cresol	8270, 8250, 8040
Non-Chlorinated Phenolics (Continued)	2,4-Dimethylphenol	8270, 8250, 8040
	4,6-Dinitro-o-cresol	8270, 8250, 8040
	2,4-Dinitrophenol	8270, 8250, 8040
	o-Nitrophenol	8270, 8040
	p-Nitrophenol	8270, 8040
	Phenol	8270, 8250, 8040
Organo-Bromines	Bromodichloromethane	8240, 8010
	Bromoform (Tribromomethane)	8240, 8020
	4-Bromophenyl phenyl ether	8270
	Bromomethane (Methyl bromide)	8240, 8010
	Chlorodibromomethane	8240, 8010
	1,2-Dibromo-3-chloropropane	8240, 8010

Table A-1

(Continued)

Treatability Group	Constituent Selected for Regulation	Analytical Method
Organo-Bromines (Continued)	tris-(2,3-Dibromopropyl) phosphate	8270
	Dibromomethane	8240, 8010
	Ethylene dibromide (1,2-Dibromoethane)	8240, 8010
Organo-Nitrogen Compounds	Acetonitrile	8240
	2-Acetylaminofluorene	8270
	Acrylamide	8015
	Acrylonitrile	8240, 8030
	Aniline	8270, 8250
	p-Chloroaniline	8270
	1,4-Dinitrobenzene	8270
	2,4-Dinitrotoluene	8270, 8250, 8090, 8060
	2,6-Dinitrotoluene	8270, 8250, 8090, 8060
	Diphenylamine/Diphenylnitrosamine (sum)	8270
	Di-n-propylnitrosamine	8270
	Methyacrylonitrile	8240[b]
	Methyapyrilene	8270
	5-Nitro-o-toluidine	8270

Table A-1

(Continued)

Treatability Group	Constituent Selected for Regulation	Analytical Method
Organo-Nitrogen Compounds (Continued)	o-Nitroaniline	8270
	p-Nitroaniline	8270
	Nitrobenzene	8270, 8250, 8090
	N-Nitroso-di-n-butylamine	8270
	N-Nitrosodiethylamine	8270
	N-Nitrosodimethylamine	8270
	N-Nitrosodimethylethylamine	8270
	N-Nitrosomorpholine	8270
	N-Nitrosopiperidine	8270
	N-Nitropyrrolidine	8270
	Phenacetin	8270
	Pronamide	8270
	Propanenitrile (Ethyl cyanide)	8240, 8015
	Pyridine	8270
Organo-Sulfur Pesticides	Disulfoton	8140
	Famphur	8140
	Methyl parathion	8140

Table A-1

(Continued)

Treatability Group	Constituent Selected for Regulation	Analytical Method
Organo-Sulfur Pesticides (Continued)	Parathion	8140
	Phorate	8140
Oxygenated Hydrocarbons	Acetone	8240
	Acetophenone	8270
	n-Butanol	8015[b]
	1,4-Dioxane	8240[b], 8015
	Ethyl acetate	8240
	Ethyl ether	8240, 8015
	Ethyl methacrylate	8240, 8015
	Isobutanol	8015[b]
	Isosafrole	8270
	Methanol	8015[b]
	Methyl ethyl ketone	8240, 8015
	Methyl isobutyl ketone	8240, 8015
	Methyl methacrylate	8240, 8015
	Safrole	8270

Table A-1

(Continued)

Treatability Group	Constituent Selected for Regulation	Analytical Method
PCBs and Dioxins	Hexachlorodibenzo-p-dioxins	8280, 8290
	Hexachlorodibenzofurans	8280, 8290
	Pentachlorodibenzo-p-dioxins	8280, 8290
	Pentachlorodibenzofurans	8280, 8290
	Tetrachlorodibenzo-p-dioxins	8280, 8290
	Tetrachlorodibenzofurans	8280, 8290
	Aroclor 1016	8080, 8081
	Aroclor 1221	8080, 8081
	Aroclor 1232	8080, 8081
	Aroclor 1242	8080, 8081
	Aroclor 1248	8080, 8081
	Aroclor 1254	8080, 8081
	Aroclor 1260	8080, 8081
	PCBs (total)	8080, 8081
Phthalates	Butyl benzyl phthalate	8270, 8060
	Diethyl phthalate	8270, 8060
	Dimethyl phthalate	8270, 8060

Table A-1

(Continued)

Treatability Group	Constituent Selected for Regulation	Analytical Method
Phthalates (Continued)	Di-n-butyl phthalate	8270, 8060
	Di-n-octyl phthalate	8270, 8060
	bis(2-Ethylhexyl)phthalate	8270, 8060
	Phthalic Anhydride	8270, 8060
Polynuclear Aromatic Hydrocarbons	Acenaphthalene	8270, 8100
	Acenaphthene	8270, 8100
	Anthracene	8270, 8100
	Benz(a)anthracene	8270, 8250, 8100, 8310
	Benzo(b)fluoranthene/Benzo(k)fluoranthene (sum)	8270, 8250, 8100, 8310
	Benzo(ghi)perylene	8270, 8250, 8100, 8130
	Benzo(a)pyrene	8270, 8100
	Chrysene	8270, 8250, 8100, 8310
	Dibenz(a,h)anthracene	8270, 8100
	Fluoranthene	8270, 8100
	Fluorene	8270, 8100
	Indeno(1,2,3)pyrene	8270, 8100
	3-Methylcholanthrene	8270

Table A-1

(Continued)

Treatability Group	Constituent Selected for Regulation	Analytical Method
Polynuclear Aromatic Hydrocarbons (Continued)	Naphthalene	8270, 8250, 8100
	Phenanthrene	8270, 8100
	Pyrene	8270, 8100
Metals	Antimony	6010, 7040, 7041
	Arsenic	7060, 6010, 7061
	Barium	6010, 7080, 7081
	Beryllium	6010, 7090, 7091
	Cadmium	6010, 7130, 7131
	Chromium (total)	6010, 7190, 7191
	Lead	7421, 6010, 7420
	Mercury	7471
	Nickel	6010, 7520, 7521
	Selenium	7740, 6010, 7741
	Silver	6010, 7760, 7761

Table A-1

(Continued)

Treatability Group	Constituent Selected for Regulation	Analytical Method
Metals (Continued)	Thallium	7841, 6010, 7840
	Zinc	6010, 7950, 7951

[a]All methods are from SW-846. The first method listed for each constituent is the most common method of analysis.

[b]Direct-injection gas chromatography (GC) or gas chromatography/mass spectrometry (GC/MS).

Table A-2

Analytical Methods
Instrumentation

Method Number	Method Instrumentation
6010	Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP)
7040	Atomic Absorption, Direct Aspiration (AA)
7041	Graphite Furnace Atomic Absorption (GFAA)
7060	GFAA
7061	Gaseous-Hydride Atomic Absorption (GHAA)
7080	AA
7081	GFAA
7090	AA
7091	GFAA
7130	AA
7131	GFAA
7190	AA
7191	GFAA
7210	AA
7420	AA
7421	GFAA
7470	Cold Vapor Atomic Absorption, Wastewaters Only
7520	AA
7521	GFAA
7740	GFAA
7741	GHAA
7760	AA
7761	GFAA
7840	AA
7841	GFAA

Table A-2

(Continued)

Method Number	Method Instrumentation
7910	AA
7911	GFAA
7950	AA
7951	GFAA
8010	Gas Chromatography/Electrolytic Conductivity Detector (GC/HECD)
8015	Gas Chromatography/Flame Ionization Detector (GC/FID)
8020	Gas Chromatography/Photo-ionization Detector (GC/PID)
8030	GC/FID
8040	GC/FID
8060	Gas Chromatography/Electron Capture Detector (GC/ECD) or GC/FID
8080	GC/ECD or HECD
8081	GC/ECD
8090	GC/ECD or FID
8100	GC/FID
8110	GC/HECD
8120	GC/ECD
8140	GC/Flame Photometric or Thermionic Detector
8150	Gas Chromatography/Mass Spectrometry (GC/MS)
8240	GC/MS
8250	GC/MS
8270	GC/MS
8280	High Resolution Gas Chromatography/Low Resolution Mass Spectrometry (HRGC/LRMS)
8290	High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS)
8310	High Performance Liquid Chromatography/Ultraviolet Spectroscopy (HPLC/UV)