APPENDIX III
TABLE III
METHODS AND DETECTION/QUANTITATION LIMITS FOR SPECIFIED ANALYTES OF CONCERN TO RISK ASSESSMENT

AQUEOUS MATRICES

ANALYTE/ COMMON NAME CAS NUMBER	METHOD REFERENCE/TITLE OF METHOD	INSTRUMENT-ATION	QUANTITATION/ DETECTION LIMIT
Tetrachloromethane (Carbon Tetrachloride) 56235	CLP SOW METHOD QTM "Chemical Analytical Services for Multi-Media, Multi-Concentration Samples for Organic Analysis by Quick Turnaround Gas Chromatography Techniques"	GC-ECD	CRQL = 20 ug/L
	EPA METHOD 601/SW846 Method 8010/SMEWW Method 6230B "Purgeable Halocarbons"	GC-ELCD	MDL = 0.12 ug/L
	EPA METHOD 624 "Purgeables"	GC-MS	MDL = 2.8 ug/L
	EPA DW METHOD 502.1 "Volatile Halogenated Organic Compounds in Water by Purge and Trap Gas Chromatography"	GC-ELCD	MDL = 0.003 ug/L
	EPA DW METHOD 502.2 "Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series"	GC-ELCD	MDL = 0.01 ug/L
	EPA DW METHOD 524.1/SMEWW Method 6210B (Method I)/SMEWW Method 6210C (Method II) "Measurement of Purgeable Organic Compounds in Water by Packed Column Gas Chromatography-Mass Spectrometry"	GC-MS	MDL = 0.3 ug/L, 2.8 ug/L MDL = 2.8 ug/L
	EPA DW METHOD 524.2/SMEWW Method 6210D "Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography-Mass Spectrometry"	GC-MS	MDL = 0.21 ug/L
	SMEWW METHOD 6230C "Purge and Trap Packed-Column Gas Chromatographic Method II"	GC-MS	MDL = 0.12 ug/L
	SMEWW METHOD 6230D "Purge and Trap Capillary-Column Gas Chromatographic Method"	GC-ECD	NA
	SW846 METHOD 8240 "Gas Chromatography-Mass Spectrometry for Volatile Organics"	GC-MS	PQL = 5.0 ug/L

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METHODS AND DETECTION/QUANTITATION LIMITS FOR SPECIFIED ANALYTES OF CONCERN TO RISK ASSESSMENT

AQUEOUS MATRICES

ANALYTE/ COMMON NAME CAS NUMBER	METHOD REFERENCE/TITLE OF METHOD	INSTRUMENT-ATION	QUANTITATION/ DETECTION LIMIT
Trichloromethane (Chloroform) 67663	CLP SOW METHOD LC-ORG "Chemical Analytical Services for the Analysis of Low Concentration Water Samples for Organic Compounds by Gas Chromatography-Mass Spectrometry (GC-MS) and Gas Chromatography-Electron Capture (GC-ECD) Techniques"	GC-MS	CRQL = 1.0 ug/L
	CLP SOW METHOD ORG "Statement of Work for Organics Analysis - Multi-Media, Multi-Concentration"	GC-MS	CRQL = 10 ug/L
	CLP SOW METHOD QTM "Chemical Analytical Services for Multi-Media, Multi-Concentration Samples for Organic Analysis by Quick Turnaround Gas Chromatography Techniques"	GC-ECD	CRQL = 20 ug/L
	EPA METHOD 601/SW846 Method 8010/SMEWW Method 6230B "Purgeable Halocarbons"	GC-ELCD	MDL = 0.05 ug/L
	EPA METHOD 624 "Purgeables"	GC-MS	MDL = 1.6 ug/L
	EPA DW METHOD 502.1 "Volatile Halogenated Organic Compounds in Water by Purge and Trap Gas Chromatography"	GC-ELCD	NA
	EPA DW METHOD 502.2 "Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series"	GC-ELCD	MDL = 0.02 ug/L
	EPA DW METHOD 524.1/SMEWW Method 6210B (Method I)/SMEWW Method 6210C (Method II) "Measurement of Purgeable Organic Compounds in Water by Packed Column Gas Chromatography-Mass Spectrometry"	GC-MS	MDL = 0.2 ug/L, 1.6 ug/L MDL = 1.6 ug/L
	EPA DW METHOD 524.2/SMEWW Method 6210D "Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography-Mass Spectrometry"	GC-MS	MDL = 0.03 ug/L
	SMEWW METHOD 6230C "Purge and Trap Packed-Column Gas Chromatographic Method II"	GC-MS	MDL = 0.05 ug/L

APPENDIX III
TABLE III
METHODS AND DETECTION/QUANTITATION LIMITS FOR SPECIFIED ANALYTES OF CONCERN TO RISK ASSESSMENT

AQUEOUS MATRICES

ANALYTE/ COMMON NAME CAS NUMBER	METHOD REFERENCE/TITLE OF METHOD	INSTRUMENT-ATION	QUANTITATION/ DETECTION LIMIT
Trichloromethane (Chloroform) 67663	SMEWW METHOD 6230D "Purge and Trap Capillary-Column Gas Chromatographic Method"	GC-ECD	NA
	SW846 METHOD 8240 "Gas Chromatography-Mass Spectrometry for Volatile Organics"	GC-MS	PQL = 5.0 ug/L

APPENDIX III
TABLE IV
METHOD TITLES AND APPLICATIONS

METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
[1]CLP SOW		
METHOD INORG	"Statement of Work for Inorganics Analysis - Multi-Media, Multi-Concentration," Doc No. ILM02.0	This method is for the analysis of 23 metals and cyanide. Sample matrices compatible with this method include water and soil/sediment.
METHOD LC-ORG	"Chemical Analytical Services for the Analysis of Low Concentration Water Samples for Organic Compounds by Gas Chromatography-Mass Spectrometry (GC-MS) and Gas Chromatography-Electron Capture (GC-ECD) Techniques," 6/91 Draft	This method consists of three separate methods. These methods are for the analysis of 40 volatile compounds, 60 semivolatile compounds and 28 organochlorine pesticides and Aroclors. Sample matrices compatible with this method include drinking water, surface water and groundwater.
METHOD ORG	"Statement of Work for Organics Analysis - Multi-Media, Multi-Concentration," Doc No. OLM01.8 (8/91)	This method consists of three separate methods. These methods are for the analysis of 34 volatile compounds, 65 semivolatile compounds and 27 organochlorine pesticides and Aroclors. Sample matrices compatible with these methods include water and soil/sediment.
METHOD QTM	"Chemical Analytical Services for Multi-Media, Multi-Concentration Samples for Organic Analysis by Quick Turnaround Gas Chromatography Techniques," Draft 7/91	This method consists of five separate methods. These methods are for the analysis of 21 volatile compounds, 16 polynuclear aromatic hydrocarbons, 16 phenols, 19 pesticides and 8 Aroclors plus toxaphene. Sample matrices compatible with this method include water and soil/sediment.
[2]EPA		
METHOD 601	"Purgeable Halocarbons"	This method is for the analysis of 29 purgeable halocarbons. Sample matrices compatible with this method include municipal and industrial discharges.
METHOD 602	"Purgeable Aromatics"	This method is for the analysis of seven purgeable aromatic compounds. Sample matrices compatible with this method include municipal and industrial discharges.

[1]CLP SOW CONTRACT LABORATORY PROGRAM (CLP) STATEMENT OF WORK, OFFICE OF EMERGENCY AND REMEDIAL RESPONSE

[2]EPA GUIDELINES ESTABLISHING TEST PROCEDURES FOR THE ANALYSIS OF POLLUTANTS UNDER THE CLEAN WATER ACT FINAL RULE AND INTERIM FINAL RULE AND PROPOSED RULE, 10/84, 40 CFR PART 136

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METHOD TITLES AND APPLICATIONS

METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
EPA		
METHOD 606	"Phthalate Ester"	This method is for the analysis of six phthalate ester compounds. Sample matrices compatible with this method include municipal and industrial discharges.
METHOD 607	"Nitrosamines"	This method is for the analysis of three nitrosamines. Sample matrices compatible with this method include municipal and industrial discharges.
METHOD 608	"Organochlorine Pesticides and PCBs"	This method is for the analysis of 27 organochlorine pesticides and Aroclors. Sample matrices compatible with this method include municipal and industrial discharges.
METHOD 609	"Nitroaromatics and Isophorone"	This method is for the analysis of four nitroaromatics and isophorone. Sample matrices compatible with this method include municipal and industrial discharges.
METHOD 610	"Polynuclear Aromatic Hydrocarbons"	This method is for the analysis of 16 polynuclear aromatic hydrocarbons. Sample matrices compatible with this method include municipal and industrial discharges.
METHOD 612	"Chlorinated Hydrocarbons"	This method is for the analysis of nine chlorinated hydrocarbons. Sample matrices compatible with this method include municipal and industrial discharges.
METHOD 624	"Purgeables"	This method is for the analysis of 30-33 purgeable organic compounds. Sample matrices compatible with this method include municipal and industrial discharges.
METHOD 625	"Base/Neutrals and Acids"	This method is for the analysis of 80-84 semivolatile compounds. Sample matrices compatible with this method include municipal and industrial discharges.

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METHOD TITLES AND APPLICATIONS

METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
[3]EPA AIR		
METHOD TO-1	"Method for the Determination of Volatile Organic Compounds in Ambient Air Using Tenax Adsorption and Gas Chromatography-Mass Spectrometry (GC-MS)"	This method is for the analysis of 18 nonpolar volatile compounds with boiling points between 80 and 200 degrees °C. Samples are collected on pre-cleaned tenax cartridges.
METHOD TO-14	"The Determination of Volatile Organic Compounds (VOCs) in Ambient Air Using Summa Passivated Canister Sampling and Gas Chromatographic Analysis"	This method is for the analysis of 40 volatile organic compounds. Samples are collected on cleaned and certified SUMMA canisters.
METHOD TO-2	"Method for the Determination of Volatile Organic Compounds in Ambient Air by Carbon Molecular Sieve Adsorption and Gas Chromatography-Mass Spectrometry (GC-MS)"	This method is for the analysis of 11 volatile organic compounds with boiling points between -15 and 120 degrees °C. Samples are collected on pre-cleaned carbon molecular sieves.
METHOD TO-3	"Method for the Determination of Volatile Organic Compounds in Ambient Air Using Cryogenic Preconcentration Techniques and Gas Chromatography with Flame Ionization and Electron Capture Detection"	This method is for the analysis of eight volatile organic compounds with boiling points between -10 and 200 degrees °C.
METHOD TO-4	"Method for the Determination of Organochlorine Pesticides and Polychlorinated Biphenyls in Ambient Air"	This method is for the analysis of 11 organochlorine pesticides and Aroclors. Samples are collected on polyurethane foam filters. Samples are prepared using a Soxhlet extraction. Analysis is performed by GC-ECD.

[3]EPA AIR COMPENDIUM OF METHODS FOR THE DETERMINATION OF TOXIC ORGANIC COMPOUNDS IN AMBIENT AIR, 5/88, ENVIRONMENTAL MONITORING SYSTEMS LABORATORY/RTP, EPA 600/4-84-041

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METHOD TITLES AND APPLICATIONS

METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
[4]EPA DW		
METHOD 502.1	"Volatile Halogenated Organic Compounds in Water by Purge and Trap Gas Chromatography"	This method is for the analysis of 40 halogenated volatile organic compounds. Sample matrices compatible with this method include drinking water, source water and water being treated for potability.
METHOD 502.2	"Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series"	This method is for the analysis of 60 volatile organic compounds. Sample matrices compatible with this method include drinking water, source water and water being treated for potability.
METHOD 503.1	"Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography"	This method is for the analysis of 28 aromatic and unsaturated organic compounds. Sample matrices compatible with this method include drinking water, source water and water being treated for potability.
METHOD 505	"Analysis of Organohalide Pesticides and Aroclors in Water by Microextraction and Chromatography"	This method is for the analysis of 25 organohalide pesticides and Aroclors. Sample matrices compatible with this method include drinking water, source water and water being treated for potability.
METHOD 508	"Determination of Chlorinated Pesticides in Water by Gas Chromatography with an Electron Capture Detector"	This method is for the analysis of 34 chlorinated pesticides and Aroclors. Sample matrices compatible with this method include groundwater and drinking water.
METHOD 524.1	"Measurement of Purgeable Organic Compounds in Water by Packed Column Gas Chromatography-Mass Spectrometry"	This method is for analysis of 48 volatile compounds. Sample matrices compatible with this method include drinking water, source water and water being treated for potability.
METHOD 524.2	"Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography-Mass Spectrometry"	This method is for the analysis of 60 volatile organic compounds. Sample matrices compatible with this method include drinking water, source water and water being tested for potability.

[4]EPA DW METHODS FOR THE DETERMINATION OF ORGANIC COMPOUNDS IN DRINKING WATER, 12/88, ENVIRONMENTAL MONITORING SYSTEMS LABORATORY/CINN, EPA 600/4-88/039

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METHOD TITLES AND APPLICATIONS

METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
EPA DW		
METHOD 525	"Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography-Mass Spectrometry"	This method is for the analysis of 35 organic compounds. Sample matrices compatible with this method include drinking water, source water and water being treated for potability.
[5]MCAWW		
METHOD 200.7	"Inductively Coupled Plasma-Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes"	This method is for the analysis of 30 metals. Sample matrices compatible with this method include drinking water, surface water and wastewater.
METHOD 206.2	"Arsenic (Atomic Absorption, Furnace Technique)"	Sample matrices compatible with this method include drinking water, surface water, saline water, waste, sludge and soil/sediment.
METHOD 206.3	"Arsenic (Atomic Absorption-Gaseous Hydride)"	This method is for the analysis of inorganic arsenic. Sample matrices compatible with this method include drinking water, fresh water and saline water.
METHOD 206.4	"Arsenic (Spectrophotometric-SDDC)"	This method is for the analysis of inorganic arsenic. Sample matrices compatible with this method include drinking water, surface water, groundwater and wastes.
METHOD 206.5	"Arsenic (Sample Digestion prior to Total Arsenic Analysis by Silver Diethyldithiocarbamate or Hydride Procedures)"	This method is a preparation procedure for the conversion of organic arsenic to inorganic arsenic. Sample matrices compatible with this method include drinking water, surface water and waste.
METHOD 210.1	"Beryllium (Atomic Absorption, Direct Aspiration)"	Sample matrices compatible with this method include drinking water, surface water, groundwater, waste, sludge and soil/sediment.

[5] MCAWW METHOD FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 3/83, ENVIRONMENTAL MONITORING SYSTEMS LABORATORY/CINN, EPA 600/4-79/020

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METHOD TITLES AND APPLICATIONS

METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
MCAWW		
METHOD 210.2	"Beryllium (Atomic Absorption, Furnace Technique)"	Sample matrices compatible with this method include drinking water, surface water, groundwater, waste, sludge and soil/sediment.
METHOD 213.1	"Cadmium (Atomic Absorption, Direct Aspiration)"	Sample matrices compatible with this method include drinking water, surface water, groundwater, waste, sludge and soil/sediment.
METHOD 213.2	"Cadmium (Atomic Absorption, Furnace Technique)"	Sample matrices compatible with this method include drinking water, surface water, groundwater, waste, sludge and soil/sediment.
METHOD 218.1	"Chromium (Atomic Absorption, Direct Aspiration)"	Sample matrices compatible with this method include drinking water, surface water, groundwater, waste, sludge and soil/sediment.
METHOD 218.2	"Chromium (Atomic Absorption, Furnace Technique)"	Sample matrices compatible with this method include drinking water, surface water, groundwater, waste, sludge and soil/sediment.
METHOD 218.3	"Chromium (Atomic Absorption, Chelation- Extraction)"	Sample matrices compatible with this method include drinking water, surface water, groundwater and waste.
METHOD 218.4	"Chromium, Hexavalent (Atomic Absorption, Chelation-Extraction)"	Sample matrices compatible with this method include drinking water, surface water, groundwater and waste.
METHOD 218.5	"Chromium, Dissolved Hexavalent (Atomic Absorption, Furnace Technique)"	Sample matrices compatible with this method include drinking water, surface water and certain filtered wastes.
METHOD 239.1	"Lead (Atomic Absorption, Direct Aspiration)"	Sample matrices compatible with this method include drinking water, surface water, groundwater, waste, sludge and soil/sediment.
METHOD 239.2	"Lead (Atomic Absorption, Furnace Technique)"	Sample matrices compatible with this method include drinking water, surface water, groundwater, waste, sludge and soil/sediment.
METHOD 245.1	"Mercury (Manual Cold Vapor Technique)"	Sample matrices compatible with this method include drinking water, surface water and saline water.

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METHOD TITLES AND APPLICATIONS

METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
MCAWW		
METHOD 245.2	"Mercury (Automated Cold Vapor Technique)"	Sample matrices compatible with this method include surface water, waste water and effluent.
METHOD 245.5	"Mercury in Sediment (Manual Cold Vapor Technique)"	Sample matrices compatible with this method include bottom deposits, sludge and soil/sediment.
METHOD 335.1	"Cyanide, Amendable to Chlorination"	This method is applicable to the determination of cyanide amenable to chlorination in drinking, surface and saline waters and domestic and industrial wastes.
METHOD 335.2	"Cyanide, Total (Titrimetric, Spectrophotometric)"	This method is applicable to the determination of cyanide in drinking, surface and saline waters and domestic and industrial wastes.
[6]SMEWW		
METHOD 3111B	"Direct Air-Acetylene Flame Method"	This method is for the analysis of 27 metals. Sample matrices compatible with this method include surface water, groundwater and drinking water.
METHOD 3111C	"Extraction/Air-Acetylene Flame Method"	This method is for the analysis of 10 metals at low concentrations. Sample matrices compatible with this method include surface water, groundwater and drinking water.
METHOD 3111D	"Direct Nitrous Oxide-Acetylene Flame Method"	This method is for the analysis of 10 metals. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 3111E	"Extraction/Nitrous Oxide-Acetylene Flame Method"	This method is for the analysis of aluminum and beryllium. Sample matrices compatible with this analysis include groundwater, surface water and drinking water.

[6]SMEWW STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, 17TH EDITION, 1989

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METHOD TITLES AND APPLICATIONS

METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
SMEWW		
METHOD 3112B	"Cold Vapor Atomic Absorption Spectrometric Method"	This method is for the analysis of mercury. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 3113B	"Electrothermal Atomic Absorption Spectrometric Method"	This method is for the analysis of 17 metals in microquantities. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 3114B	"Manual Hydride Generation/Atomic Absorption Spectrometric Method"	This method is for the analysis of arsenic and selenium. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 3120B	"Inductively Coupled Plasma (ICP) Method"	This method is for the analysis of 27 metals. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 3500AS C*	"Silver Diethyldithiocarbamate Method"	This method is for the analysis of arsenic. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 3500BE D*	"Aluminon Method"	This method is for the analysis of beryllium. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 3500CD D*	"Dithizone Method"	This method is for the analysis of cadmium. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 3500CR D*	"Colorimetric Method"	This method is for the analysis of chromium. Sample matrices compatible with this method include groundwater, surface water and drinking water.

* The first two letters after the number represent the element name and the third letter is the method code.

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METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
SMEWW		
METHOD 3500HG C*	"Dithizone Method"	This method is for the analysis of mercury. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 3500PB D*	"Dithizone Method"	This method is for the analysis of lead. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 4500 CN	"Cyanide"	This method is used for the analysis for cyanide in aqueous and solid matrices. It includes total cyanide, cyanide amenable to chlorination, and weak and dissociable cyanides.
METHOD 6040B	"Closed-Loop Stripping, Gas Chromatographic-Mass Spectrometric Analysis"	This method is for the analysis of volatile organic compounds of intermediate weight. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 6210B	"Purge and Trap Packed-Column Gas Chromatographic-Mass Spectrometric Method I"	This method is for the analysis of 31 volatile organic compounds. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 6210D	"Purge and Trap Capillary-Column Gas Chromatographic-Mass Spectrometric Method"	This method is for the analysis of 62 purgeable organic compounds. Sample matrices compatible with this method include drinking water, raw source water and water being treated for potability.
METHOD 6220B	"Purge and Trap Gas Chromatographic Method I"	This method is for the analysis of seven aromatic volatile compounds. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 6220C	"Purge and Trap Gas Chromatographic Method II"	This method is for the analysis of 28 purgeable aromatic and unsaturated compounds. Sample matrices compatible with this method include drinking water, raw source water, and water being treated for potability.

* The first two letters after the number represent the element name and the third letter is the method code.

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METHOD TITLES AND APPLICATIONS

METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
SMEWW		
METHOD 6230B	"Purge and Trap Packed Column Gas Chromatographic Method I"	This method is for the analysis of 29 purgeable halocarbons. Sample matrices compatible with this method include municipal and industrial discharges.
METHOD 6230C	"Purge and Trap Packed Column Gas Chromatographic Method II"	This method is for the analysis of 39 purgeable halocarbons. Sample matrices compatible with this method include drinking water, raw source water and water being treated for potability.
METHOD 6230D	"Purge and Trap Capillary-Column Gas Chromatographic Method"	This method is for the analysis of 60 purgeable halocarbons. Sample matrices compatible with this method include drinking water, raw source water and water being treated for potability.
METHOD 6410B	"Liquid-Liquid Extraction Gas Chromatographic-Mass Spectrometric Method"	This method is for the analysis of 81 semivolatile organic compounds. Sample matrices compatible with this method include groundwater, surface water and drinking water.
METHOD 6440B	"Liquid-Liquid Extraction Chromatographic Method"	This method is for the analysis of 16 polynuclear aromatic hydrocarbons. Sample matrices compatible with this method include municipal and industrial discharges.
METHOD 6630B	"Liquid-Liquid Extraction Gas Chromatographic Method I"	This method is for the analysis of 18 organochlorine pesticides. Sample matrices compatible with this method include agricultural discharges.
METHOD 6630C	"Liquid-Liquid Extraction Gas Chromatographic Method II"	This method is for the analysis of 25 organochlorine pesticides. Sample matrices compatible with this method include groundwater, surface water and drinking water.
[8]SW846		
METHOD 6010	"Inductively Coupled Plasma Atomic Emission Spectroscopy"	This method is for the analysis of 26 metals. Sample matrices compatible with this method include groundwater, soils and wastes.

[8]SW846 TEST METHODS FOR EVALUATING SOLID WASTE, THIRD EDITION, 11/86, OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE.

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METHOD TITLES AND APPLICATIONS

METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
SW846		
METHOD 7060	"Arsenic (Atomic Absorption, Furnace Technique)"	Sample matrices compatible with this method include groundwater, soils, extracts and wastes.
METHOD 7061	"Arsenic (Atomic Absorption, Gaseous Hydride)"	Sample matrices compatible with this method include groundwater, soils, extracts and wastes.
METHOD 7090	"Beryllium (Atomic Absorption, Direct Aspiration)"	Sample matrices compatible with this method include water and wastes.
METHOD 7091	"Beryllium (Atomic Absorption, Furnace Technique)"	Sample matrices compatible with this method include water and wastes.
METHOD 7130	"Cadmium (Atomic Absorption, Direct Aspiration)"	Sample matrices compatible with this method include water, waste and sludge.
METHOD 7131	"Cadmium (Atomic Absorption, Furnace Technique)"	Sample matrices compatible with this method include water, soil and waste.
METHOD 7190	"Chromium (Atomic Absorption, Direct Aspiration)"	Sample matrices compatible with this method include water, soil and waste.
METHOD 7191	"Chromium (Atomic Absorption, Furnace Technique)"	Sample matrices compatible with this method include water, soil and waste.
METHOD 7195	"Chromium, Hexavalent (Coprecipitation)"	This method is for the analysis of dissolved hexavalent chromium in extraction procedure (EP) toxicity extracts and groundwater.
METHOD 7196	"Chromium, Hexavalent (Colorimetric)"	This method is for the analysis of dissolved hexavalent chromium in extraction procedure (EP) toxicity characteristic extracts and groundwater.
METHOD 7197	"Chromium, Hexavalent (Chelation/Extraction)"	This method is for the analysis of dissolved hexavalent chromium in extraction procedure (EP) toxicity extracts and groundwater.

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METHOD TITLES AND APPLICATIONS

METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
SW846		
METHOD 7198	"Chromium, Hexavalent (Differential Pulse Polarography)"	This method is for the analysis of dissolved hexavalent chromium in extraction procedure (EP) toxicity extracts, natural water and waste water.
METHOD 9010A	"Total and Amenable Cyanide"	This method is for the analysis of inorganic cyanide (total and amendable to chlorination) in waste and leachate. The method detects inorganic cyanides that are present as either soluble salts or complexes.
METHOD 9012	"Total and Amenable Cyanide (Colorimetric, Automated UV)"	This method is for the analysis of inorganic cyanide (total and amendable to chlorination) in waste and leachate. The method detects inorganic cyanides that are present as either soluble salts or complexes.
METHOD 7420	"Lead (Atomic Absorption, Direct Aspiration)"	Sample matrices compatible with this method include water, waste and sludge.
METHOD 7421	"Lead (Atomic Absorption, Furnace Technique)"	Sample matrices compatible with this method include water, waste and soils.
METHOD 7470	"Mercury in Liquid Waste (Manual Cold-Vapor Technique)"	Sample matrices compatible with this method include groundwater, aqueous waste and mobility procedure extracts.
METHOD 7471	"Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)"	This method is for the analysis of inorganic and organic mercury. Sample matrices compatible with this method include soil, sludge and sediment.
METHOD 8010	"Halogenated Volatile Organics"	This method is for the analysis of 34 halogenated volatile organic compounds. Sample matrices compatible with this method include soil/sludge, groundwater, liquid waste and water immiscible waste.
METHOD 8020	"Aromatic Volatile Organics"	This method is for the analysis of seven aromatic volatile organic compounds. Sample matrices compatible with this method include soil/sludge, groundwater, liquid waste and water immiscible waste.

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METHOD REFERENCE	TITLE OF METHOD	APPLICATION OF METHOD
SW846		
METHOD 8060	"Phthalate Esters"	This method is for the analysis of six phthalate esters. Sample matrices compatible with this method include water, soil, sludge and water immiscible waste.
METHOD 8080	"Organochlorine Pesticides and PCBs"	This method is for the analysis of 26 organochlorine pesticides and Aroclors. Sample matrices compatible with this method include water, soil, sludge and water immiscible waste.
METHOD 8100	"Polynuclear Aromatic Hydrocarbons"	This method is for the analysis of 24 polynuclear aromatic hydrocarbons. Sample matrices compatible with this method include groundwater, surface water, drinking water and soil/sediment.
METHOD 8240	"Gas Chromatography-Mass Spectrometry for Volatile Organics Packed Column Technique"	This method is for the analysis of 73 volatile organic compounds. Sample matrices include groundwater, caustic or acid liquors, and soil/sediment.
METHOD 8250	"Gas Chromatography-Mass Spectrometry for Semivolatile Organics: Packed Column Technique"	This method is for the analysis of 113 semivolatile organic compounds. Sample matrices compatible with this method include solid waste, soil and groundwater.
METHOD 8270	"Gas Chromatography-Mass Spectrometry for Semivolatile Organics: Capillary Column Technique"	This method is for the analysis of 131 semivolatile compounds. Sample matrices compatible with this method include groundwater, waste and soil.
METHOD 8310	"Polynuclear Aromatic Hydrocarbons"	This method is for the analysis of 16 polynuclear aromatic hydrocarbons. Sample matrices compatible with this method include waters, soil, waste and sludge.

APPENDIX III

Table V- A
SUMMARY OF ROUTINE METHODS BY PROGRAM AND COMPOUND CLASS
ORGANIC COMPOUNDS

Drinking Water (USEPA, Office of Water)

Compound Class	EPA Method No.	Analytical System	Sample Introduction/ Preparation	Detection Limit/ Range (ppb)
Acrolein and Acrylonitrile	603	GC-FID	P&T	0.5-0.6
Base/Neutrals, Acids and Pesticides	625*	GC-MS	XTN	0.09-44.0
Benzidines	605	HPLC/Electrochem	XTN	0.08-0.13
Carbamates and Urea Pesticides	632	HPLC/UV	XTN	0.003-11.1
Chlorinated Acids	515.1	ECD Capillary Column	XTN	EDL, 0.1-1.0
Chlorinated Hydrocarbons	612	GC-ECD	XTN	0.03-1.34
Chlorinated Pesticides	508	ECD Capillary Column	XTN	EDL, 0.01-0.5 (most <0.1)
1,2-Dibromoethane and 1,2-Dibromo-3-Chloropropane	504	GC-ECD	XTN	0.01
Dithiocarbamate Pesticides	630	Colorimetric	CS_2 Liberation	1.9-15.3
Extractable Organics	525*	GC-MS Capillary Column	XTN	0.1-1.0
Haloethers	611	GC-ELCD	XTN	0.3-3.9
Nitroaromatics and Isophorone	609	GC-FID + ECD	XTN	0.01-15.7
Nitrogen and Phosphorous Containing Pesticide	507	NPD Capillary Column	XTN	EDL (Estimated D.L.) 0.1-5.0 (most <1.0)
Nitrosamines	607	GC-NPD	XTN	0.15-0.81
N-Methylcarbamates and N-Methylcarbamoyloximes	531.1	HPLC Fluorescence Detector	DI	0.5-4.0
Organohalide Pesticides and PCBs	617	GC-ECD	XTN	0.002-0.176
Organophosphate Pesticides	614	GC-FPD or NPD	XTN	0.012-0.015
Organophosphate Pesticides	622	GC-FPD	XTN	0.1-5.0
Perchlorination Screening of PCBs	508A	ECD/ELCD Packed or Capillary Column	XTN	0.1-0.3
Pesticide and PCBs	505*	GC-ECD Capillary Column	XTN	Variable Pesticide 0.005-1.0 Herbicide 0.2-7.0 PCBs 0.1-0.5
Pesticides and PCBs Organochlorine	608*	GC-ECD	XTN	0.002-0.24
Phenols	604	GC-FID	XTN	0.14-16.0
Phthalate Esters	606	GC-ECD	XTN	0.29-3.0
Purgeable Aromatics	602*	GC-PID	P&T	0.2-0.4

* Frequently requested method.

Table V-A
SUMMARY OF ROUTINE METHODS BY PROGRAM AND COMPOUND CLASS
ORGANIC COMPOUNDS (continued)

Industrial and Municipal Waste Water (USEPA, Office of Research and Development)

Compound Class	EPA Method No.	Analytical System	Sample Introduction/ Preparation	Detection Limit/ Range (ppb)
Purgeable Halocarbons	601*	GC-ELCD	P&T	0.02-1.81
Purgeable Organics	524.1	GC-MS Capillary Column	P&T	0.1-1.0
Purgeable Organics	524.2*	GC-MS Capillary Column	P&T	0.02-0.2
Purgeables	624*	GC-MS	P&T	1.6-7.2
Volatile Aromatics and Unsaturated Compounds	503.1	GC-PID	P&T	0.002-0.03
Volatile Halocarbons	502.1	GC-ECD Packed Column	P&T	0.001-0.01
Volatile Halocarbons	502.2*	GC-ELCD/PID Capillary Column	P&T	0.01-0.10
2,3,7,8-Tetrachlorodibenzo-p dioxin	613	GC-MS	XTN	0.002
Triazine Pesticides	619	GC-NPD	XTN	0.03-0.07

Aqueous and Solid Matrices (USEPA, Office of Water)

Compound Class	EPA Method No.	Analytical System	Sample Introduction/ Preparation	Detection Range (ppb)
Semivolatile Organics	1625	Isotope Dilution by GC-MS (Capillary Column)	XTN	most 20-100 ppb (dependent on % solids)
Tetra- through octa-chlorinated dioxins and furans	1613	Isotope Dilution by high resolution GC-high resolution MS	XTN	10-100 parts per quadrillion in water 1-10 parts per trillion in soil
Volatile Organics	1624	Isotope Dilution by GC-MS (Capillary Column)	P&T	5-100 ppb (dependent on % solids)

* Frequently requested method.

Table V- A
SUMMARY OF ROUTINE METHODS BY PROGRAM AND COMPOUND CLASS
ORGANIC COMPOUNDS (continued)

Solid Matrices (USEPA, Test Methods for Evaluating Solid Waste, SW846, November, 1986.)

Compound Class	EPA Method No.	Analytical System	Sample Introduction/ Preparation	Detection Limit/ Range (ppb)
Acrolein, Acrylonitrite, Acetonitrile	8030	GC-FID	5030	0.5-0.6
Aromatic Volatile Organics	8020*	GC-FID	5030	0.2-0.4
Chlorinated Herbicides	8150	GC-ECD or ELCD	3550	0.1-200
Chlorinated Hydrocarbons	8120	GC-ECD	3550	0.03-1.3
Nitroaromatics and Cyclic Ketones	8090	GC-FID or ECD	3550	0.06-5.0
Organophosphorus Pesticides	8140	GC-FPD or NPD	3550	0.1-5.0
Organochlorine Pesticides and PCBs	8080*	GC-ECD	3550	70-1000
Phenols	8040	GC-FID	3550	0.14-16
Phthalate Esters	8060	GC-ECD	3550	0.29-31
Polynuclear Aromatic Hydrocarbons	8100	GC-FID	3550	Not Reported
Polynuclear Aromatic Hydrocarbons	8310	HPLC/UV and Fluor	3550	0.013-2.3
Purgeable Halogenated Volatile Organics	8010	GC-ELCD	5030	0.03-0.52
Purgeable Non-Halogenated Volatile Organics	8015	GC-FID	5030	Not Reported
Semivolatile Organics	8270*	GC-MS Capillary Column	3550	Not Reported
Volatile Organics	8240*	GC-MS	5030	1.6-7.2

* Frequently requested method.

APPENDIX III
TABLE V-B
SUMMARY OF ROUTINE METHODS BY PROGRAM AND COMPOUND CLASS
INORGANIC ANALYTES

Analyte	EPA Method No.	Analytical System	Sample Preparation	Detection Limit Range (ppb)
Total/Dissolved Metals	1620	ICP	3005,3010	
Total/Dissolved Metals	6010	ICP	3005,3010	
Total/Dissolved Metals	7000	AA	3005,3010	1,000
Aluminum	7020	AA	3005,3010	4300-5700
Antimony	204.2 CLP	GFAA	*	
Antimony	7040	AA	3005,3010	70
Antimony	7041	GFAA	3005,3010,3020	20
Barium	7080	AA	3005,3010	30
Barium	7081	GFAA	Nitric acid, reflux	2.0
Beryllium	7090	AA	3005,3010	50-200
Beryllium	7091	GFAA	3020	1.0-30
Boron	212.3	Spectrophotometric	Hydrochloric acid	200
Calcium	215.2	Titrimetric	*	100,000
Calcium	7140	AA	3005,3010	4800-5200
Cobalt	7200	AA	3005-3010	3400-4600
Cobalt	7201	GFAA	3020	50
Copper	7210	AA	3005,3010	3700-4300
Copper	7211	GFAA	Nitric acid, reflux	1.0
Cyanide	335.2	Total, (Titrimetric, Spectrophotometric)	***	10
Cyanide	335.2	Midi (Distillation, Total, Colorimetric, Automated UV)	***	5.0
Cyanide	355.1	Amenable to Chlorination (Titrimetric, Spectrophotometric)	****	10
Cyanide, Amenable to Chlorination, without distillation	4500-CN-H Standard Method for the Examination of Water and Wastewater 1989	Spectrophotometric	pH > 12	20
Cyanide	335.3	Total, Spectrophotometric	***	10
Gold	231.1	AA	Nitric acid, Aqua Regia	100
Gold	231.2	GFAA	Nitric acid, Aqua Regia	1.0
Iron	7380	AA	3005,3010	4400-5600
Iron	7381	GFAA	Nitric acid, reflux	1.0

APPENDIX III
TABLE V-B
SUMMARY OF ROUTINE METHODS BY PROGRAM AND COMPOUND CLASS
INORGANIC ANALYTES
(continued)

Analyte	EPA Method No.	Analytical System	Sample Preparation	Detection Limit/ Range (ppb)
Iridium	235.1	AA	Nitric acid, Aqua Regia	3000
Iridium	235.2	GFAA	Nitric acid, Aqua Regia	30
Magnesium	7450	AA	3005,3010	970-1030
Manganese	7460	AA	3005,3010	10
Manganese	7461	GFAA	Nitric acid, reflux	0.2
Molybdenum	246.1	AA	*	100
Molybdenum	246.2	GFAA	*	1.0
Molybdenum	7480	AA	3005,3010	10,000
Molybdenum	7481	GFAA	3020	-
Nickel	7520	AA	3005,3010	4900-5100
Osmium	252.1	AA	Nitric,sulfuric acids	300
Osmium	252.2	GFAA	Nitric acid	20
Osmium	7550	AA	3005,3010	-
Palladium	253.1	AA	Nitric acid	100
Palladium	253.2	GFAA	Nitric acid	5.0
Platinum	255.1	AA	**	1000
Platinum	255.2	GFAA	**	20
Potassium	7610	AA	3005,3010	1000-2200
Rhenium	264.1	AA	Nitric acid	5000
Rhenium	264.2	GFAA	Nitric acid	200
Rhodium	265.1	AA	Nitric acid Regia	50
Rhodium	265.2	GFAA	Nitric acid	5.0
Ruthenium	267.1	AA	Hydrochloric acid	200
Ruthenium	267.2	GFAA	Hydrochloric acid	20
Selenium	270.3	AA-Hydride	**	-
Selenium	7740	GFAA	3020	3.0-5.0
Selenium	7741	AA Hydride	3005,3010	5.0
Silver	7760	AA	3005,3010	1200-2800
Silver	7761	GFAA	Nitric acid, reflux	0.2
Sodium	7770	AA	3005,3010	4800-5200
Thallium	7840	AA	3005, 3010	-
Thallium	7841	GFAA	3020	1.0-10
Tin	282.1	AA	**	800
Tin	282.2	GFAA	**	5.0
Titanium	283.1	AA	**	400
Titanium	283.2	GFAA	**	10
Vanadium	7910	AA	3005,3010	49400-50600
Vanadium	7911	GFAA	3020	50
Zinc	7950	AA	3005,3010	5.0
Zinc	7951	GFAA	Nitric acid, reflux	0.05

APPENDIX III
TABLE V-B
SUMMARY OF ROUTINE METHODS BY PROGRAM AND COMPOUND CLASS
INORGANIC ANALYTES
(continued)

Sample Preparation Methods

3005 Acid Digestion of Waters for Total Recoverable Dissolved Metals for Analysis by Flame Atomic Absorption Spectroscopy or Inductively Coupled Plasma Spectroscopy.

3010 Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by Flame Atomic Absorption Spectroscopy or Inductively Coupled Plasma Spectroscopy.

3020 Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by Furnace Atomic Absorption Spectroscopy.

* CLP preparation methods are categorized by water/soil, ICP, AA, and GFAA instrumentation.

- CLP methods are based on the 200 series Methods for Chemical Analysis of Water and Wastes. U.S. Environmental Monitoring Systems Laboratory. Cincinnati, Ohio. March, 1983.
- Water sample preparation for GFAA uses nitric acid, hydrogen peroxide and mild heat. SOW 788, D-5.
- Water sample preparation for ICP and AA uses nitric acid, hydrochloric acid and mild heat. SOW 788, D-5.
- Soil sample preparation for ICP, AA, GFAA uses nitric acid, hydrogen peroxide and mild heat.
- Hydrochloric acid is used as the final reflux acid for several analytes. SOW 788, D-5,6.

** Nitric and hydrochloric acids are used for digestion.

*** Total cyanide is determined by a reflux-distillation procedure using a sodium hydroxide scrubber.

**** Cyanide amenable to chlorination is chlorinated at pH greater than 11.