3140 Finley Road
Downers Grove, IL 60515
630.795.3200
Fax 630.795.1130

Clayton
GROUP SERVICES

US EPA RECORDS CENTER REGION 5
425647

September 16, 2002

Mr. Steven J. Faryan
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
On-Scene Coordinator
Emergency Response Branch Region 5
HSE-5J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Clayton Project 65263.01-013

RE: The Lockformer Company
711 West Ogden Avenue
Lisle, Illinois 60532

Dear Mr. Faryan:

As requested, please find the enclosed information package for First Environmental Laboratories, Inc. The information package contains the following:

- State of Illinois EPA Environmental Laboratory Accreditation.
- Sample Acceptance Policy, Receipt, Log-in, and Storage SOP.
- Volatile Organic Compounds by GCMS SOP.
- Method Detection Limit Study (Aqueous @ 5 ppb and 2 ppb).
- Method Detection Limit Study (Soil @ 5 ppb and 2 ppb).
- Revised Detection and Reporting Limit Table 13A [Lockformer Work Plan, Volume III (QAPP)]
- Analytical Report and QC Package Contents (Similar to currently accepted Enchem, Inc. deliverables).

15-65263ca159/WSE

Upon review and approval by the U.S. EPA, the information will be incorporated into the final version of the QAPP.

Should you have any questions, do not hesitate to contact Mr. Ron St. John or the undersigned at 630.795.3200.

Sincerely,

William S. Elwell, P.G.
Senior Project Manager
Environmental Services

Enclosure: First Environmental Laboratories, Inc. Information Package

cc: Mr. Omprakash Patel, Weston Solutions, Inc.
Ms. Julie Doyle, Chuhak & Tecson, P.C.

STATE OF ILLINOIS

ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL LABORATORY ACCREDITATION

is hereby granted to

FIRST ENVIRONMENTAL LABORATORIES, INC.
1600 SHORE ROAD, SUITE D
NAPERVILLE, IL 60563

ACCREDITATION NUMBER #100292

ACCREDITED IN ACCORDANCE WITH

According to the Illinois Administrative Code, Title 35, Subtitle A, Chapter II, Part 186, ACCREDITATION OF LABORATORIES FOR DRINKING WATER, WASTEWATER AND HAZARDOUS WASTES ANALYSIS, the State of Illinois formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed below.

The laboratory agrees to perform all analyses listed on this scope of accreditation according to the Part 186 requirements and acknowledges that continued accreditation is dependent on successful ongoing compliance with the applicable requirements of Part 186. Please contact the Illinois EPA Environmental Laboratory Accreditation Program (IL ELAP) to verify the laboratory's scope of accreditation and accreditation status. Accreditation by the State of Illinois is not an endorsement or a guarantee of validity of the data generated by the laboratory.

Janet Cruse

Janet Cruse
Accreditation Officer
Environmental Laboratory Accreditation Program

Certificate No.: 000618
Expiration Date: 02/28/2003
Issued On: 06/25/2002

State of Illinois
Environmental Protection Agency

Certificate No.: 000618

Awards the Certificate of Approval

First Environmental Laboratories, Inc.
1600 Shore Road, Suite D
Naperville, IL 60563

According to the Illinois Administrative Code, Title 35, Subtitle A, Chapter II, Part 186, ACCREDITATION OF LABORATORIES FOR DRINKING WATER, WASTEWATER AND HAZARDOUS WASTES ANALYSIS, the State of Illinois formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed below.

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Drinking Water, Inorganic

SM2130B,18Ed

Turbidity

SM2320B,18Ed

Alkalinity

SM2330B,18Ed

Corrosivity (Langlier Index)

SM2540C,18Ed

Total dissolved solids

SM4500CN-CE18Ed

Cyanide

SM4500F-C,18Ed

Fluoride

SM4500NO2B,18Ed

Nitrite

SM4500P-E,18Ed

Orthophosphate

SM4500Si-D,18Ed

Silica

SM5540-C,18Ed

Foaming Agent

USEPA200.7R4.4

Aluminum	Arsenic	Barium
Beryllium	Cadmium	Calcium
Chromium	Copper	Hardness (calc.)
Iron	Magnesium	Manganese
Nickel	Silver	Sodium
Zinc		

USEPA245.1R3.0

Mercury

USEPA353.2R2.0

Nitrate

USEPA375.2R2.0

Sulfate

Drinking Water, Organic

State of Illinois
Environmental Protection Agency

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First Environmental Laboratories, Inc.
1600 Shore Road, Suite D
Naperville, IL 60563

Drinking Water, Organic *USEPA524.2R4.1*

Total trihalomethanes

Hazardous and Solid Waste, Inorganic

1010

Ignitability

1311

TCLP (Organic and Inorganic)

1312

Synthetic Precipitation Leaching Procedure

6010B

Aluminum	Antimony	Arsenic
Barium	Beryllium	Cadmium
Calcium	Chromium	Cobalt
Copper	Iron	Lead
Magnesium	Manganese	Molybdenum
Nickel	Potassium	Selenium
Silver	Sodium	Thallium
Vanadium	Zinc	

7196A

Chromium VI

7470A

Mercury

9010B

Cyanide

9014

Cyanide

9034

Sulfides

9038

Sulfate

9040B

Hydrogen ion (pH)

9045C

Hydrogen ion (pH)

9065

Phenolics

9095A

Paint Filter

9251

Chloride

Hazardous and Solid Waste, Organic

8011

1,2-Dibromo-3-chloropropane (DBCP) 1,2-Dibromoethane (EDB)

State of Illinois
Environmental Protection Agency

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First Environmental Laboratories, Inc.
1600 Shore Road, Suite D
Naperville, IL 60563

Hazardous and Solid Waste, Organic	*8081A*	
4,4'-DDD	4,4'-DDE	4,4'-DDT
Aldrin	alpha-BHC	alpha-Chlordane
beta-BHC	Chlordane - not otherwise specified	delta-BHC
Dieldrin	Endosulfan I	Endosulfan II
Endosulfan sulfate	Endrin	Endrin aldehyde
Endrin ketone	gamma-BHC (Lindane)	gamma-Chlordane
Heptachlor	Heptachlor epoxide	Methoxychlor
Toxaphene		
8082		
PCB-1016	PCB-1221	PCB-1232
PCB-1242	PCB-1248	PCB-1254
PCB-1260		
8260B		
1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene
1,1-Dichloropropene	1,2,3-Trichlorobenzene	1,2,3-Trichloropropane
1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (EDB)	1,2-Dichlorobenzene	1,2-Dichloroethane
1,2-Dichloropropane	1,3,5-TCB	1,3,5-Trimethylbenzene
1,3-Dichlorobenzene	1,3-Dichloropropane	1,4-Dichlorobenzene
1-Chlorobutane	2,2-Dichloropropane	2-Butanone (Methyl ethyl ketone, MEK)
2-Chloroethyl vinyl ether	2-Chlorotoluene	2-Hexanone
2-Nitropropane	4-Chlorotoluene	4-Methyl-2-pentanone (Methyl isobutyl ketone,
Acetone	Acrolein (Propenal)	Acrylonitrile
Allyl chloride	Benzene	Bromobenzene
Bromochloromethane	Bromodichloromethane	Bromoform
Bromomethane	Carbon disulfide	Carbon tetrachloride
Chlorobenzene	Chlorodibromomethane (Dibromochloromethan	Chloroethane
Chloroform	Chloromethane	cis-1,2-Dichloroethene
cis-1,3-Dichloropropene	Dibromomethane	Dichlorodifluoromethane
Dichloromethane (Methylene chloride)	Ethyl ether	Ethyl methacrylate
Ethylbenzene	Hexachlorobutadiene	Hexachloroethane
Isopropylbenzene	Methacrylonitrile	Methyl acrylate
Methyl ethyl ketone	Methyl iodide (Iodmethane)	Methyl isobutyl ketone
Methyl methacrylate	Methyl-t-butyl ether	m-Xylene
Naphtha ene	n-Butylbenzene	n-Propylbenzene
o-Xylene	Pentachloroethane	p-Isopropyltoluene
Propionitrile (Ethyl Cyanide)	p-Xylene	sec-Butylbenzene
Styrene	tert-Butylbenzene	Tetrachloroethene
Tetrahydrofuran	Toluene	trans-1,2-Dichloroethene
trans-1,3-Dichloropropene	trans-1,4-Dichloro-2-butene	Trichloroethene
Trichlorofluoromethane	Vinyl acetate	Vinyl chloride
Xylenes (Total)		
8270C		
1,2,4,5-Tetrachlorobenzene	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene

State of Illinois
Environmental Protection Agency

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First Environmental Laboratories, Inc.
1600 Shore Road, Suite D
Naperville, IL 60563

Hazardous and Solid Waste, Organic

8270C

1,3,5-Trinitrobenzene (1,3,5-TNB)

1,3-Dichlorobenzene
1,3-Dinitrobenzene (1,3-DNB)
1,4-Dichlorobenzene
1,4-Naphthoquinone
1,4-Phenylenediamine
1-Naphthylamine
2,3,4,6-Tetrachlorophenol
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene (2,4-DNT)
2,6-Dichlorophenol
2,6-Dinitrotoluene (2,6-DNT)
2-Acetylaminofluorene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Methylphenol
2-Naphthylamine
2-Nitroaniline
2-Nitrophenol
3,3'-Dichlorobenzidine
3,3'-Dimethylbenzidine
3-Methylcholanthrene
3-Nitroaniline
4,6-Dinitro-2-methylphenol
4-Aminobiphenyl
4-Bromophenyl phenyl ether
4-Chloro-3-methylphenol
4-Chloroaniline
4-Chlorophenyl phenyl ether
4-Methylphenol
4-Nitroaniline
4-Nitrophenol
5-Nitro-o-toluidine
7,12-Dimethylbenz(a)anthracene
Acenaphthene
Acenaphthylene
Acetophenone
Aniline
Anthracene
Benzidine
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(g,h,i)perlyene
Benzo(k)fluoranthene
Benzoic acid
Benzyl alcohol
Bis(2-chloroethoxy) methane
Bis(2-chloroethyl) ether
Bis(2-chloroisopropyl) ether
Bis(2-ethylhexyl) phthalate
Butyl benzyl phthalate
Carbazole
Chlorobenzilate
Chrysene
Diallate
Dibenzo(a,h)anthracene
Dibenzofuran
Diethyl phthalate
Dimethoate
Dimethyl phthalate
Di-n-butyl phthalate
Di-n-octyl phthalate
Dinoseb
Diphenylamine
Ethyl methanesulfonate
Famphur
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachlorophene
Indeno(1,2,3-cd) pyrene
Isodrin
Isophorone
Isosafrole
Kepone
m-Cresol (3-Methylphenol)
Methyl methanesulfonate
Methyl parathion
Methylpyrilene
Naphthalene
Nitrobenzene
Nitroquinoline-1-oxide
N-Nitrosodiethylamine
N-Nitrosodimethylamine
N-Nitrosodi-n-butylamine (N-Nitrosodibutylamin
N-Nitrosodi-n-propylamine
N-Nitrosodiphenylamine
N-Nitrosomethylethylamine
N-Nitrosomorpholine
N-Nitrosopiperidine
N-Nitrosopyrrolidine
O,O,O-Triethyl phosphorothioate
o-Cresol (2-Methylphenol)
o-Toluidine
Parathion
p-Cresol (4-Methylphenol)
Pentachlorobenzene
Pentachloronitrobenzene
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
Phorate
Pronamide
Pyrene
Pyridine
Thionazine (Zinophos)

Wastewater, Inorganic

SM2130, 18Ed

Turbidity

SM2310B4a, 18Ed

Acidity

SM2320B, 18Ed

State of Illinois
Environmental Protection Agency

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First Environmental Laboratories, Inc.
1600 Shore Road, Suite D
Naperville, IL 60563

Wastewater, Inorganic	*SM2320B,18Ed*	Alkalinity
SM2340B,18Ed		
Hardness		
SM2510B,18Ed		
Specific conductance		
SM2540B,18Ed		
Residue (Total)		
SM2540C 18Ed		
Residue (TDS)		
SM2540D 18Ed		
Residue (TSS)		
SM3500Cr-D,18Ed		
Chromium VI		
SM4500Cl-E,18Ed		
Chloride		
SM4500CL-G,18Ed		
Chlorine		
SM4500CN-CE18Ed		
Cyanide		
SM4500F-B,C18Ed		
Fluoride		
SM4500H-B,18Ed		
Hydrogen ion (pH)		
SM4500NH3BC18Ed		
Ammonia		
SM4500NH3BG18Ed		
Ammonia		
SM4500NO2B,18Ed		
Nitrite		
SM4500NO3F,18Ed		
Nitrate-Nitrite (sum)		
SM4500P-E,18Ed		
Orthophosphate (as P)	Phosphorus	
SM4500S-D,18Ed		
Sulfide		
SM4500Si-D,18Ed		
Silica		
SM5210B,18Ed		
Biochemical oxygen demand (BOD)		
SM5220D,18/19/20Ed		
Chemical Oxygen Demand (COD)		
USEPA120.1		

State of Illinois
Environmental Protection Agency

Certificate No.: 000618

Awards the Certificate of Approval

First Environmental Laboratories, Inc.
1600 Shore Road, Suite D
Naperville, IL 60563

Wastewater, Inorganic

USEPA120.1
Specific conductance

USEPA130.2
Hardness

USEPA150.1
Hydrogen ion (pH)

USEPA160.1
Residue (TDS)

USEPA160.2
Residue (TSS)

USEPA160.3
Residue (Total)

USEPA160.4
Residue (Volatile)

USEPA1664RA
Oil and Grease

USEPA180.1
Turbidity

USEPA200.7

Aluminum	Antimony	Arsenic
Barium	Beryllium	Boron
Cadmium	Calcium	Chromium
Cobalt	Copper	Iron
Lead	Magnesium	Manganese
Molybdenum	Nickel	Potassium
Selenium	Silver	Sodium
Thallium	Vanadium	Zinc

USEPA200.7R4.4

Aluminum	Antimony	Arsenic
Barium	Beryllium	Boron
Cadmium	Calcium	Chromium
Cobalt	Copper	Hardness (calc.)
Iron	Lead	Magnesium
Manganese	Molybdenum	Nickel
Potassium	Selenium	Silver
Sodium	Thallium	Vanadium
Zinc		

USEPA245.1
Mercury

USEPA305.1
Acidity

USEPA310.1
Alkalinity

USEPA325.2
Chloride

State of Illinois
Environmental Protection Agency

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First Environmental Laboratories, Inc.
1600 Shore Road, Suite D
Naperville, IL 60563

Wastewater, Inorganic

USEPA325.3

Chloride

USEPA335.2

Cyanide

USEPA340.2

Fluoride

USEPA350.1

Ammonia

USEPA350.2

Ammonia

USEPA353.2

Nitrate (total)

USEPA353.3

Nitrate (total)

USEPA354.1

Nitrite

USEPA365.2

Orthophosphate

Phosphorus

USEPA375.4

Sulfate

USEPA376.2

Sulfide

USEPA405.1

Biochemical oxygen demand (BOD)

USEPA410.4

Chemical Oxygen Demand (COD)

USEPA420.1

Phenolics

Wastewater, Organic

USEPA608

4,4'-DDD	4,4'-DDE	4,4'-DDT
Aldrin	alpha-BHC	beta-BHC
Chlordane	delta-BHC	Dieldrin
Endosulfan I	Endosulfan II	Endosulfan sulfate
Endrin	Endrin aldehyde	gamma-BHC (Lindane)
Heptachlor	Heptachlor epoxide	Methoxychlor
PCB-1016	PCB-1221	PCB-1232
PCB-1242	PCB-1248	PCB-1254
PCB-1260	Toxaphene	

USEPA624

1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane
1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichlorobenzene
1,2-Dichloroethane	1,2-Dichloropropane	1,3-Dichlorobenzene

State of Illinois
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Naperville, IL 60563

Wastewater, Organic

2-Chloroethylvinyl ether
Benzene
Bromomethane
Chloroethane
cis-1,3-Dichloropropene
Ethylbenzene
trans-1,2-Dichloroethene
Trichlorofluoromethane

USEPA624

Acrolein
Bromodichloromethane
Carbon tetrachloride
Chloroform
Dibromochloromethane
Tetrachloroethene
trans-1,3-Dichloropropene
Vinyl chloride

1,4-Dichlorobenzene
Acrylonitrile
Bromoform
Chlorobenzene
Chloromethane
Dichloromethane (Methylene chloride)
Toluene
Trichloroethene
Xylenes (total)

USEPA625

1,2,4-Trichlorobenzene
1,4-Dichlorobenzene
2,4-Dichlorophenol
2,4-Dinitrotoluene (2,4-DNT)
2-Chlorophenol
3,3'-Dichlorobenzidine
4-Chlorophenyl phenyl ether
Acenaphthylene
Benzo(a)anthracene
Benzo(g,h,i)perylene
Bis(2-chloroethoxy) methane
Chrysene
Dimethyl phthalate
Fluoranthene
Hexachlorobutadiene
Indeno(1,2,3-cd) pyrene
Nitrobenzene
N-Nitrosodiphenylamine
Phenol

1,2-Dichlorobenzene
2,2-Oxybis(1-chloropropane)
2,4-Dimethylphenol
2,6-Dinitrotoluene (2,6-DNT)
2-Methyl-4,6-dinitrophenol
4-Bromophenyl phenyl ether
4-Nitrophenol
Anthracene
Benzo(a)pyrene
Benzo(k)fluoranthene
Bis(2-chloroethyl) ether
Dibenzo(a,h)anthracene
Di-n-butyl phthalate
Fluorene
Hexachlorocyclopentadiene
Isophorone
N-Nitrosodimethylamine
Pentachlorophenol
Pyrene

1,3-Dichlorobenzene
2,4,6-Trichlorophenol
2,4-Dinitrophenol
2-Chloronaphthalene
2-Nitrophenol
4-Chloro-3-methylphenol
Acenaphthene
Benzidine
Benzo(b)fluoranthene
Benzyl butyl phthalate
Bis(2-ethylhexyl) phthalate
Diethyl phthalate
Di-n-octyl phthalate
Hexachlorobenzene
Hexachloroethane
Naphthalene
N-Nitrosodi-n-propylamine
Phenanthrene

First Environmental Laboratories

Standard Operating Procedure

Title: Sample Acceptance Policy, Receipt, Log-in, and Storage

This is an internal document based on information contained in various regulatory documents.

Objective of Procedure: This SOP provides details regarding First Environmental Laboratories' sample acceptance policy, chain of custody procedures, and log-in procedures.

1. Definitions:

1.1. Chain of Custody Document: A document established for the purpose of tracing sample possession from the time of collection to data reporting. It may also include traceability of final sample disposition.

1.2. Custody (at the laboratory): A sample is in custody when it meets one of the following requirements:

- It is in the actual possession of an authorized employee.
- It is in their view, after being in their physical possession.
- It was in their physical possession and then stored in a secure area.
- It is in a secure area.

1.3. Secure Area: A secure area can be a locked refrigerator, a locked room, or a locked lab with restricted personnel entrance.

2. Sample Acceptance Policy

Certification requires the laboratory to establish a written acceptance policy that clearly outlines the circumstances under which samples will be accepted. This policy must be made available to all sample collection personnel. A copy of the laboratories' sample acceptance policy is included in First Environmental Laboratories' Service Brochure that is provided to new clients. A copy of the policy will be included along with the chain of custody forms and sample instructions provided with sample bottles. Clients are encouraged to use sampling materials provided by the laboratory. Page 10 of this SOP summarizes First Environmental Laboratories' sample acceptance policy.

3. Chain of Custody Procedures

3.1. Chain of Custody Record

An essential part of any sampling or analytical event is assuring the integrity of the sample from collection to data reporting. The chain of custody provides documentation and traceability of sample possession and handling. Samples are physical evidence and should be handled according to the procedural safeguards outlined in this SOP. Any analytical data can potentially be used for purposes of litigation and strict adherence to chain of custody procedures is necessary. This SOP does not detail evidentiary chain of custody procedures, which may be required for specific projects at the request of the client. See the SOP titled, Evidentiary Chain of Custody Procedures, (SOP #116).

The chain of custody record should contain the following information:

- company's name, address, and phone., FAX No.
- contact name
- sampler or collector's name
- project identity / location
- identity of person receiving report
- date / time of sample collection
- sample identification, description, or location
- matrix type
- analyses required or reference to quote/order detailing required analyses
- condition of sample shipper and containers upon receipt
- preservation type
- temperature of cooler upon receipt
- date and time of sample receipt
- signatures of persons involved in the chain of possession
- comments / special instructions
- lab identity (a 5 digit sample number entered by laboratory personnel)

3.2. Initiation of the Chain of Custody

3.2.1. Chain of custody forms will be provided with all sample containers.

3.2.2. The chain of custody is initiated in the field by sample collection personnel. The sample collector is responsible for the care and custody of the samples until properly dispatched to the receiving laboratory or turned over to the laboratory. The sample collector must assure that each container is in his/her physical possession or view at all times, or locked in such a place and manner to preclude tampering.

3.2.3. If samples are received but the chain of custody is lacking, the person delivering the samples will fill out a chain of custody form. If a third party courier delivers the

samples, notify the client immediately. A faxed, signed form from the client is sufficient to allow receipt and analysis by the lab. However, the client has already broken the integrity of the chain of custody from the field. Assuming **First Environmental Laboratories, Inc.** did not do the sampling, then this is not our liability. Clients should be encouraged to use the proper procedures and forms.

3.2.4. Deviation from acceptable protocols will be cited on the COC or in the Analytical Report.

3.3. Maintaining Chain-of-Custody

3.3.1. Samples awaiting analysis are refrigerated if necessary..

3.3.2. If a sample needs to be shipped to a subcontracted laboratory, a purchase order/ chain of custody form will be completed. Pertinent information regarding sample analysis particular to the project such as, method and detection limit requirements will be provided to the subcontracting laboratory. The client must be informed regarding analyses performed externally.

3.3.3. In order to satisfy the custodial and evidentiary requirements of sample handling procedures, the following will be adhered to at all times:

- Samples will be stored in a secure area
- Access to the laboratory will be through a monitored reception area. Other access doors to the laboratory will be kept locked.
- Visitors are escorted while in the laboratory. All visitors sign the "Visitor Log."
- After the analyst has removed a sample from storage, the analyst is responsible for the custody of the sample. Each analyst should return the sample to the storage area before the end of the working day.

3.3.4. The chain of custody record is used to document return of samples to clients.

4. Sample Receipt by Laboratory

4.1. Laboratory custody of the sample begins at sample receipt. Samples may be delivered by the following methods:

- Field samplers provided by First Environmental Laboratories, Inc.
- Field samplers provided by the client
- First Environmental Laboratories, Inc. couriers

- Private courier service
- US mail
- The client or an agent of the client.

4.2. Independent couriers are not required to sign the chain of custody form. Ideally, the chain of custody should be kept in the sealed sample cooler. The receipt from the courier or the transportation bill should be kept with the chain of custody record retained by the laboratory. Normally, the Office Manager or Project Manager will receive samples. The employee receiving the samples is responsible for signing the delivery forms for the carrier. The shipping containers are then taken to the log-in area for completion of the receiving process, which entails unpacking the shipping container and cross checking the chain of custody against the quote/order on file for the project.

4.3. Samples received after normal working hours or on weekends, which are not immediately unpacked, will be placed in cold storage.

5. Sample Log-in

5.1. Thermal Preservation

5.1.1. An infrared thermometer is used to take the temperature of a representative sample from each cooler. Alternatively, a temperature blank, e.g., a container of water, may be used rather than a representative sample. **The temperature is recorded on the chain of custody record. The acceptable temperature is within +/-2°C of the required temperature or the method specified range. For samples with a specified temperature of 4°C, the acceptable temperature is just above the freezing temperature of water to 6°C**. Freezing is undesirable, since it could lead to breakage of glass containers. When the client delivers samples, thermal preservation is considered acceptable only if there is evidence that the chilling process has begun such as arrival on ice. In this case, "received on ice" will be noted on the chain of custody record as appropriate. If the proper temperature was not maintained, the Project Manager is notified.

A variety of acceptable procedures for preservation of volatiles in a soil matrix are presented in Method 5035A, Closed – System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. Regardless of whether or not the samples are in empty vials or vials containing reagent water, the samples need to be frozen within 48 hours of collection. If the samples are frozen prior to receipt by the laboratory, the laboratory must document on the chain of custody that the sample temperature upon receipt was within negative 7 to negative 20°C. If the proper temperature was not maintained, the Project Manager is notified.

If the option for field preserved sodium bisulfate and methanol vials is utilized, freezing does not need to be initiated within 48 hours of sample collection. Samples preserved using this option must be kept at 4°C.

5.1.2. If the proper thermal preservation was not maintained, a notation is made on the Sample Acceptance and Log-in Record (See Attachment 1 to this SOP) and the Project Manager is notified.

5.1.3. The Project Manager will document the decision to proceed with analysis by initialing and dating the notation on the Sample Acceptance and Log-in Record.

5.2. Chemical Preservation and Sample Volume

5.2.1. Samples are examined for proper containers having appropriate chemical preservation and adequate sample volumes upon receipt. The container types and preservatives are indicated on the project file. (see attached)

5.2.2. The actual method SOPs specify preservation and storage requirements. It is the responsibility of the analyst to ensure adequate preservation prior to analysis. Every attempt is made to adequately preserve the sample, e.g., adjust the pH per method requirements, at the time samples are collected. In most cases, containers having a pre-measured volume of preservative are sent to the client. The pre-measured volume of preservative is adequate for "normal" samples. A sample having a very high pH or very low pH may not be adjusted to the proper pH when the "normal" volume of preservative is utilized. The results of all pH checks should be recorded in the appropriate laboratory notebook.

5.2.3. Generally, analyses require samples to be free of chlorine. If sample(s) are suspected to contain chlorine, the sample(s) should be checked using Potassium-Iodide Starch Test Paper Strips. If the test strip turns blue-black, chlorine is present in the sample. An appropriate de-chlorinating agent should be used to de-chlorinate the sample as described by the specific method SOP. The results of all chlorine checks should be recorded in the appropriate laboratory notebook.

5.2.4. If the proper containers or adequate sample volumes were not received, a note is made on Sample Acceptance and Log-in Record and the Project Manager is notified.

5.2.5. The Project Manager will document the decision to proceed with analysis by initialing and dating the notation on Sample Acceptance and Log-in Record.

5.2.6. If un-presereved sample containers were received and the decision has been made to proceed with analysis, laboratory personnel will prepare appropriate sample splits into the required preserved containers. They will indicate the type of container/preservative

used for preparing the split on the project file. Note : laboratory personnel will ensure that the sample is homogenous prior to obtaining a sample split.

5.2.7. Samples are routinely received "un-prepared," e.g. not digested, not extracted. If samples are received prepared, then a notation is made on the COC or project file. The notation is initialed and dated by the person making the notation.

5.3. Holding Times

5.3.1. Analyses having "short" holding times, must be delivered to the laboratory in a manner that provides adequate lead time to meet the holding time.

5.3.2. Log-in personnel will notify laboratory personnel when samples are received requiring analyses that are known to have "short" holding times.

5.3.3. If holding times are expired at the time of sample receipt, the Project Manager will be notified.

5.3.4. The Project Manager will document the decision to proceed with analysis by initialing and dating the notation on the Sample Acceptance and Log-in Record.

5.4. Verification

5.4.1. The sample container identification is compared to the chain of custody and the chain of custody is in turn compared to the quote/order. Any discrepancies found are noted and the Project Manager notified. If discrepancies are found, the client will be contacted for clarification.

5.4.2. If sample containers show signs of damage or contamination the Project Manager is notified.

5.4.3. Documentation of discrepancies and resolution of problems will be noted, initialed, dated, and recorded on the Sample Acceptance and Log-in Record.

5.4.4. If custody seals were used to seal the sample containers and/or cooler, this should be noted on the COC or Sample Acceptance and Log-in Record.

5.5. Laboratory Identification

5.5.1. A unique 5 digit code is assigned to each sample. The code is written on each bottle label and on the chain of custody record in the column labeled, "Lab I.D."

5.5.2. The Client Name, Project I.D., Sample Description, Received Date/Time, Due Date, and Initials (of person making entries) are entered in the sample logbook in

numerical order. The sample logbook provides a link between each field I.D. code and the assigned Lab I.D. code.

5.5.3. Each container is assigned a unique Lab I.D. code.

5.5.4. The Lab I.D. code is used to identify all samples, subsamples, extracts and digests. The Lab I.D. code/container code is entered into the laboratory records and is used to link the sample with all activities related to sample analysis.

5.6. Documentation

5.6.1. The form titled, Sample Acceptance & Log-in Record, is completed during log-in. See Attachment 1 to this SOP. This form is used to document all aspects of sample acceptance.

5.6.2. A project file folder is prepared for each sample group submission. The tab of the project file is labeled with the client name, sample number(s), and due date. If the sample(s) require RUSH analysis, the tab is also stamped "RUSH." The front of the project file is stamped. The stamp permits entry of the due date, Project Manager I.D., checkboxes for analyte groups, reviewed by, date reported, date FAXed, date invoiced.

5.6.3. The chain of custody form, accompanying freight bills, quote/order form and log sheets are placed in the project file, which is then forwarded to the Analysis Control Area.

5.6.4. The assigned Project Manager reviews the project within 24 hours of log-in completion. The Project Manager initials the file folder upon completing the review.

5.6.5. Whenever there is a problem or question associated with sample acceptance, the Project Manager will be notified. The Project Manager is responsible for resolving the problem, documenting resolution of the problem and documenting the decision to proceed with analysis. Depending on the nature of the issue, problem resolution will be documented on either the COC or Sample Acceptance & Log-in Record.

5.6.6. The COC is part of the final report delivered to the client. Where appropriate the Project Manager will cite deviations from acceptable protocols and qualify analytical data in the final Analytical Report. Reference the SOP titled, Log-in, Data Entry & Reporting, (SOP #120).

5.6.7. If samples do not meet acceptance criteria and are ultimately rejected, all correspondence and records of conversations concerning the final disposition of rejected samples will be retained.

6. Sample Storage

6.1. Samples must be stored in a manner that avoids deterioration, contamination, or damage during storage, handling, preparation, and analysis.

6.2. Samples are stored away from all standards, reagents, food and other potentially contaminating sources. Highly contaminated samples must be segregated from other "clean" samples to prevent cross contamination.

6.3. Sample extracts, leachates and digests are stored in an area separate from samples.

6.4. Samples are stored in accordance with the thermal preservation requirements established in the methods.

6.5. The refrigerators and freezers used for sample storage are monitored on a daily basis. The temperature of the each unit is maintained within $\pm 2^{\circ}C$ of the specified preservation temperature unless method specific criteria exist. For samples with a specified storage temperature of $4^{\circ}C$, the temperature is maintained between the freezing point of water to $6^{\circ}C$.

6.6. Samples requiring evidentiary chain of custody procedures will be stored in a refrigeration unit that can be secured.

6.7. When obtaining a sample aliquot from a submitted sample, laboratory personnel will ensure that the sample is homogenous prior to taking the sample aliquot.

7. Safety

7.1. All samples are potentially hazardous and any procedure involving the sample should be performed in a way that minimizes exposure to the sample. Avoid contact with the sample on skin or clothing. If contact occurs wash the affected area thoroughly. Do not "smell" the sample to determine odors or to classify the sample. Lab coats, safety glasses and gloves should be worn when handling samples. If there is evidence of leakage from the sample bottle or if any noxious odors are evident, the sample(s) should be placed under a hood. Appropriate cleanup equipment (spill pillow, vermiculite, whisk broom, dust pan and a sealable container) should be in or near the login area to use in case a sample container breaks.

7.2. Sample coolers must be opened carefully in order to avoid direct contact with the samples. Be aware that sample leakage could be present and take necessary caution to avoid contact.

References

8.1. Chapter 5. Quality Systems, of Part 186, Accreditation of Laboratories for Drinking Water, Wastewater and Hazardous Waste Analyses.

8.2. Evidentiary Chain of Custody Procedures, (SOP #116)

8.3. Method 5035A, Closed – System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples.

8.4. Log-in, Data Entry & Reporting, (SOP #120).

9. Approvals

Reviewed for Technical Accuracy by: _____

Reviewed for Quality Assurance Compliance by: _____

Implementation Date: 08/12/02

End Use Date: _____

Sample Acceptance Policy

The regulations guiding laboratory certification requires that our laboratory have a written sample acceptance policy available to sample collectors. Exceptions will be noted on the chain of custody and/or in the Analytical Report.

The sample collector must document the following information on the Chain of Custody:

- company's name, address, and phone., FAX No.
- contact name
- sampler or collector's name
- project identity / location
- identity of person receiving report
- date / time of sample collection
- sample identification, description, or location
- matrix type
- analyses required or reference to quote/order detailing required analyses
- signatures of persons involved in the chain of possession, including collector's
- comments / special instructions

Laboratory personnel must document the following on the Chain of Custody:

- adequacy of documentation provided by the sample collector (see above)
- condition of sample shipper and containers upon receipt
- preservation type
- temperature of cooler upon receipt
- date and time of sample receipt
- signatures of persons involved in the chain of possession, including receiving personnel
- lab identity (a 5 digit sample number entered by laboratory personnel)

Sample bottles provided by the laboratory are pre-labeled with water resistant labels that are color coded to indicate the type of preservative present in the container.

Red = Nitric Acid
Yellow = Sulfuric Acid Blue = Sodium Hydroxide
Teal = No Treat

Sample bottles need to be labeled using indelible ink.

Adequate sample volume must be provided for the analyses requested.

The temperature within the cooler must be maintained at 4°C during transit to the laboratory. Please ensure that appropriate quantities of ice / ice packs are enclosed within the cooler to maintain this temperature.

Analyses having "short" holding times, must be delivered to the laboratory in a manner that provides adequate lead time to meet the holding time.

Laboratory Personnel can provide information regarding sample volume, preservation, and holding time requirements.

File ID_____

Sample Acceptance & Log-in Record

Was proper, full, and complete documentation received with the samples? (project name/location, sample identification, date/time of collection, collector's name, sample type)? _____yes _____no
(circle missing items)

Were samples received un-damaged, and were all identifications un-questionable? _____yes _____no

Were samples received in appropriately preserved containers? _____yes _____no

Were method specified thermal preservation requirements met? _____yes _____no
For samples with a specified temperature of 4°C, the acceptable temperature is just above the freezing temperature of water to 6°C. Evidence of having begun the chilling process needs to be present for samples received within 6 hours of collection. *(Temperature upon sample receipt is noted directly on COC.)*

Were samples delivered prior to the expiration of any "short" holding times? _____yes _____no

If "no" is checked for any of the above questions, provide details and document resolution of problem below. Initial and date each entry.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Soil / Sediments / Sludges_____ Aqueous_____
Other_____

	# per sample		# per sample
4 oz jar	☐	40 mL VOA vials	☐
16 oz jar	☐	NaOH (p) CN	☐
32 oz jar	☐	H_2SO_4 (p) WC	☐
5035 vials	☐	HNO_3 (p) Metals	☐
Encore Samplers	☐	No Treat (p) general	☐
_____	☐	H_2SO_4 (g) Phenol	☐
Samples on Hold	☐	H_2SO_4 (g) O&G	☐
Location_____		H_2SO_4 (p) TOC/TOX	☐
		No Treat (amber / clear g)	☐
		Trip Blank	☐
		_____	☐

p = plastic g = glass

Due Date:			
Project Manager:			
Logged-in by:			
	Needed		Entered
	Total	TCLP	
Conventionals			
% Solids			
Metals			
Volatiles / BTEX			
PNAs			
BNAs			
PCBs / Pesticides			
TPH			
F-list V☐ SV ☐			
Sub-out Alcohols☐ Herbs☐ EOX ☐ TOC ☐ TOX ☐			
Reviewed By:			
Date E-mailed:			
Date Faxed:			
Date Invoiced:			
Quote Enclosed: ☐ Surcharge:_____%			

Notes:

_____

_____

_____

First Environmental Laboratories

Standard Operating Procedure

Title: VOLATILE ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY / MASS SPECTROMETRY (GC/MS)

Matrices: wastewater, drinking water, groundwater, soil/sediment, wastes

Regulatory References:
SW-846, 3rd Edition, July 1992 and it's updates, Method 5030, 5035A and 8260B
EPA 600/4-82-057, July 1982, Method 624

Regulatory Limits: NA

Preservation Requirements: Aqueous samples are preserved in accordance with method 5030. Each 40-mL sample vial is preserved with 0.5 mL of 50% HCL. Soil samples are collected and preserved in accordance with method 5035A. This method specifies several procedures for the collection and preservation of samples for either low-level or high-level analysis. 1.) Samples may be collected in empty sealed vials, cooled to 4 +/- 2 deg C for no more than 48 hours, then frozen upon receipt by the laboratory (-7 to –20 deg C). 2.) Samples may be collected in vials preserved with sodium bisulfate and/or methanol and then cooled to 4 +/- 2 deg C. 3.) Samples may be collected in empty sealed vials and frozen in the field. 4.) Samples for high-level analysis may be collected in bulk (e.g. 4-ounce jar) and cooled to 4 +/- 2 deg C. Specific details can be found in method 5035A Appendix A.

Container: 40mL glass vial with teflon-lined septa for aqueous matrices and 4 oz or method 5035A compliant container for solid matrices. 5035A containers must be pre-weighed and the tare weight indicated on the vial.

Single Analysis Sample Volume: 5 mL or 1 to 5g.

Holding Time: 14 days for preserved samples (7 days for unpreserved aqueous samples). 48 hours for unpreserved, unfrozen soil samples.

(Range) Reporting Limit: 2.0 ug/L – 100 ug/L; 2.0 ug/kg – 100 ug/kg

Summary of Method:

Method 8260 is used to determine volatile organic compounds in a variety of solid waste matrices. This method is applicable to nearly all types of samples, regardless of water content, including various air

Analyte	Aqueous ug/L	Non-Aqueous ug/kg
1,1-Dichloroethane	5.0	5.0
1,1-Dichloroethene	5.0	5.0
cis-1,2-Dichloroethene	5.0	5.0
trans-1,2-Dichloroethene	5.0	5.0
2,2-Dichloropropane	5.0	5.0
1,2-Dichloropropane	5.0	5.0
1,3-Dichloropropane	5.0	5.0
1,1-Dichloro-2-propanone (1,1-Dichloroacetone)	PP	PP
1,1-Dichloropropene	5.0	5.0
cis-1,3-Dichloropropene	5.0	5.0
trans-1,3-Dichloropropene	5.0	5.0
Ethyl acetate	100	100
Ethylbenzene	5.0	5.0
Ethylene dibromide (EDB)(1,2-Dibromoethane)	10.0	10.0
Ethyl ether	50.0	50.0
Ethyl methacrylate	10.0	10.0
Heptane	5.0	5.0
Hexachlorobutadiene	10.0	10.0
Hexachloroethane	10.0	10.0
Hexane	5.0	5.0
2-Hexanone (Methyl Butyl Ketone)	10.0	10.0
Iodomethane (Methyl Iodide)	10.0	10.0
Isopropylbenzene (Cumene)	5.0	5.0
p-Isopropyltoluene (Cymene)	5.0	5.0
Methacrylonitrile	10.0	10.0
Methyl acrylate	10.0	10.0
Methylene chloride (Dichloromethane)	5.0	5.0
Methyl methacrylate	10.0	10.0
4-Methyl-2-pentanone	10.0	10.0
Methyl-t-butyl ether (MTBE)	5.0	5.0
Naphthalene	5.0	5.0
Nitrobenzene	PP	PP
2-Nitropropane	10.0	10.0
Pentachloroethane	100	100
1-Propanol	100	100
2-Propanol (Isopropyl alcohol)	100	100
Propionitrile	10.0	10.0
n-Propylbenzene	5.0	5.0
Pyridine	PP	PP
Styrene	5.0	5.0
1,1,1,2-Tetrachloroethane	5.0	5.0
1,1,2,2-Tetrachloroethane	5.0	5.0
Tetrachloroethylene	5.0	5.0

electron impact spectra of authentic standards. Quantitation is accomplished by comparing the response of a major (quantitation) ion relative to an internal standard using a five-point calibration curve.

The method includes specific calibration and quality control steps that supersede the general requirements provided in Method 8000.

1. Instrumentation / Apparatus / Glassware

Purge-and-trap device for aqueous and solid samples - Described in Method 5030.

Injection port liners (HP Catalog #18740-80200, or equivalent) - modified for direct injection analysis by placing a 1-cm plug of glass wool approximately 50-60 mm down the length of the injection port towards the oven. The analytical column is mounted 1 cm into the liner from the oven side of the injection port, according to manufacturer's specifications.

Gas chromatography/mass spectrometer/data system

Gas chromatograph - An analytical system complete with a temperature-programmable gas chromatograph suitable for splitless injection with appropriate interface for sample introduction device. The system includes all required accessories, including syringes, analytical columns, and gases. The Hewlett Packard 5890 or 6890 meets all the specifications required by method 8260B.

Gas chromatographic column: 30 m x 0.25 mm ID capillary column coated with ZB-624 (or DB-624), 1.4-um film thickness, or equivalent. (Hewlett Packard part number 19091V-402).

Mass spectrometer - Capable of scanning from 35 to 300 amu every 2 sec or less, using 70 volts (nominal) electron energy in the electron impact ionization mode. The mass spectrometer must be capable of producing a mass spectrum for 4-Bromofluorobenzene (BFB) which meets all of the criteria in Table 6 when 5-50 ng of the GC/MS tuning standard (BFB) are injected through the GC. To ensure sufficient precision of mass spectral data, the desirable MS scan rate allows acquisition of at least five spectra while a sample component elutes from the GC. The Hewlett Packard model 5972 and 5973 meet all of the requirements of method 8260B.

GC/MS interface – The analytical column is directly coupled into the mass spectrometer ion source.

Data system - A computer system that allows the continuous acquisition and storage on machine-readable media of all mass spectra obtained throughout the duration of the chromatographic program must be interfaced to the mass spectrometer. The computer must have software that allows searching any GC/MS data file for ions of a specified mass and plotting such ion abundances versus time or scan number. This type of plot is defined as an Extracted Ion Current Profile (EICP). Software must also be available that allows integrating the abundances in any EICP between specified time or scan-number limits. The most recent version of the EPA/NIST Mass Spectral Library should also be available. The Hewlett Packard data systems with Enviroquant software meet all of the method requirements.

Microsyringes – 2-, 10-, 25-, 100-, 250-, 500-, and 1,000-uL (gas-tight).

Balance - Top-loading, capable of weighing 0.01 g.

Secondary dilution standards - Using stock standard solutions, prepare secondary dilution standards in methanol containing the compounds of interest, either singly or mixed together. Secondary dilution standards must be stored with minimal headspace and should be checked frequently for signs of degradation or evaporation, especially just prior to preparing calibration standards from them. Store in a vial with no headspace. Replace after one week. Secondary standards for gases should be replaced after one week unless the acceptability of the standard can be documented. When using premixed certified solutions, store according to the manufacturer's documented holding time and storage temperature recommendations. The analyst should also handle and store standards as stated below and return them to the freezer as soon as standard mixing or diluting is completed to prevent the evaporation of volatile target compounds.

Prepare the following VOA calibration solutions: Dilute the indicated volumes of each mixture to 40.0 mLs in a volumetric flask using "Purge and Trap Grade" Methanol.

Solution #1:

Catalog Number	Description	Initial Conc	Volume	Final Conc
47427-U	EPA 524.2 Rev 4 Mix	2000 ug/mL	1000 uL	50 ug/mL
4-7406	Iodomethane	2000 ug/mL	1000 uL	50 ug/mL
5-02111	502/524 Volatile Organics Calib Mix	2000 ug/mL	1000 uL	50 ug/mL
47428-U	EPA 524 Rev 4 Ketones Mix	2000 ug/mL	1000 uL	50 ug/mL
4-0017	2-Chloroethyl vinyl ether	5000 ug/mL	400 uL	50 ug/mL
RK30216	Vinyl Acetate Standard	2000 ug/mL	1000 uL	50 ug/mL
EPM60034-1	Acrolein & Acrylonitrile	10000 ug/mL	1000 uL	250 ug/mL
	Hexane and Heptane		uL	50 ug/mL

Table 2

Store with minimal headspace in 2mL or 5mL vials with mini-nert valves and septa. Store in the VOA freezer at -18 deg C, separate from samples. This solution should be replaced every 6 months.

The gases mixture, Supelco #48799-U, is prepared in a separate solution. The gases have a tendency to degrade/evaporate faster than the other compounds and this solution should be replaced weekly.

Solution #2:

Catalog Number	Description	Initial Conc	Volume	Final Conc
48799-U	Volatile Org Cpds Mix 6	2000 ug/mL	1000 uL	50 ug/mL

Table 3

Store with minimal headspace in 2mL or 5mL vials with mini-nert valves and septa. Store in the VOA freezer separate from samples.

Internal Standard/System Monitoring Compounds Solution (Surrogate standards) - A stock internal standard/surrogate solution in methanol should be prepared. Each sample undergoing GC/MS analysis must be spiked with 1.0 uL of the surrogate spiking solution prior to analysis.

Matrix spiking and laboratory control sample (LCS) standards - Matrix spiking standards should be prepared from volatile organic compounds which are representative of the compounds being investigated. At a minimum, the matrix spike should include 1,1-dichloroethene, trichloroethene, chlorobenzene, toluene, and benzene. The matrix spiking solution should contain compounds that are expected to be found in the types of samples to be analyzed.

The matrix spike solution is purchased "ready to use" from NSI (Catalog #C-420WL 50 ug/mL). This same solution may be used as a second source standard to verify the initial calibration curve (ICVS).

Store with minimal headspace in 2mL or 5mL vials with mini-nert valves and septa. Store in the VOA freezer at -18 deg C, separate from samples. This solution should be replaced every 6 months.

Great care must be taken to maintain the integrity of all standard solutions. It is recommended all standards in methanol be stored at –10 deg C or less, in amber bottles with PTFE-lined screw-caps.

4. Analytical Procedures

4.1. Interferences

Major contaminant sources are volatile materials in the laboratory and impurities in the inert purging gas and in the sorbent trap. The use of non-polytetrafluoroethylene (PTFE) thread sealants, plastic tubing, or flow controllers with rubber components should be avoided, since such materials out-gas organic compounds which will be concentrated in the trap during the purge operation. Analyses of calibration and reagent blanks provide information about the presence of contaminants. When potential interfering peaks are noted in blanks, the analyst should change the purge gas source and regenerate the molecular sieve purge gas filter. Subtracting blank values from sample results is not permitted. If reporting values without correcting for the blank results in what the laboratory feels is a false positive result for a sample, the laboratory should fully explained this in text accompanying the uncorrected data.

Contamination may occur when a sample containing low concentrations of volatile organic compounds is analyzed immediately after a sample containing high concentrations of volatile organic compounds. A technique to prevent this problem is to rinse the purging apparatus and sample syringes with two portions of organic-free reagent water between samples. After the analysis of a sample containing high concentrations of volatile organic compounds, one or more blanks should be analyzed to check for cross-contamination. Alternatively, if the sample immediately following the high concentration sample does not contain the volatile organic compounds present in the high level sample, freedom from contamination has been established.

For samples containing large amounts of water-soluble materials, suspended solids, high boiling compounds, or high concentrations of compounds being determined, it may be necessary to wash the purging device with a soap solution, rinse it with organic-free reagent water, and then dry the purging device in an oven at 105 deg C. In extreme situations, the entire purge-and-trap device may require dismantling and cleaning. Screening of the samples prior to purge-and-trap GC/MS analysis is highly recommended to prevent contamination of the system.

is the instrument ID letter.) A separate method file should be kept for aqueous and non-aqueous sample analyses. The Hewlett Packard software stores calibration information as well as the analytical parameters in the Method file. Typically, the method name ending with an "S" will be the non-aqueous method file, and the method name ending with a "W" will be the aqueous method file.

Column	ZB-624 or DB-624 30meter
Column ID/Thickness	0.25mm ID 1.4um
Interface	Cap Direct Split Inj.
GC Type	HP5890 Series II/Plus
Mass Spectrometer	HP5972A or 5973
Tune	BFB Tune + 300v
Scan Range	35-260 amu
Sampling #	3
Threshold	100
Carrier Gas	Helium
Vacuum Comp.	On
Pressure	16psi @ 35 deg C
Constant Flow Mode	1.0 mL/min
Split Flow	25 ml/min
Split Ratio	25:1
Inj. B Temp	220 C
Detector B Temp	280 C
Initial Temp	35 C
Initial Time	4 minutes
Rate(1)	7.00 C/min
Final Temp(1)	120 C
Final Time(1)	0 min
Rate(2)	25.0 C/min
Final Temp(2)	230 C
Final Time(2)	1.50 min
Total GC run time	22.04 min
Purge B	On (during entire run)

Table 5

BFB. Each GC/MS system must be hardware-tuned to meet the criteria in Table 6 for a 5-50 ng injection or purging of 4-bromofluorobenzene (2-uL injection of the BFB standard). Analyses must not begin until these criteria are met.

Update the initial calibration in the Enviroquant method identification file. This will automatically update the response factors that will be used in the quantification of target compounds.

System performance check compounds (SPCCs). A system performance check should be made before this calibration curve is used. Five compounds (the System Performance Check Compounds, or SPCCs) are checked for a minimum average response factor. These compounds are chloromethane; 1,1-dichloroethane; bromoform; chlorobenzene; and 1,1,2,2-tetrachloroethane. These compounds are used to check compound instability and to check for degradation caused by contaminated lines or active sites in the system. Example problems include:

Chloromethane is the most likely compound to be lost if the purge flow is too fast.

Bromoform is one of the compounds most likely to be purged very poorly if the purge flow is too slow. Cold spots and/or active sites in the transfer lines may adversely affect response. Response of the quantitation ion (m/z 173) is directly affected by the tuning of BFB at ions m/z 174/176. Increasing the m/z 174/176 ratio relative to m/z 95 may improve bromoform response.

Tetrachloroethane and 1,1-dichloroethane are degraded by contaminated transfer lines in purge-and-trap systems and/or active sites in trapping materials.

The minimum mean response factors for the volatile SPCCs are as follows:

Chloromethane	0.10
1,1-Dichloroethane	0.10
Bromoform	0.10
Chlorobenzene	0.30
1,1,2,2-Tetrachloroethane	0.30

Calibration check compounds (CCCs). The purpose of the CCCs are to evaluate the calibration from the standpoint of the integrity of the system. High variability for these compounds may be indicative of system leaks or reactive sites on the column. Meeting the CCC criteria is not a substitute for successful calibration of the target analytes using one of the approaches described in Sec. 7.0 of Method 8000.

The RSD for each individual Calibration Check Compound (CCC) must be equal or less than 30%. If the CCCs are not included in the list of analytes for a project, and therefore not included in the calibration standards, refer to Sec. 7.0 of Method 8000. The CCCs are:

1,1-Dichloroethene	Toluene
Chloroform	Ethylbenzene
1,2-Dichloropropane	Vinyl chloride

If an RSD of greater than 30% is measured for any CCC, then corrective action to eliminate a system leak and/or column reactive sites is necessary before reattempting calibration.

Evaluation of retention times. The relative retention times of each target analyte in each calibration standard should agree within 0.06 relative retention time units. Late-eluting compounds usually have much better agreement.

4.4 Sample Preparation

All samples and standard solutions must be allowed to warm to ambient temperature before analysis. Set up the introduction device as outlined in the method of choice.

The process of taking an aliquot destroys the validity of remaining volume of an aqueous sample for future analysis by introducing headspace to the sample vial.

Aqueous Samples. With the Varian Archon autosampler, the 40 mL sample vial that was collected in the field is placed directly on the autosampler tray. The autosampler is then instructed to withdraw a 5 mL aliquot for analysis. The internal standard and surrogate solution is automatically added by the autosampler.

The following procedure may be used to dilute aqueous samples for analysis of volatiles. All steps must be performed without delays, until the diluted sample is in the 40 mL vial.

1 Dilutions may be made in volumetric flasks (50- to 100-mL). Select the volumetric flask that will allow for the necessary dilution. Intermediate dilution steps may be necessary for extremely large dilutions.

2 Calculate the approximate volume of organic-free reagent water to be added to the volumetric flask, and add slightly less than this quantity of organic-free reagent water to the flask.

3 Inject the appropriate volume of the original sample from the syringe into the flask. Dilute the sample to the mark with organic-free reagent water. Cap the flask, invert, three times. Repeat above procedure for additional dilutions.

4 Fill a 40-mL vial with the diluted sample, making sure there is no headspace when the cap is applied.

MS/MSD/LCS: Add 100 uL of the matrix spike solution to a 50-mL aliquot of the sample chosen for spiking in a 50-mL volumetric flask. Disregarding any dilutions, this is equivalent to a concentration of 50 ug/L of each matrix spike standard.

Follow the same procedure in preparing the laboratory control sample (LCS), except the spike is added to a clean matrix. (e.g. Laboratory DI water.)

Non-Aqueous Samples Low Concentration Procedure. There are 3 types of sample preservatives all using 40-mL vials; 1.) a frozen sample, 2.) a refrigerated sample in sodium bisulfate and, 3.) an untreated refrigerated sample that has been collected in the last 48 hours. Remove the 40-mL vial containing the sample from the freezer or refrigerator. Weigh the sample and vial, subtract the tare weight and record the sample weight directly on the vial. This vial is then placed directly on the Varian Archon autosampler tray. The autosampler is then instructed to add reagent water to the vial so that the final volume of water in the vial is 10 mLs. The internal standard and surrogate solution is added along with the reagent water. The Archon will then purge the soil sample within the 40 mL vial, while heating the sample to 40 deg C

conditions of this method. The characteristic ions from the reference mass spectrum are defined to be the three ions of greatest relative intensity, or any ions over 30% relative intensity if less than three such ions occur in the reference spectrum. Compounds are identified as present when the following criteria are met.

The Enviroquant software method should be set-up to meet the specifications outlined in method 8260B, section 7.6.1.

For samples containing components not associated with the calibration standards, a library search may be made for the purpose of tentative identification. The necessity to perform this type of identification will be determined by the purpose of the analyses being conducted.

4.6 Quantitative analysis

Sample calculations for volatile analyses are made according to the following procedure:

The target compound concentrations are calculated by the internal standard method. The relative response factor (RRF) from the multi-point calibration is used to calculate the concentration in the sample.

$$\text{Sample Concentration} = \frac{(\text{Area of Compound})\ (\text{Amt IS})\ (\text{Final Volume})}{(\text{Area IS})\ (\text{RRF})\ (\text{Initial Volume or Weight})}$$

The automatic Hewlett Packard quantitation algorithm will report the calculation above for water samples on the report summary page. The soil sample concentration must be calculated manually using the following equation:

$$\text{Sample Concentration} = \frac{(\text{Reported Concentration})\ (5)}{(\text{Weight of sample purged})\ (\%\ \text{Total Solids})}$$

(Note: The multiplier "5" in the numerator is to convert the concentration, which is calculated as micrograms per Liter, to total nanograms.)

High Concentration (Medium Level) Soil Calculation:

Sample calculations for volatile soil analyses are made according to the following procedure:

The target compound concentrations are calculated by the internal standard method. The relative response factor (RRF) from the multi-point calibration is used to calculate the concentration in the sample.

5. Quality Control

Quality Control Indicator (QCI)	Frequency	Control Limit (Interim)	Control Limit (Statistical)
System Tuning (BFB)	The start of every 12-hour sequence	Table 6 above	NA
Calibration Curve	Referenced - performed at least annually	ccc compounds must be <30% RSD SPCCs >RRF	NA
Initial Calibration Verification	Immediately following the curve	± 10% or within stated limits	As supplied by manufacturer
Method Blank	Every 12 hour sequence following the CCVS	Less than the reporting limit	NA
Continuing Calibration Standard (CCVS) – 50 ug/L	*Every 12-hour* sequence	*ccc compounds must* be <20%	NA
Laboratory Control Standard (LCS) – 50 ug/L	Per batch, where a batch is defined as daily or every 20 samples - whichever is less	± 20%	3 standard deviations for the control limit and 2 standard deviations for the warning limit*
Matrix Spike / Matrix Spike Duplicate (MS/MSD) – 50 ug/L	Per batch, where a batch is defined as daily or every 20 samples - whichever is less	± 25%	3 standard deviations for the control limit and 2 standard deviation for the warning limit
Surrogate Recoveries	Every Sample	Per method	3 standard deviations for the control limit and 2 standard deviation for the warning limit
Internal Standard Areas	Every Sample	Areas must be +/- 50% of CCVS	NA
* A control chart is required for both the MS/MSD or the LCS			

The experience of the analyst performing GC/MS analyses is invaluable to the success of the methods. Each day that analysis is performed, the calibration verification standard should be evaluated to determine if the chromatographic system is operating properly. Questions that should be asked are: Do the peaks look normal? Is the response obtained comparable to the response from previous calibrations? Careful examination of the standard chromatogram can indicate whether the column is still performing acceptably, the injector is leaking, the injector septum needs replacing, etc. If any changes are made to the system (e.g., the column changed), recalibration of the system must take place.

12. Approvals

Reviewed for Technical Accuracy by: _____

Reviewed for Quality Assurance Compliance by: _____

Implementation Date: 08/22/02

End Use Date: _____

Method Detection Limit (MDL) Study Final Report

Laboratory:	First Environmental Laboratories, Inc.
Method / Revision (all):	SW-846 Method 8260B and EPA 600/482-057 Method 624
Analyte or Analyte Group:	Volatile Soils
Preparation Analyst:	Not Applicable
Instrument Analyst:	John Bychowski
Date of Analysis:	04/11/02
Instrument ID:	GC/MS "A" with Archon Autosampler
Instrument Conditions:	Standard
Est. Detection Limit:	5.0 ug/L

Calib. Standards Source:	Supelco #5377, #5378	Date Prepared:	02/22/02	01/21/99
Spiking Solution Source:	Supelco #5418, #5419	Date Prepared:	03/13/02	01/12/99
Spiking Concentration:	5.0 ug/kg	Units: ug/kg		

A minimum of seven replicates was used to perform the MDL study? _X_ yes __no

Were all replicates values used in determining the MDL? _X_ yes __no

If no, submit documentation verifying that the laboratory exclued values which it determined are outliers by using a statistical outlier test.

Has the laboratory established criteria for accepting replicate percent recovery? _X_ yes __no

If yes, the acceptance criteria can be found in MDL SOP page 6. (± 50% or per method)

If yes, this MDL study has met the laboratory's criteria for acceptable replicate percent recovery? __ yes *_X_no

The calculated MDL is greater than "0"? _X_ yes __no

The calculated MDL is greater than 1/10 the MDL spiking concentration? _X_ yes __no

The MDL spiking concentration is greater than the calculated MDL? _X_ yes __no

For drinking water laboratory accreditation, the laboratory has achieved a MDL equal to or less than those specified in Section 186 Appendix A? 186.160(c) __ yes __no

Only MDL studies meeting the requirements set forth in Section 186.160 will be deemed acceptable.

Comments: *MDL STUDY REPEATED AT 2.0 ug/kg SPIKE LEVEL FOR CPDS WHOSE SPK LEVEL > 10x MDL VALUE. (16 CPDS)

Approved by:

Method Detection Limit (MDL) Study Final Report

Compound ID:	#1 a65171.d	#2 a65172.d	#3 a65173.d	#4 a65174.d	#5 a65175.d	#6 a65176.d	#7 a65177.d	#8 a65178.d	#9
Dichlorodifluoromethane	3.32	3.93	4.05	4.40	2.95	3.25	3.69	3.79	
Chloromethane	4.25	4.43	4.74	4.98	3.91	3.96	4.31	4.50	
Vinyl Chloride	3.90	4.35	4.80	5.03	3.54	3.74	4.15	4.33	
Bromomethane	6.77	7.02	7.34	7.64	6.72	6.58	7.04	7.02	
Chloroethane	4.79	5.04	5.54	5.69	4.54	4.90	5.31	5.31	
Trichlorofluoromethane	4.23	4.93	5.13	5.53	3.80	4.18	4.60	4.99	
Ethyl ether	4.81	5.17	5.03	5.26	5.39	5.03	5.66	5.80	
Acrolein	37.65	35.17	38.74	39.38	32.86	43.94	38.36	33.52	
Acetone	8.00	8.62	8.80	8.52	8.07	8.30	8.69	9.99	
1,1-Dichloroethene	4.36	4.91	5.20	5.87	4.26	4.37	5.02	5.44	
Iodomethane	4.12	4.46	4.42	4.71	3.94	4.25	4.41	4.52	
Allyl chloride	4.82	5.11	5.44	5.55	4.82	5.00	5.49	5.66	
Methylene chloride	6.18	6.45	5.90	6.50	5.63	5.68	5.89	6.74	
Acrylonitrile	24.56	28.26	26.92	26.24	26.86	26.19	28.07	28.56	
Carbon disulfide	4.82	5.47	5.74	6.15	4.55	4.89	5.30	5.55	
trans-1,2-Dichloroethene	4.35	4.95	4.94	5.24	4.06	4.36	4.91	4.94	
cis-1,2-Dichloroethene	4.44	4.73	4.81	4.92	4.42	4.46	4.79	4.83	
Methyl-t-butyl ether (MTBE)	5.04	5.52	5.47	5.42	5.47	5.51	5.79	5.96	
n-Hexane	4.66	5.27	5.61	6.07	4.14	4.41	5.09	5.42	
Vinyl Acetate	4.78	5.36	5.16	5.39	5.35	5.48	5.56	5.68	
1,1-Dichloroethane	4.48	4.97	5.20	5.46	4.71	4.97	5.29	5.37	
2,2-Dichloropropane	4.03	4.50	4.67	4.81	3.78	3.90	4.37	4.37	
2-Butanone (MEK)	4.47	4.06	3.59	3.74	3.73	3.61	4.51	3.61	
Propionitrile	4.77	4.24	4.71	4.72	4.72	4.14	4.64	4.95	
Methyl acrylate	4.61	5.38	4.90	4.97	4.87	5.04	5.11	5.21	
Bromochloromethane	4.55	4.59	4.65	4.78	4.38	4.48	4.50	4.66	
Methacrylonitrile	5.92	6.80	6.13	6.51	6.25	6.24	6.97	7.14	
Tetrahydrofuran (THF)	7.82	8.68	8.07	8.02	8.86	8.17	8.72	9.74	
Chloroform	7.13	7.59	7.74	8.03	7.54	7.58	8.08	8.07	
Dibromofluoromethane	52.85	54.54	54.07	54.66	55.84	55.55	56.08	57.43	
1,1,1-Trichloroethane	4.14	4.76	4.78	5.15	3.98	4.15	4.54	4.74	
Butyl chloride (1-chlorobutane)	5.11	5.62	5.77	6.30	5.04	5.20	5.72	5.86	
Carbon tetrachloride	4.10	4.44	4.64	5.07	3.71	3.67	4.16	4.23	
1,1-Dichloropropene	4.53	5.03	5.12	5.70	4.24	4.35	4.95	4.92	
1,2-Dichloroethane	4.81	5.14	5.15	5.49	5.19	5.23	5.59	5.74	

Method Detection Limit (MDL) Study Final Report

Note: CL = confidence limit
Check T value @ 99% Confidence Level for No. of replicates in study.

Compound ID:	Mean Conc	Mean % rec	Spk Amt	Std Dev	T Value	MDL	Units	Upper CL	Lower CL	RSD %
Dichlorodifluoromethane	3.67	73.5	5	0.47	3.00	1.42	ug/L	2.73	0.98	9.49
Chloromethane	4.39	87.7	5	0.36	3.00	1.09	ug/L	2.09	0.75	7.27
Vinyl Chloride	4.23	84.6	5	0.51	3.00	1.53	ug/L	2.94	1.06	10.20
Bromomethane	7.02	140.3	5	0.35	3.00	1.03	ug/L	1.99	0.71	6.90
Chloroethane	5.14	102.8	5	0.39	3.00	1.17	ug/L	2.25	0.81	7.82
Trichlorofluoromethane	4.67	93.5	5	0.58	3.00	1.72	ug/L	3.31	1.19	11.51
Ethyl ether	5.27	105.4	5	0.33	3.00	1.00	ug/L	1.93	0.69	6.69
Acrolein	37.45	149.8	25	3.59	3.00	10.76	ug/L	20.65	7.42	14.35
Acetone	8.62	172.5	5	0.62	3.00	1.87	ug/L	3.58	1.29	12.45
1,1-Dichloroethene	4.93	98.6	5	0.57	3.00	1.72	ug/L	3.31	1.19	11.50
Iodomethane	4.35	87.1	5	0.24	3.00	0.73	ug/L	1.39	0.50	4.84
Allyl chloride	5.24	104.7	5	0.34	3.00	1.01	ug/L	1.95	0.70	6.77
Methylene chloride	6.12	122.4	5	0.41	3.00	1.23	ug/L	2.36	0.85	8.20
Acrylonitrile	26.96	107.8	25	1.33	3.00	3.98	ug/L	7.65	2.75	5.32
Carbon disulfide	5.31	106.2	5	0.53	3.00	1.59	ug/L	3.05	1.10	10.60
trans-1,2-Dichloroethene	4.72	94.4	5	0.41	3.00	1.22	ug/L	2.34	0.84	8.14
cis-1,2-Dichloroethene	4.68	93.5	5	0.20	3.00	0.60	ug/L	1.16	0.42	4.04
Methyl-t-butyl ether (MTBE)	5.52	110.5	5	0.27	3.00	0.81	ug/L	1.56	0.56	5.41
n-Hexane	5.08	101.7	5	0.65	3.00	1.94	ug/L	3.72	1.34	12.92
Vinyl Acetate	5.35	106.9	5	0.28	3.00	0.83	ug/L	1.59	0.57	5.52
1,1-Dichloroethane	5.06	101.1	5	0.34	3.00	1.02	ug/L	1.95	0.70	6.78
2,2-Dichloropropane	4.30	86.1	5	0.37	3.00	1.10	ug/L	2.12	0.76	7.37
2-Butanone (MEK)	3.92	78.3	5	0.39	3.00	1.16	ug/L	2.22	0.80	7.71
Propionitrile	4.61	92.2	5	0.28	3.00	0.83	ug/L	1.59	0.57	5.52
Methyl acrylate	5.01	100.2	5	0.23	3.00	0.70	ug/L	1.34	0.48	4.67
Bromochloromethane	4.57	91.5	5	0.12	3.00	0.37	ug/L	0.72	0.26	2.49
Methacrylonitrile	6.50	129.9	5	0.43	3.00	1.30	ug/L	2.50	0.90	8.70
Tetrahydrofuran (THF)	8.51	170.2	5	0.62	3.00	1.87	ug/L	3.60	1.29	12.50
Chloroform	7.72	154.4	5	0.33	3.00	0.99	ug/L	1.90	0.68	6.61
Dibromofluoromethane	55.13	110.3	50	1.40	3.00	4.20	ug/L	8.07	2.90	2.80
1,1,1-Trichloroethane	4.53	90.6	5	0.40	3.00	1.21	ug/L	2.33	0.84	8.08
Butyl chloride (1-chlorobutane)	5.58	111.6	5	0.43	3.00	1.30	ug/L	2.49	0.90	8.66
Carbon tetrachloride	4.25	85.1	5	0.47	3.00	1.40	ug/L	2.68	0.96	9.32
1,1-Dichloropropene	4.86	97.1	5	0.47	3.00	1.42	ug/L	2.72	0.98	9.46
1,2-Dichloroethane	5.29	105.9	5	0.30	3.00	0.89	ug/L	1.71	0.61	5.95

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Compound ID:	%R is <50 - 150	Spk/MDL	Spk Conc <10 times MDL	MDL Spk Conc is >MDL
Dichlorodifluoromethane	Y	3.5	Y	Y
Chloromethane	Y	4.6	Y	Y
Vinyl Chloride	Y	3.3	Y	Y
Bromomethane	Y	4.8	Y	Y
Chloroethane	Y	4.3	Y	Y
Trichlorofluoromethane	Y	2.9	Y	Y
Ethyl ether	Y	5.0	Y	Y
Acrolein	Y	2.3	Y	Y
Acetone	N	2.7	Y	Y
1,1-Dichloroethene	Y	2.9	Y	Y
Iodomethane	Y	6.9	Y	Y
Allyl chloride	Y	4.9	Y	Y
Methylene chloride	Y	4.1	Y	Y
Acrylonitrile	Y	6.3	Y	Y
Carbon disulfide	Y	3.1	Y	Y
trans-1,2-Dichloroethene	Y	4.1	Y	Y
cis-1,2-Dichloroethene	Y	8.3	Y	Y
Methyl-t-butyl ether (MTBE)	Y	6.2	Y	Y
n-Hexane	Y	2.6	Y	Y
Vinyl Acetate	Y	6.0	Y	Y
1,1-Dichloroethane	Y	4.9	Y	Y
2,2-Dichloropropane	Y	4.5	Y	Y
2-Butanone (MEK)	Y	4.3	Y	Y
Propionitrile	Y	6.0	Y	Y
Methyl acrylate	Y	7.1	Y	Y
Bromochloromethane	Y	13.4	N	Y
Methacrylonitrile	Y	3.8	Y	Y
Tetrahydrofuran (THF)	N	2.7	Y	Y
Chloroform	N	5.0	Y	Y
Dibromofluoromethane	Y	11.9	N	Y
1,1,1-Trichloroethane	Y	4.1	Y	Y
Butyl chloride (1-chlorobutane)	Y	3.9	Y	Y
Carbon tetrachloride	Y	3.6	Y	Y
1,1-Dichloropropene	Y	3.5	Y	Y
1,2-Dichloroethane	Y	5.6	Y	Y

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	#1	#2	#3	#4	#5	#6	#7	#8	#9
Compound ID:	a65171.d	a65172.d	a65173.d	a65174.d	a65175.d	a65176.d	a65177.d	a65178.d	
Benzene	4.48	4.84	4.98	5.27	4.44	4.68	4.73	4.88	
n-Heptane	4.21	4.82	5.09	5.77	3.62	4.07	4.52	4.83	
Trichloroethene	4.10	4.50	4.55	4.94	3.83	4.14	4.36	4.35	
Methyl methacrylate	4.15	4.46	4.39	4.43	4.04	4.14	4.41	4.49	
1,2-Dichloropropane	4.50	4.92	5.01	5.36	4.76	5.11	5.11	5.20	
Bromodichloromethane	4.61	4.83	4.95	5.24	4.76	4.88	5.04	5.19	
Dibromomethane	4.73	4.90	4.86	5.01	4.62	4.75	5.00	5.13	
2-Nitropropane	3.44	3.69	3.36	3.76	3.44	3.35	3.84	4.07	
2-Chloroethyl vinyl ether	3.94	3.99	3.99	3.90	3.90	4.06	3.87	4.29	
cis-1,3-Dichloropropene	4.39	4.54	4.81	4.83	4.40	4.58	4.66	4.79	
4-Methyl-2-pentanone	4.01	4.63	4.63	4.69	4.67	4.46	4.69	4.85	
Toluene	4.24	4.51	4.68	4.82	4.06	4.17	4.33	4.57	
trans-1,3-Dichloropropene	4.28	4.46	4.52	4.61	4.41	4.45	4.46	4.50	
1,1,2-Trichloroethane	4.82	4.95	4.87	5.13	4.75	4.84	5.14	5.14	
d8-Toluene	50.41	50.91	50.65	52.19	51.71	52.37	52.23	53.18	
1,2-Dibromoethane	4.35	4.55	4.34	4.35	4.48	4.40	4.48	4.47	
1,4-Dichloro-2-butene	4.04	4.59	4.49	4.71	4.16	4.49	4.31	4.78	
Ethyl methacrylate	4.10	4.27	4.26	4.29	4.19	4.12	4.15	4.35	
2-Hexanone	4.32	4.56	4.43	4.46	4.37	4.22	4.36	4.55	
Tetrachloroethene	3.98	4.08	4.17	4.52	3.37	3.53	3.71	4.41	
1,3-Dichloropropane	4.76	5.01	4.98	5.26	4.87	5.07	5.09	5.25	
Chlorodibromomethane	4.45	4.36	4.39	4.47	4.07	4.27	4.33	4.46	
1,2-Dibromoethane (EDB)	4.49	4.57	4.37	4.40	4.47	4.44	4.48	4.48	
Chlorobenzene	4.44	4.46	4.61	4.86	4.10	4.21	4.30	4.34	
Ethyl benzene	4.31	4.48	4.65	5.02	4.03	4.27	4.40	4.56	
m&p-Xylene	8.63	8.52	8.78	9.38	7.60	7.89	8.15	8.41	
o-Xylene	4.32	4.33	4.40	4.68	3.79	4.15	4.12	4.15	
Styrene	4.32	4.32	4.44	4.58	4.06	4.10	4.20	4.40	
Bromoform	4.13	4.13	3.94	4.19	4.04	3.94	4.07	4.14	
Isopropylbenzene (cumene)	4.05	4.25	4.34	4.75	3.67	3.89	3.98	4.08	
4-Bromofluorobenzene	52.36	52.18	53.02	53.84	53.49	54.48	54.31	55.32	
1,1,1,2-Tetrachloroethane	4.23	4.14	4.43	4.54	3.90	4.10	4.24	4.20	
1,1,2,2-Tetrachloroethane	4.81	4.77	4.86	5.13	4.85	5.01	5.08	5.14	
1,2,3-Trichloropropane	4.70	4.58	4.62	4.38	4.85	4.62	4.73	4.78	
n-Propylbenzene	4.26	4.42	4.51	5.04	3.92	4.05	4.25	4.40	
o-Chlorotoluene	4.46	4.56	4.62	4.97	4.14	4.50	4.72	4.86	
p-Chlorotoluene	4.60	4.87	4.90	5.24	4.33	4.59	4.78	4.72	
1,2,4-Trimethylbenzene	4.23	4.34	4.43	4.69	3.81	4.05	4.24	4.26	
Bromobenzene	4.38	4.21	4.26	4.39	4.00	3.92	4.06	4.10	
tert-Butylbenzene	4.00	4.14	4.27	4.55	3.57	3.78	3.90	3.90	

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Compound ID:	Mean Conc	Mean % rec	Spk Amt	Std Dev	T Value	MDL	Units	Upper CL	Lower CL	RSD %
Benzene	4.79	95.8	5	0.27	3.00	0.81	ug/L	1.56	0.56	5.41
n-Heptane	4.62	92.3	5	0.67	3.00	2.00	ug/L	3.84	1.38	13.33
Trichloroethene	4.35	86.9	5	0.34	3.00	1.01	ug/L	1.93	0.69	6.71
Methyl methacrylate	4.31	86.3	5	0.17	3.00	0.52	ug/L	1.00	0.36	3.49
1,2-Dichloropropane	5.00	99.9	5	0.27	3.00	0.81	ug/L	1.55	0.56	5.39
Bromodichloromethane	4.94	98.8	5	0.21	3.00	0.64	ug/L	1.23	0.44	4.27
Dibromomethane	4.88	97.5	5	0.17	3.00	0.51	ug/L	0.98	0.35	3.39
2-Nitropropane	3.62	72.4	5	0.26	3.00	0.79	ug/L	1.51	0.54	5.24
2-Chloroethyl vinyl ether	3.99	79.9	5	0.14	3.00	0.41	ug/L	0.78	0.28	2.70
cis-1,3-Dichloropropene	4.63	92.5	5	0.18	3.00	0.53	ug/L	1.02	0.37	3.54
4-Methyl-2-pentanone	4.58	91.6	5	0.25	3.00	0.76	ug/L	1.46	0.52	5.07
Toluene	4.42	88.5	5	0.26	3.00	0.79	ug/L	1.52	0.55	5.30
trans-1,3-Dichloropropene	4.46	89.2	5	0.09	3.00	0.28	ug/L	0.54	0.20	1.89
1,1,2-Trichloroethane	4.96	99.1	5	0.16	3.00	0.48	ug/L	0.92	0.33	3.21
d8-Toluene	51.71	103.4	50	0.97	3.00	2.90	ug/L	5.57	2.00	1.93
1,2-Dibromoethane	4.43	88.6	5	0.08	3.00	0.23	ug/L	0.45	0.16	1.56
1,4-Dichloro-2-butene	4.45	88.9	5	0.26	3.00	0.78	ug/L	1.49	0.54	5.19
Ethyl methacrylate	4.22	84.3	5	0.09	3.00	0.27	ug/L	0.51	0.19	1.79
2-Hexanone	4.41	88.2	5	0.12	3.00	0.35	ug/L	0.66	0.24	2.31
Tetrachloroethene	3.97	79.4	5	0.41	3.00	1.23	ug/L	2.35	0.85	8.17
1,3-Dichloropropane	5.04	100.7	5	0.17	3.00	0.52	ug/L	0.99	0.36	3.44
Chlorodibromomethane	4.35	87.0	5	0.13	3.00	0.40	ug/L	0.76	0.27	2.66
1,2-Dibromoethane (EDB)	4.46	89.3	5	0.06	3.00	0.18	ug/L	0.35	0.13	1.22
Chlorobenzene	4.42	88.3	5	0.24	3.00	0.72	ug/L	1.37	0.49	4.77
Ethyl benzene	4.47	89.3	5	0.29	3.00	0.88	ug/L	1.70	0.61	5.89
m&p-Xylene	8.42	84.2	10	0.55	3.00	1.65	ug/L	3.18	1.14	5.52
o-Xylene	4.24	84.9	5	0.26	3.00	0.77	ug/L	1.49	0.53	5.16
Styrene	4.30	86.1	5	0.18	3.00	0.53	ug/L	1.01	0.36	3.52
Bromoform	4.07	81.5	5	0.09	3.00	0.28	ug/L	0.54	0.19	1.87
Isopropylbenzene (cumene)	4.13	82.5	5	0.33	3.00	0.98	ug/L	1.88	0.67	6.52
4-Bromofluorobenzene	53.63	107.3	50	1.08	3.00	3.24	ug/L	6.23	2.24	2.16
1,1,1,2-Tetrachloroethane	4.22	84.5	5	0.20	3.00	0.59	ug/L	1.13	0.41	3.93
1,1,2,2-Tetrachloroethane	4.96	99.1	5	0.15	3.00	0.45	ug/L	0.87	0.31	3.01
1,2,3-Trichloropropane	4.66	93.2	5	0.14	3.00	0.43	ug/L	0.83	0.30	2.88
n-Propylbenzene	4.36	87.1	5	0.34	3.00	1.01	ug/L	1.95	0.70	6.77
o-Chlorotoluene	4.60	92.1	5	0.26	3.00	0.77	ug/L	1.48	0.53	5.14
p-Chlorotoluene	4.75	95.1	5	0.27	3.00	0.80	ug/L	1.54	0.55	5.36
1,2,4-Trimethylbenzene	4.26	85.1	5	0.26	3.00	0.78	ug/L	1.49	0.53	5.17
Bromobenzene	4.17	83.3	5	0.17	3.00	0.52	ug/L	1.00	0.36	3.47
tert-Butylbenzene	4.01	80.3	5	0.30	3.00	0.91	ug/L	1.75	0.63	6.08

Method Detection Limit (MDL) Study Final Report

Compound ID:	%R is <50 - 150	Spk/MDL	Spk Conc <10 times	MDL Spk Conc
Benzene	Y	6.2	Y	Y
n-Heptane	Y	2.5	Y	Y
Trichloroethene	Y	5.0	Y	Y
Methyl methacrylate	Y	9.6	Y	Y
1,2-Dichloropropane	Y	6.2	Y	Y
Bromodichloromethane	Y	7.8	Y	Y
Dibromomethane	Y	9.8	Y	Y
2-Nitropropane	Y	6.4	Y	Y
2-Chloroethyl vinyl ether	Y	12.3	N	Y
cis-1,3-Dichloropropene	Y	9.4	Y	Y
4-Methyl-2-pentanone	Y	6.6	Y	Y
Toluene	Y	6.3	Y	Y
trans-1,3-Dichloropropene	Y	17.6	N	Y
1,1,2-Trichloroethane	Y	10.4	N	Y
d8-Toluene	Y	17.2	N	Y
1,2-Dibromoethane	Y	21.3	N	Y
1,4-Dichloro-2-butene	Y	6.4	Y	Y
Ethyl methacrylate	Y	18.6	N	Y
2-Hexanone	Y	14.4	N	Y
Tetrachloroethene	Y	4.1	Y	Y
1,3-Dichloropropane	Y	9.7	Y	Y
Chlorodibromomethane	Y	12.6	N	Y
1,2-Dibromoethane (EDB)	Y	27.4	N	Y
Chlorobenzene	Y	7.0	Y	Y
Ethyl benzene	Y	5.7	Y	Y
m&p-Xylene	Y	6.0	Y	Y
o-Xylene	Y	6.5	Y	Y
Styrene	Y	9.5	Y	Y
Bromoform	Y	17.8	N	Y
Isopropylbenzene (cumene)	Y	5.1	Y	Y
4-Bromofluorobenzene	Y	15.4	N	Y
1,1,1,2-Tetrachloroethane	Y	8.5	Y	Y
1,1,2,2-Tetrachloroethane	Y	11.1	N	Y
1,2,3-Trichloropropane	Y	11.6	N	Y
n-Propylbenzene	Y	4.9	Y	Y
o-Chlorotoluene	Y	6.5	Y	Y
p-Chlorotoluene	Y	6.2	Y	Y
1,2,4-Trimethylbenzene	Y	6.5	Y	Y
Bromobenzene	Y	9.6	Y	Y
tert-Butylbenzene	Y	5.5	Y	Y

Method Detection Limit (MDL) Study Final Report

	#1	#2	#3	#4	#5	#6	#7	#8	#9
Compound ID:	a65171.d	a65172.d	a65173.d	a65174.d	a65175.d	a65176.d	a65177.d	a65178.d	
Pentachloroethane	3.90	3.85	3.97	4.05	3.59	3.70	3.74	2.94	
1,3,5-Trimethylbenzene	4.31	4.43	4.46	4.83	4.00	4.12	4.33	4.45	
sec-Butylbenzene	4.14	4.27	4.45	4.81	3.58	3.77	4.04	4.17	
1,3-Dichlorobenzene	4.41	4.41	4.30	4.68	3.95	4.08	4.16	4.16	
p-Isopropyltoluene (cymene)	4.13	4.33	4.35	4.72	3.62	3.83	3.89	4.12	
1,4-Dichlorobenzene	4.40	4.40	4.42	4.73	4.07	4.27	4.20	4.21	
1,2-Dichlorobenzene	4.34	4.38	4.36	4.63	4.11	4.15	4.25	4.25	
n-Butylbenzene	4.32	4.47	4.64	5.25	3.80	4.07	4.39	4.38	
Hexachloroethane	2.77	2.76	2.71	2.94	2.28	2.44	2.56	2.56	
1,2-Dibromo-3-chloropropane	4.56	4.77	4.44	4.82	4.45	4.31	4.86	5.35	
1,2,3-Trichlorobenzene	4.11	4.13	4.04	4.12	3.72	3.59	3.74	3.73	
Hexachlorobutadiene	3.88	3.83	4.03	4.32	3.39	3.46	3.63	3.79	
1,2,4-Trichlorobenzene	4.17	4.12	4.02	4.35	3.83	4.00	3.87	3.83	
Naphthalene	4.89	5.06	4.71	4.94	4.58	4.59	4.63	4.75	

Method Detection Limit (MDL) Study Final Report

Compound ID:	Mean Conc	Mean % rec	Spk Amt	Std Dev	T Value	MDL	Units	Upper CL	Lower CL	RSD %
Pentachloroethane	3.72	74.4	5	0.35	3.00	1.04	ug/L	2.00	0.72	6.96
1,3,5-Trimethylbenzene	4.37	87.3	5	0.25	3.00	0.75	ug/L	1.43	0.52	4.98
sec-Butylbenzene	4.15	83.1	5	0.38	3.00	1.15	ug/L	2.20	0.79	7.64
1,3-Dichlorobenzene	4.27	85.4	5	0.23	3.00	0.69	ug/L	1.32	0.48	4.60
p-Isopropyltoluene (cymene)	4.12	82.5	5	0.35	3.00	1.04	ug/L	2.00	0.72	6.94
1,4-Dichlorobenzene	4.34	86.8	5	0.20	3.00	0.60	ug/L	1.15	0.41	4.00
1,2-Dichlorobenzene	4.31	86.2	5	0.16	3.00	0.49	ug/L	0.93	0.33	3.24
n-Butylbenzene	4.42	88.3	5	0.42	3.00	1.27	ug/L	2.44	0.88	8.48
Hexachloroethane	2.63	52.6	5	0.21	3.00	0.63	ug/L	1.21	0.43	4.19
1,2-Dibromo-3-chloropropane	4.70	93.9	5	0.33	3.00	0.99	ug/L	1.91	0.69	6.63
1,2,3-Trichlorobenzene	3.90	78.0	5	0.22	3.00	0.67	ug/L	1.28	0.46	4.46
Hexachlorobutadiene	3.79	75.8	5	0.30	3.00	0.91	ug/L	1.74	0.63	6.06
1,2,4-Trichlorobenzene	4.02	80.5	5	0.18	3.00	0.55	ug/L	1.06	0.38	3.68
Naphthalene	4.77	95.4	5	0.18	3.00	0.53	ug/L	1.02	0.37	3.54

Method Detection Limit (MDL) Study Final Report

Compound ID:	%R is <50 - 150	Spk/MDL	Spk Conc <10 times	MDL Spk Conc
Pentachloroethane	Y	4.8	Y	Y
1,3,5-Trimethylbenzene	Y	6.7	Y	Y
sec-Butylbenzene	Y	4.4	Y	Y
1,3-Dichlorobenzene	Y	7.2	Y	Y
p-Isopropyltoluene (cymene)	Y	4.8	Y	Y
1,4-Dichlorobenzene	Y	8.3	Y	Y
1,2-Dichlorobenzene	Y	10.3	N	Y
n-Butylbenzene	Y	3.9	Y	Y
Hexachloroethane	Y	8.0	Y	Y
1,2-Dibromo-3-chloropropane	Y	5.0	Y	Y
1,2,3-Trichlorobenzene	Y	7.5	Y	Y
Hexachlorobutadiene	Y	5.5	Y	Y
1,2,4-Trichlorobenzene	Y	9.1	Y	Y
Naphthalene	Y	9.4	Y	Y
Outliers:	3		16	0

Method Detection Limit (MDL) Study Final Report

Laboratory:	First Environmental Laboratories, Inc.
Method / Revision (all):	SW-846 Method 8260B and EPA 600/482-057 Method 624
Analyte or Analyte Group:	Volatile Soils
Preparation Analyst:	Not Applicable
Instrument Analyst:	John Bychowski
Date of Analysis:	04/11/02
Instrument ID:	GC/MS "A" with Archon Autosampler
Instrument Conditions:	Standard
Est. Detection Limit:	5.0 ug/L

Calib. Standards Source:	Supelco #5377, #5378	Date Prepared:	02/22/02	01/21/99
Spiking Solution Source:	Supelco #5418, #5419	Date Prepared:	03/13/02	01/12/99
Spiking Concentration:	2.0 ug/kg	Units: ug/kg		

A minimum of seven replicates was used to perform the MDL study? _X_ yes __no

Were all replicates values used in determining the MDL? _X_ yes __no

If no, submit documentation verifying that the laboratory exclued values which it determined are outliers by using a statistical outlier test.

Has the laboratory established criteria for accepting replicate percent recovery? _X_ yes __no

If yes, the acceptance criteria can be found in MDL SOP page 6. (± 50% or per method)

If yes, this MDL study has met the laboratory's criteria for acceptable replicate percent recovery? __ yes _X_no

The calculated MDL is greater than "0"? _X_ yes __no

The calculated MDL is greater than 1/10 the MDL spiking concentration? _X_ yes __no

The MDL spiking concentration is greater than the calculated MDL? _X_ yes __no

For drinking water laboratory accreditation, the laboratory has achieved a MDL equal to or less than those specified in Section 186 Appendix A? 186.160(c) __ yes __no

Only MDL studies meeting the requirements set forth in Section 186.160 will be deemed acceptable.

Comments: MDL ALSO PERFORMED AT 5.0 ug/kg.

Approved by: ML

Method Detection Limit (MDL) Study Final Report

Compound ID:	#1 a65179.d	#2 a65180.d	#3 a65181.d	#4 a65182.d	#5 a65183.d	#6 a65184.d	#7 a65189.d	#8 a65190.d	#9
Dichlorodifluoromethane	0.96	0.92	1.07	1.16	1.23	1.21	1.30	1.42	
Chloromethane	1.74	1.74	1.81	1.98	1.96	2.03	2.03	2.23	
Vinyl Chloride	1.44	1.57	1.56	1.72	1.70	1.86	1.79	2.06	
Bromomethane	3.07	2.95	3.18	3.35	3.36	3.25	3.48	3.94	
Chloroethane	2.08	2.04	2.17	2.29	2.41	2.42	2.31	2.62	
Trichlorofluoromethane	1.43	1.50	1.63	1.72	1.85	1.87	1.98	2.01	
Ethyl ether	2.33	2.30	2.39	2.40	2.54	2.31	2.53	2.45	
Acrolein	4.81	0.00	9.64	14.33	7.98	4.05	4.46	9.51	
Acetone	6.36	6.14	6.03	5.96	5.90	5.59	7.26	7.43	
1,1-Dichloroethene	1.62	1.60	1.77	1.84	1.91	1.86	1.91	2.05	
Iodomethane	1.64	1.69	1.82	1.87	1.97	1.87	2.00	2.10	
Allyl chloride	2.26	2.21	2.41	2.42	2.43	2.49	2.41	2.60	
Methylene chloride	3.50	3.66	4.04	4.10	4.02	4.15	4.27	4.54	
Acrylonitrile	12.95	11.71	12.87	13.29	13.73	12.55	14.01	13.64	
Carbon disulfide	1.71	1.71	1.86	1.91	1.96	1.99	2.06	2.18	
trans-1,2-Dichloroethene	1.86	1.76	1.95	2.02	2.01	2.01	2.15	2.23	
cis-1,2-Dichloroethene	1.79	1.92	2.11	1.99	1.92	2.01	2.10	2.18	
Methyl-t-butyl ether (MTBE)	2.65	2.52	2.74	2.71	2.70	2.66	2.76	2.79	
n-Hexane	0.75	0.89	1.01	0.91	0.56	1.03	1.07	1.09	
Vinyl Acetate	2.62	2.52	2.69	2.74	2.65	2.63	2.88	2.59	
1,1-Dichloroethane	2.16	2.19	2.22	2.32	2.42	2.46	2.56	2.69	
2,2-Dichloropropane	1.57	1.47	1.62	1.64	1.69	1.66	1.70	1.84	
2-Butanone (MEK)	1.20	0.00	1.10	0.75	0.63	0.55	0.00	0.74	
Propionitrile	1.62	0.00	1.14	2.27	0.63	0.48	1.66	1.10	
Methyl acrylate	2.32	2.24	2.51	2.33	2.37	2.16	2.60	2.64	
Bromochloromethane	1.95	1.91	1.99	1.83	1.93	1.97	1.91	2.00	
Methacrylonitrile	2.98	2.83	2.98	3.04	2.95	2.96	3.34	3.19	
Tetrahydrofuran (THF)	3.28	3.68	3.59	3.58	3.59	2.80	3.80	3.41	
Chloroform	5.38	5.37	5.66	5.73	5.59	5.61	5.65	5.65	
Dibromofluoromethane	57.43	57.46	58.87	58.66	58.94	57.70	58.95	59.11	
1,1,1-Trichloroethane	1.59	1.63	1.71	1.80	1.81	1.88	1.79	1.99	
Butyl chloride (1-chlorobutane	2.63	2.68	2.86	2.85	2.99	3.01	2.94	3.15	
Carbon tetrachloride	1.17	1.26	1.33	1.35	1.38	1.38	1.43	1.54	
1,1-Dichloropropene	1.76	1.79	1.85	1.88	1.87	1.99	1.86	2.03	

Method Detection Limit (MDL) Study Final Report

Note: CL = confidence limit
Check T value @ 99% Confidence Level for No. of replicates in study

Compound ID:	Mean Conc	Mean % rec	Spk Amt	Std Dev	T Value	MDL	Units	Upper CL	Lower CL	RSD %
Dichlorodifluoromethane	1.16	57.9	2	0.17	3.00	0.51	ug/kg	0.97	0.35	8.46
Chloromethane	1.94	97.0	2	0.17	3.00	0.51	ug/kg	0.97	0.35	8.43
Vinyl Chloride	1.71	85.6	2	0.20	3.00	0.59	ug/kg	1.12	0.40	9.76
Bromomethane	3.32	166.1	2	0.30	3.00	0.90	ug/kg	1.74	0.62	15.08
Chloroethane	2.29	114.6	2	0.19	3.00	0.58	ug/kg	1.11	0.40	9.66
Trichlorofluoromethane	1.75	87.4	2	0.22	3.00	0.65	ug/kg	1.24	0.45	10.78
Ethyl ether	2.41	120.3	2	0.09	3.00	0.28	ug/kg	0.54	0.19	4.70
Acrolein	6.85	68.5	10	4.42	3.00	13.25	ug/kg	25.44	9.14	44.19
Acetone	6.33	316.7	2	0.66	3.00	1.99	ug/kg	3.81	1.37	33.12
1,1-Dichloroethene	1.82	91.0	2	0.15	3.00	0.46	ug/kg	0.88	0.31	7.61
Iodomethane	1.87	93.5	2	0.15	3.00	0.46	ug/kg	0.89	0.32	7.74
Allyl chloride	2.40	120.2	2	0.12	3.00	0.37	ug/kg	0.71	0.25	6.13
Methylene chloride	4.04	201.8	2	0.33	3.00	0.98	ug/kg	1.89	0.68	16.42
Acrylonitrile	13.09	130.9	10	0.74	3.00	2.23	ug/kg	4.28	1.54	7.43
Carbon disulfide	1.92	96.1	2	0.16	3.00	0.49	ug/kg	0.94	0.34	8.14
trans-1,2-Dichloroethene	2.00	99.9	2	0.15	3.00	0.45	ug/kg	0.86	0.31	7.46
cis-1,2-Dichloroethene	2.00	100.1	2	0.13	3.00	0.38	ug/kg	0.73	0.26	6.31
Methyl-t-butyl ether (MTBE)	2.69	134.6	2	0.08	3.00	0.25	ug/kg	0.48	0.17	4.20
n-Hexane	0.91	45.7	2	0.18	3.00	0.54	ug/kg	1.05	0.38	9.08
Vinyl Acetate	2.67	133.3	2	0.11	3.00	0.33	ug/kg	0.63	0.22	5.43
1,1-Dichloroethane	2.38	118.9	2	0.19	3.00	0.57	ug/kg	1.09	0.39	9.45
2,2-Dichloropropane	1.65	82.4	2	0.11	3.00	0.32	ug/kg	0.62	0.22	5.35
2-Butanone (MEK)	0.62	31.1	2	0.44	3.00	1.33	ug/kg	2.55	0.92	22.14
Propionitrile	1.11	55.6	2	0.73	3.00	2.20	ug/kg	4.22	1.52	36.69
Methyl acrylate	2.40	119.8	2	0.17	3.00	0.51	ug/kg	0.99	0.35	8.56
Bromochloromethane	1.94	96.8	2	0.05	3.00	0.16	ug/kg	0.32	0.11	2.74
Methacrylonitrile	3.03	151.7	2	0.16	3.00	0.48	ug/kg	0.92	0.33	7.97
Tetrahydrofuran (THF)	3.47	173.3	2	0.31	3.00	0.94	ug/kg	1.80	0.65	15.61
Chloroform	5.58	279.0	2	0.13	3.00	0.40	ug/kg	0.77	0.28	6.65
Dibromofluoromethane	58.39	116.8	50	0.73	3.00	2.18	ug/kg	4.19	1.50	1.45
1,1,1-Trichloroethane	1.78	88.8	2	0.13	3.00	0.39	ug/kg	0.75	0.27	6.51
Butyl chloride (1-chlorobutane	2.89	144.4	2	0.17	3.00	0.52	ug/kg	0.99	0.36	8.63
Carbon tetrachloride	1.36	67.8	2	0.11	3.00	0.33	ug/kg	0.63	0.23	5.51
1,1-Dichloropropene	1.88	93.9	2	0.09	3.00	0.27	ug/kg	0.53	0.19	4.57

Method Detection Limit (MDL) Study Final Report

Compound ID:	%R is <50 - 150	Spk/MDL	Spk Conc <10 times MDL	MDL Spk Conc is >MDL
Dichlorodifluoromethane	Y	3.9	Y	Y
Chloromethane	Y	4.0	Y	Y
Vinyl Chloride	Y	3.4	Y	Y
Bromomethane	N	2.2	Y	Y
Chloroethane	Y	3.5	Y	Y
Trichlorofluoromethane	Y	3.1	Y	Y
Ethyl ether	Y	7.1	Y	Y
Acrolein	Y	0.8	Y	N
Acetone	N	1.0	Y	Y
1,1-Dichloroethene	Y	4.4	Y	Y
Iodomethane	Y	4.3	Y	Y
Allyl chloride	Y	5.4	Y	Y
Methylene chloride	N	2.0	Y	Y
Acrylonitrile	Y	4.5	Y	Y
Carbon disulfide	Y	4.1	Y	Y
trans-1,2-Dichloroethene	Y	4.5	Y	Y
cis-1,2-Dichloroethene	Y	5.3	Y	Y
Methyl-t-butyl ether (MTBE)	Y	8.0	Y	Y
n-Hexane	N	3.7	Y	Y
Vinyl Acetate	Y	6.1	Y	Y
1,1-Dichloroethane	Y	3.5	Y	Y
2,2-Dichloropropane	Y	6.2	Y	Y
2-Butanone (MEK)	N	1.5	Y	Y
Propionitrile	Y	0.9	Y	N
Methyl acrylate	Y	3.9	Y	Y
Bromochloromethane	Y	12.2	N	Y
Methacrylonitrile	N	4.2	Y	Y
Tetrahydrofuran (THF)	N	2.1	Y	Y
Chloroform	N	5.0	Y	Y
Dibromofluoromethane	Y	22.9	N	Y
1,1,1-Trichloroethane	Y	5.1	Y	Y
Butyl chloride (1-chlorobutane	Y	3.9	Y	Y
Carbon tetrachloride	Y	6.1	Y	Y
1,1-Dichloropropene	Y	7.3	Y	Y

Method Detection Limit (MDL) Study Final Report

	#1	#2	#3	#4	#5	#6	#7	#8	#9
Compound ID:	a65179.d	a65180.d	a65181.d	a65182.d	a65183.d	a65184.d	a65189.d	a65190.d	
1,2-Dichloroethane	2.33	2.38	2.41	2.43	2.46	2.47	2.64	2.59	
Benzene	1.86	1.89	2.03	1.96	2.09	2.12	2.18	2.24	
n-Heptane	0.38	0.44	0.45	0.50	0.44	0.53	0.56	0.54	
Trichloroethene	1.67	1.61	1.80	1.77	1.85	1.81	2.00	1.93	
Methyl methacrylate	1.86	1.67	1.90	2.05	1.92	1.86	2.08	2.01	
1,2-Dichloropropane	2.16	2.11	2.31	2.36	2.26	2.22	2.29	2.32	
Bromodichloromethane	2.23	2.38	2.38	2.43	2.47	2.40	2.50	2.54	
Dibromomethane	2.11	2.20	2.21	2.06	2.25	2.23	2.33	2.31	
2-Nitropropane	1.51	1.70	1.43	2.30	1.78	2.04	2.21	1.92	
2-Chloroethyl vinyl ether	1.77	1.49	1.38	1.93	1.61	1.61	1.72	1.95	
cis-1,3-Dichloropropene	1.96	1.94	2.23	2.04	2.08	2.02	2.11	2.20	
4-Methyl-2-pentanone	2.49	2.24	2.53	2.55	2.42	2.49	2.70	2.82	
Toluene	1.79	1.77	1.93	1.89	1.93	2.00	1.93	2.13	
trans-1,3-Dichloropropene	2.03	2.00	1.97	1.96	2.00	2.06	2.20	2.12	
1,1,2-Trichloroethane	2.34	2.45	2.50	2.40	2.47	2.27	2.70	2.74	
d8-Toluene	52.65	52.90	53.35	53.09	53.02	53.34	53.97	54.43	
1,2-Dibromoethane	2.16	2.01	2.07	2.16	2.06	2.13	2.23	2.11	
1,4-Dichloro-2-butene	2.08	2.30	2.00	1.94	2.06	2.07	2.16	2.18	
Ethyl methacrylate	1.89	1.99	2.03	1.95	2.01	1.88	2.26	1.99	
2-Hexanone	2.24	1.95	2.29	2.42	2.33	2.04	2.46	2.39	
Tetrachloroethene	1.32	1.34	1.39	1.40	1.43	1.49	1.49	1.65	
1,3-Dichloropropane	2.34	2.30	2.47	2.39	2.59	2.49	2.55	2.58	
Chlorodibromomethane	2.19	2.13	2.18	2.21	2.17	2.10	2.35	2.25	
1,2-Dibromoethane (EDB)	2.17	2.00	2.03	2.16	2.05	2.16	2.23	2.12	
Chlorobenzene	1.95	1.93	1.99	1.97	2.01	2.09	2.03	2.12	
Ethyl benzene	1.81	1.85	1.92	1.93	2.01	2.04	2.00	2.15	
m&p-Xylene	3.36	3.42	3.50	3.49	3.62	3.73	3.68	3.80	
o-Xylene	1.71	1.68	1.86	1.81	1.82	1.90	1.89	1.98	
Styrene	1.88	1.85	2.00	1.91	1.97	1.92	1.96	2.12	
Bromoform	2.15	2.08	2.00	2.11	2.20	2.11	2.25	2.32	
Isopropylbenzene (cumene)	1.67	1.60	1.72	1.76	1.75	1.85	1.77	1.92	
4-Bromofluorobenzene	54.37	54.63	54.38	55.74	54.99	55.13	56.30	56.97	
1,1,1,2-Tetrachloroethane	1.94	2.11	2.12	2.10	2.10	2.10	2.16	2.15	
1,1,2,2-Tetrachloroethane	2.94	2.97	2.80	3.10	2.89	2.81	3.08	2.89	
1,2,3-Trichloropropane	2.43	2.50	2.52	2.49	2.32	2.26	2.63	2.54	
n-Propylbenzene	1.86	1.92	1.89	1.95	2.00	2.00	1.97	2.13	
o-Chlorotoluene	2.31	2.32	2.37	2.45	2.40	2.49	2.48	2.53	
p-Chlorotoluene	2.26	2.29	2.30	2.36	2.38	2.41	2.37	2.46	
1,2,4-Trimethylbenzene	1.90	1.90	1.96	1.97	2.03	2.05	2.03	2.18	

Method Detection Limit (MDL) Study Final Report

Compound ID:	Mean Conc	Mean % rec	Spk Amt	Std Dev	T Value	MDL	Units	Upper CL	Lower CL	RSD %
1,2-Dichloroethane	2.46	123.2	2	0.10	3.00	0.31	ug/kg	0.60	0.22	5.21
Benzene	2.05	102.3	2	0.14	3.00	0.41	ug/kg	0.78	0.28	6.80
n-Heptane	0.48	24.0	2	0.06	3.00	0.19	ug/kg	0.36	0.13	3.11
Trichloroethene	1.81	90.3	2	0.13	3.00	0.38	ug/kg	0.73	0.26	6.36
Methyl methacrylate	1.92	95.9	2	0.13	3.00	0.39	ug/kg	0.76	0.27	6.57
1,2-Dichloropropane	2.25	112.7	2	0.09	3.00	0.26	ug/kg	0.49	0.18	4.26
Bromodichloromethane	2.42	120.8	2	0.09	3.00	0.28	ug/kg	0.55	0.20	4.74
Dibromomethane	2.21	110.6	2	0.09	3.00	0.28	ug/kg	0.53	0.19	4.59
2-Nitropropane	1.86	93.1	2	0.31	3.00	0.94	ug/kg	1.81	0.65	15.71
2-Chloroethyl vinyl ether	1.68	84.1	2	0.20	3.00	0.60	ug/kg	1.15	0.41	10.02
cis-1,3-Dichloropropene	2.07	103.6	2	0.10	3.00	0.31	ug/kg	0.60	0.22	5.23
4-Methyl-2-pentanone	2.53	126.5	2	0.17	3.00	0.52	ug/kg	1.00	0.36	8.72
Toluene	1.92	96.1	2	0.11	3.00	0.34	ug/kg	0.66	0.24	5.70
trans-1,3-Dichloropropene	2.04	102.1	2	0.08	3.00	0.25	ug/kg	0.47	0.17	4.09
1,1,2-Trichloroethane	2.48	124.2	2	0.16	3.00	0.49	ug/kg	0.94	0.34	8.18
d8-Toluene	53.34	106.7	50	0.59	3.00	1.76	ug/kg	3.38	1.22	1.18
1,2-Dibromoethane	2.12	105.8	2	0.07	3.00	0.21	ug/kg	0.40	0.14	3.46
1,4-Dichloro-2-butene	2.10	104.9	2	0.11	3.00	0.34	ug/kg	0.65	0.23	5.62
Ethyl methacrylate	2.00	100.0	2	0.12	3.00	0.35	ug/kg	0.68	0.24	5.91
2-Hexanone	2.27	113.3	2	0.18	3.00	0.55	ug/kg	1.05	0.38	9.12
Tetrachloroethene	1.44	71.9	2	0.11	3.00	0.32	ug/kg	0.61	0.22	5.27
1,3-Dichloropropane	2.46	123.2	2	0.11	3.00	0.33	ug/kg	0.63	0.23	5.52
Chlorodibromomethane	2.20	109.9	2	0.08	3.00	0.23	ug/kg	0.44	0.16	3.84
1,2-Dibromoethane (EDB)	2.12	105.8	2	0.08	3.00	0.24	ug/kg	0.46	0.17	4.01
Chlorobenzene	2.01	100.6	2	0.07	3.00	0.20	ug/kg	0.38	0.14	3.32
Ethyl benzene	1.96	98.2	2	0.11	3.00	0.33	ug/kg	0.63	0.23	5.46
m&p-Xylene	3.58	89.4	4	0.16	3.00	0.47	ug/kg	0.90	0.32	3.91
o-Xylene	1.83	91.6	2	0.10	3.00	0.30	ug/kg	0.57	0.21	4.97
Styrene	1.95	97.6	2	0.08	3.00	0.25	ug/kg	0.48	0.17	4.20
Bromoform	2.15	107.6	2	0.10	3.00	0.30	ug/kg	0.58	0.21	5.07
Isopropylbenzene (cumene)	1.76	87.8	2	0.10	3.00	0.30	ug/kg	0.57	0.21	4.96
4-Bromofluorobenzene	55.31	110.6	50	0.95	3.00	2.84	ug/kg	5.45	1.96	1.89
1,1,1,2-Tetrachloroethane	2.10	104.9	2	0.07	3.00	0.20	ug/kg	0.39	0.14	3.39
1,1,2,2-Tetrachloroethane	2.94	146.8	2	0.11	3.00	0.33	ug/kg	0.64	0.23	5.59
1,2,3-Trichloropropane	2.46	123.1	2	0.12	3.00	0.36	ug/kg	0.69	0.25	6.03
n-Propylbenzene	1.97	98.3	2	0.08	3.00	0.25	ug/kg	0.48	0.17	4.17
o-Chlorotoluene	2.42	120.9	2	0.08	3.00	0.24	ug/kg	0.47	0.17	4.07
p-Chlorotoluene	2.35	117.7	2	0.07	3.00	0.20	ug/kg	0.38	0.14	3.34
1,2,4-Trimethylbenzene	2.00	100.1	2	0.09	3.00	0.28	ug/kg	0.53	0.19	4.60

Method Detection Limit (MDL) Study Final Report

Compound ID:	%R is <50 - 150	Spk/MDL	Spk Conc <10 times	MDL Spk Conc
1,2-Dichloroethane	Y	6.4	Y	Y
Benzene	Y	4.9	Y	Y
n-Heptane	N	10.7	N	Y
Trichloroethene	Y	5.2	Y	Y
Methyl methacrylate	Y	5.1	Y	Y
1,2-Dichloropropane	Y	7.8	Y	Y
Bromodichloromethane	Y	7.0	Y	Y
Dibromomethane	Y	7.3	Y	Y
2-Nitropropane	Y	2.1	Y	Y
2-Chloroethyl vinyl ether	Y	3.3	Y	Y
cis-1,3-Dichloropropene	Y	6.4	Y	Y
4-Methyl-2-pentanone	Y	3.8	Y	Y
Toluene	Y	5.8	Y	Y
trans-1,3-Dichloropropene	Y	8.1	Y	Y
1,1,2-Trichloroethane	Y	4.1	Y	Y
d8-Toluene	Y	28.4	N	Y
1,2-Dibromoethane	Y	9.6	Y	Y
1,4-Dichloro-2-butene	Y	5.9	Y	Y
Ethyl methacrylate	Y	5.6	Y	Y
2-Hexanone	Y	3.7	Y	Y
Tetrachloroethene	Y	6.3	Y	Y
1,3-Dichloropropane	Y	6.0	Y	Y
Chlorodibromomethane	Y	8.7	Y	Y
1,2-Dibromoethane (EDB)	Y	8.3	Y	Y
Chlorobenzene	Y	10.0	N	Y
Ethyl benzene	Y	6.1	Y	Y
m&p-Xylene	Y	8.5	Y	Y
o-Xylene	Y	6.7	Y	Y
Styrene	Y	8.0	Y	Y
Bromoform	Y	6.6	Y	Y
Isopropylbenzene (cumene)	Y	6.7	Y	Y
4-Bromofluorobenzene	Y	17.6	N	Y
1,1,1,2-Tetrachloroethane	Y	9.8	Y	Y
1,1,2,2-Tetrachloroethane	Y	6.0	Y	Y
1,2,3-Trichloropropane	Y	5.5	Y	Y
n-Propylbenzene	Y	8.0	Y	Y
o-Chlorotoluene	Y	8.2	Y	Y
p-Chlorotoluene	Y	10.0	Y	Y
1,2,4-Trimethylbenzene	Y	7.3	Y	Y

Method Detection Limit (MDL) Study Final Report

	#1	#2	#3	#4	#5	#6	#7	#8	#9
Compound ID:	a65179.d	a65180.d	a65181.d	a65182.d	a65183.d	a65184.d	a65189.d	a65190.d	
Bromobenzene	2.09	2.07	2.06	2.06	1.99	2.01	2.05	2.01	
tert-Butylbenzene	1.76	1.82	1.83	1.88	1.83	1.91	1.93	1.98	
Pentachloroethane	1.95	2.02	2.01	1.97	1.98	1.96	2.00	1.90	
1,3,5-Trimethylbenzene	2.06	2.04	2.12	2.08	2.04	2.13	2.09	2.17	
sec-Butylbenzene	1.72	1.73	1.79	1.77	1.79	1.84	1.78	1.96	
1,3-Dichlorobenzene	2.11	2.08	2.04	2.18	2.12	2.16	2.13	2.14	
p-Isopropyltoluene (cymene)	1.84	1.86	1.89	1.93	1.92	1.93	1.96	2.03	
1,4-Dichlorobenzene	2.23	2.17	2.28	2.23	2.28	2.22	2.18	2.20	
1,2-Dichlorobenzene	2.23	2.22	2.23	2.21	2.16	2.17	2.24	2.20	
n-Butylbenzene	1.85	1.96	2.02	2.02	1.97	2.02	1.90	2.06	
Hexachloroethane	1.23	1.22	1.21	1.15	1.19	1.27	1.33	1.38	
1,2-Dibromo-3-chloropropane	2.90	2.35	2.58	2.12	2.53	2.65	3.08	2.52	
1,2,3-Trichlorobenzene	1.89	1.84	1.87	1.88	1.75	1.72	1.75	1.78	
Hexachlorobutadiene	1.59	1.61	1.71	1.66	1.69	1.73	1.68	1.71	
1,2,4-Trichlorobenzene	2.02	1.92	1.95	1.89	1.92	1.87	1.94	1.94	
Naphthalene	2.71	2.49	2.42	2.44	2.38	2.27	2.76	2.49	

Method Detection Limit (MDL) Study Final Report

Compound ID:	Mean Conc	Mean % rec	Spk Amt	Std Dev	T Value	MDL	Units	Upper CL	Lower CL	RSD %
Bromobenzene	2.04	102.1	2	0.03	3.00	0.10	ug/kg	0.20	0.07	1.75
tert-Butylbenzene	1.87	93.4	2	0.07	3.00	0.21	ug/kg	0.41	0.15	3.54
Pentachloroethane	1.97	98.7	2	0.04	3.00	0.12	ug/kg	0.22	0.08	1.93
1,3,5-Trimethylbenzene	2.09	104.6	2	0.05	3.00	0.14	ug/kg	0.27	0.10	2.31
sec-Butylbenzene	1.80	89.9	2	0.08	3.00	0.23	ug/kg	0.43	0.16	3.78
1,3-Dichlorobenzene	2.12	106.0	2	0.04	3.00	0.13	ug/kg	0.26	0.09	2.22
p-Isopropyltoluene (cymene)	1.92	96.0	2	0.06	3.00	0.18	ug/kg	0.34	0.12	2.98
1,4-Dichlorobenzene	2.22	111.2	2	0.04	3.00	0.12	ug/kg	0.24	0.08	2.05
1,2-Dichlorobenzene	2.21	110.4	2	0.03	3.00	0.09	ug/kg	0.17	0.06	1.46
n-Butylbenzene	1.98	98.8	2	0.07	3.00	0.21	ug/kg	0.41	0.15	3.53
Hexachloroethane	1.25	62.4	2	0.08	3.00	0.23	ug/kg	0.44	0.16	3.79
1,2-Dibromo-3-chloropropane	2.59	129.6	2	0.30	3.00	0.90	ug/kg	1.72	0.62	14.96
1,2,3-Trichlorobenzene	1.81	90.5	2	0.07	3.00	0.20	ug/kg	0.39	0.14	3.38
Hexachlorobutadiene	1.67	83.6	2	0.05	3.00	0.15	ug/kg	0.29	0.10	2.49
1,2,4-Trichlorobenzene	1.93	96.6	2	0.04	3.00	0.13	ug/kg	0.26	0.09	2.24
Naphthalene	2.50	124.8	2	0.16	3.00	0.49	ug/kg	0.95	0.34	8.22

Method Detection Limit (MDL) Study Final Report

Compound ID:	%R is <50 - 150	Spk/MDL	Spk Conc <10 times	MDL Spk Conc
Bromobenzene	Y	19.1	N	Y
tert-Butylbenzene	Y	9.4	Y	Y
Pentachloroethane	Y	17.3	N	Y
1,3,5-Trimethylbenzene	Y	14.5	N	Y
sec-Butylbenzene	Y	8.8	Y	Y
1,3-Dichlorobenzene	Y	15.0	N	Y
p-Isopropyltoluene (cymene)	Y	11.2	N	Y
1,4-Dichlorobenzene	Y	16.3	N	Y
1,2-Dichlorobenzene	Y	22.9	N	Y
n-Butylbenzene	Y	9.5	Y	Y
Hexachloroethane	Y	8.8	Y	Y
1,2-Dibromo-3-chloropropane	Y	2.2	Y	Y
1,2,3-Trichlorobenzene	Y	9.9	Y	Y
Hexachlorobutadiene	Y	13.4	N	Y
1,2,4-Trichlorobenzene	Y	14.9	N	Y
Naphthalene	Y	4.1	Y	Y
Outliers:	9		15	2

Method Detection Limit (MDL) Study Final Report

Laboratory:	First Environmental Laboratories, Inc.
Method / Revision (all):	SW-846 Method 8260B/EPA 600/482-057 Method 624
Analyte or Analyte Group:	Volatiles - Aqueous
Preparation Analyst:	Not Applicable
Instrument Analyst:	Pam Hentschel
Date of Analysis:	03/28/02
Instrument ID:	GC/MS "C" with Archon Autosampler
Instrument Conditions:	Standard
Est. Detection Limit:	5.0 ug/L

Calib. Standards Source:	Supelco #5377, #5378	Date Prepared:	02/22/02
Spiking Solution Source:	Supelco #5418, #5419	Date Prepared:	03/13/02
Spiking Concentration:	5.0 ug/L	Units: ug/L	

A minimum of seven replicates was used to perform the MDL study? _X_ yes __no

Were all replicates values used in determining the MDL? _X_ yes __no

If no, submit documentation verifying that the laboratory exclued values which it determined are outliers by using a statistical outlier test.

Has the laboratory established criteria for accepting replicate percent recovery? _X_ yes __no

If yes, the acceptance criteria can be found in MDL SOP page 6. (± 50% or per method)

If yes, this MDL study has met the laboratory's criteria for acceptable replicate percent recovery? __ yes _X_* no

The calculated MDL is greater than "0"? _X_ yes __no

The calculated MDL is greater than 1/10 the MDL spiking concentration? _X_ yes __no

The MDL spiking concentration is greater than the calculated MDL? _X_ yes __no

For drinking water laboratory accreditation, the laboratory has achieved a MDL equal to or less than those specified in Section 186 Appendix A? 186.160(c) __ yes __no

Only MDL studies meeting the requirements set forth in Section 186.160 will be deemed acceptable.

Comments: *MDL Study also performed at 2.0 ug/L.

7 outliers; Spike recovery.

Approved by:

Method Detection Limit (MDL) Study Final Report

Compound ID:	#1 c57732.d	#2 c57733.d	#3 c57734.d	#4 c57735.d	#5 c57736.d	#6 c57737.d	#7 c57738.d	#8 C57739.D
Dichlorodifluoromethane	5.78	4.42	4.95	4.89	5.02	4.73	4.94	4.87
Chloromethane	5.01	3.71	4.16	2.98	4.00	3.88	4.18	3.92
Vinyl Chloride	5.98	4.72	5.02	5.00	5.15	4.60	4.70	4.80
Bromomethane	9.51	6.30	7.82	14.43	8.15	6.21	6.27	7.20
Chloroethane	6.96	5.24	5.51	5.88	6.29	4.88	5.28	5.24
Trichlorofluoromethane	6.50	4.79	5.37	5.45	5.55	4.98	5.41	5.20
Ethyl ether	5.08	4.50	5.46	5.37	5.62	4.88	5.34	5.20
Acrolein	27.27	25.38	28.94	28.09	27.35	34.07	35.67	31.91
Acetone	7.43	5.90	6.03	4.18	5.19	5.00	6.20	5.57
1,1-Dichloroethene	3.96	4.59	4.81	4.98	5.00	4.86	5.12	5.21
Iodomethane	4.25	3.39	3.65	7.56	4.05	3.34	3.42	3.55
Allyl chloride	9.02	4.53	8.98	9.42	10.10	2.71	3.64	2.48
Methylene chloride	5.77	5.52	5.39	4.74	5.50	5.07	5.24	5.29
Acrylonitrile	22.73	25.82	25.46	25.24	27.56	26.03	26.10	24.71
Carbon disulfide	5.52	4.91	4.81	4.47	4.77	4.00	4.34	4.22
trans-1,2-Dichloroethene	5.52	4.82	5.22	5.01	5.20	4.56	4.99	4.90
cis-1,2-Dichloroethene	5.14	4.39	4.97	4.93	5.05	4.30	4.76	4.68
Methyl-t-butyl ether (MTBE)	5.70	5.49	5.67	5.50	5.75	4.65	5.29	4.70
n-Hexane	4.80	4.41	4.53	4.79	4.48	4.69	4.47	4.33
Vinyl Acetate	5.22	4.98	4.94	5.54	5.05	3.20	4.48	2.97
1,1-Dichloroethane	5.32	5.04	5.43	5.34	5.48	4.64	4.93	5.12
2,2-Dichloropropane	13.96	8.91	13.19	12.97	12.97	1.02	3.36	0.81
2-Butanone (MEK)	2.89	1.90	3.16	2.03	2.83	1.78	1.91	2.77
Propionitrile	3.69	2.61	2.86	2.00	2.96	2.20	2.83	2.53
Methyl acrylate	2.84	2.06	2.31	2.89	2.34	2.90	2.73	2.91
Bromochloromethane	5.94	5.14	6.04	6.51	6.31	4.99	5.03	5.24
Methacrylonitrile	4.88	3.67	4.49	4.48	4.79	4.53	4.74	4.92
Tetrahydrofuran (THF)	5.57	4.78	5.27	4.62	5.64	4.30	5.52	5.84
Chloroform	6.63	5.74	6.49	6.27	6.33	5.83	6.03	6.05
Dibromofluoromethane	55.60	51.67	56.54	57.98	57.72	51.78	52.73	52.53
1,1,1-Trichloroethane	5.91	5.39	5.40	5.69	5.74	4.66	5.71	4.48
Butyl chloride (1-chlorobutane	5.70	5.23	5.35	5.13	5.26	5.15	5.32	5.22
Carbon tetrachloride	6.11	5.38	5.48	5.38	5.56	5.12	5.71	4.53
1,1-Dichloropropene	4.99	4.60	4.64	5.36	4.81	4.61	5.08	4.91

Method Detection Limit (MDL) Study Final Report

Note: CL = confidence limit
Check T value @ 99% Confidence Level for No. of replicates in study

Compound ID:	Mean Conc	Mean % rec	Spk Amt	Std Dev	T Value	MDL	Units	Upper CL	Lower CL	RSD %
Dichlorodifluoromethane	4.95	99.0	5	0.38	3.00	1.15	ug/L	2.21	0.79	7.7
Chloromethane	3.98	79.6	5	0.56	3.00	1.69	ug/L	3.24	1.17	11.3
Vinyl Chloride	5.00	99.9	5	0.44	3.00	1.32	ug/L	2.53	0.91	8.8
Bromomethane	8.24	164.7 •	5	2.75	3.00	8.25	ug/L	15.83	5.69	55.0
Chloroethane	5.66	113.2	5	0.68	3.00	2.05	ug/L	3.93	1.41	13.7
Trichlorofluoromethane	5.41	108.1	5	0.51	3.00	1.53	ug/L	2.94	1.06	10.2
Ethyl ether	5.18	103.6	5	0.36	3.00	1.07	ug/L	2.06	0.74	7.2
Acrolein	29.84	119.3	25	3.64	3.00	10.91	ug/L	20.95	7.53	14.6
Acetone	5.69	113.8	5	0.96	3.00	2.88	ug/L	5.53	1.99	19.2
1,1-Dichloroethene	4.82	96.3	5	0.40	3.00	1.19	ug/L	2.28	0.82	7.9
Iodomethane	4.15	83.0	5	1.42	3.00	4.24	ug/L	8.15	2.93	28.3
Allyl chloride	6.36	127.2	5	3.30	3.00	9.91	ug/L	19.02	6.83	66.1
Methylene chloride	5.32	106.3	5	0.31	3.00	0.94	ug/L	1.80	0.65	6.3
Acrylonitrile	25.46	101.8	25	1.38	3.00	4.14	ug/L	7.95	2.86	5.5
Carbon disulfide	4.63	92.6	5	0.48	3.00	1.43	ug/L	2.75	0.99	9.6
trans-1,2-Dichloroethene	5.03	100.6	5	0.29	3.00	0.87	ug/L	1.67	0.60	5.8
cis-1,2-Dichloroethene	4.78	95.6	5	0.31	3.00	0.92	ug/L	1.76	0.63	6.1
Methyl-t-butyl ether (MTBE)	5.34	106.9	5	0.44	3.00	1.31	ug/L	2.52	0.91	8.8
n-Hexane	4.56	91.3	5	0.18	3.00	0.53	ug/L	1.02	0.37	3.5
Vinyl Acetate	4.55	91.0	5	0.95	3.00	2.85	ug/L	5.48	1.97	19.0
1,1-Dichloroethane	5.16	103.3	5	0.29	3.00	0.86	ug/L	1.65	0.59	5.7
2,2-Dichloropropane	8.40	168.0 •	5	5.77	3.00	17.31	ug/L	33.24	11.94	115.5
2-Butanone (MEK)	2.41	48.2 •	5	0.55	3.00	1.66	ug/L	3.19	1.15	11.1
Propionitrile	2.71	54.2	5	0.52	3.00	1.55	ug/L	2.97	1.07	10.3
Methyl acrylate	2.62	52.5	5	0.33	3.00	1.00	ug/L	1.93	0.69	6.7
Bromochloromethane	5.65	113.0	5	0.62	3.00	1.85	ug/L	3.55	1.28	12.3
Methacrylonitrile	4.56	91.3	5	0.40	3.00	1.20	ug/L	2.30	0.83	8.0
Tetrahydrofuran (THF)	5.19	103.9	5	0.56	3.00	1.67	ug/L	3.20	1.15	11.1
Chloroform	6.17	123.4	5	0.31	3.00	0.94	ug/L	1.80	0.65	6.3
Dibromofluoromethane	54.57	109.1	50	2.68	3.00	8.03	ug/L	15.42	5.54	5.4
1,1,1-Trichloroethane	5.37	107.5	5	0.53	3.00	1.58	ug/L	3.03	1.09	10.5
Butyl chloride (1-chlorobutane	5.30	105.9	5	0.18	3.00	0.54	ug/L	1.04	0.37	3.6
Carbon tetrachloride	5.41	108.2	5	0.46	3.00	1.37	ug/L	2.64	0.95	9.2
1,1-Dichloropropene	4.88	97.5	5	0.27	3.00	0.80	ug/L	1.53	0.55	5.3

Method Detection Limit (MDL) Study Final Report

Compound ID:	%R is <50 - 150	Spk/MDL	Spk Conc <10 times MDL	MDL Spk Conc is >MDL
Dichlorodifluoromethane	Y	4.3	Y	Y
Chloromethane	Y	3.0	Y	Y
Vinyl Chloride	Y	3.8	Y	Y
Bromomethane	N	0.6	Y	N
Chloroethane	Y	2.4	Y	Y
Trichlorofluoromethane	Y	3.3	Y	Y
Ethyl ether	Y	4.7	Y	Y
Acrolein	Y	2.3	Y	Y
Acetone	Y	1.7	Y	Y
1,1-Dichloroethene	Y	4.2	Y	Y
Iodomethane	Y	1.2	Y	Y
Allyl chloride	Y	0.5	Y	N
Methylene chloride	Y	5.3	Y	Y
Acrylonitrile	Y	6.0	Y	Y
Carbon disulfide	Y	3.5	Y	Y
trans-1,2-Dichloroethene	Y	5.7	Y	Y
cis-1,2-Dichloroethene	Y	5.5	Y	Y
Methyl-t-butyl ether (MTBE)	Y	3.8	Y	Y
n-Hexane	Y	9.4	Y	Y
Vinyl Acetate	Y	1.8	Y	Y
1,1-Dichloroethane	Y	5.8	Y	Y
2,2-Dichloropropane	N	0.3	Y	N
2-Butanone (MEK)	N	3.0	Y	Y
Propionitrile	Y	3.2	Y	Y
Methyl acrylate	Y	5.0	Y	Y
Bromochloromethane	Y	2.7	Y	Y
Methacrylonitrile	Y	4.2	Y	Y
Tetrahydrofuran (THF)	Y	3.0	Y	Y
Chloroform	Y	5.3	Y	Y
Dibromofluoromethane	Y	6.2	Y	Y
1,1,1-Trichloroethane	Y	3.2	Y	Y
Butyl chloride (1-chlorobutane	Y	9.3	Y	Y
Carbon tetrachloride	Y	3.6	Y	Y
1,1-Dichloropropene	Y	6.3	Y	Y

Method Detection Limit (MDL) Study Final Report

	#1	#2	#3	#4	#5	#6	#7	#8
Compound ID:	c57732.d	c57733.d	c57734.d	c57735.d	c57736.d	c57737.d	c57738.d	C57739.D
1,2-Dichloroethane	5.46	4.95	5.66	5.73	6.20	4.96	5.26	4.92
Benzene	5.15	4.80	4.47	4.79	4.69	4.86	4.85	4.82
n-Heptane	4.24	4.23	4.13	4.09	4.18	3.63	3.97	4.02
Trichloroethene	5.17	4.57	4.42	4.72	4.80	4.75	4.97	4.62
Methyl methacrylate	3.40	2.99	2.95	3.20	2.73	2.80	2.84	3.13
1,2-Dichloropropane	4.88	4.74	4.49	4.50	4.60	5.05	4.98	4.92
Bromodichloromethane	5.61	5.43	5.08	5.46	5.17	4.49	5.08	4.32
Dibromomethane	7.21	6.35	7.73	7.32	8.12	5.17	5.49	5.81
2-Nitropropane	3.75	3.11	4.53	4.21	4.30	3.47	3.36	3.95
2-Chloroethyl vinyl ether	2.73	3.02	2.34	2.79	2.30	2.53	2.51	2.58
cis-1,3-Dichloropropene	4.33	4.35	3.67	4.05	3.97	3.87	3.72	3.93
4-Methyl-2-pentanone	4.14	4.20	4.00	4.17	4.56	4.47	4.37	4.44
Toluene	4.79	4.46	4.50	4.67	4.56	4.55	4.86	4.67
trans-1,3-Dichloropropene	2.52	2.62	2.66	2.68	2.71	2.75	2.62	2.72
1,1,2-Trichloroethane	4.33	4.66	4.44	4.86	4.81	4.88	4.85	4.47
d8-Toluene	52.04	50.05	48.83	49.88	51.26	49.46	50.02	49.07
1,2-Dibromoethane	3.81	4.08	4.18	4.31	4.31	4.43	4.32	4.44
1,4-Dichloro-2-butene	0.91	0.83	0.92	0.60	0.49	0.52	1.04	0.54
Ethyl methacrylate	1.80	2.64	2.09	2.12	2.17	2.25	1.98	2.63
2-Hexanone	1.10	1.96	1.83	1.53	1.61	1.68	1.38	2.01
Tetrachloroethene	3.95	5.04	4.76	4.93	4.86	4.86	4.74	5.00
1,3-Dichloropropane	3.46	4.81	4.87	4.82	4.70	4.56	4.33	4.50
Chlorodibromomethane	3.32	4.26	4.43	4.64	4.38	4.37	4.17	4.49
1,2-Dibromoethane (EDB)	3.00	4.25	4.08	4.54	4.40	4.39	4.31	4.50
Chlorobenzene	3.80	4.38	4.54	4.54	4.72	4.70	4.44	4.70
Ethyl benzene	3.49	4.10	4.10	4.13	4.12	4.33	3.96	4.24
m&p-Xylene	6.81	7.86	7.94	8.17	8.48	8.31	7.90	8.35
o-Xylene	3.24	4.12	4.08	3.91	4.05	3.90	3.78	3.95
Styrene	3.18	3.64	3.39	3.82	3.57	3.51	3.68	3.77
Bromoform	2.95	4.11	4.02	4.38	4.01	4.10	3.98	3.85
Isopropylbenzene (cumene)	3.11	3.86	3.83	3.79	3.96	4.02	3.89	3.86
4-Bromofluorobenzene	49.66	46.21	44.91	47.65	46.07	44.79	44.13	44.76
1,1,1,2-Tetrachloroethane	3.69	4.80	4.70	4.80	4.70	4.61	4.37	4.45
1,1,2,2-Tetrachloroethane	3.42	5.20	5.33	5.64	5.71	5.91	5.86	5.59
1,2,3-Trichloropropane	3.35	4.68	5.11	5.81	5.12	6.03	6.27	5.72
n-Propylbenzene	3.11	4.49	4.23	4.86	4.87	4.60	4.50	4.72
o-Chlorotoluene	3.22	5.05	5.20	5.63	5.28	5.55	5.61	5.17
p-Chlorotoluene	3.06	4.47	4.90	5.18	5.05	5.08	5.10	4.80
1,2,4-Trimethylbenzene	3.18	4.74	4.86	4.87	5.03	5.07	4.96	4.85

Method Detection Limit (MDL) Study Final Report

Compound ID:	Mean Conc	Mean % rec	Spk Amt	Std Dev	T Value	MDL	Units	Upper CL	Lower CL	RSD %
1,2-Dichloroethane	5.39	107.9	5	0.46	3.00	1.37	ug/L	2.63	0.95	9.2
Benzene	4.80	96.1	5	0.19	3.00	0.57	ug/L	1.09	0.39	3.8
n-Heptane	4.06	81.2	5	0.20	3.00	0.60	ug/L	1.14	0.41	4.0
Trichloroethene	4.75	95.1	5	0.23	3.00	0.70	ug/L	1.35	0.49	4.7
Methyl methacrylate	3.01	60.1	5	0.23	3.00	0.68	ug/L	1.30	0.47	4.5
1,2-Dichloropropane	4.77	95.4	5	0.22	3.00	0.66	ug/L	1.27	0.45	4.4
Bromodichloromethane	5.08	101.6	5	0.46	3.00	1.38	ug/L	2.65	0.95	9.2
Dibromomethane	6.65	133.0	5	1.10	3.00	3.29	ug/L	6.31	2.27	21.9
2-Nitropropane	3.84	76.7	5	0.50	3.00	1.50	ug/L	2.87	1.03	10.0
2-Chloroethyl vinyl ether	2.60	52.0	5	0.24	3.00	0.72	ug/L	1.38	0.49	4.8
cis-1,3-Dichloropropene	3.99	79.7	5	0.25	3.00	0.75	ug/L	1.45	0.52	5.0
4-Methyl-2-pentanone	4.29	85.9	5	0.19	3.00	0.58	ug/L	1.12	0.40	3.9
Toluene	4.63	92.7	5	0.14	3.00	0.42	ug/L	0.81	0.29	2.8
trans-1,3-Dichloropropene	2.66	53.2	5	0.07	3.00	0.22	ug/L	0.42	0.15	1.5
1,1,2-Trichloroethane	4.66	93.3	5	0.22	3.00	0.66	ug/L	1.27	0.46	4.4
d8-Toluene	50.08	100.2	50	1.09	3.00	3.25	ug/L	6.25	2.25	2.2
1,2-Dibromoethane	4.24	84.7	5	0.21	3.00	0.63	ug/L	1.20	0.43	4.2
1,4-Dichloro-2-butene	0.73	14.6 •	5	0.22	3.00	0.65	ug/L	1.25	0.45	4.3
Ethyl methacrylate	2.21	44.2 •	5	0.29	3.00	0.88	ug/L	1.70	0.61	5.9
2-Hexanone	1.64	32.8 •	5	0.30	3.00	0.91	ug/L	1.75	0.63	6.1
Tetrachloroethene	4.77	95.4	5	0.35	3.00	1.04	ug/L	2.00	0.72	6.9
1,3-Dichloropropane	4.51	90.1	5	0.46	3.00	1.38	ug/L	2.65	0.95	9.2
Chlorodibromomethane	4.26	85.2	5	0.40	3.00	1.21	ug/L	2.33	0.84	8.1
1,2-Dibromoethane (EDB)	4.18	83.7	5	0.50	3.00	1.50	ug/L	2.88	1.03	10.0
Chlorobenzene	4.48	89.6	5	0.30	3.00	0.90	ug/L	1.73	0.62	6.0
Ethyl benzene	4.06	81.2	5	0.25	3.00	0.76	ug/L	1.46	0.53	5.1
m&p-Xylene	7.98	79.8	10	0.52	3.00	1.57	ug/L	3.02	1.08	5.2
o-Xylene	3.88	77.6	5	0.28	3.00	0.84	ug/L	1.62	0.58	5.6
Styrene	3.57	71.4	5	0.21	3.00	0.63	ug/L	1.21	0.43	4.2
Bromoform	3.93	78.5	5	0.42	3.00	1.27	ug/L	2.43	0.87	8.4
Isopropylbenzene (cumene)	3.79	75.8	5	0.28	3.00	0.85	ug/L	1.64	0.59	5.7
4-Bromofluorobenzene	46.02	92.0	50	1.85	3.00	5.53	ug/L	10.62	3.82	3.7
1,1,1,2-Tetrachloroethane	4.52	90.3	5	0.37	3.00	1.10	ug/L	2.12	0.76	7.4
1,1,2,2-Tetrachloroethane	5.33	106.7	5	0.81	3.00	2.43	ug/L	4.66	1.68	16.2
1,2,3-Trichloropropane	5.26	105.2	5	0.94	3.00	2.81	ug/L	5.40	1.94	18.8
n-Propylbenzene	4.42	88.5	5	0.57	3.00	1.71	ug/L	3.29	1.18	11.4
o-Chlorotoluene	5.09	101.8	5	0.79	3.00	2.36	ug/L	4.53	1.63	15.7
p-Chlorotoluene	4.71	94.1	5	0.70	3.00	2.10	ug/L	4.04	1.45	14.0
1,2,4-Trimethylbenzene	4.70	93.9	5	0.62	3.00	1.86	ug/L	3.58	1.29	12.4

Method Detection Limit (MDL) Study Final Report

Compound ID:	%R is <50 - 150	Spk/MDL	Spk Conc <10 times	MDL Spk Conc
1,2-Dichloroethane	Y	3.6	Y	Y
Benzene	Y	8.8	Y	Y
n-Heptane	Y	8.4	Y	Y
Trichloroethene	Y	7.1	Y	Y
Methyl methacrylate	Y	7.4	Y	Y
1,2-Dichloropropane	Y	7.6	Y	Y
Bromodichloromethane	Y	3.6	Y	Y
Dibromomethane	Y	1.5	Y	Y
2-Nitropropane	Y	3.3	Y	Y
2-Chloroethyl vinyl ether	Y	7.0	Y	Y
cis-1,3-Dichloropropene	Y	6.6	Y	Y
4-Methyl-2-pentanone	Y	8.6	Y	Y
Toluene	Y	11.8	N	Y
trans-1,3-Dichloropropene	Y	22.8	N	Y
1,1,2-Trichloroethane	Y	7.6	Y	Y
d8-Toluene	Y	15.4	N	Y
1,2-Dibromoethane	Y	8.0	Y	Y
1,4-Dichloro-2-butene	N	7.7	Y	Y
Ethyl methacrylate	N	5.7	Y	Y
2-Hexanone	N	5.5	Y	Y
Tetrachloroethene	Y	4.8	Y	Y
1,3-Dichloropropane	Y	3.6	Y	Y
Chlorodibromomethane	Y	4.1	Y	Y
1,2-Dibromoethane (EDB)	Y	3.3	Y	Y
Chlorobenzene	Y	5.5	Y	Y
Ethyl benzene	Y	6.6	Y	Y
m&p-Xylene	Y	6.4	Y	Y
o-Xylene	Y	5.9	Y	Y
Styrene	Y	8.0	Y	Y
Bromoform	Y	4.0	Y	Y
Isopropylbenzene (cumene)	Y	5.9	Y	Y
4-Bromofluorobenzene	Y	9.0	Y	Y
1,1,1,2-Tetrachloroethane	Y	4.5	Y	Y
1,1,2,2-Tetrachloroethane	Y	2.1	Y	Y
1,2,3-Trichloropropane	Y	1.8	Y	Y
n-Propylbenzene	Y	2.9	Y	Y
o-Chlorotoluene	Y	2.1	Y	Y
p-Chlorotoluene	Y	2.4	Y	Y
1,2,4-Trimethylbenzene	Y	2.7	Y	Y

Method Detection Limit (MDL) Study Final Report

	#1	#2	#3	#4	#5	#6	#7	#8
Compound ID:	c57732.d	c57733.d	c57734.d	c57735.d	c57736.d	c57737.d	c57738.d	C57739.D
Bromobenzene	3.46	4.99	5.09	5.25	5.32	5.14	5.20	5.09
tert-Butylbenzene	4.11	6.10	5.95	6.33	6.33	6.30	5.96	6.00
Pentachloroethane	3.23	4.83	4.70	5.44	4.88	5.16	4.82	5.18
1,3,5-Trimethylbenzene	3.13	4.64	4.65	4.76	4.60	4.66	4.65	4.63
sec-Butylbenzene	3.05	4.29	4.50	4.64	4.43	4.25	4.22	4.22
1,3-Dichlorobenzene	3.17	4.48	4.58	4.69	4.52	4.33	4.44	4.44
p-Isopropyltoluene (cymene)	2.83	3.93	3.95	3.69	3.93	3.77	3.66	3.86
1,4-Dichlorobenzene	3.51	5.04	5.05	5.23	5.00	4.94	5.00	4.80
1,2-Dichlorobenzene	3.21	4.70	4.92	4.94	4.63	4.59	4.74	4.49
n-Butylbenzene	1.41	1.81	1.53	1.71	1.57	1.42	1.52	1.25
Hexachloroethane	2.98	4.81	4.22	4.93	4.10	4.31	4.45	4.79
1,2-Dibromo-3-chloropropane	2.58	4.30	3.62	4.25	3.90	4.17	4.13	4.94
1,2,3-Trichlorobenzene	2.43	3.90	4.08	3.33	3.58	3.76	3.52	3.70
Hexachlorobutadiene	2.59	3.01	3.16	3.38	3.14	2.76	3.00	3.12
1,2,4-Trichlorobenzene	1.78	3.13	2.95	2.80	2.86	3.07	2.99	3.31
Naphthalene	1.67	3.04	2.83	2.94	2.94	3.20	2.63	2.97

Method Detection Limit (MDL) Study Final Report

Compound ID:	Mean Conc	Mean % rec	Spk Amt	Std Dev	T Value	MDL	Units	Upper CL	Lower CL	RSD %
Bromobenzene	4.94	98.9	5	0.61	3.00	1.82	ug/L	3.50	1.26	12.2
tert-Butylbenzene	5.89	117.7	5	0.74	3.00	2.21	ug/L	4.23	1.52	14.7
Pentachloroethane	4.78	95.6	5	0.67	3.00	2.02	ug/L	3.87	1.39	13.4
1,3,5-Trimethylbenzene	4.47	89.3	5	0.54	3.00	1.62	ug/L	3.12	1.12	10.8
sec-Butylbenzene	4.20	84.0	5	0.49	3.00	1.46	ug/L	2.81	1.01	9.8
1,3-Dichlorobenzene	4.33	86.6	5	0.48	3.00	1.44	ug/L	2.77	1.00	9.6
p-Isopropyltoluene (cymene)	3.70	74.1	5	0.37	3.00	1.11	ug/L	2.13	0.77	7.4
1,4-Dichlorobenzene	4.82	96.4	5	0.54	3.00	1.63	ug/L	3.13	1.12	10.9
1,2-Dichlorobenzene	4.53	90.6	5	0.55	3.00	1.66	ug/L	3.19	1.15	11.1
n-Butylbenzene	1.53	30.6	5	0.18	3.00	0.53	ug/L	1.01	0.36	3.5
Hexachloroethane	4.32	86.5	5	0.62	3.00	1.86	ug/L	3.58	1.29	12.4
1,2-Dibromo-3-chloropropane	3.99	79.7	5	0.68	3.00	2.04	ug/L	3.92	1.41	13.6
1,2,3-Trichlorobenzene	3.54	70.8	5	0.50	3.00	1.51	ug/L	2.90	1.04	10.1
Hexachlorobutadiene	3.02	60.4	5	0.25	3.00	0.74	ug/L	1.42	0.51	4.9
1,2,4-Trichlorobenzene	2.86	57.2	5	0.47	3.00	1.39	ug/L	2.68	0.96	9.3
Naphthalene	2.78	55.6	5	0.48	3.00	1.43	ug/L	2.74	0.99	9.5

Method Detection Limit (MDL) Study Final Report

Compound ID:	%R is <50 - 150	Spk/MDL	Spk Conc <10 times	MDL Spk Conc
Bromobenzene	Y	2.7	Y	Y
tert-Butylbenzene	Y	2.3	Y	Y
Pentachloroethane	Y	2.5	Y	Y
1,3,5-Trimethylbenzene	Y	3.1	Y	Y
sec-Butylbenzene	Y	3.4	Y	Y
1,3-Dichlorobenzene	Y	3.5	Y	Y
p-Isopropyltoluene (cymene)	Y	4.5	Y	Y
1,4-Dichlorobenzene	Y	3.1	Y	Y
1,2-Dichlorobenzene	Y	3.0	Y	Y
n-Butylbenzene	N	9.5	Y	Y
Hexachloroethane	Y	2.7	Y	Y
1,2-Dibromo-3-chloropropane	Y	2.4	Y	Y
1,2,3-Trichlorobenzene	Y	3.3	Y	Y
Hexachlorobutadiene	Y	6.8	Y	Y
1,2,4-Trichlorobenzene	Y	3.6	Y	Y
Naphthalene	Y	3.5	Y	Y
Outliers:	7		3	3

Method Detection Limit (MDL) Study Final Report

Laboratory:	First Environmental Laboratories, Inc.
Method / Revision (all):	SW-846 Method 8260B/EPA 600/482-057 Method 624
Analyte or Analyte Group:	Volatiles - Aqueous
Preparation Analyst:	Not Applicable
Instrument Analyst:	Pam Hentschel
Date of Analysis:	3/28/02
Instrument ID:	GC/MS "C" with Archon Autosampler
Instrument Conditions:	Standard
Est. Detection Limit:	5.0 ug/L

Calib. Standards Source:	Supelco #5377, #5378	Date Prepared:	2/22/02
Spiking Solution Source:	Supelco #5418, #5419	Date Prepared:	3/13/02
Spiking Concentration:	2.0 ug/L	Units: ug/L	

A minimum of seven replicates was used to perform the MDL study? _X_ yes __no

Were all replicates values used in determining the MDL? _X_ yes __no

If no, submit documentation verifying that the laboratory exclued values which it determined are outliers by using a statistical outlier test.

Has the laboratory established criteria for accepting replicate percent recovery? _X_ yes __no

If yes, the acceptance criteria can be found in MDL SOP page 6. (± 50% or per method)

If yes, this MDL study has met the laboratory's criteria for acceptable replicate percent recovery? __ yes _X_no

The calculated MDL is greater than "0"? _X_ yes __no

The calculated MDL is greater than 1/10 the MDL spiking concentration? _X_ yes __no

The MDL spiking concentration is greater than the calculated MDL? _X_ yes __no

For drinking water laboratory accreditation, the laboratory has achieved a MDL equal to or less than those specified in Section 186 Appendix A? 186.160(c) __ yes __no

Only MDL studies meeting the requirements set forth in Section 186.160 will be deemed acceptable.

Comments: SPIKED BELOW THE ROUTINE RL at 2.0 ug/L.

19 outliers; Spike recovery.

MDL also PERFORMED AT 5.0 ug/L.

Approved by:

Method Detection Limit (MDL) Study Final Report

Compound ID:	#1 c57740.d	#2 c57741.d	#3 c57742.d	#4 c57743.d	#5 c57744.d	#6 c57745.d	#7 c57746.d	#8 c57747.d
Dichlorodifluoromethane	1.64	1.73	1.80	1.72	1.81	1.97	2.02	1.98
Chloromethane	1.92	1.99	1.68	1.70	1.99	1.95	1.75	2.12
Vinyl Chloride	1.84	1.94	1.95	1.86	1.85	2.07	2.06	2.14
Bromomethane	3.19	2.53	2.80	2.87	2.89	3.52	3.12	2.45
Chloroethane	1.58	1.93	2.09	2.07	2.34	2.24	2.48	2.10
Trichlorofluoromethane	1.82	1.95	2.01	1.90	2.04	2.27	2.17	2.20
Ethyl ether	2.24	2.06	2.01	2.13	2.40	2.05	2.37	2.19
Acrolein	20.82	21.81	17.20	16.42	15.72	15.43	22.16	23.05
Acetone	3.40	2.10	2.76	2.99	3.11	2.37	3.75	4.09
1,1-Dichloroethene	1.89	1.90	1.76	1.95	1.89	2.07	1.76	1.86
Iodomethane	1.63	1.59	1.28	1.40	1.31	1.51	1.31	1.37
Allyl chloride	0.33	0.64	0.52	0.85	0.66	0.75	1.28	0.43
Methylene chloride	2.09	2.27	2.28	2.33	2.28	2.13	2.62	2.38
Acrylonitrile	10.03	9.20	9.07	9.34	10.07	9.82	10.01	11.29
Carbon disulfide	1.51	1.75	1.60	1.58	1.70	1.74	1.76	1.79
trans-1,2-Dichloroethene	1.88	1.82	1.73	1.73	2.10	1.93	1.96	1.97
cis-1,2-Dichloroethene	1.87	1.79	1.86	1.80	1.92	2.01	1.80	2.07
Methyl-t-butyl ether (MTBE)	1.66	1.66	1.90	1.79	1.79	1.94	2.09	1.82
n-Hexane	1.79	1.77	1.69	1.59	1.64	1.66	2.00	1.99
Vinyl Acetate	1.09	1.05	0.76	0.84	0.47	0.93	0.81	0.44
1,1-Dichloroethane	1.89	1.94	1.94	1.96	2.06	1.99	2.17	2.03
2,2-Dichloropropane	0.00	0.05	0.31	0.05	0.11	0.52	2.51	0.00
2-Butanone (MEK)	0.00	0.00	0.00	0.00	0.40	0.77	0.71	0.00
Propionitrile	0.00	0.26	0.00	0.00	0.67	0.42	0.00	0.00
Methyl acrylate	0.90	0.82	0.00	0.81	0.62	0.74	0.73	1.10
Bromochloromethane	1.82	1.77	1.89	1.96	1.97	2.03	2.10	1.95
Methacrylonitrile	1.73	2.03	1.84	2.16	1.78	1.87	2.02	2.17
Tetrahydrofuran (THF)	2.40	2.19	1.85	1.56	2.45	2.47	2.04	2.16
Chloroform	3.21	3.23	3.02	3.12	3.13	3.22	3.28	3.49
Dibromofluoromethane	50.21	50.12	50.44	51.11	50.65	52.54	54.04	52.34
1,1,1-Trichloroethane	1.39	1.55	1.85	1.61	1.56	2.09	2.28	1.85
Butyl chloride (1-chlorobutane	2.68	2.77	2.59	2.69	2.64	2.72	2.58	2.94
Carbon tetrachloride	1.21	1.63	2.19	1.91	1.67	2.58	2.53	2.04
1,1-Dichloropropene	1.96	1.87	1.71	1.76	2.10	1.96	2.07	2.18

Method Detection Limit (MDL) Study Final Report

Note: CL = confidence limit
Check T value @ 99% Confidence Level for No. of replicates in study

Compound ID:	Mean Conc	Mean % rec	Spk Amt	Std Dev	T Value	MDL	Units	Upper CL	Lower CL	RSD %
Dichlorodifluoromethane	1.83	91.7	2	0.14	3.00	0.42	ug/L	0.81	0.29	7.0
Chloromethane	1.89	94.4	2	0.16	3.00	0.48	ug/L	0.92	0.33	8.0
Vinyl Chloride	1.96	98.2	2	0.11	3.00	0.34	ug/L	0.66	0.24	5.7
Bromomethane ol	2.92	146.1	2	0.35	3.00	1.05	ug/L	2.02	0.73	17.6
Chloroethane	2.10	105.2	2	0.27	3.00	0.82	ug/L	1.57	0.56	13.7
Trichlorofluoromethane	2.05	102.3	2	0.16	3.00	0.47	ug/L	0.90	0.32	7.8
Ethyl ether	2.18	109.1	2	0.15	3.00	0.44	ug/L	0.85	0.30	7.3
Acrolein	19.08	190.8	10	3.18	3.00	9.54	ug/L	18.33	6.59	31.8
Acetone	3.07	153.6 •	2	0.67	3.00	2.01	ug/L	3.86	1.39	33.5
1,1-Dichloroethene	1.89	94.3	2	0.10	3.00	0.30	ug/L	0.58	0.21	5.0
Iodomethane	1.43	71.3	2	0.14	3.00	0.40	ug/L	0.78	0.28	6.8
Allyl chloride	0.68	34.1 •	2	0.29	3.00	0.88	ug/L	1.69	0.61	14.7
Methylene chloride	2.30	114.9	2	0.16	3.00	0.49	ug/L	0.93	0.34	8.1
Acrylonitrile	9.85	98.5	10	0.70	3.00	2.11	ug/L	4.05	1.46	7.0
Carbon disulfide	1.68	83.9	2	0.10	3.00	0.31	ug/L	0.59	0.21	5.1
trans-1,2-Dichloroethene	1.89	94.5	2	0.13	3.00	0.38	ug/L	0.73	0.26	6.4
cis-1,2-Dichloroethene	1.89	94.5	2	0.10	3.00	0.31	ug/L	0.60	0.21	5.2
Methyl-t-butyl ether (MTBE)	1.83	91.6	2	0.14	3.00	0.43	ug/L	0.83	0.30	7.2
n-Hexane	1.77	88.3	2	0.16	3.00	0.47	ug/L	0.90	0.32	7.8
Vinyl Acetate	0.80	39.9 •	2	0.24	3.00	0.72	ug/L	1.39	0.50	12.0
1,1-Dichloroethane	2.00	99.9	2	0.09	3.00	0.26	ug/L	0.51	0.18	4.4
2,2-Dichloropropane	0.44	22.2 •	2	0.85	3.00	2.56	ug/L	4.92	1.77	42.7
2-Butanone (MEK)	0.24	11.8 •	2	0.34	3.00	1.02	ug/L	1.96	0.71	17.1
Propionitrile	0.17	8.4 •	2	0.26	3.00	0.77	ug/L	1.48	0.53	12.9
Methyl acrylate	0.72	35.8 •	2	0.32	3.00	0.96	ug/L	1.85	0.67	16.1
Bromochloromethane	1.94	96.8	2	0.11	3.00	0.32	ug/L	0.62	0.22	5.4
Methacrylonitrile	1.95	97.5	2	0.17	3.00	0.51	ug/L	0.97	0.35	8.4
Tetrahydrofuran (THF)	2.14	107.0	2	0.32	3.00	0.95	ug/L	1.83	0.66	15.9
Chloroform	3.21	160.6 •	2	0.14	3.00	0.42	ug/L	0.80	0.29	6.9
Dibromofluoromethane	51.43	102.9	50	1.40	3.00	4.20	ug/L	8.07	2.90	2.8
1,1,1-Trichloroethane	1.77	88.6	2	0.30	3.00	0.90	ug/L	1.74	0.62	15.1
Butyl chloride (1-chlorobutane	2.70	135.1	2	0.12	3.00	0.35	ug/L	0.67	0.24	5.8
Carbon tetrachloride	1.97	98.5	2	0.47	3.00	1.40	ug/L	2.69	0.97	23.3
1,1-Dichloropropene	1.95	97.6	2	0.16	3.00	0.49	ug/L	0.95	0.34	8.2

Method Detection Limit (MDL) Study Final Report

Compound ID:	%R is <50 - 150	Spk/MDL	Spk Conc <10 times MDL	MDL Spk Conc is >MDL
Dichlorodifluoromethane	Y	4.8	Y	Y
Chloromethane	Y	4.2	Y	Y
Vinyl Chloride	Y	5.8	Y	Y
Bromomethane	Y	1.9	Y	Y
Chloroethane	Y	2.4	Y	Y
Trichlorofluoromethane	Y	4.3	Y	Y
Ethyl ether	Y	4.5	Y	Y
Acrolein	N	1.0	Y	Y
Acetone	N	1.0	Y	N
1,1-Dichloroethene	Y	6.6	Y	Y
Iodomethane	Y	4.9	Y	Y
Allyl chloride	N	2.3	Y	Y
Methylene chloride	Y	4.1	Y	Y
Acrylonitrile	Y	4.7	Y	Y
Carbon disulfide	Y	6.5	Y	Y
trans-1,2-Dichloroethene	Y	5.2	Y	Y
cis-1,2-Dichloroethene	Y	6.4	Y	Y
Methyl-t-butyl ether (MTBE)	Y	4.6	Y	Y
n-Hexane	Y	4.3	Y	Y
Vinyl Acetate	N	2.8	Y	Y
1,1-Dichloroethane	Y	7.6	Y	Y
2,2-Dichloropropane	N	0.8	Y	N
2-Butanone (MEK)	N	2.0	Y	Y
Propionitrile	N	2.6	Y	Y
Methyl acrylate	N	2.1	Y	Y
Bromochloromethane	Y	6.2	Y	Y
Methacrylonitrile	Y	4.0	Y	Y
Tetrahydrofuran (THF)	Y	2.1	Y	Y
Chloroform	N	4.8	Y	Y
Dibromofluoromethane	Y	11.9	N	Y
1,1,1-Trichloroethane	Y	2.2	Y	Y
Butyl chloride (1-chlorobutane	Y	5.8	Y	Y
Carbon tetrachloride	Y	1.4	Y	Y
1,1-Dichloropropene	Y	4.0	Y	Y

Method Detection Limit (MDL) Study Final Report

	#1	#2	#3	#4	#5	#6	#7	#8
Compound ID:	c57740.d	c57741.d	c57742.d	c57743.d	c57744.d	c57745.d	c57746.d	c57747.d
1,2-Dichloroethane	1.90	1.85	2.00	1.91	2.22	1.93	2.00	2.36
Benzene	1.89	1.88	1.94	1.87	1.89	1.87	1.97	2.14
n-Heptane	1.46	1.33	1.53	1.26	1.49	1.29	1.20	1.35
Trichloroethene	1.97	1.97	1.81	1.92	2.07	2.03	2.11	2.19
Methyl methacrylate	0.71	0.62	0.74	0.80	0.79	0.96	0.82	0.80
1,2-Dichloropropane	1.58	1.90	1.84	2.02	1.94	1.90	1.83	2.02
Bromodichloromethane	1.41	1.47	2.10	1.67	1.61	1.87	2.09	1.92
Dibromomethane	1.93	2.24	2.17	2.05	2.53	2.50	2.53	2.49
2-Nitropropane	0.68	1.94	1.89	1.86	0.79	1.74	0.64	1.55
2-Chloroethyl vinyl ether	0.62	0.63	0.76	0.51	0.66	0.93	0.76	0.53
cis-1,3-Dichloropropene	1.29	1.40	1.45	1.37	1.46	1.35	1.23	1.44
4-Methyl-2-pentanone	1.69	1.72	2.03	2.01	2.09	1.63	1.76	1.66
Toluene	1.82	1.92	1.80	1.86	1.80	1.78	1.79	2.00
trans-1,3-Dichloropropene	0.93	0.85	0.82	0.87	0.94	0.89	0.80	1.00
1,1,2-Trichloroethane	2.00	2.03	1.82	1.95	1.85	1.96	1.89	2.03
d8-Toluene	49.19	49.02	47.53	49.83	49.39	46.14	48.95	49.42
1,2-Dibromoethane	1.42	1.47	1.55	1.45	1.55	1.51	1.35	1.48
1,4-Dichloro-2-butene	0.28	0.38	0.26	0.41	0.43	0.34	0.36	0.27
Ethyl methacrylate	0.73	0.81	0.77	0.86	0.73	0.86	0.74	0.81
2-Hexanone	0.16	0.42	0.24	0.36	0.36	0.39	0.57	0.22
Tetrachloroethene	3.21	3.38	3.18	3.34	3.51	3.35	3.57	3.89
1,3-Dichloropropane	1.73	1.68	1.84	1.87	1.94	1.85	1.82	1.91
Chlorodibromomethane	1.65	1.71	1.64	1.79	1.70	1.67	1.77	1.84
1,2-Dibromoethane (EDB)	1.44	1.53	1.57	1.47	1.60	1.58	1.43	1.54
Chlorobenzene	1.83	1.99	1.77	1.85	1.84	1.90	1.83	2.02
Ethyl benzene	1.50	1.65	1.55	1.57	1.64	1.64	1.62	1.66
m&p-Xylene	2.98	3.29	3.08	2.71	3.11	3.05	3.00	3.33
o-Xylene	1.43	1.49	1.35	1.34	1.56	1.44	1.44	1.53
Styrene	1.15	1.26	1.24	1.24	1.28	1.25	1.26	1.33
Bromoform	1.43	1.63	1.33	1.32	1.62	1.54	1.65	1.65
Isopropylbenzene (cumene)	1.36	1.45	1.31	1.32	1.37	1.39	1.34	1.51
4-Bromofluorobenzene	45.23	43.17	41.78	44.03	45.30	43.63	43.80	45.28
1,1,1,2-Tetrachloroethane	1.75	1.97	1.64	1.86	1.96	1.79	1.97	2.02
1,1,2,2-Tetrachloroethane	2.26	2.32	2.49	2.38	2.38	2.26	2.32	2.33
1,2,3-Trichloropropane	2.54	2.16	2.59	2.29	2.11	2.15	2.25	2.14
n-Propylbenzene	1.65	1.75	1.93	1.70	1.88	1.74	1.72	1.99
o-Chlorotoluene	2.13	2.41	2.56	2.25	2.57	2.50	2.24	2.62
p-Chlorotoluene	1.83	1.97	2.28	1.94	2.11	2.11	2.03	2.26
1,2,4-Trimethylbenzene	1.93	2.01	2.13	1.85	1.98	1.99	1.94	2.13

Method Detection Limit (MDL) Study Final Report

Compound ID:	Mean Conc	Mean % rec	Spk Amt	Std Dev	T Value	MDL	Units	Upper CL	Lower CL	RSD %
1,2-Dichloroethane	2.02	101.1	2	0.18	3.00	0.53	ug/L	1.02	0.37	8.9
Benzene	1.93	96.6	2	0.09	3.00	0.27	ug/L	0.53	0.19	4.6
n-Heptane	1.36	68.2	2	0.12	3.00	0.35	ug/L	0.68	0.24	5.9
Trichloroethene	2.01	100.4	2	0.12	3.00	0.35	ug/L	0.68	0.24	5.9
Methyl methacrylate	0.78	39.0 •	2	0.10	3.00	0.29	ug/L	0.56	0.20	4.9
1,2-Dichloropropane	1.88	93.9	2	0.14	3.00	0.42	ug/L	0.81	0.29	7.0
Bromodichloromethane	1.77	88.4	2	0.27	3.00	0.80	ug/L	1.54	0.55	13.3
Dibromomethane	2.31	115.3	2	0.24	3.00	0.72	ug/L	1.38	0.50	12.0
2-Nitropropane	1.39	69.3	2	0.58	3.00	1.74	ug/L	3.33	1.20	29.0
2-Chloroethyl vinyl ether	0.68	33.8 •	2	0.14	3.00	0.41	ug/L	0.79	0.29	6.9
cis-1,3-Dichloropropene	1.37	68.7	2	0.08	3.00	0.24	ug/L	0.47	0.17	4.1
4-Methyl-2-pentanone	1.82	91.2	2	0.19	3.00	0.56	ug/L	1.08	0.39	9.4
Toluene	1.85	92.3	2	0.08	3.00	0.23	ug/L	0.44	0.16	3.9
trans-1,3-Dichloropropene	0.89	44.4 •	2	0.07	3.00	0.20	ug/L	0.38	0.14	3.3
1,1,2-Trichloroethane	1.94	97.1	2	0.08	3.00	0.24	ug/L	0.46	0.17	4.0
d8-Toluene	48.68	97.4	50	1.23	3.00	3.69	ug/L	7.08	2.55	2.5
1,2-Dibromoethane	1.47	73.6	2	0.07	3.00	0.20	ug/L	0.39	0.14	3.4
1,4-Dichloro-2-butene	0.34	17.1 •	2	0.07	3.00	0.20	ug/L	0.38	0.14	3.3
Ethyl methacrylate	0.79	39.4 •	2	0.05	3.00	0.16	ug/L	0.31	0.11	2.7
2-Hexanone	0.34	17.0 •	2	0.13	3.00	0.39	ug/L	0.75	0.27	6.5
Tetrachloroethene	3.43	171.4 •	2	0.23	3.00	0.69	ug/L	1.32	0.47	11.4
1,3-Dichloropropane	1.83	91.5	2	0.09	3.00	0.26	ug/L	0.50	0.18	4.4
Chlorodibromomethane	1.72	86.1	2	0.07	3.00	0.22	ug/L	0.41	0.15	3.6
1,2-Dibromoethane (EDB)	1.52	76.0	2	0.07	3.00	0.20	ug/L	0.38	0.14	3.3
Chlorobenzene	1.88	93.9	2	0.09	3.00	0.26	ug/L	0.49	0.18	4.3
Ethyl benzene	1.60	80.2	2	0.06	3.00	0.17	ug/L	0.33	0.12	2.9
m&p-Xylene	3.07	76.7	4	0.19	3.00	0.58	ug/L	1.11	0.40	4.8
o-Xylene	1.45	72.4	2	0.08	3.00	0.23	ug/L	0.45	0.16	3.9
Styrene	1.25	62.6	2	0.05	3.00	0.15	ug/L	0.29	0.10	2.5
Bromoform	1.52	76.1	2	0.14	3.00	0.42	ug/L	0.82	0.29	7.1
Isopropylbenzene (cumene)	1.38	69.1	2	0.07	3.00	0.20	ug/L	0.39	0.14	3.4
4-Bromofluorobenzene	44.03	88.1	50	1.23	3.00	3.69	ug/L	7.09	2.55	2.5
1,1,1,2-Tetrachloroethane	1.87	93.5	2	0.13	3.00	0.40	ug/L	0.77	0.28	6.7
1,1,2,2-Tetrachloroethane	2.34	117.1	2	0.07	3.00	0.22	ug/L	0.43	0.16	3.7
1,2,3-Trichloropropane	2.28	113.9	2	0.19	3.00	0.56	ug/L	1.08	0.39	9.3
n-Propylbenzene	1.80	89.8	2	0.12	3.00	0.37	ug/L	0.70	0.25	6.1
o-Chlorotoluene	2.41	120.5	2	0.18	3.00	0.55	ug/L	1.05	0.38	9.1
p-Chlorotoluene	2.07	103.3	2	0.16	3.00	0.47	ug/L	0.90	0.32	7.8
1,2,4-Trimethylbenzene	2.00	99.8	2	0.10	3.00	0.29	ug/L	0.56	0.20	4.8

Method Detection Limit (MDL) Study Final Report

Compound ID:	%R is <50 - 150	Spk/MDL	Spk Conc <10 times	MDL Spk Conc
1,2-Dichloroethane	Y	3.8	Y	Y
Benzene	Y	7.3	Y	Y
n-Heptane	Y	5.7	Y	Y
Trichloroethene	Y	5.6	Y	Y
Methyl methacrylate	N	6.8	Y	Y
1,2-Dichloropropane	Y	4.8	Y	Y
Bromodichloromethane	Y	2.5	Y	Y
Dibromomethane	Y	2.8	Y	Y
2-Nitropropane	Y	1.2	Y	Y
2-Chloroethyl vinyl ether	N	4.8	Y	Y
cis-1,3-Dichloropropene	Y	8.2	Y	Y
4-Methyl-2-pentanone	Y	3.6	Y	Y
Toluene	Y	8.6	Y	Y
trans-1,3-Dichloropropene	N	10.0	N	Y
1,1,2-Trichloroethane	Y	8.3	Y	Y
d8-Toluene	Y	13.6	N	Y
1,2-Dibromoethane	Y	9.9	Y	Y
1,4-Dichloro-2-butene	N	10.2	N	Y
Ethyl methacrylate	N	12.3	N	Y
2-Hexanone	N	5.1	Y	Y
Tetrachloroethene	N	2.9	Y	Y
1,3-Dichloropropane	Y	7.7	Y	Y
Chlorodibromomethane	Y	9.3	Y	Y
1,2-Dibromoethane (EDB)	Y	10.2	N	Y
Chlorobenzene	Y	7.8	Y	Y
Ethyl benzene	Y	11.6	N	Y
m&p-Xylene	Y	6.9	Y	Y
o-Xylene	Y	8.5	Y	Y
Styrene	Y	13.3	N	Y
Bromoform	Y	4.7	Y	Y
Isopropylbenzene (cumene)	Y	9.8	Y	Y
4-Bromofluorobenzene	Y	13.5	N	Y
1,1,1,2-Tetrachloroethane	Y	5.0	Y	Y
1,1,2,2-Tetrachloroethane	Y	8.9	Y	Y
1,2,3-Trichloropropane	Y	3.6	Y	Y
n-Propylbenzene	Y	5.5	Y	Y
o-Chlorotoluene	Y	3.7	Y	Y
p-Chlorotoluene	Y	4.3	Y	Y
1,2,4-Trimethylbenzene	Y	6.9	Y	Y

Method Detection Limit (MDL) Study Final Report

	#1	#2	#3	#4	#5	#6	#7	#8
Compound ID:	c57740.d	c57741.d	c57742.d	c57743.d	c57744.d	c57745.d	c57746.d	c57747.d
Bromobenzene	2.08	2.23	2.45	2.13	2.49	2.21	2.19	2.59
tert-Butylbenzene	1.70	1.86	2.13	2.03	1.95	1.71	1.89	2.08
Pentachloroethane	0.00	0.00	0.06	0.10	0.05	0.00	0.00	0.00
1,3,5-Trimethylbenzene	1.58	1.65	1.82	1.68	1.77	1.85	1.69	1.97
sec-Butylbenzene	1.47	1.47	1.71	1.28	1.56	1.62	1.57	1.68
1,3-Dichlorobenzene	1.79	1.56	1.64	1.40	1.66	1.86	1.61	1.69
p-Isopropyltoluene (cymene)	1.10	0.95	1.09	0.90	0.83	0.92	1.06	1.01
1,4-Dichlorobenzene	1.98	2.06	2.17	1.97	1.97	2.05	2.13	2.13
1,2-Dichlorobenzene	1.77	1.79	2.16	1.78	1.85	1.79	1.82	2.02
n-Butylbenzene	0.40	0.49	0.54	0.39	0.45	0.48	0.47	0.56
Hexachloroethane	1.81	1.92	2.06	1.63	1.96	1.75	2.17	1.94
1,2-Dibromo-3-chloropropane	0.70	2.92	1.21	0.71	0.48	2.14	0.84	1.61
1,2,3-Trichlorobenzene	1.50	1.54	1.33	0.87	1.55	1.16	1.15	1.23
Hexachlorobutadiene	1.40	1.13	1.81	1.43	1.22	1.41	1.72	1.53
1,2,4-Trichlorobenzene	1.99	1.44	1.28	1.16	1.34	1.26	0.84	1.37
Naphthalene	1.42	1.26	1.10	0.91	1.02	1.03	1.02	0.94

Method Detection Limit (MDL) Study Final Report

Compound ID:	Mean Conc	Mean % rec	Spk Amt	Std Dev	T Value	MDL	Units	Upper CL	Lower CL	RSD %
Bromobenzene	2.30	114.8	2	0.19	3.00	0.56	ug/L	1.08	0.39	9.4
tert-Butylbenzene	1.92	95.9	2	0.16	3.00	0.48	ug/L	0.92	0.33	8.0
Pentachloroethane	0.03	1.3	2	0.04	3.00	0.12	ug/L	0.22	0.08	1.9
1,3,5-Trimethylbenzene	1.75	87.6	2	0.13	3.00	0.38	ug/L	0.73	0.26	6.3
sec-Butylbenzene	1.55	77.3	2	0.14	3.00	0.41	ug/L	0.79	0.29	6.9
1,3-Dichlorobenzene	1.65	82.6	2	0.14	3.00	0.42	ug/L	0.81	0.29	7.0
p-Isopropyltoluene (cymene)	0.98	49.1	2	0.10	3.00	0.29	ug/L	0.56	0.20	4.9
1,4-Dichlorobenzene	2.06	102.9	2	0.08	3.00	0.24	ug/L	0.46	0.17	4.0
1,2-Dichlorobenzene	1.87	93.6	2	0.14	3.00	0.42	ug/L	0.82	0.29	7.1
n-Butylbenzene	0.47	23.6	2	0.06	3.00	0.18	ug/L	0.35	0.12	3.0
Hexachloroethane	1.91	95.3	2	0.17	3.00	0.52	ug/L	0.99	0.36	8.6
1,2-Dibromo-3-chloropropane	1.33	66.3	2	0.85	3.00	2.54	ug/L	4.87	1.75	42.3
1,2,3-Trichlorobenzene	1.29	64.6	2	0.24	3.00	0.71	ug/L	1.36	0.49	11.8
Hexachlorobutadiene	1.46	72.8	2	0.23	3.00	0.69	ug/L	1.32	0.47	11.5
1,2,4-Trichlorobenzene	1.34	66.8	2	0.32	3.00	0.97	ug/L	1.85	0.67	16.1
Naphthalene	1.09	54.4	2	0.17	3.00	0.51	ug/L	0.99	0.35	8.6

TABLE 13A

First Environmental Laboratories Detection and Reporting Limits

Volatile Organics (VOCs) -- Target Compound List (TCL) -- Method 8260B

The Lockformer Company / Lisle, Illinois

Chemical Name	Water (µg/L)		Soil (µg/Kg)		Extractable Soil (µg/kg)	
	MDL	RQL	MDL	RQL	MDL	RQL
1,1,1-Trichloroethane	0.40	1.0	1.21	5.0	0.40	100
1,1,2,2-Tetrachloroethane	0.22	1.0	0.45	5.0	0.22	100
1,1,2-Trichloroethane	0.24	1.0	0.48	5.0	0.24	100
1,1-Dichloroethane	0.26	1.0	1.02	5.0	0.26	100
1,1-Dichloroethene	0.30	1.0	1.72	5.0	0.30	100
1,2-Dichlorobenzene	0.42	1.0	0.49	5.0	0.42	100
1,2-Dichloroethane	0.53	1.0	0.89	5.0	0.53	100
1,2-Dichloropropane	0.42	1.0	0.81	5.0	0.42	100
1,3-Dichlorobenzene	0.42	1.0	0.69	5.0	0.42	100
1,4-Dichlorobenzene	0.24	1.0	0.60	5.0	0.24	100
2-Butanone	1.02	5.0	1.16	10	1.02	100
2-Hexanone	0.39	5.0	0.55	10	0.39	100
4-Methyl-2-Pentanone	0.56	5.0	0.76	10	0.56	100
Acetone	2.01	5.0	1.87	10	2.01	100
Benzene	0.27	1.0	0.81	5.0	0.27	100
Bromodichloromethane	0.80	1.0	0.64	5.0	0.80	100
Bromoform	0.42	1.0	0.30	5.0	0.42	100
Bromomethane	1.05	2.0	1.03	10	1.05	100
Carbon Disulfide	0.31	1.0	1.59	5.0	0.31	100
Carbon Tetrachloride	0.48	1.0	1.40	5.0	0.48	100
Chlorobenzene	0.26	1.0	0.72	5.0	0.26	100
Chloroethane	0.82	2.0	1.17	10	0.82	100
Chloroform	0.42	1.0	0.99	5.0	0.42	100
Chloromethane	0.48	2.0	1.09	10	0.48	100
cis-1,2-Dichloroethene	0.31	1.0	0.60	5.0	0.31	100
cis-1,3-Dichloropropene	0.24	1.0	0.53	5.0	0.24	100
Dibromochloromethane	0.80	1.0	0.40	5.0	0.80	100
Ethylbenzene	0.17	1.0	0.88	5.0	0.17	100
Total xylenes	0.23	3.0	1.65	15	0.23	100
Methylene Chloride	0.49	1.0	1.23	5.0	0.49	100
Styrene	0.15	1.0	0.53	5.0	0.15	100
Tetrachloroethene	0.69	1.0	1.23	5.0	0.69	100
Toluene	0.23	1.0	0.79	5.0	0.23	100
trans-1,2-Dichloroethene	0.38	1.0	1.22	5.0	0.38	100
trans-1,3-Dichloropropene	0.20	1.0	0.28	5.0	0.20	100
Trichloroethene	0.35	1.0	1.01	5.0	0.35	100
Vinyl Acetate	0.72	1.0	0.83	5.0	0.72	100
Vinyl Chloride	0.34	2.0	1.53	10	0.34	100

NOTES:

Soil MDL Study performed 04/02 / Aqueous MDL Study performed 03/02

Extractable Soil MDL values are the values determined from the Aqueous MDL Study performed 03/02.

RQL = Reportable Quantitation Limit

MDL = Method Detection Limit (as defined and calculated in 40CFR, Part 136, Appendix B)

The Analytical Report will consist of the following:

- Chain of Custody (COC) documentation
- Sample Results
- Reporting Limits
- Method Citations .
- Note: a "J" flag will be used to indicate positive results above the Method Detection Limit (MDL), but below the established Reporting Limit (RL).
- Results for soil samples will be reported on a dry weight basis.

A QC Package will be provided and it will consist of the following:

- Case Narrative
- Surrogate recoveries
- Method Blank Association Form
- Method Blank results
- Laboratory Control Spike results
- Batch or client specific Matrix Spike/Matrix Spike Duplicate (MS/MSD) results. If MS/MSD data represents batch QC, a notation will be included in the case narrative.