INSTALLATION RESTORATION PROGRAM

FINAL
REMEDIAL INVESTIGATION REPORT

APPENDICES

110th FIGHTER WING
MICHIGAN AIR NATIONAL GUARD
BATTLE CREEK, MICHIGAN

JUNE 1996

19960801 107

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HAZARDOUS WASTE REMEDIAL ACTIONS PROGRAM
Environmental Restoration and Waste Management Programs
Oak Ridge, Tennessee 37831-7606
managed by LOCKHEED MARTIN ENERGY SYSTEMS, INC.
for the U.S. DEPARTMENT OF ENERGY under contract DE-AC05-84OR21400

REPORT DOCUMENTATION PAGE

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OMB No. 0704-0188

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1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
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Installation Restoration Program Remedial Investigation Report. WK Kellogg, Battle Creek, MI, Volume II

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Oak Ridge TN

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Hazardous Waste Remedial Actions Program
Martin Marietta Energy Systems, Inc.
Oak Ridge, TN 37831

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13. ABSTRACT *(Maximum 200 words)*

Remedial Investigation Report of Sites 1 and 3, AOC B, and base boundary wells at WK Kellogg, Battle Creek, MI, volume II. A Remedial Investigation was performed at WK Kellogg to delineate the horizontal and vertical extent of contamination. The sites involved in this investigation include: Site 1 -- Fuel Tank Farm/ AOC B -- Motor Pool Drainage Ditch; Site 3 -- Fire Training Area; Base Boundary Wells. The recommendations are that Site 1/ AOC B, and Site 3 continue on to a Feasibility Study and Remediation.

14. SUBJECT TERMS

Installation Restoration Program; Air National Guard; Remedial Investigation; WK Kellogg, Battle Creek, MI

15. NUMBER OF PAGES

201

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G	- Grant	TA	- Task
PE	- Program Element	WU	- Work Unit Accession No.

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FINAL

INSTALLATION RESTORATION PROGRAM

REMEDIAL INVESTIGATION REPORT

110th FIGHTER WING
MICHIGAN AIR NATIONAL GUARD
BATTLE CREEK, MICHIGAN

Submitted to:

AIR NATIONAL GUARD READINESS CENTER
ANDREWS AFB, MARYLAND

Submitted by:

HAZARDOUS WASTE REMEDIAL ACTIONS PROGRAM
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
Oak Ridge, Tennessee 37831

for the:

U.S. DEPARTMENT OF ENERGY

Prepared by:

EARTH TECH, Inc.
Oak Ridge, Tennessee 37830

JUNE 1996

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BATTLE CREEK, MICHIGAN

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APPENDIX A: FIELD CHANGE REQUEST FORMS

Copy each for K-20 files

Number 01

TECHNICAL RECORD OF PROJECT CHANGE	
1a. Project Title: 110th Fighter Group, Michigan Air National Guard, Battle Creek, Michigan	
1b. Contract No.: 43B-89785C	1c. Task Order No.: K-20
1d. SOW Date: February 3, 1994	1e. Affected SOW Task: Task 08
1f. Description of and Justification for Change: Add water quality parameters to May 1994 round of groundwater analyses (see attached)	
2a. Effective Start Date: 2/6/94	2b. End Date:
2c. Impact on Overall Project Schedule/Deliverables: No impact	
3. Estimated Cost Impacts: $4702 (see attached)	
3a. Est. Labor Hours: N/A	Est. Labor Cost
3b. Est. Persons/Trips: N/A	Est. Travel Cost
3c. Subcontractor 1: $4702 (laboratory)	Est. Sub 1 Cost
3d. Subcontractor 2: N/A	Est. Sub 2 Cost
3e. Other Direct Costs: N/A	Est. ODCs Cost
	EST. TOTAL COST $4702
4a. Requested Action: Approve as requested	
	4b. Date Needed:
4c. The HAZWRAP Project Manager is notified of the need for change in project cost, schedule, direction, or scope. This form does NOT satisfy Sect. 3, "Changes," of contract Terms and Conditions. Submitted by: Jack Briegel JS Briegel Date: 2/6/95	
5. Acknowledgement of Receipt: HAZWRAP Project Manager (Initial Only) TC Date: 2-7-95	
6. Distribution by HAZWRAP Energy Systems: ___ GRP Ldr _____ ___ Buyer _____ ___ Hydro _____ ___ QA _____ ___ QC _____	Sponsor: ___ Project Officer Subcontractor: ___ Project Manager

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Number 03

TECHNICAL RECORD OF PROJECT CHANGE	
1a. Project Title: 110th Fighter Group, Michigan Air National Guard, Battle Creek, Michigan	
1b. Contract No.: 43B-99785C	1c. Task Order No.: K-20
1d. SOW Date: February 3, 1994	1e. Affected SOW Task: Task 08
1f. Description of and Justification for Change: Add all metals included in the Michigan 10 metals list to Site 1 soil analysis (see attached)	
2a. Effective Start Date: 2/6/94	2b. End Date:
2c. Impact on Overall Project Schedule/Deliverables: No impact	
3. Estimated Cost Impacts: $ (see attached)	
3a. Est. Labor Hours: N/A	Est. Labor Cost
3b. Est. Persons/Trips: N/A	Est. Travel Cost
3c. Subcontractor 1: $4,500	Est. Sub 1 Cost $4,500 (unburdened)
3d. Subcontractor 2: N/A	Est. Sub 2 Cost
3e. Other Direct Costs: N/A	Est. ODCs Cost
	EST. TOTAL COST $5,199
4a. Requested Action: Approve as requested	
	4b. Date Needed: 2/13/95
4c. The HAZWRAP Project Manager is notified of the need for change in project cost, schedule, direction, or scope. This form does NOT satisfy Sect. 3, "Changes," of contract Terms and Conditions. Submitted by: Jack Breazeal (JB Breazeal)	Date: 2/6/95
5. Acknowledgement of Receipt: HAZWRAP Project Manager (Initial Only) TFC	Date: 2-7
6. Distribution by HAZWRAP Energy Systems: __ GRP Ldr _____ __ Buyer _____ __ Hydro _____ __ QA _____ __ QC _____	Sponsor: __ Project Officer Subcontractor: __ Project Manager

C:\batork\tpo.03

Number 04

TECHNICAL RECORD OF PROJECT CHANGE	
1a. Project Title: 110th Fighter Group, Michigan Air National Guard, Battle Creek, Michigan	
1b. Contract No.: 43B-99785C	1c. Task Order No.: K-20
1d. SOW Date: February 3, 1994	1e. Affected SOW Task: Task 09 (RI Report
1f. Description of and Justification for Change: Add the Area of Concern B soils, investigated during the PA/SI, into the Site 1 Remedial Investigation risk assessment. Include the AOC B soil risk assessment into the Remedial Investigation report.	
2a. Effective Start Date: 5/1/95	2b. End Date:
2c. Impact on Overall Project Schedule/Deliverables: No impact	
3. Estimated Cost Impacts: see following breakdown	
3a. Est. Labor Hours: 24	Est. Labor Cost: $1,000
3b. Est. Persons/Trips:----	Est. Travel Cost ---
3c. Subcontractor 1:----	Est. Sub 1 Cost ----
3d. Subcontractor 2:-----	Est. Sub 2 Cost ----
3e. Other Direct Costs: -----	Est. ODCs Cost ----
	EST. TOTAL COST $1,000
4a. Requested Action: Approve as requested	
	4b. Date Needed:
4c. The HAZWRAP Project Manager is notified of the need for change in project cost, schedule, direction, or scope. This form does NOT satisfy Sect. 3, "Changes," of contract Terms and Conditions. Submitted by: JS Bruegel	Date: 5/2/95
5. Acknowledgement of Receipt: HAZWRAP Project Manager (Initial Only)	Date:
6. Distribution by HAZWRAP Energy Systems: __ GRP Ldr _____ __ Buyer _____ __ Hydro _____ __ QA _____ __ QC _____	Sponsor: __ Project Officer Subcontractor: __ Project Manager

To: Tom Cady (615) 435-3709 (Rx)

The Earth Technology Corporation

Field change No. 2
Page 1 of 1

FIGURE 2-10 Field Change Request

Project name 110th Fo, MIANG, BATTLE CREEK Project Number 948901-08
Applicable Document DRAFT FINAL RI WP Date 11/8/94

Description: Add one optional GW sampling point (GW12: add soil borings.. as illustrated on the attached map

Minor change ☒ Major change ☐ Major project impact ☐
Requested by: Jack Briegel

Reason for change:
Two source areas have been identified at Site 1 the tanks themselves and a source south of the tanks (IGW6); the abandoned fuel line is a suspected source; these sampling points will investigate this suspect
Recommended disposition: source
approve as recommended

Impact on present and completed work:
no significant impact

Accepted ☒ Rejected ☐ Signature J Briegel Project Manager Date 11/8/94
Accepted ☐ Rejected ☐ Signature N/A Project QA/QC Officer Date

(Required prior to implementation of major changes)
Accepted ☐ Rejected ☐ Signature Program Manager Date
Accepted ☐ Rejected ☐ Signature Program QA/QC Officer Date

(Required prior to implementation of changes with major project impact)
Approved ☐ Rejected ☐ Signature Tom Cady CLIENT Project Manager Date 11-8-94

Final Disposition

Signature Date

The Earth Technology Corporation

Field change No. 3 RI
Page 1 of 1

FIGURE 2-10 Field Change Request

Project name 110th FD MINING RI Project Number 94890I-08

Applicable Document Draft Final RI Work Plan Date Sept. 1994

Description: change groundwater sampling methodology - precleaned Teflon bailers will be used to collect the samples - no rinsates will be collected from the bailers

Minor change [X] Major change [ ] Major project impact [ ]

Requested by: Jack Briegel

Reason for change:

sample integrity is not affected: the use of disposable bailers eliminates the potential that samples can be cross-contaminated by decontaminated, non-dedicated bailers using

Recommended disposition:

approve as recommended

Impact on present and completed work:

no impact - minor cost savings by eliminating rinsate blanks

Accepted [X] Rejected [ ] Signature J S Briegel Project Manager Date 12/28/94

Accepted [ ] Rejected [ ] Signature _____ Project QA/QC Officer Date _____

(Required prior to implementation of major changes)

Accepted [ ] Rejected [ ] Signature _____ Program Manager Date _____

Accepted [ ] Rejected [ ] Signature _____ Program QA/QC Officer Date _____

(Required prior to implementation of changes with major project impact)

Approved [ ] Rejected [ ] Signature Tom Cauley CLIENT Project Manager Date 12-29-94

Final Disposition _____

Signature _____ Date _____

Form3E-1
6/30/89

The Earth Technology Corporation

Field change No. 5 RI
Page 1 of 1

FIGURE 2-10 Field Change Request

Project name 110th FG, MIANG Battle Creek, Mich Project Number 948901-

Applicable Document Draft Final RI WP Date 12/28/94

Description: Sample only BC-MW4 and BC-MW16 (new wells). Collect samples for VOC, SVOC, TAL metals, NO_3^{2-} SO_4^{2-} and Cl^-; confirm at Level "B" QA. JSB 12/28/94

Minor change [X] Major change [ ] Major project impact [ ]

Requested by: Jack Briegel

Reason for change: The MDNR has taken a position stating that a majority of the base monitoring wells are improperly constructed, and are only useable to collect "screening" data (Dec 12, 1994 letter - Lori Aronoff to Capt. Rod Vollmer (Chairmen). Until this issue is resolved the base boundary wells remaining will not be sampled.

Recommended disposition:
approve as recommended

Impact on present and completed work:
no impact

Accepted [X] Rejected [ ] Signature J S Briegel Project Manager Date 12-28-94

Accepted [ ] Rejected [ ] Signature _____ Project QA/QC Officer Date _____

(Required prior to implemenation of major changes)

Accepted [ ] Rejected [ ] Signature _____ Program Manager Date _____

Accepted [ ] Rejected [ ] Signature _____ Program QA/QC Officer Date _____

(Required prior to implementation of changes with major project impact)

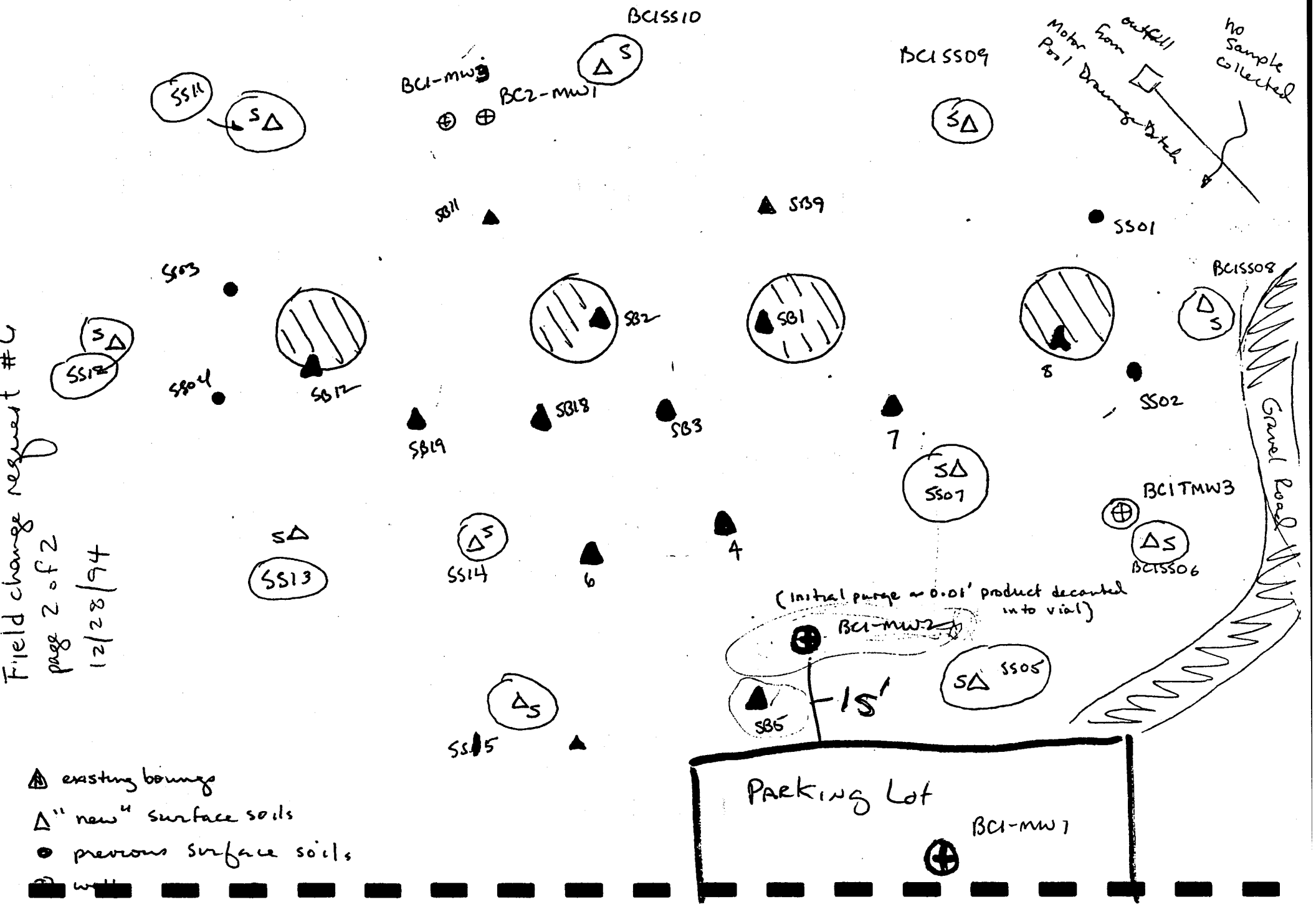
Approved [ ] Rejected [ ] Signature Tom Cady CLIENT Project Manager Date 12-28-94

Final Disposition _____

Signature _____ Date _____

Form 3E-1
6/30/89

12/19/94



Field change request #6
page 2 of 2
12/28/94

APPENDIX B: SCREENING DATA

- Summary Tables
- VOC Groundwater
- SVOC Groundwater
- VOC - SVOC Groundwater QA
- PNA - Soil
- VOC - Soil

Table B-1 Soil Screening Results
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs[a]	
			Ethylbenzene Concentration (µg/kg)	Total Xylene Concentration (µg/kg)
Site 1				
1SB1 (b)	11/6/94 00-01	2000	ND	ND
1SB1 (b)	11/6/94 05-07	< 200	17	83
1SB1	11/6/94 10-12	230	ND	ND
1SB1	11/6/94 15-17	290	ND	ND
1SB1 (b)	11/6/94 20-22	440	ND	ND
1SB1	11/6/94 25-27	< 200	ND	ND
1SB1D	11/6/94 25-27	200	ND	ND
1SB2 (b)	11/6/94 00-01	> 5,000	ND	ND
1SB2	11/6/94 05-07	560	ND	ND
1SB2 (b)	11/6/94 10-12	240	ND	ND
1SB2	11/6/94 15-17	5,000	24	230
1SB2 (b)	11/6/94 20-22	> 5,000	180	1,100

Table B-1 Soil Screening Results (continued)
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs[a]	
			Ethylbenzene Concentration (µg/kg)	Total Xylene Concentration (µg/kg)
1SB3 (b)	11/8/94 00-01	3,700	ND	ND
1SB3	11/8/94 05-07	< 200	NS	NS
1SB3D	11/8/94 05-07	< 200	NS	NS
1SB3	11/8/94 10-12	< 200	NS	NS
1SB3	11/8/94 15-17	2,200	NS	NS
1SB3 (b)	11/8/94 20-22	230,000	NS	NS
1SB4 (b)	11/6/94 00-01	> 5,000	NS	NS
1SB4	11/6/94 05-07	210	ND	ND
1SB4 (b)	11/6/94 10-12	< 200	ND	ND
1SB4D	11/6/94 10-12	400	ND	ND
1SB4	11/6/94 15-17	410	ND	ND
1SB5 (b)	11/7/94 00-01	4,900	NS	NS

Table B-1 Soil Screening Results (continued)
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs[a]	
			Ethylbenzene Concentration (µg/kg)	Total Xylene Concentration (µg/kg)
1SB5	11/7/94 05-07	250	ND	ND
1SB5 (b)	11/7/94 10-12	520	ND	ND
1SB5	11/7/94 15-17	< 200	ND	ND
1SB5 (b)	11/7/94 20-22	< 200	ND	ND
1SB5	11/7/94 25-27	>5,000	ND	ND
1SB5D	11/7/94 25-27	>5,000	ND	ND
1SB6	11/9/94 10-12	< 200	ND	ND
1SB7 (b)	11/9/94 00-01	> 5,000	NS	NS
1SB7	11/9/94 05-07	< 200	NS	NS
1SB7 (b)	11/9/94 10-12	420	NS	NS
1SB7	11/9/94 15-17	260	NS	NS
1SB8 (b)	11/7/94 00-01	> 5,000	NS	NS

Table B-1 Soil Screening Results (continued)
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs[a]	
			Ethylbenzene Concentration (µg/kg)	Total Xylene Concentration (µg/kg)
1SB8	11/7/94 05-07	< 200	ND	ND
1SB8	11/7/94 10-12	< 200	ND	ND
1SB8	11/7/94 15-17	NA	ND	ND
1SB8 (b)	11/7/94 20-22	270	ND	ND
1SB8D	11/7/94 20-22	300	NS	NS
1SB9 (b)	11/9/94 00-01	1,200	NS	NS
1SB9	11/9/94 05-07	< 200	NS	NS
1SB9	11/9/94 10-12	1,100	NS	NS
1SB9	11/9/94 15-17	< 200	NS	NS
1SB9	11/9/94 20-22	210	NS	NS
1SB11 (b)	11/9/94 00-01	870	NS	NS
1SB11	11/9/94 05-07	< 200	NS	NS

Table B-1 Soil Screening Results (continued)
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs[a]	
			Ethylbenzene Concentration (µg/kg)	Total Xylene Concentration (µg/kg)
1SB11	11/9/94 10-12	240	ND	ND
1SB11	11/9/94 15-17	< 200	NS	NS
1SB11 (b)	11/9/94 19-23	< 200	NS	NS
1SB11D (b)	11/9/94 19-23	< 200	NS	NS
1SB12 (b)	11/7/94 00-01	2,900	NS	NS
1SB12	11/7/94 05-07	< 200	ND	ND
1SB12	11/7/94 15-17	< 200	ND	ND
1SB12 (b)	11/7/94 20-22	< 200	ND	ND
1SB13	11/8/94 10-12	< 200	ND	ND
1SB14	11/8/94 10-12	< 200	ND	ND
1SB15 (b)	11/8/94 10-12	< 200	ND	ND
1SB16	11/8/94 10-12	300	ND	ND

Table B-1 Soil Screening Results (continued)
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs[a]	
			Ethylbenzene Concentration (µg/kg)	Total Xylene Concentration (µg/kg)
1SB17	11/8/94 10-12	< 200	ND	ND
1SB18	11/9/94 05-07	< 200	NS	NS
1SB18	11/9/94 10-12	< 200	NS	NS
1SB18 (b)	11/9/94 15-17	> 5,000	NS	NS
1SB18D	11/9/94 15-17	> 5,000	NS	NS
1SB18	11/9/94 20-22	> 5,000	NS	NS
1SB19 (b)	11/10/94 00-01	790	NS	NS
1SB19	11/9/94 15-17	<200	NS	NS
1SB19	05-07	< 200	NS	NS
1SB19	10-12	< 200	NS	NS
1SB19 (b)	20-22	< 200	NS	NS
1MW2	05-07	< 200	NS	NS
1MW2 (b)	10-12	< 200	NS	NS
1MW2	15-17	< 200	NS	NS

Table B-1 Soil Screening Results (continued)
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs[a]	
			Ethylbenzene Concentration (µg/kg)	Total Xylene Concentration (µg/kg)
1MW2 (b)	20-22	< 200	NS	NS
BCISS01 (b)	11/10/94 00-01	> 5,000	NS	NS
BCISS02 (b)	11/10/94 00-01	> 5,000	NS	NS
BCISS03 (b)	11/10/94 00-01	> 5,000	NS	NS
BCISS04 (b)	11/10/94 00-01	3,400	NS	NS
BCISS05	12/17/94 00-01	> 5000	NS	NS
BCISS06	12/17/94 00-01	3700	NS	NS
BCISS07	12/17/94 00-01	> 50000	NS	NS
BCISS08	12/17/94 00-01	31000	NS	NS
BCISS09	12/17/94 00-01	4300	NS	NS
BCISS9D	12/17/94 00-01	4700	NS	NS
BCISS10	12/17/94 00-01	460000	NS	NS
BCISS11 (b)	12/17/94 00-01	< 200	NS	NS

Table B-1 Soil Screening Results (continued)
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs[a]	
			Ethylbenzene Concentration (µg/kg)	Total Xylene Concentration (µg/kg)
BCISS12 (b)	12/17/94 00-01	< 200	NS	NS
BCISS13 (b)	12/17/94 00-01	< 200	NS	NS
BCISS14 (b)	12/17/94 00-01	660	NS	NS
BCISS15	12/17/94 00-01	4600	NS	NS
Background				
BCBGSS01	12/17/94 00-01	< 1000	NS	NS
BCBGSS02	12/17/94 00-01	< 1000	NS	NS
BCBGSS03	12/17/94 00-01	> 1000	NS	NS
BCBGSS03D	12/17/94 00-01	> 1000	NS	NS
BCBGSS04	12/17/94 00-01	> 1000	NS	NS
BCBGSS05	12/17/94 00-01	< 1000	NS	NS
BCBGSS06	12/17/94 00-01	< 1000	NS	NS
BCBGSS06D	12/17/94 00-01	< 1000	NS	NS

Table B-1 Soil Screening Results (continued)
110th FG, MIANG, Battle Creek, Michigan

Sample Location	Date Sampled/ Depth (ft bgs)	PAH Concentration (ppb)	VOCs[a]	
			Ethylbenzene Concentration (µg/kg)	Total Xylene Concentration (µg/kg)
BCBGSS07	12/17/94 00-01	> 1000	NS	NS
BCBGSS08	12/17/94 00-01	> 1000	NS	NS
BCBG1 (b)	12/17/94 05-07	< 1000	NS	NS
BCBG2 (b)	12/17/94 05-07	< 1000	NS	NS
BCBG3 (b)	12/17/94 05-07	< 1000	NS	NS
BCBG4 (b)	12/17/94 05-07	< 1000	NS	NS

bgs below ground surface
VOC Volatile organic componds
NS - Not Sampled
ND - Not Detected
(a) - Benzene, toluene, TCE, PCE, and DCE were all non-detect in the soil screening results
(b) - Samples were confirmed
PAH Polyaromatic Hydrocarbon
µg/kg micrograms/kilogram

Table B-2 Detections of Organics in Groundwater Screening Samples
110th FG, MIANG, Battle Creek, Michigan

Sample Location	1GW1	1GW3	1GW4	1GW6	1GW10	1GW12	1GW13	1GW14	BC1TMW3	BC2-MW1
Date Sampled Depth (ft bgs)	12/15/94 40-38	11/2/94 34-36	11/3/94 26-28	11/2/94 28-30	12/15/94 25-27	11/6/94 43-45	12/14/94 25-27	12/15/94 40-42	12/15/94 25-32	11/6/94 NA
VOCs[2] (µg/l)(a)										
1,2,4-Trimethylbenzene					5.9					
1,3,5-Trimethylbenzene					10					
Benzene	2.1									
Chlorobenzene					2.1					
Chloroform										
Ethylbenzene			5.2	2.3	1.8					
Isopropylbenzene					2.8					
Methylene Chloride								0.5		
p-Isopropyltoluene					2.3					
s-Butylbenzene					3.6					
Tetrachloroethene					35			4.45	2.4	
Toluene	21	1.9			21			47.6	2.6	
Xylenes (o, m, & p)				25	7.3					
SVOCs[1] (µg/l)(a)										
1-Methylnaphthalene				1900	60	5.0	21			7.0
2-Methylnaphthalene				2500	26	7.0				7.0
Fluorene				420						
Naphthalene					473					6.0
Phenanthrene				880						

1 VOCs - Volatile Organic Compounds.
2 SVOCs - Semivolatile Organic Compounds.
3 Naphthelene was reported on the VOC and SVOC lists: this value is the hightest of the two results.

Sample location - D indicates duplicate sample.
(a) No entry indicates no detection.

µg/l micrograms/liter

November 1994 samples were analyzed for 6 VOCs (EPA SW8021) and 13 PAH compounds (EPA SW846 8270).
December 1994 samples were analyzed for 47 VOCs (EPA SW846 8260) and 60 SVOCs (EPA SW846 8270).

BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW1
25-27'

Submittal Number 32565- 1
Date Sampled: 11/03/94 Time: 16:10
Date Received: 11/04/94 Time: 08:00
Analysis Date: 11/07/94
Lab Sample No: 101952

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: 1GW14038 (106569)
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 11:30
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0001
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	2.1	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	21	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethlybenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

LIENT I.D.....: Sample ID: 1GW14038 (106569)
ATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 11:30
WORK DESCRIPTION...: Project ID: 110FG, MIANG

1GW1 40-38

LABORATORY I.D...: 114420-0001
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	ND	1.0	ug/l			
1,2,3-Tricholorbenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	100	0	%	86-115 %		
1,2-Dichloethane-d4	102	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/28/94	0	Month/Day/Year			

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW3
25'-27'

Submittal Number 32565- 1
Date Sampled: 11/03/94 Time: 10:30
Date Received: 11/03/94 Time: 14:30
Analysis Date: 11/03/94
Lab Sample No: 101896

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW3D
25-27'

Submittal Number 32565- 1
Date Sampled: 11/03/94 Time: 10:30
Date Received: 11/03/94 Time: 14:30
Analysis Date: 11/03/94
Lab Sample No: 101897

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: 1GW3 (106574)
DATE SAMPLED.....: 12/15/94 — Dec 34-36
TIME SAMPLED.....: 12:10
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0006
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	1.9	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethlybenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: 1GW3 (106574)
DATE SAMPLED.....: 12/15/94 — 34-36
TIME SAMPLED.....: 12:10
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0006
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	ND	1.0	ug/l			
1,2,3-Tricholorbenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	100	0	%	86-115 %		
1,2-Dichloethane-d4	98	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW4

Submittal Number 32565- 1
Date Sampled: 11/03/94 Time: 09:10
Date Received: 11/03/94 Time: 14:30
Analysis Date: 11/04/94
Lab Sample No: 101895

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<5.0	Tetrachloroethene	<5.0
cis-1,2-Dichloroethylene	<5.0	Toluene	<5.0
trans-1,2-Dichloroethene	<5.0	Trichloroethylene	<5.0
Ethylbenzene	**5.2**	Xylene, Total	<15

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW5

Submittal Number 32565- 1
Date Sampled: 11/03/94 Time: 14:15
Date Received: 11/04/94 Time: 08:00
Analysis Date: 11/04/94
Lab Sample No: 101951

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW6

Submittal Number 32565- 1
Date Sampled: 11/02/94 Time: 15:05
Date Received: 11/02/94 Time: 16:45
Analysis Date: 11/03/94
Lab Sample No: 101821

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<2.0	Tetrachloroethene	<2.0
cis-1,2-Dichloroethylene	<2.0	Toluene	<2.0
trans-1,2-Dichloroethene	<2.0	Trichloroethylene	<2.0
Ethylbenzene	**2.3**	Xylene, Total	**25**

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW7

Submittal Number 32565- 1
Date Sampled: 11/04/94 Time: 14:30
Date Received: 11/04/94 Time: 16:40
Analysis Date: 11/04/94
Lab Sample No: 102121

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW8

Submittal Number 32565- 1
Date Sampled: 11/02/94 Time: 17:30
Date Received: 11/02/94 Time: 00:00
Analysis Date: 11/03/94
Lab Sample No: 101845

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW9

Submittal Number 32565- 1
Date Sampled: 11/04/94 Time: 16:45
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/06/94
Lab Sample No: 102128

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW10
34'-36'

Submittal Number 32565- 1
Date Sampled: 11/04/94 Time: 09:30
Date Received: 11/04/94 Time: 16:40
Analysis Date: 11/04/94
Lab Sample No: 102119

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW10D
34'-36'

Submittal Number 32565- 1
Date Sampled: 11/04/94 Time: 09:30
Date Received: 11/04/94 Time: 16:40
Analysis Date: 11/04/94
Lab Sample No: 102120

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: 1GW102527 (106571)
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 10:15
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0003
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	21	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	35	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	2.1	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	1.8	1.0	ug/l			
Xylenes (o,m & p)	7.3	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	2.8	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethlybenzene	10	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: 1GW102527 (106571)
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 10:15
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0003
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	5.9	1.0	ug/l			
s-butylbenzene	3.6	1.0	ug/l			
p-Isopropyltoluene	2.3	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	47	1.0	ug/l			
1,2,3-Tricholorbenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	86-115 %		
1,2-Dichloethane-d4	98	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW11

Submittal Number 32565- 1
Date Sampled: 11/04/94 Time: 11:20
Date Received: 11/04/94 Time: 16:40
Analysis Date: 11/04/94
Lab Sample No: 102117

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1GW12

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 09:00
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102317

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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"Quick" turn waters
Dec. 1994

MOBILE LABORATORY DATA

Client: EARTH TECH, Oak Ridge, TN

Location: Battle Creek, MI ANG **Project Number: 27001.01**

Sample ID	Compound	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1GW133840	Cis-1,2-DCE	<1.0	ug/l	Water	12/14/94	11:35
	Trans-1,2-DCE	<1.0	ug/l	Water	12/14/94	11:35
	Trichloroethylene	<1.0	ug/l	Water	12/14/94	11:35
	Tetrachloroethylene	<1.0	ug/l	Water	12/14/94	11:35
	Benzene	<1.0	ug/l	Water	12/14/94	11:35
	Toluene	<1.0	ug/l	Water	12/14/94	11:35
	Ethylbenzene	<1.0	ug/l	Water	12/14/94	11:35
	Xylene, Total	<3.0	ug/l	Water	12/14/94	11:35

*Soils analyzed on a wet weight basis.

MOBILE LABORATORY DATA

Client: EARTH TECH, Oak Ridge, TN

Location: Battle Creek, MI ANG **Project Number: 27001.01**

Sample ID	Compound	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1GW133133	Cis-1,2-DCE	<1.0	ug/l	Water	12/14/94	13:21
	Trans-1,2-DCE	<1.0	ug/l	Water	12/14/94	13:21
	Trichloroethylene	<1.0	ug/l	Water	12/14/94	13:21
	Tetrachloroethylene	<1.0	ug/l	Water	12/14/94	13:21
	Benzene	<1.0	ug/l	Water	12/14/94	13:21
	Toluene	<1.0	ug/l	Water	12/14/94	13:21
	Ethylbenzene	<1.0	ug/l	Water	12/14/94	13:21
	Xylene, Total	<3.0	ug/l	Water	12/14/94	13:21

*Soils analyzed on a wet weight basis.

MOBILE LABORATORY DATA

Client: EARTH TECH, Oak Ridge, TN

Location: Battle Creek, MI ANG **Project Number: 27001.01**

Sample ID	Compound	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1GW132527	Cis-1,2-DCE	<1.0	ug/l	Water	12/14/94	13:45
	Trans-1,2-DCE	<1.0	ug/l	Water	12/14/94	13:45
	Trichloroethylene	<1.0	ug/l	Water	12/14/94	13:45
	Tetrachloroethylene	<1.0	ug/l	Water	12/14/94	13:45
	Benzene	<1.0	ug/l	Water	12/14/94	13:45
	Toluene	<1.0	ug/l	Water	12/14/94	13:45
	Ethylbenzene	<1.0	ug/l	Water	12/14/94	13:45
	Xylene, Total	<3.0	ug/l	Water	12/14/94	13:45

*Soils analyzed on a wet weight basis.

LABORATORY TESTS RESULTS

01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: 1GW14 (106573)
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 14:55
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0005
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	1.2	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	5.2	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	5.6	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethlybenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: 1GW14 (106573)
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 14:55
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0005
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	ND	1.0	ug/l			
1,2,3-Tricholorbenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	86-115 %		
1,2-Dichloethane-d4	98	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

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LABORATORY TESTS RESULTS

01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: 1GW14D (106572)
DATE SAMPLED.....: 12/15/94 \ Duplicated
TIME SAMPLED.....: 14:55
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0004
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	90	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	3.3	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethlybenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: 1GW14D (106572)
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 14:55
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0004
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	3.4	1.0	ug/l			
1,2,3-Tricholorbenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	100	0	%	86-115 %		
1,2-Dichloethane-d4	96	0	%	70-121 %		
Toluene-d8	102	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: BCITMW3 (106570)
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 15:55
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0002
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
olatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	2.6	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	2.4	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethlybenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: BCITMW3 (106570)
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 15:55
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0002
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	ND	1.0	ug/l			
1,2,3-Tricholorbenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	86-115 %		
1,2-Dichloethane-d4	100	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: BC2MW1

Submittal Number 32565- 1
Date Sampled: 11/04/94 Time: 17:00
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/05/94
Lab Sample No: 102127

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 03-November-1994 Sampling
Sample: 1GW1

Submittal Number 32429- 3
Date Sampled: 11/03/94 Time: 16:10
Date Received: 11/04/94 Time: 08:00
Analysis Date: 11/08/94
Lab Sample No: 102031

25'-27' JSB 6/3/95

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	<5.0
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: 1GW14038

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 11:30
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106566

1GW1 - 40-38

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy)-Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl)-Ether	<5.0	5.0
Bis (2-ethylhexyl)-Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl-Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: 1GW14038

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 11:30
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106566

1GW1 4038

Parameter	Result ug/l	Reporting Limit ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 03-02 November-1994
Sample: IGW3

Submittal Number 32429- 2
Date Sampled: 11/03/94 Time: 10:30
Date Received: 11/03/94 Time: 14:30
Analysis Date: 11/09/94
Lab Sample No: 101926

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	<5.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 03-02 November-1994
Sample: IGW3D — dup

Submittal Number 32429- 2
Date Sampled: 11/03/94 Time: 10:30
Date Received: 11/03/94 Time: 14:30
Analysis Date: 11/09/94
Lab Sample No: 101927

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	<5.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: 1GW3
34-36'

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 12:10
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106567

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy)-Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl)-Ether	<5.0	5.0
Bis (2-ethylhexyl)-Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl-Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: 1GW3

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 12:10
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106567

34-36

Parameter	Result ug/l	Reporting Limit ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 03-November-1994 Sampling
Sample: 1GW5

34-36

Submittal Number 32429- 3
Date Sampled: 11/03/94 Time: 14:15
Date Received: 11/04/94 Time: 08:00
Analysis Date: 11/08/94
Lab Sample No: 102030

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	<5.0
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 03-02 November-1994
Sample: IGW6
23-30

Submittal Number 32429- 2
Date Sampled: 11/02/94 Time: 15:05
Date Received: 11/03/94 Time: 07:30
Analysis Date: 11/08/94
Lab Sample No: 101924

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<250	250
Acenaphthylene	<250	250
Anthracene	<250	250
Benzo (a) Anthracene	<250	250
Benzo (b&k) Fluoranthene	<250	250
Benzo (a) Pyrene	<250	250
Benzo (g,h,i,) Perylene	<250	250
Chrysene	<250	250
Dibenzo (a,h) Anthracene	<250	250
Fluoranthene	<250	250
Fluorene	**420**	250
Indeno (1,2,3-cd) Pyrene	<250	250
Naphthalene	<250	250
Phenanthrene	**880**	250
Pyrene	<250	250
1-Methylnaphthalene	**1900**	250
2-Methylnaphthalene	**2500**	250

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 04-November-1994 Sampling
Sample: 1GW7 31-33

Submittal Number 32429- 4
Date Sampled: 11/04/94 Time: 14:30
Date Received: 11/04/94 Time: 16:40
Analysis Date: 11/08/94
Lab Sample No: 102126

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	<5.0
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 03-02 November-1994
Sample: IGW8 28-30

Submittal Number 32429- 2
Date Sampled: 11/02/94 Time: 17:30
Date Received: 11/03/94 Time: 07:30
Analysis Date: 11/08/94
Lab Sample No: 101923

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	<5.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 06-November-1994 Sampling
Sample: 1GW9 28-30

Submittal Number 32429- 5
Date Sampled: 11/04/94 Time: 16:45
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/09/94
Lab Sample No: 102197

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	<5.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: 1GW102527

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 10:15
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106561

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy)-Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl)-Ether	<5.0	5.0
Bis (2-ethylhexyl)-Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl-Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: 1GW102527

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 10:15
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106561

1GW10 25-27

Parameter	Result ug/l	Reporting Limit ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	**26**	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	**29**	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	**60**	5.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 04-November-1994 Sampling
Sample: 1GW10 31-36

Submittal Number 32429- 4
Date Sampled: 11/04/94 Time: 09:30
Date Received: 11/04/94 Time: 16:40
Analysis Date: 11/08/94
Lab Sample No: 102124

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	<5.0
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 04-November-1994 Sampling
Sample: 1GW11 27-21

Submittal Number 32429- 4
Date Sampled: 11/04/94 Time: 11:20
Date Received: 11/04/94 Time: 16:40
Analysis Date: 11/08/94
Lab Sample No: 102122

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	<5.0
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 06-November-1994 Sampling
Sample: 1GW12 43-45

Submittal Number 32429- 5
Date Sampled: 11/06/94 Time: 09:00
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/09/94
Lab Sample No: 102195

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	<5.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	**5.0**	5.0
2-Methylnaphthalene	**7.0**	5.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: December 14, 1994 Samples
Sample: 1GW132527A

Submittal Number 32429- 6
Date Sampled: 12/14/94 Time: 13:45
Date Received: 12/15/94 Time: 09:48
Analysis Date: 12/15/94
Lab Sample No: 106207

1GW13 25 27

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	**21**
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: December 14, 1994 Samples
Sample: 1GW133133B

Submittal Number 32429- 6
Date Sampled: 12/14/94 Time: 13:21
Date Received: 12/15/94 Time: 09:48
Analysis Date: 12/15/94
Lab Sample No: 106206

1GW13 31-33

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	<5.0
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: December 14, 1994 Samples
Sample: 1GW133840C

Submittal Number 32429- 6
Date Sampled: 12/14/94 Time: 11:35
Date Received: 12/15/94 Time: 09:48
Analysis Date: 12/15/94
Lab Sample No: 106205

1GW13 38-4C

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	<5.0
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: 1GW14

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 14:55
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106562

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy)-Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl)-Ether	<5.0	5.0
Bis (2-ethylhexyl)-Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl-Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: 1GW14

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 14:55
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106562

Parameter	Result ug/l	Reporting Limit ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: 1GW14D

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 14:55
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106563

Duplicate

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy)-Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl)-Ether	<5.0	5.0
Bis (2-ethylhexyl)-Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl-Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: 1GW14D

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 14:55
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106563

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy)-Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl)-Ether	<5.0	5.0
Bis (2-ethylhexyl)-Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl-Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: BC1TMW3 32-37

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 15:55
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106565

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy)-Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl)-Ether	<5.0	5.0
Bis (2-ethylhexyl)-Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl-Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: BC1TMW3

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 15:55
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106565

Parameter	Result ug/l	Reporting Limit ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 06-November-1994 Sampling
Sample: BC2MW1

Submittal Number 32429- 5
Date Sampled: 11/04/94 Time: 17:00
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/09/94
Lab Sample No: 102196

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	**6.0**	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	**7.0**	5.0
2-Methylnaphthalene	**7.0**	5.0

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: BCFB1

Submittal Number 32565- 1
Date Sampled: 11/02/94 Time: 00:00
Date Received: 11/02/94 Time: 16:45
Analysis Date: 11/03/94
Lab Sample No: 101822

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	**1.9**
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	*<50

* See attached Statement of Data Qualifications.

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: BCFB2

Submittal Number 32565- 1
Date Sampled: 11/02/94 Time: 15:00
Date Received: 11/02/94 Time: 16:45
Analysis Date: 11/02/94
Lab Sample No: 101820

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	*<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	*<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

* See attached Statement of Data Qualifications.

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: BCER1

Submittal Number 32565- 1
Date Sampled: 11/03/94 Time: 07:30
Date Received: 11/03/94 Time: 14:30
Analysis Date: 11/03/94
Lab Sample No: 101894

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	**2.0**
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: BCER2

Submittal Number 32565- 1
Date Sampled: 11/04/94 Time: 10:45
Date Received: 11/04/94 Time: 16:40
Analysis Date: 11/04/94
Lab Sample No: 102118

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	*** 1.5**
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

* See attached Statement of Data Qualifications.

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 03-02 November-1994
Sample: BCER1

Submittal Number 32429- 2
Date Sampled: 11/03/94 Time: 07:30
Date Received: 11/03/94 Time: 14:30
Analysis Date: 11/09/94
Lab Sample No: 101925

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Chrysene	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Naphthalene	<5.0	5.0
Phenanthrene	<5.0	5.0
Pyrene	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 04-November-1994 Sampling
Sample: BCER2

Submittal Number 32429- 4
Date Sampled: 11/04/94 Time: 10:45
Date Received: 11/04/94 Time: 16:40
Analysis Date: 11/08/94
Lab Sample No: 102123

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	<5.0	Fluoranthene	<5.0
Acenaphthylene	<5.0	Fluorene	<5.0
Anthracene	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Benzo (a) Anthracene	<5.0	Naphthalene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Phenanthrene	<5.0
Benzo (a) Pyrene	<5.0	Pyrene	<5.0
Benzo (g,h,i,) Perylene	<5.0	1-Methylnaphthalene	<5.0
Chrysene	<5.0	2-Methylnaphthalene	<5.0
Dibenzo (a,h) Anthracene	<5.0		

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: BCERO1121594 (106575)
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 13:00
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0007
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	1.3	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	3.0	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	1.2	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethlybenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: BCERO1121594 (106575)
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 13:00
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0007
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	ND	1.0	ug/l			
1,2,3-Tricholorbenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	98	0	%	86-115 %		
1,2-Dichloethane-d4	98	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

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(313) 462-3900

PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: BCER0
1121594

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 13:00
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106564

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy)-Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl)-Ether	<5.0	5.0
Bis (2-ethylhexyl)-Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl-Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: BCER0
1121594

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 13:00
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106564

Parameter	Result ug/l	Reporting Limit ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

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PAH RESULTS FOR BC ANGB

analyzed 12-19-94

Sample ID	Result	Units
BCBGSS01	<1.0	mg/kg
BCBGSS02	<1.0	mg/kg
BCBGSS03	>>1.0	mg/kg
BCBGSS03D	>>1.0	mg/kg
BCBGSS04	>>1.0	mg/kg
BCBGSS05	<1.0	mg/kg
BCBGSS06	<1.0	mg/kg
BCBGSS06D	<1.0	mg/kg
BCBGSS07	>>1.0	mg/kg
BCBGSS08	>>1.0	mg/kg
BCBG1 0507	<1.0	mg/kg
BCBG2 0507	<1.0	mg/kg
BCBG3 0507	<1.0	mg/kg
BCBG4 0507	<1.0	mg/kg

analyzed 12-20-94

< 200 mg/kg

Sample ID	Result	Units
BC1MW2 0507	<0.2	mg/kg
BC1MW2 1012	<0.2	mg/kg
BC1MW2 1517	<0.2	mg/kg
BC1MW2 2022	<0.2	mg/kg
BC1SS05	>5.0	mg/kg
BC1SS06	3.7	mg/kg
BC1SS07	>50	mg/kg
BC1SS08	31	mg/kg
BC1SS09	4.3	mg/kg
BC1SS09D	4.7	mg/kg
BC1SS10	460	mg/kg
BC1SS11	<0.2	mg/kg
BC1SS12	<0.2	mg/kg
BC1SS13	<0.2	mg/kg
BC1SS14	0.66	mg/kg
BC1SS15	4.6	mg/kg

BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B20507

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 11:30
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/06/94
Lab Sample No: 102134

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B21012

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 11:40
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/07/94
Lab Sample No: 102135

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B21517

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 11:50
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/07/94
Lab Sample No: 102136

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	**0.024**	Xylene, Total	**0.23**

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B22022

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 12:00
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/07/94
Lab Sample No: 102137

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	**0.18**	Xylene, Total	**1.1**

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B10507

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 13:20
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/07/94
Lab Sample No: 102138

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	**0.017**	Xylene, Total	**0.083**

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B11012

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 13:50
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/07/94
Lab Sample No: 102139

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B11517

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 14:10
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/07/94
Lab Sample No: 102140

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B12022

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 14:38
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/07/94
Lab Sample No: 102141

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B40507

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 15:35
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/08/94
Lab Sample No: 102142

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B41012

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 15:45
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/07/94
Lab Sample No: 102143

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B41012D

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 15:45
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/07/94
Lab Sample No: 102144

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B41517

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 16:10
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/07/94
Lab Sample No: 102145

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B12527

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 14:55
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/08/94
Lab Sample No: 102146

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B12527D

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 14:55
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/08/94
Lab Sample No: 102147

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: BCER3

Submittal Number 32565- 1
Date Sampled: 11/06/94 Time: 14:50
Date Received: 11/07/94 Time: 08:45
Analysis Date: 11/06/94
Lab Sample No: 102148

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	<1.0
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B80507

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 15:15
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102300

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B30001

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 10:35
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102301

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B51012

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 10:50
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102302

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B52527D

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 12:10
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/09/94
Lab Sample No: 102303

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	*<0.11

* See attached Statement of Data Qualifications.

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B2001

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 09:00
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102304

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B50507

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 10:15
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102305

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B120507

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 13:35
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102306

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B10001

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 09:30
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/09/94
Lab Sample No: 102307

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B121517

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 14:30
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102308

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B82022

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 16:10
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102309

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B81517

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 15:50
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102310

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B122022

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 14:45
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102311

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B52527

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 12:10
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/09/94
Lab Sample No: 102312

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	*<0.060

* See attached Statement of Data Qualifications.

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B52022

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 11:40
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102313

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B81012

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 15:35
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/09/94
Lab Sample No: 102314

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B51517

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 11:10
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/09/94
Lab Sample No: 102315

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CREEK ANG VOA'S

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: BCER4

Submittal Number 32565- 1
Date Sampled: 11/07/94 Time: 16:00
Date Received: 11/08/94 Time: 08:25
Analysis Date: 11/08/94
Lab Sample No: 102316

Parameter	Result ug/l	Parameter	Result ug/l
Benzene	<1.0	Tetrachloroethene	<1.0
cis-1,2-Dichloroethylene	<1.0	Toluene	**1.5**
trans-1,2-Dichloroethene	<1.0	Trichloroethylene	<1.0
Ethylbenzene	<1.0	Xylene, Total	<3.0

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B61012

Submittal Number 32565- 1
Date Sampled: 11/08/94 Time: 09:00
Date Received: 11/08/94 Time: 13:30
Analysis Date: 11/09/94
Lab Sample No: 102376

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B171012

Submittal Number 32565- 1
Date Sampled: 11/08/94 Time: 10:15
Date Received: 11/08/94 Time: 13:30
Analysis Date: 11/09/94
Lab Sample No: 102377

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B141012

Submittal Number 32565- 1
Date Sampled: 11/08/94 Time: 08:45
Date Received: 11/08/94 Time: 13:30
Analysis Date: 11/09/94
Lab Sample No: 102378

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B161012

Submittal Number 32565- 1
Date Sampled: 11/08/94 Time: 09:45
Date Received: 11/08/94 Time: 13:30
Analysis Date: 11/09/94
Lab Sample No: 102379

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B151012

Submittal Number 32565- 1
Date Sampled: 11/08/94 Time: 09:30
Date Received: 11/08/94 Time: 13:30
Analysis Date: 11/09/94
Lab Sample No: 102380

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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BATTLE CRREK ANG VOA SOIL

EARTH TECH - OAK RIDGE
Proj: Field Analysis Michigan
ANG- Battle Creek
Subm: November 2,1994 sampling
Sample: 1B131012

Submittal Number 32565- 1
Date Sampled: 11/08/94 Time: 08:15
Date Received: 11/08/94 Time: 13:30
Analysis Date: 11/09/94
Lab Sample No: 102381

Parameter	Result mg/kg	Parameter	Result mg/kg
Benzene	<0.010	Tetrachloroethene	<0.010
cis-1,2-Dichloroethylene	<0.010	Toluene	<0.010
trans-1,2-Dichloroethene	<0.010	Trichloroethylene	<0.010
Ethylbenzene	<0.010	Xylene, Total	<0.030

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MOBILE LABORATORY DATA

Client: Michigan Air National Guard

Location: Battle Creek, MI **Project Number: 94890107**

Sample ID	Compoud	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
BC1CONA	Total PAH	0.37	mg/kg	Soil	11/6/94	17:00
BC1CONB	Total PAH	110	mg/kg	Soil	11/6/94	17:10
1B10507	Total PAH	<0.20	mg/kg	Soil	11/6/94	13:20
1B11012	Total PAH	0.23	mg/kg	Soil	11/6/94	13:50
1B11517	Total PAH	0.29	mg/kg	Soil	11/6/94	14:10
1B12022	Total PAH	0.44	mg/kg	Soil	11/6/94	14:38
1B12527	Total PAH	<0.20	mg/kg	Soil	11/6/94	14:55
1B12527D	Total PAH	0.20	mg/kg	Soil	11/6/94	14:55
1B20507	Total PAH	0.56	mg/kg	Soil	11/6/94	11:30
1B21012	Total PAH	0.24	mg/kg	Soil	11/6/94	11:40
1B21517	Total PAH	5.0	mg/kg	Soil	11/6/94	11:50
1B22022	Total PAH	>5.0	mg/kg	Soil	11/6/94	12:00
1B40507	Total PAH	0.21**	mg/kg	Soil	11/6/94	15:35
1B41012	Total PAH	<0.20	mg/kg	Soil	11/6/94	15:45

*Soils analyzed on a wet weight basis. **reanalysis did not confirm.

MOBILE LABORATORY DATA

Client: Michigan Air National Guard

Location: Battle Creek, MI **Project Number: 94890107**

Sample ID	Compoud	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1B41012D	Total PAH	0.40***	mg/kg	Soil	11/6/94	15:45
1B41517	Total PAH	0.41	mg/kg	Soil	11/6/94	16:10
1B82022	Total PAH	0.27	mg/kg	Soil	11/7/94	16:10
1B52527	Total PAH	>5.0	mg/kg	Soil	11/7/94	12:10
1B121517	Total PAH	<0.20	mg/kg	Soil	11/7/94	14:30
1B122022	Total PAH	<0.20	mg/kg	Soil	11/7/94	14:45
1B52022	Total PAH	<0.20	mg/kg	Soil	11/7/94	11:40
1B30001	Total PAH	3.7	mg/kg	Soil	11/7/94	10:35
1B51517	Total PAH	<0.20	mg/kg	Soil	11/7/94	11:10
1B80507	Total PAH	<0.20	mg/kg	Soil	11/7/94	15:15
1B10001	Total PAH	2.0	mg/kg	Soil	11/7/94	9:30
1B120507	Total PAH	<0.20	mg/kg	Soil	11/7/94	13:35
1B50507	Total PAH	0.25**	mg/kg	Soil	11/7/94	10:15
1B20001	Total PAH	>5.0	mg/kg	Soil	11/7/94	9:00

*Soils analyzed on a wet weight basis. **reanalysis did not confirm. ***confirmed by reanalysis.

MOBILE LABORATORY DATA

Client: Michigan Air National Guard

Location: Battle Creek, MI **Project Number: 94890107**

Sample ID	Compoud	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1B52527D	Total PAH	>5.0	mg/kg	Soil	11/7/94	12:10
1B51012	Total PAH	0.52	mg/kg	Soil	11/7/94	10:50
1B61012	Total PAH	<0.20	mg/kg	Soil	11/8/94	9:00
1B131012	Total PAH	<0.20	mg/kg	Soil	11/8/94	8:15
1B151012	Total PAH	<0.20	mg/kg	Soil	11/8/94	9:30
1B141012	Total PAH	<0.20	mg/kg	Soil	11/8/94	8:45
1B171012	Total PAH	<0.20	mg/kg	Soil	11/8/94	10:15
1B161012	Total PAH	0.30	mg/kg	Soil	11/8/94	9:45
1B161012 Lab Dup	Total PAH	0.30	mg/kg	Soil	11/8/94	9:45
1B81012	Total PAH	<0.20	mg/kg	Soil	11/7/94	15:35
1B90001	Total PAH	1.2	mg/kg	Soil	11/9/94	15:20
1B110001	Total PAH	0.87	mg/kg	Soil	11/10/94	10:30
1SS04	Total PAH	3.4	mg/kg	Soil	11/10/94	11:59
1SS03	Total PAH	>5.0	mg/kg	Soil	11/10/94	12:08

*Soils analyzed on a wet weight basis.

MOBILE LABORATORY DATA

Client: Michigan Air National Guard

Location: Battle Creek, MI **Project Number: 94890107**

Sample ID	Compoud	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1SS02	Total PAH	>5.0	mg/kg	Soil	11/10/94	11:55
1SS01	Total PAH	>5.0	mg/kg	Soil	11/10/94	11:50
1B71012	Total PAH	0.42	mg/kg	Soil	11/9/94	11:45
1B70001	Total PAH	>5.0	mg/kg	Soil	11/9/94	14:55
1B71517	Total PAH	0.26	mg/kg	Soil	11/9/94	11:50
1B90507	Total PAH	<0.20	mg/kg	Soil	11/9/94	16:30
1B91012	Total PAH	1.1	mg/kg	Soil	11/9/94	16:45
1B110507	Total PAH	<0.20	mg/kg	Soil	11/9/94	14:40
1B120001	Total PAH	2.9	mg/kg	Soil	11/9/94	14:25
1B91517	Total PAH	<0.20	mg/kg	Soil	11/9/94	17:30
1B120001 Lab Dup	Total PAH	2.9	mg/kg	Soil	11/9/94	14:25
1B111517	Total PAH	<0.20	mg/kg	Soil	11/9/94	15:10
1B92022	Total PAH	0.21	mg/kg	Soil	11/9/94	17:20
1B111012	Total PAH	0.24	mg/kg	Soil	11/9/94	14:55
1B111923	Total PAH	<0.20	mg/kg	Soil	11/9/94	15:40

*Soils analyzed on a wet weight basis.

MOBILE LABORATORY DATA

Client: Michigan Air National Guard

Location: Battle Creek, MI **Project Number: 94890107**

Sample ID	Compoud	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1B111923 D	Total PAH	<0.20	mg/kg	Soil	11/9/94	15:40
1B190001	Total PAH	0.79	mg/kg	Soil	11/10/94	10:50
1B31012	Total PAH	<0.20	mg/kg	Soil	11/8/94	16:50
1B32022	Total PAH	230	mg/kg	Soil	11/8/94	17:15
1B30507D	Total PAH	<0.20	mg/kg	Soil	11/8/94	16:30
1B30507	Total PAH	<0.20	mg/kg	Soil	11/8/94	16:30
1B31517	Total PAH	2.2	mg/kg	Soil	11/8/94	17:05
1B40001	Total PAH	>5.0	mg/kg	Soil	11/9/94	9:00
1B191517	Total PAH	<0.20	mg/kg	Soil	11/9/94	10:30
1B192022	Total PAH	<0.20	mg/kg	Soil	11/9/94	10:55
1B70507	Total PAH	<0.20	mg/kg	Soil	11/9/94	11:30
1B180507	Total PAH	<0.20	mg/kg	Soil	11/9/94	8:20
1B50001	Total PAH	4.9	mg/kg	Soil	11/9/94	9:35
1B191012	Total PAH	<0.20	mg/kg	Soil	11/9/94	10:15
1B181012	Total PAH	<0.20	mg/kg	Soil	11/9/94	8:35

*Soils analyzed on a wet weight basis.

MOBILE LABORATORY DATA

Client: Michigan Air National Guard

Location: Battle Creek, MI **Project Number: 94890107**

Sample ID	Compoud	Result	Units ug/l or mg/kg*	Matrix	Date Sampled	Time Sampled
1B190507	Total PAH	<0.20	mg/kg	Soil	11/9/94	10:00
1B182022	Total PAH	>5.0	mg/kg	Soil	11/9/94	9:20
1B80001	Total PAH	>5.0	mg/kg	Soil	11/9/94	11:25
1B181517	Total PAH	>5.0	mg/kg	Soil	11/9/94	9:05
1B181517D	Total PAH	>5.0	mg/kg	Soil	11/9/94	9:05

*Soils analyzed on a wet weight basis.

APPENDIX C: SOIL SAMPLING FORMS

The Earth Technology Corporation

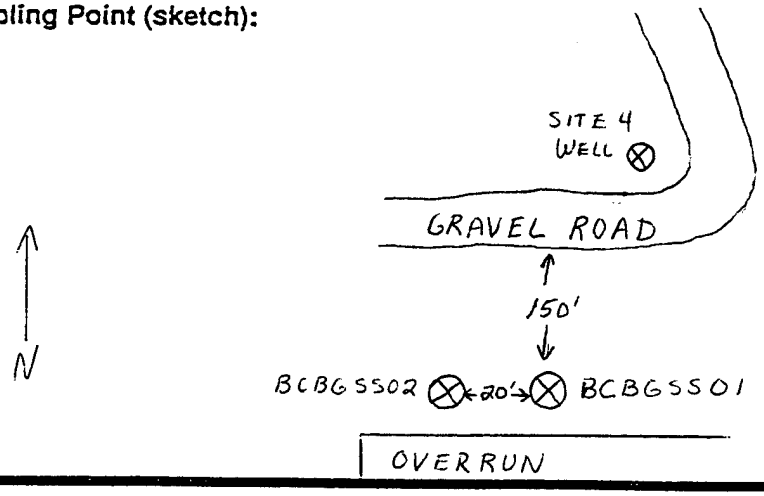
Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BCBGSS01
Recorded By J. BRIEGEL
Duplicate Number
Date 12-17-94
Checked By JSB
Site BACKGROUND
Date 6/3/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description
USCS Soil Type SC
Color BROWN/ORANGE BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):



Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BCBGSS02
Recorded By J. BRIEGEL
Duplicate Number
Date 12-17-94
Checked By JJB
Site BACKGROUND
Date 6/13/95

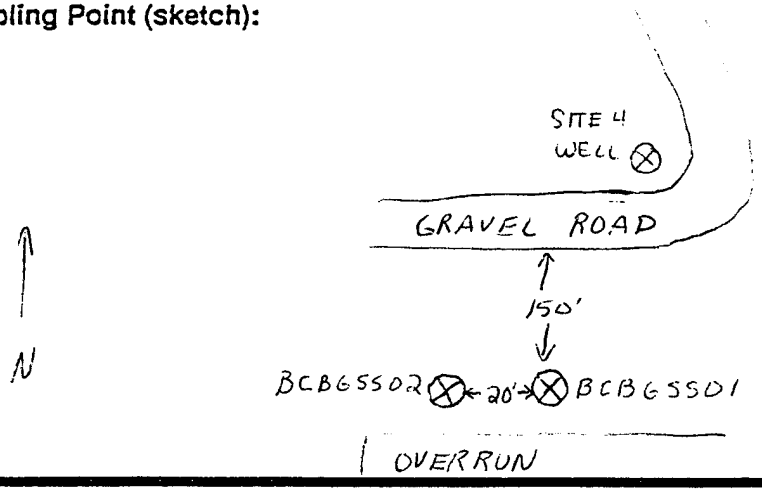
Sampling Equipment HAND AUGER

Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SC
Color BROWN/ORANGE BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):



Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BCBGSS03
Recorded By J. BRIEGEL
Duplicate Number BCBGSS03D
Date 12-17-94
Checked By JSB
Site BACKGROUND
Date 6/13/95

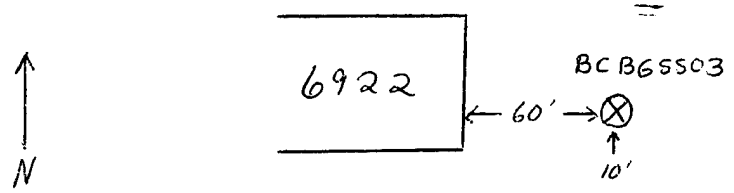
Sampling Equipment HAND AUGER

Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SC
Color BROWN
Odor NONE
Depth 0-1'
Number of Samples 2
Comments

Sampling Point (sketch):



Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water ☒ Methanol
☒ Detergent/water ☐ Hexane
☐ Potable Water ☐ HNO_3 ; dilution
☒ Deionized Water ☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BCBG5504
Recorded By J. BRIEGEL
Duplicate Number
Date 12-17-94
Checked By JSB
Site BACKGROUND
Date 6/13/95

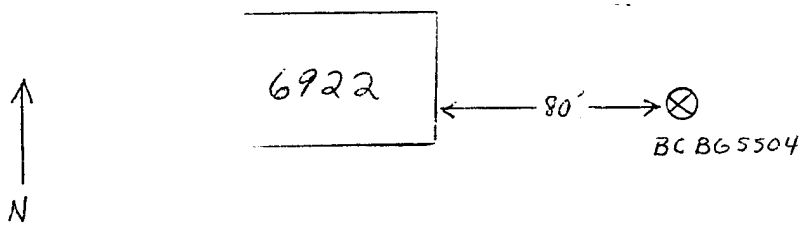
Sampling Equipment HAND AUGER

Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SC
Color DARK BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):



Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water ☒ Methanol
☒ Detergent/water ☐ Hexane
☐ Potable Water ☐ HNO_3 ; dilution
☒ Deionized Water ☐ Other

Form F1020

The Earth Technology Corporation

Soil/Sediment Sampling Record

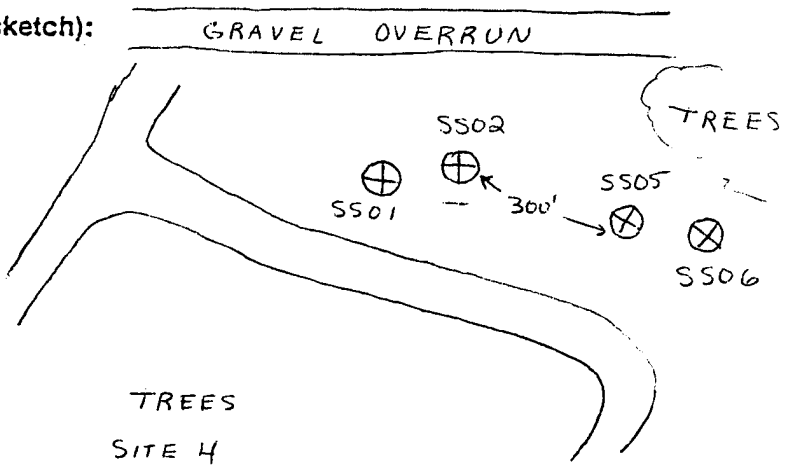
Project Name 110th FG, MIANG RI
Location BATTLE CREEK, MICHIGAN
Recorded By J. BRIEGEL
Date 12-18-94
Site BACKGROUND

Project Number 948901
Sample Number BCBGSS05
Duplicate Number
Checked By JSB
Date 6/3/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description
USCS Soil Type SC
Color DARK BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):



Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BCBGSS06
Recorded By J. BRIEGEL
Duplicate Number BCBGSS06D
Date 12-18-94
Checked By JSB
Site BACKGROUND
Date 6/3/95

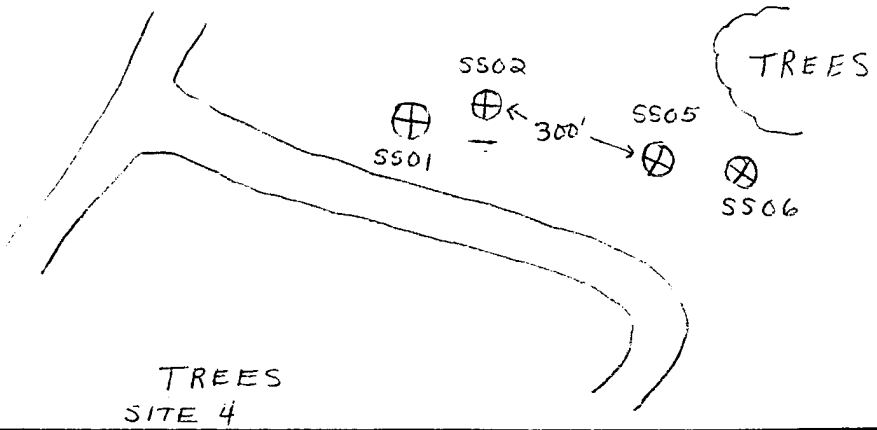
Sampling Equipment HAND AUGER

Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SC
Color DARK BROWN
Odor NONE
Depth 0-1'
Number of Samples 2
Comments

Sampling Point (sketch):



Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water ☒ Methanol
☒ Detergent/water ☐ Hexane
☐ Potable Water ☐ HNO_3 ; dilution
☒ Deionized Water ☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BC BGSS07
Recorded By J. BRIEGEL
Duplicate Number
Date 12-18-94
Checked By JSB
Site BACKGROUND
Date 6/3/95

Sampling Equipment HAND AUGER

Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SC
Color DARK BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):

Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water ☒ Methanol
☒ Detergent/water ☐ Hexane
☐ Potable Water ☐ HNO_3 ; dilution
☒ Deionized Water ☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK MICHIGAN
Sample Number BCBGSS08
Recorded By J. BRIEGEL
Duplicate Number
Date 12-18-94
Checked By JSB
Site BACKGROUND
Date 6/7/95

Sampling Equipment HAND AUGER

Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SC
Color DARK BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):

Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110TH FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BC15501
Recorded By J. BRIEGEL
Duplicate Number
Date 11/10/94
Checked By JSB
Site Site 1
Date 6/5/95

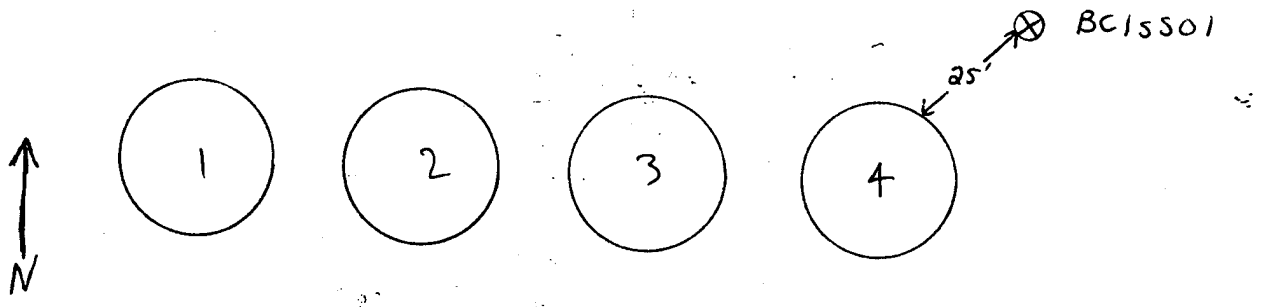
Sampling Equipment HAND AUGER

Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SC
Color DK BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):



Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F1025

The Earth Technology Corporation

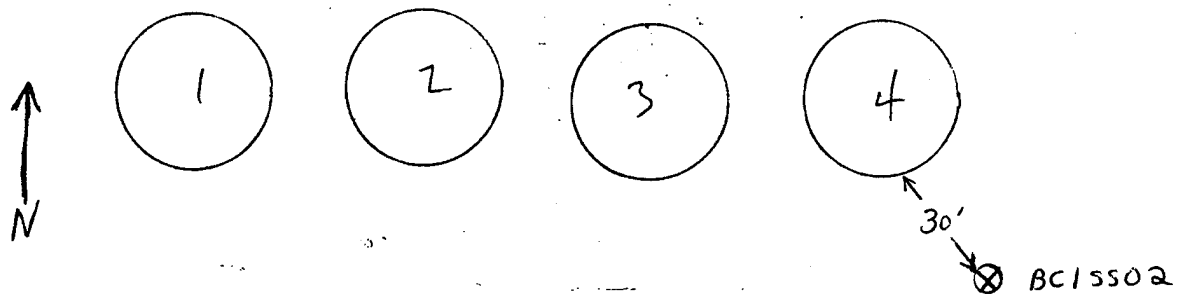
Soil/Sediment Sampling Record

Project Name 110TH FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BC1SS02
Recorded By J. BRIEGEL
Duplicate Number
Date 11-10-94
Checked By JBB
Site 1
Date 6/5/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description
USCS Soil Type SC
Color BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):



Decontamination
Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F102

The Earth Technology Corporation

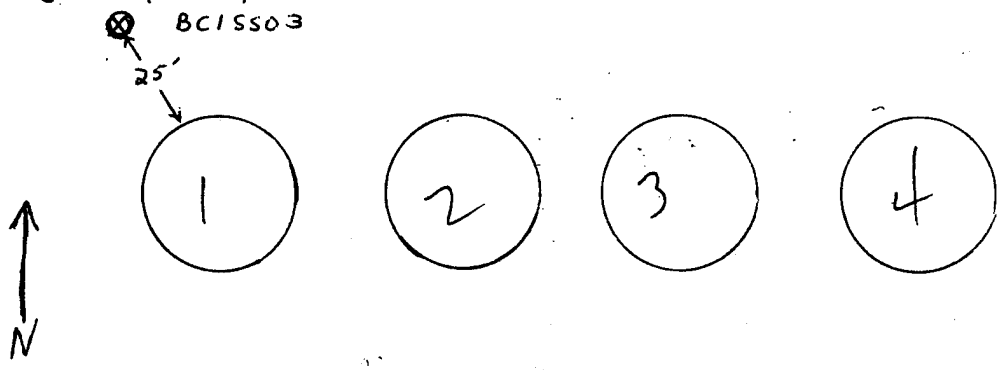
Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BC1SS03
Recorded By J. BRIEGEL
Duplicate Number
Date 11-10-94
Checked By JBB
Site 1
Date 6/5/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description
USCS Soil Type SC
Color BROWN ORANGE BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):



Decontamination
Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water ☒ Methanol
☒ Detergent/water ☐ Hexane
☐ Potable Water ☐ HNO_3 ; dilution
☒ Deionized Water ☐ Other

Form F1025

The Earth Technology Corporation

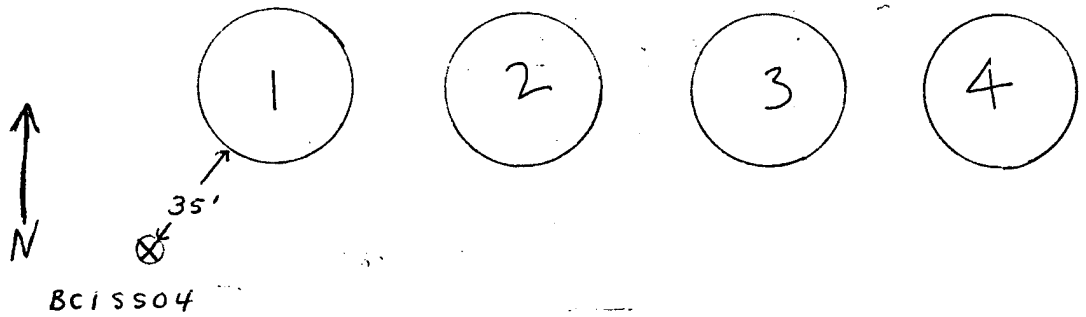
Soil/Sediment Sampling Record

Project Name 110TH FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BCISS04
Recorded By J. BRIEGEL
Duplicate Number
Date 11/10/94
Checked By JSB
Site 1
Date 6/5/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description
USCS Soil Type SC
Color DK BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):



Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F1025

The Earth Technology Corporation

Soil/Sediment Sampling Record

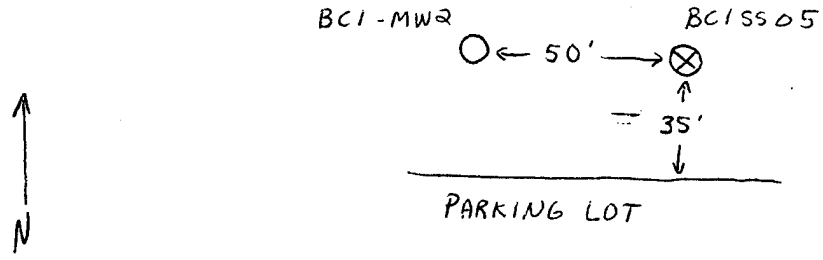
Project Name 110th FG, MIANG RI
Location BATTLE CREEK, MICHIGAN
Recorded By J. BRIEGEL
Date 12-17-94
Site 1

Project Number 948901
Sample Number BCISSO5
Duplicate Number
Checked By JSB
Date 6/3/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description
USCS Soil Type SM
Color BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):



Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Location BATTLE CREEK MICHIGAN
Recorded By J. BRIEGEL
Date 12-17-94
Site 1

Project Number 948901
Sample Number BCISS06
Duplicate Number
Checked By JSB
Date 6/13/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SM
Color BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):

Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water ☒ Methanol
☒ Detergent/water ☐ Hexane
☐ Potable Water ☐ HNO_3 ; dilution
☒ Deionized Water ☐ Other

Form F102

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BCISSO7
Recorded By J. BRIEGEL
Duplicate Number
Date 12-17-94
Checked By JSP
Site 1
Date 6/2/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description
USCS Soil Type SC
Color BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):

Decontamination
Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water ☒ Methanol
☒ Detergent/water ☐ Hexane
☐ Potable Water ☐ HNO_3 ; dilution
☒ Deionized Water ☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Location BATTLE CREEK, MICHIGAN
Recorded By J. BRIEGEL
Date 12-17-94
Site 1

Project Number 948901
Sample Number BCISS08
Duplicate Number
Checked By JSB
Date 6/3/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description
USCS Soil Type GW
Color
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):

Decontamination
Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F102

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BC1SS09
Recorded By J. BRIEGEL
Duplicate Number BC1SS09D
Date 12-17-94
Checked By JJB
Site 1
Date 6/3/95

Sampling Equipment HAND AUGER

Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SP
Color BROWN
Odor NONE
Depth 0-1'
Number of Samples 2
Comments

Sampling Point (sketch):

Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BCISS1D
Recorded By J BRIEGEL
Duplicate Number
Date 12-17-94
Checked By JB
Site 1
Date 6/7/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description
USCS Soil Type SW
Color BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):

Decontamination
Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F102

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BC1SS11
Recorded By J. BRIEGEL
Duplicate Number
Date 12-17-94
Checked By JSB
Site 1
Date 6/3/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description
USCS Soil Type SP
Color ORANGE-BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):

Decontamination
Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water ☒ Methanol
☒ Detergent/water ☐ Hexane
☐ Potable Water ☐ HNO_3 ; dilution
☒ Deionized Water ☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BC1SS12
Recorded By J. BRIEGEL
Duplicate Number
Date 12-17-94
Checked By JJB
Site 1
Date 6/3/95

Sampling Equipment HAND AUGER

Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SC
Color ORANGE-BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):

Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BCISS13
Recorded By J. BRIEGEL
Duplicate Number
Date 12-18-94
Checked By JSB
Site 1
Date 6/3/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SC
Color ORANGE-BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):

Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F1026

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BCISS14
Recorded By J BRIEGEL
Duplicate Number
Date 12-18-94
Checked By JGB
Site 1
Date 6/3/95

Sampling Equipment HAND AUGER
Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SC
Color ORANGE-BROWN / BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):

Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F102

The Earth Technology Corporation

Soil/Sediment Sampling Record

Project Name 110th FG, MIANG RI
Project Number 948901
Location BATTLE CREEK, MICHIGAN
Sample Number BC1SS15
Recorded By J. BRIEGEL
Duplicate Number
Date 12-18-94
Checked By JJB
Site 1
Date 6/3/95

Sampling Equipment HAND AUGER

Sample Type (Soil) Sediment Rock

Sample Type Description

USCS Soil Type SW
Color BROWN
Odor NONE
Depth 0-1'
Number of Samples 1
Comments

Sampling Point (sketch):

Decontamination

Equipment: ☒ Hand auger
Type AMS
☒ Trowel
☐ Other

Decontamination Fluids:
☐ Steam/Hot Water
☒ Detergent/water
☐ Potable Water
☒ Deionized Water
☒ Methanol
☐ Hexane
☐ HNO_3 ; dilution
☐ Other

Form F1026

APPENDIX D: BOREHOLE LOGS

EARTH TECH

Borehole Log

Project Name: 110TH FG, MIANG			Project Number: 948901
Borehole Location: SITE 1		Borehole No: BC1-MW1	Sheet 1 of 2
Drilling Agency: STEARNS		Driller: MIKE HEFFEARN	
Drilling Equipment: CME 550		Date Started: 13 DEC 94	Total Depth (feet): 32
Drilling Method: HOLLOW STEM AUGER		Date Finished: 14 DEC 94	Depth To Bedrock (feet): NA
Drilling Fluid: NA		Number of Samples: 11	Depth to Water (feet): ~27
Completion Information: COMPLETED AS FLUSH MOUNT MONITORING WELL		Borehole Diameter (in): 7.25	Elevation and Datum:
		Logged By: J. BRIEGEL / S. SMITH	
		Checked By: JSG	Date: 6/7/95

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
1		0006	AUGER ONLY	NA	1340	NA				SAND, FINE TO MEDIUM GRAINED, DARK YELLOWISH BROWN (10YR 4/6), MOIST, LOOSE TO MEDIUM DENSE	ASPHALT/CONCRETE @ SURFACE
2											
3											
4											
5											
6											
7	1	0608	6/6/6/5	100%	1345	NA	0.0/0.1			SAND, MEDIUM GRAINED, TRACE FINES, YELLOWISH BROWN (10YR 5/8), MOIST, MEDIUM DENSE	
8											
9	2	0810	3/3/4/5	50%	1350	NA	0.0/0.0			SAND, MEDIUM TO COARSE GRAINED, TRACE CLAY, YELLOWISH BROWN (10YR 4/2) MOIST, LOOSE	CLAYEY, ~9.5 TO 10
10											
11	3	1012	3/3/4/4	90%	1400	NA	0.0/0.0			D.O. ABOVE, OLIVE GREEN 11.2 - 12.0	
12											
13	4	1214	2/3/4/5	25%	1405	NA	0.0/0.0			D.O. ABOVE, 10YR 4/6	
14										CONTINUED PG 2	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog1.dwg

EARTH TECH

Borehole Log

Project Name: 110TH FG, MIANG | Project Number: 98890 1

Borehole Location: SITE 1 | Borehole No: BC1-MW1 | Sheet 2 of 2

Checked By: JSG | Date: 6/3/95

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	5	1416	2/4/16/9	50%	1410	NA	0.0/0.0			D.O. ABOVE 10YR5/8	
16											
17	6	1618	6/8/7/11	60%	1415	NA	0.0/0.0			D.O ABOVE, TRACE GRAVEL, MEDIUM DENSE	
18											
19	7	1820	9/11/11/14	60%	1420	NA	0.0/6.0			SAND, FINE TO V. COARSE GRAINED W/GRAVEL, WELL SORTED, YELLOWISH BROWN (10YR5/8), MOIST, MEDIUM DENSE	
20											
21	8	2022	8/15/22/23	60%	1425	NA	0.0/0.0			SAND, MEDIUM TO COARSE GRAINED, YELLOWISH BROWN (10YR 5/8) MOIST, DENSE	
22											
23	9	2224	8/12/14/14	60%	1432	NA	0.0/0.0			SAND, FINE TO MEDIUM GRAINED, TRACE GRAVEL, YELLOWISH BROWN (10YR 7/6) MOIST, MEDIUM DENSE	
24											
25	10	2426	4/8/9/7	90%	1438	NA	0.0/0.0			D.O. ABOVE, NO GRAVEL	
26											
27	11	2628	5/7/9/10	90%	1445	NA	0.0/0.0			SAND, ~~SILTY~~ 55 FINE GRAINED ABUNDANT FINES, YELLOWISH BROWN (10YR4/6), WET, MEDIUM DENSE ▽	
28											
29		2832	AUGER ONLY							PROBABLY AS ABOVE, AUGER ONLY	
30											
31											
32										TOTAL DEPTH = 32'	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dw

EARTH TECH

Borehole Log

Project Name: 110TH FIGHTER GROUP, MIANG		Project Number: 948901
Borehole Location: SITE 1, FUEL TANK FARM	Borehole No: BC1-MW2	Sheet 1 of 2
Drilling Agency: STEARNS	Driller: MIKE HEFFEARN	
Drilling Equipment: CME 550	Date Started: 14 DEC 94	Total Depth (feet): 30.2
Drilling Method: HOLLOW STEM AUGER	Date Finished: 14 DEC 94	Depth To Bedrock (feet): NA
Drilling Fluid: NA	Number of Samples: 4	Depth to Water (feet): 25.6
Completion Information: completed as monitoring well	Borehole Diameter (in): 7.25 ~~8.25~~ 4¼	Elevation and Datum:
	Logged By: S. SMITH	
	Checked By: JSB	Date: 6/5/95

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
1			AUGER		1312	NA				AUGER ONLY	GRASS @ SURFACE
2											
3											
4											
5											
6	1		2-3-4-4	90%	1318	NA	0/0		SP	SAND, FINE TO MEDIUM GRAINED, TRACE FINE GRAVEL, DARK YELLOWISH BROWN (10YR4/6), MOIST, LOOSE	BC1MW20507 (Sample I.d.)
7											
8			AUGER			NA				AUGER ONLY, PROBABLY AS ABOVE, 7-10FT	
9											
10											
11	2		4-4-4-4	75%	1325	NA	0/0		SP	D.O. ABOVE (NO. 1)	BC1MW21012 (Sample I.d.)
12											
13			AUGER			NA					
14											
15											

Key S/B = Sample reading / Background reading NA = not analyzed

holelog1.dwg

EARTH TECH

Borehole Log

Project Name: 110TH FG, MIANG | Project Number: 948901

Borehole Location: SITE 1, FUEL TANK FARM | Borehole No: BC1-HW2 | Sheet 2 of 2

Checked By: | Date:

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
16	3		9-9-9-15	85%	1333	NA	0/0			SAND, MEDIUM TO COARSE GRAINED W/FINE GRAVEL, MOTTLED YELLOWISH BROWN AND DARK YELLOWISH BROWN (10YR5/6 AND 4/6), MOIST, MEDIUM DENSE	BC1MW21517 (Sample Id)
17											
18			AUGER			NA				AUGER ONLY, 17-20FT PROBABLY AS ABOVE	
19											
20										D.O. ABOVE (NO.3)	BC1MW22022 (Sample Id)
21	4		14-19-19-17	60%	1337	NA	0/0				
22										AUGER ONLY, 22-30FT	
23											ROUGH DRILLING APPROX 22-27FT
24											
25											
26											HYDROCARBON ODOR NOTED FROM CUTTINGS
27											
28											
29											
30										TOTAL DEPTH = 30FT	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dwg

EARTH TECH

Borehole Log

Project Name: 110TH FIGHTER GROUP, MIANG		Project Number: 948901
Borehole Location: SITE 1, FUEL TANK FARM	Borehole No: BCI-MW3 (temporary well) 1/3/95	Sheet 1 of 2
Drilling Agency: STEARNS	Driller: MIKE HEFFEARN	
Drilling Equipment: CME 550	Date Started: 15 DEC 94	Total Depth (feet): 30
Drilling Method: HOLLOW STEM AUGER	Date Finished: 15 DEC 94	Depth To Bedrock (feet): NA
Drilling Fluid: NA	Number of Samples: NA	Depth to Water (feet): 24.7
Completion Information: BOREHOLE ABANDONED AFTER COLLECTION OF GROUNDWATER SAMPLE	Borehole Diameter (in): 7.25	Elevation and Datum:
	Logged By: S. SMITH	
	Checked By: JSB	Date: 6/3/95

Depth (feet)	Sample: Number	Sample: Interval	Sample: Blow Count	Sample: Recovery	Sample: Time	Field Analysis: FID (ppm) S/B	Field Analysis: PID (ppm) S/B	LOG: Graphic	LOG: USCS or Rock Type	Lithologic Description	Remarks
1			AUGER ONLY							SAND, FINE TO MEDIUM GRAINED, TRACE GRAVEL, DARK YELLOWISH BROWN (10YR4/4) MOIST, LOOSE	
2											
3											
4											
5											
6										SAND, MEDIUM TO COARSE GRAINED W/GRAVEL, DARK YELLOWISH BROWN (10YR4/6) MOIST, LOOSE	
7											
8											
9											
10											
11											
12											
13											
14											
15											

Key S/B = Sample reading / Background reading NA = not analyzed

holelog1.dwg

EARTH TECH

Borehole Log

Project Name: 110TH FIGHTER GROUP, MIANG	Project Number: 948901
Borehole Location: SITE 1, FUEL TANK FARM	Borehole No: BC1-MWT (temporary well)
Sheet 2 of 2	
Checked By: JSB	Date: 6/1/95

Depth (feet)	Sample: Number	Sample: Interval	Sample: Blow Count	Sample: Recovery	Sample: Time	Field Analysis: FID (ppm) S/B	Field Analysis: PID (ppm) S/B	LOG: Graphic	LOG: USCS or Rock Type	Lithologic Description	Remarks
17											ROUGH DRILLING
18											
19											
20										PROBABLY AS ABOVE, BECOMING MEDIUM DENSE	
21											
22											
23											
24											
25											
26											
27											
28											
29											
30										TOTAL DEPTH = 30'	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dwg

EARTH TECH

Borehole Log

Project Name: 110TH FIGHTER GROUP, MIANG		Project Number: 948901	
Borehole Location: PARADE GROUNDS	Borehole No: BC-~~MW6~~ AWL6 JSB 3/14/95	Sheet 1 of 3	
Drilling Agency: STEARNS	Driller: MIKE HEFFEARN		
Drilling Equipment: CME 550	Date Started: 15 DEC 94	Total Depth (feet): 40.0	
Drilling Method: HOLLOW STEM AUGER	Date Finished: 15 DEC 94	Depth To Bedrock (feet): NA	
Drilling Fluid: NA	Number of Samples: NA	Depth to Water (feet): 32.90	
Completion Information: COMPLETED AS FLUSH MOUNT MONITORING WELL	Borehole Diameter (in): 7.25	Elevation and Datum:	
	Logged By: S. SMITH		
	Checked By: JSB	Date: 6/3/95	

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm)* S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
1	NA	0005	AUGER ONLY	NA	1149	NA	0.0/0.0			SAND, FINE TO MEDIUM GRAINED, TRACE GRAVEL, DARK YELLOWISH BROWN (10YR 4/6) MOIST, LOOSE	GRASS@SURFACE
2											
3											
4											
5											
6	NA	0510	AUGER ONLY	NA	1154	NA	0.0/0.0			D.O. ABOVE	
7	2										
8											
9											
10											
11	NA	1015	AUGER ONLY	NA	1157	NA	0.0/0.0			D.O. ABOVE	
12	2										
13											
14											
15											

Key S/B = Sample reading / Background reading NA = not analyzed

holelog1.dwg

*PID READINGS TAKEN FROM CUTTINGS @ SURFACE

EARTH TECH

Borehole Log

Project Name: 110TH FIGHTER GROUP, MIANG | Project Number: 948901

Borehole Location: PARADE GROUNDS | Borehole No: BC-MW16 | Sheet 2 of 3

Checked By: BB | Date: 6/3/95

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
16	NA SS									D.O. ABOVE	
17											
18	~~1157~~	1520	AUGER ONLY ~~HAS~~	NA	1159	NA	0.0/0.0			SAND, MEDIUM GRAINED W/GRAVEL, YELLOWISH BROWN (10 YR 5/6), MOIST, LOOSE	
19											
20											
21										D.O. ABOVE	
22	NA	2025	AUGER ONLY	NA	1203	NA	0.0/0.0				
23											
24											
25										D.O. ABOVE	
26											
27	NA	2530	AUGER ONLY	NA	1205	NA	0.0/0.0				
28											
29											
30										D.O. ABOVE, FINE TO MEDIUM GRAINED, TRACE GRAVEL	
31											
32	NA	3035	AUGER ONLY	NA	1208	NA	0.0/0.0				
33											
34											
35											

Key: S/B = Sample reading / Background reading; NA = not analyzed

holelog2.dw

EARTH TECH

Borehole Log

Project Name: 110TH FIGHTER GROUP, HIANG		Project Number: 948901
Borehole Location: PARADE GROUNDS	Borehole No: BC-MW16	Sheet 3 of 3
	Checked By: JSS	Date: 6/3/95

Depth (feet)	Sample: Number	Sample: Interval	Sample: Blow Count	Sample: Recovery	Sample: Time	Field Analysis: FID (ppm) S/B	Field Analysis: PID (ppm) S/B	LOG: Graphic	LOG: USCS or Rock Type	Lithologic Description	Remarks
36										D.O. ABOVE	
37	4	35 40	AUGER ONLY	NA	1211	NA	0.0 / 0.0				
38											
39											
40										TOTAL DEPTH = 40'	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dwg

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC1B1	Sheet 1 of 2	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/06/94	Total Depth (feet): 27	
Drilling Method: Geoprobe	Date Finished: 11/07/94	Depth to Bedrock (feet): NA	
Drilling Fluid NA	Number of Samples: 6	Depth to Water (feet): ~25	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: JB	Date: 6/3/98	

Depth (feet)	Sample Number	Sample Interval	Blow Count	Recovery	Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BC1B1 0001	00-01'	NA	100%	0930	NA	NA				
1										1'-5', Drive only	
5	BC1B10507	05'-07'	NA	NA	1320	NA	3.2/0		SW	Sand with minor gravel, coarse-med. grained, brown-gray-brown, loose, moist-very moist	slight hydrocarbon odor
7										7'-10', Drive only	
10	BC1B11012	10'-12'	NA	NA	1350	NA	9.3/0		SW	Sand with gravel, coarse grained, trace fines, gray brown, loose, moist	Slight hydrocarbon odor
12										12'-15' Drive only	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

Form F 1009 3-91

EARTH TECH

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich | Project Number: 948901-08

Borehole Location: Site 1: Former Fuel Tank Area | Borehole No: BC1B1 | Sheet 2 of 2

Checked By: JBS | Date: 6/3/95

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	BC1B1S17	15'-17'	NA	NA	1410	NA	7.0/0		SW	sand with minor gravel, fine-coarse grained, gray-brown, loose, moist	Slight hydrocarbon odor
17										17'-20', Drive only	
20	BC1B1A0a2	20'-22'	NA	NA	1438	NA	>2500		SM	silty sand, fine to v. fine sand, Lt. brown, cohesive, moist	Slight hydrocarbon odor
22										22'-25', Drive only	
25	BC1B1A527	25'-27'	NA	NA	1455	NA	25/0		SP	sand, well-sorted, brown, loose, wet	slight hydrocarbon odor
27										TD = 27'	

Key: S/B = Sample reading / Background reading; NA = not analyzed

holelog2.dwg

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC1B2	Sheet 1 of 2	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/06/94	Total Depth (feet): 22	
Drilling Method: Geoprobe	Date Finished: 11/07/94	Depth to Bedrock (feet): NA	
Drilling Fluid: NA	Number of Samples: 5	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: BSB	Date: 6/3/95	

Depth (feet)	Sample Number	Sample Interval	Blow Count	Recovery	Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BC1B2 000'	00-01'	NA	NA	0900	NA	0/0		SW	sand and gravel, dk. brown, moist	No Odor
1										1'-5', Drive only	
5	BC1B2 0507	05'-07'	NA	NA	1130	NA	0.0/0.0		SW	sand, minor v. coarse sand to fine gravel, yellow brown, v. moist	
7										7'-10', Drive only	
10	BC1B2 1012	10'-12'	NA	NA	1140	NA	10.0/0		SW	sand, coarse - v. coarse grained with v. fine - fine gravel, v. little fines, Lt. brown - brown, loose, moist	Slight hydrocarbon odor
12										12'-15', Drive only	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

Form F 1009 3-91

EARTH TECH

Borehole Log

Project Name: 110th FG, MICH ANG, BattleCreek, Mich | Project Number: 948901-08

Borehole Location: Site1: Former Fuel Tank Area | Borehole No: BC1B2 | Sheet 2 of 2

Checked By: JBO | Date: 6/3/98

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	BC1B21517	15'-17'	NA	NA	1150	NA	300/0		SM	Sand, fine-v. fine with (17-16') minor silt and clay, (16-15') coarse grained, well-sorted, loose, v. moist	Hydrocarbon Odor
17										17'-20', Drive only	
20	BC1B2aaa	20'-22'	NA		1200	NA	20/0		SM	(aa-21.5') v. fine sand with silt, gray, gray brown, moist-v. moist, cohesive; (21.5-20) sand, fine grained, well-sorted, moist	
22										TD = 22'	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dwg

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC1B3	Sheet 1 of 2	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/07/94	Total Depth (feet): 22	
Drilling Method: Geoprobe	Date Finished: 11/08/94	Depth to Bedrock (feet): NA	
Drilling Fluid: NA	Number of Samples: 5	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: JSB	Date: 6/9/95	

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BC1B3 0001	00-01'	NA	100%	1010	NA	0/0		SW	sand and gravel, brown, moist	No Odor
1										1'-5', Drive only	
5	BC1B30507	05'-07'	NA	NA	1630	NA	2.5/0.0		SC	Sandy clay, brown to dark brown, fine grained, moist	Hydrocarbon odor
7										7'-10', Drive only	
10	BC1B31012	10'-12'	NA	NA	1650	NA	2.1/0.0		SP	sand, med. grained, brown to orange brown, well-sorted, loose, moist	Petroleum odor
12										12'-15', Drive only	
15											

Key: * S/B = Sample reading / background reading; NA = not analyzed

Form F 1003 3-91

EARTH TECH

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich | Project Number: 948901-08

Borehole Location: Site 1: Former fuel tank area | Borehole No: BC/B3 | Sheet 2 of 2

Checked By: | Date:

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	BC/B3/S/7	15'-17'	NA	30%	1705	NA	1.5/0.0		SW	sand with gravel, med. grained, brown, poorly sorted, moist	Petroleum Odor
17										17'-20' Drive only	
20	BC/B3A0a2	20'-22'	NA	NA	1715	NA	79.0/0.1		SP	sand, med. grained, brown to gray, moist	Petroleum Odor
22										TD = 22'	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dwg

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC1B4	Sheet 1 of 2	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/06/94	Total Depth (feet): 20	
Drilling Method: Geoprobe	Date Finished: 11/09/94	Depth to Bedrock (feet): NA	
Drilling Fluid: NA	Number of Samples: 5	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: JSG	Date: 6/3/95	

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BC1B4 0001	00-01'	NA	100 %	0900	NA	NA		SP	sand, med. grained, moist	No Odor
1										1'-5', Drive only	
5	BC1B40507	05'-07'	NA	NA	1535	NA	0.6/0		SW	sand with minor gravel and fines, med-coarse grained, brown, moist	No Odor
7										7'-10', Drive only	
10	BC1B41012	10'-12'	NA	NA	1545	NA	298/0		SW	sand, fine gravel, coarse sand, brown gray-brown, loose, moist	No Odor
12										12'-15', Drive only	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

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EARTH TECH

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, MICH | Project Number: 948901-08

Borehole Location: Site1: Former Fuel Tank Area | Borehole No: BC1B4 | Sheet 2 of 2

Checked By: BSO | Date: 6/3/95

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	BC1B4151717	15'-17'	NA	NA	1610	NA	2.5/0			Crushed rock and soil	
17										17'-20', Drive only	
20	BC1B42022	20'-22'	NA	0%	1630	NA	NA				Sampler was bent
22										TD = ~~22~~ 20' JSB 2/19/96	

Key: S/B = Sample reading / Background reading; NA = not analyzed

holelog2.dwg

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BCIB5	Sheet 1 of 2	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/07/94	Total Depth (feet): 27	
Drilling Method: Geoprobe	Date Finished: 11/09/94	Depth to Bedrock (feet): NA	
Drilling Fluid: NA	Number of Samples: 6	Depth to Water (feet): ~25 ft.	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: BSB	Date: 6/3/95	

Depth (feet)	Sample Number	Sample Interval	Blow Count	Recovery	Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BCIB5 0001	00-01'	NA	100%	0935	NA	NA		SP	Sand, brown, med. grained, moist, well-sorted, cohesive	No Odor
1										1'-5', Drive only	
5	BCIB5 0507	05'-07'	NA	NA	1015	NA	0/0		SP	Sand, med.-coarse grained with trace fines, brown, well-sorted, loose, moist	No Odor
7										7'-10', Drive only	
10	BCIB5 1012	10'-12'	NA	NA	1050	NA	0/0		SP	Sand, brown, well-sorted, moist, loose	No Odor
12										12'-15', Drive only	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

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EARTH TECH

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, MICH | Project Number: 948901-08

Borehole Location: Site 1: Former Fuel Tank Area | Borehole No: BC1B5 | Sheet 2 of 2

Checked By: JSB | Date: 6/3/95

Depth (feet)	Sample Number	Sample Interval	Blow Count	Recovery	Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	BC1B51517	15'-17'	NA	NA	1110	NA	0/0		SP	sand, brown, well-sorted, moist, loose	No Odor
17										17'-20', Drive only	
20	BC1B52022	20'-22'	NA	NA	1140	NA	0/0		SW	Sand, Lt. brown, some gravel, loose	No Odor
22										22'-25', Drive only	
25	BC1B52527D / BC1B52527	25'-27'	NA	NA	1210	NA	25270 = 241/0 4527 = 28.5/0		SW	sand, coarse, brown, poorly-sorted, loose, saturated	Fuel Odor
27										TD = 27'	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dwg

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC186	Sheet 1 of 1	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/08/94	Total Depth (feet): 12	
Drilling Method: Geoprobe	Date Finished: 11/08/94	Depth to Bedrock (feet): NA	
Drilling Fluid NA	Number of Samples: 1	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: JSB	Date: 6/3/95	

Depth (feet)	Sample: Number	Sample: Interval	Sample: Blow Count	Sample: Recovery	Sample: Time	Field Analysis: FID (ppm) S/B*	Field Analysis: PID (ppm) S/B*	LOG: Graphic	LOG: USCS or Rock Type	Lithologic Description	Remarks
0										0-10', Drive only	
10	BC186 1012	10'-12'	NA	NA	0900	NA	10/0		SP	sand, med. grained, brown, well-sorted, loose, moist	
12										TD = 12'	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

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The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC187	Sheet 1 of 2	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/09/94	Total Depth (feet): 18	
Drilling Method: Geoprobe	Date Finished: 11/09/94	Depth to Bedrock (feet): NA	
Drilling Fluid: NA	Number of Samples: 4	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: BSS	Date: 6/1/95	

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BC187 0001	00-01'	NA	100%	1455	NA	NA		SC	sandy clay, v. small amount of gravel, brown, cohesive, moist	No Odor
1										1'-5', Drive only	
5	BC187050 7	05'-07'	NA	50%	1130	NA	13/11.8		SW	Sand, med.-coarse grained, trace fines, loose, moist	No Odor
7										7'-10', Drive only	
10	BC187101 2	10'-12'	NA	40%	1145	NA	6.6/4.4		SW	Sand with gravel, med.-v. coarse grained, brown-Lt. brown, loose, moist	No Odor
12										12'-15', Drive only	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

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EARTH TECH

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich | Project Number: 948901-08

Borehole Location: Site 1: Former Fuel Tank Area | Borehole No: BC1B7 | Sheet 2 of 2

Checked By: | Date:

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	BC1B7151717	15'-17'	NA	10%	1150	NA	25/1.1		SW	Gravelly sand, brown, loose, moist	No Odor
17										TD = 18'	* Geoprobe refusal at 18'

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dwg

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC1B8	Sheet 1 of 2	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/07/94	Total Depth (feet): 22	
Drilling Method: Geoprobe	Date Finished: 11/09/94	Depth to Bedrock (feet): NA	
Drilling Fluid: NA	Number of Samples: 5	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: JBB	Date: 6/3/95	

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BC1B8 0001	00-01'	NA	100%	1125	NA	NA		SC	Sandy clay, fine grained, brown, cohesive	No Odor
1										1'-5', Drive only	
5	BC1B8 0507	05'-07'	NA	NA	1515	NA	0/0		SP	Sand, med. grained, brown, well-sorted, loose, moist	Slight hydrocarbon odor
7										7'-10', Drive only	
10	BC1B8 1012	10'-12'	NA	NA	1535	NA	0/0		SP	Sand, med. grained, brown, well-sorted, loose, moist	
12										12'-15', Drive only	
15											

Key: * S/B = Sample reading / background reading; NA = not analyzed

EARTH TECH

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, MICH | Project Number: 948901-08

Borehole Location: Site 1: Former Fuel Tank Area | Borehole No: BC1B 8 | Sheet 2 of 2

Checked By: JSB | Date: 6/3/95

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	BC1B81517	15'-17'	NA	NA	1550	NA	0/0		SW	Sand, med. grained with a few pieces of gravel, brown, loose, moist	
17										17'-20', Drive only	
20	BC1B82022	20'-22'	NA	NA	1610	NA	0/0		SP	sand, fine grained, v. well-sorted, brown, loose, slightly moist	No Odor
22										TD = 22'	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dwg

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC189	Sheet 1 of 2	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/09/94	Total Depth (feet): 22	
Drilling Method: Geoprobe	Date Finished: 11/09/94	Depth to Bedrock (feet): NA	
Drilling Fluid NA	Number of Samples: 5	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: JSB	Date: 6/3/95	

Depth (feet)	Sample: Number	Sample: Interval	Sample: Blow Count	Sample: Recovery	Sample: Time	Field Analysis: FID (ppm) S/B*	Field Analysis: PID (ppm) S/B*	LOG: Graphic	LOG: USCS or Rock Type	Lithologic Description	Remarks
0	BC189 0001	00-01'	NA	100%	1520	NA	NA		SW	sand, med. grained, brown, poorly sorted, moist	No Odor
1										1'-5', Drive only	
5	BC189 0507	05'-07'	NA	NA	1630	NA	NA		SC	sandy clay, fine grained, v. cohesive	No Odor
7										7'-10', Drive only	
10	BC189 1012	10'-12'	NA	30%	1645	NA	NA		SC	sandy clay to just sand, fine to med. grained, brown, moist	No Odor
12										12'-15', Drive only	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

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EARTH TECH

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, MICH | Project Number: 948901-08

Borehole Location: Site 1: Former fuel tank area | Borenole No: BC1B9 | Sheet 2 of 2

Checked By: JSB | Date: 6/3/95

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	BC1B91517	15'-17'	NA	NA	1730	NA	NA		SP	sand, fine grained, brown, well-sorted, moist	No Odor
17										17'-20', Drive only	
20	BC1B92022	20'-22'	NA	NA	1720	NA	NA		SP	sand, fine grained, brown, well-sorted, moist	No Odor
22										TD = 22'	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dw

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC1B11	Sheet 1 of 2	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/09/94	Total Depth (feet): 23	
Drilling Method: Geoprobe	Date Finished: 11/10/94	Depth to Bedrock (feet): NA	
Drilling Fluid NA	Number of Samples: 5	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: JSB	Date: 6/1/95	

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BC1B11 0001	00-01'	NA	NA	1030	NA	NA		SC	clayey sand, gravel and organics, moist, cohesive	No Odor
1										1'-5', Drive only	
5	BC1B110507	05'-07	NA	100%	1440	NA	2.5/1.8		SW	Sand, med-coarse grained, brown, loose, moist	No Odor
7										7'-10', Drive only	
10	BC1B11012	10'-12'	NA	90%	1455	NA	0.7/0		SW	Sand with gravel, med.-coarse grained, brown-Lt. brown, loose, moist	No Odor
12										12'-15' Drive only	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

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EARTH TECH

Borehole Log

Project Name: 110th FG, MICH ANG; BATTLECREEK, MICH | Project Number: 948901-08

Borehole Location: Site 1: Former fuel tank area | Borehole No: BC1 B11 | Sheet 2 of 2

Checked By: SSB | Date: 6/3/98

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	BC1B11517	15'-17'	NA	NA	1510	NA	0.3/0		SM	sand with silt, v. fine - fine grained, brown - yellow brown, cohesive, moist	No Odor
17										17'-19'; Drive only	
19	BC1B11923/BC1B11923D	19'-23'	NA	80% and 70%	1540	NA	0.7/0		SW	sand, v. fine - med. grained, minor fines, brown, loose - cohesive, moist	No Odor
23										TD = 23'	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dw

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC1B12	Sheet 1 of 2	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/07/93	Total Depth (feet): 22	
Drilling Method: Geoprobe	Date Finished: 11/09/93	Depth to Bedrock (feet): NA	
Drilling Fluid: NA	Number of Samples: 5	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: JJG	Date: 6/3/95	

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BC1B12 0001	00-01'	NA	100%	1425	NA	NA		SC	V. sandy clay, fine grained, brown, somewhat cohesive, moist	No Odor
1										1'-5', Drive only	
5	BC1B12 0507	05'-07'	NA	NA	1335	NA	0/0		SP	sand, brown, well-sorted, moist, loose	No Odor
7										7'-10', Drive only	
10	BC1B12 1012	10'-12'	NA	50%	1350	NA	NA		SW	Sand, med. grained, v. small amount of gravel, poorly-sorted, Lt. brown, loose	No Odor
12										12'-15', Drive only	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

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EARTH TECH

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, MICH | Project Number: 948901-08

Borehole Location: Site 1: Former Fuel Tank Area | Borehole No: BC1B12 | Sheet 2 of 2

Checked By: JJB | Date: 6/3/95

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	BC1B12S17	15'-17'	NA	NA	1430	NA	0/0		SP	Sand, fine grained, brown, well-sorted, v. moist to moist, loose	No Odor
17										17'-20', Drive only	
20	BC1B12S22	20'-22'	NA	NA	1445	NA	0/0		SP	Sand, med. grained, brown, well-sorted, loose, slightly moist	No Odor
22										TD = 22'	

Key: S/B = Sample reading / Background reading; NA = not analyzed

holelog2.dwg

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC/B13	Sheet 1 of 1	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/08/94	Total Depth (feet): 12	
Drilling Method: Geoprobe	Date Finished: 11/08/94	Depth to Bedrock (feet): NA	
Drilling Fluid NA	Number of Samples: 1	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: SSO	Date: 6/3/95	

Depth (feet)	Sample: Number	Sample: Interval	Sample: Blow Count	Sample: Recovery	Sample: Time	Field Analysis: FID (ppm) S/B*	Field Analysis: PID (ppm) S/B*	LOG: Graphic	LOG: USCS or Rock Type	Lithologic Description	Remarks
0										0-10', Drive only	
10	BC/B13/012	10'-12'	NA	80%	0815	NA	NA		SP	sand, med.-coarse grained, minor trace fines, brown, loose, moist	No Odor
12										TD = 12	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

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The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BCIB14	Sheet 1 of 1	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/08/94	Total Depth (feet): 12	
Drilling Method: Geoprobe	Date Finished: 11/08/94	Depth to Bedrock (feet): NA	
Drilling Fluid NA	Number of Samples: 1	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: YSB	Date: 6/3/95	

Depth (feet)	Sample: Number	Sample: Interval	Sample: Blow Count	Sample: Recovery	Sample: Time	Field Analysis: FID (ppm) S/B*	Field Analysis: PID (ppm) S/B*	LOG: Graphic	LOG: USCS or Rock Type	Lithologic Description	Remarks
0										0-10', Drive only	
10	BCIB14101a	10'-12'	NA	40%	0845	NA	0/0		SW	sand, med-coarse grained, some gravel, brown, loose, v. moist	No Odor
12										TD = 12	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

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The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC1B15	Sheet 1 of 1	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/08/94	Total Depth (feet): 12	
Drilling Method: Geoprobe	Date Finished: 11/08/94	Depth to Bedrock (feet): NA	
Drilling Fluid NA	Number of Samples: 1	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: JSB	Date: 6/3/95	

Depth (feet)	Sample: Number	Sample: Interval	Sample: Blow Count	Sample: Recovery	Sample: Time	Field Analysis: FID (ppm) S/B*	Field Analysis: PID (ppm) S/B*	LOG: Graphic	LOG: USCS or Rock Type	Lithologic Description	Remarks
0										0-10', Drive only	
10	BC1B15101a	10'-12'	NA	NA	0930	NA	240/0		SP	sand, med. grained, brown, well-sorted, loose, moist	Hydrocarbon odor
12										TD = 12	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

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Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC1B16	Sheet 1 of 1
Drilling Agency: EarthTech	Driller: B. Bell	
Drilling Equipment: Geoprobe	Date Started: 11/08/94	Total Depth (feet): 12
Drilling Method: Geoprobe	Date Finished: 11/08/94	Depth to Bedrock (feet): NA
Drilling Fluid NA	Number of Samples: 1	Depth to Water (feet): NA
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA
	Logged by: A. Fox	
	Checked by: JSB	Date: 4/3/95

Depth (feet)	Sample: Number	Sample: Interval	Sample: Blow Count	Sample: Recovery	Sample: Time	Field Analysis: FID (ppm) S/B*	Field Analysis: PID (ppm) S/B*	LOG: Graphic	LOG: USCS or Rock Type	Lithologic Description	Remarks
0										0-10', Drive only	
10	BC1B1612	10'-12'	NA	NA	0945	NA	NA		SP	Sand with v. small amount of gravel, brown, mostly well-sorted, med. grained, loose, moist	
12										TD=12'	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

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Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area		Borehole No. BC1B17	Sheet 1 of 1
Drilling Agency: EarthTech		Driller: B. Bell	
Drilling Equipment: Geoprobe		Date Started: 11/08/94	Total Depth (feet): 12
Drilling Method: Geoprobe		Date Finished: 11/08/94	Depth to Bedrock (feet): NA
Drilling Fluid: NA		Number of Samples: 1	Depth to Water (feet): NA
Completion Information: filled w/ granular bentonite		Borehole Diameter (in): 1 1/16	Elevation and Datum: NA
		Logged by: A. Fox	
		Checked by: JSB	Date: 6/3/95

Depth (feet)	Sample: Number	Sample: Interval	Sample: Blow Count	Sample: Recovery	Sample: Time	Field Analysis: FID (ppm) S/B*	Field Analysis: PID (ppm) S/B*	LOG: Graphic	LOG: USCS or Rock Type	Lithologic Description	Remarks
0										0-10', Drive only	
10	BC1B17102a	10'-12'	NA	NA	1015	NA	2.5/1.2		SC	sandy clay, fine grained, brown, moist	
12										TD = 12'	
15											

Key: * S/B = Sample reading / background reading; NA = not analyzed

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The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BCIB18	Sheet 1 of 2	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/09/94	Total Depth (feet): 22	
Drilling Method: Geoprobe	Date Finished: 11/09/94	Depth to Bedrock (feet): NA	
Drilling Fluid: NA	Number of Samples: 4	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: JSB	Date: 1/3/95	

Depth (feet)	Sample Number	Sample Interval	Blow Count	Recovery	Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0										0-5', Drive only	
5	BCIB18 0507	05'-07'	NA	50%	0820	NA	24/5.1		SC	Sandy clay, gray-brown to gray	slight hydrocarbon odor
7										7'-10', Drive only	
10	BCIB18 1012	10'-12'	NA	NA	0855	NA	15/5.5		SC	Clayey sand, brown-gray brown, loose, moist, sand with fines	slight hydrocarbon odor
12										12'-15', Drive only	
15											

Key: * S/B = Sample reading / background reading; NA = not analyzed

Form F 1003
3-91

EARTH TECH

Borehole Log

Project Name: 110th FG, MICH ANG; BATTLECREEK, MICH | Project Number: 948901-08

Borehole Location: Site 1: Former Fuel Tank Area | Borehole No: BC1B18 | Sheet 2 of 2

Checked By: | Date: 11/9/94

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	BC1B1815/17	15'-17'	NA	30%	0905	NA	62/11		SC	sandy clay, gray to gray brown	Hydrocarbon Odor
17										17'-20', Drive only	
20	BC1B1820/22	20'-22'	NA	NA	0920	NA	91/11		SW	sand, med-coarse grained, thin (0.2') silty clay lense, moist to very moist, loose	* lense in 21-22' interval * mod.-strong odor
22										TD = 22	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dwg

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site 1: Former Fuel Tank Area	Borehole No. BC1819	Sheet 1 of 2	
Drilling Agency: EarthTech	Driller: B. Bell		
Drilling Equipment: Geoprobe	Date Started: 11/9/94	Total Depth (feet): 22	
Drilling Method: Geoprobe	Date Finished: 11/10/94	Depth to Bedrock (feet): NA	
Drilling Fluid: N A	Number of Samples: 5	Depth to Water (feet): NA	
Completion Information: filled w/ granular bentonite	Borehole Diameter (in): 1 1/16	Elevation and Datum: NA	
	Logged by: A. Fox		
	Checked by: DJO	Date: 6/3/95	

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BC1819 0001	00-01'	NA	100%	1050	NA	NA		SP	sand, fine, brown - reddish tint, loose, moist	No Odor
1										1'-5', Drive only	
5	BC1819 0507	05'-07'	NA	90%	1000	NA	7.5/7.3		SC	sandy clay, med-coarse grained, orange brown, cohesive, moist	No Odor
7										7'-10', Drive only	
10	BC1819 1012	10'-12'	NA	50%	1015	NA	11.2/9.3		SP	sand, med. grained, brown, well-sorted, loose, moist	No Odor
12										12'-15', Drive only	
15											

Key * S/B = Sample reading / background reading; NA = not analyzed

Form F 1009
3/91

EARTH TECH

Borehole Log

Project Name: 110th FG, MICH ANG; BATTLECREEK, MICH | Project Number: 948901-08

Borehole Location: SITE 1: Former Fuel Tank Area | Borenole No: BC1B19 | Sheet 2 of

Checked By: JSB | Date: 6/3/95

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B	Field Analysis PID (ppm) S/B	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
15	BC1B1915 17	15'-17'	NA	50%	1030	NA	10.6/11.3		SW	sand, fine-med. grained, Lt. brown, loose, moist	No Odor
17										17'-20', Drive only	
20	BC1B1920 22	20'-22'	NA	NA	1055	NA	NA		SP	Sand, med. grained, Lt. brown, well-sorted, loose	No Odor
22										TD = 22'	

Key S/B = Sample reading / Background reading NA = not analyzed

holelog2.dwg

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site X: ~~Former Fuel Tank~~ Fire Training Area 3 JSB 12/13/95 ~~Area~~		Borehole No. BC3SB1	Sheet 1 of 1
Drilling Agency: EarthTech		Driller: B. Bell	
Drilling Equipment: Geoprobe		Date Started: 11/05/94	Total Depth (feet): 6
Drilling Method: Geoprobe		Date Finished: 11/08/94	Depth to Bedrock (feet): NA
Drilling Fluid: NA		Number of Samples: 2	Depth to Water (feet): NA
Completion Information: filled w/ granular bentonite		Borehole Diameter (in): 1 1/16	Elevation and Datum: NA
		Logged by: A. Fox	
		Checked by: JSB	Date: 6/7/95

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BC3SB1 0001	00-01'	NA	100%	0835	NA	NA		SW	Sand with trace gravel and organics, brown-Lt. brown	No Odor
1										1'-4', Drive only	
4	BC3SB1 0406	04'-06'	NA	NA	1120	NA	1.4/0.4		SW	Sand, minor fines, med-V. coarse, brown, loose, moist	May have slight hydrocarbon odor
6										TD = 6'	

Key * S/B = Sample reading / background reading; NA = not analyzed

The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site X: ~~Former fuel Tank~~ 3 Fire Training Area JSB 6/7/95 ~~Area~~		Borehole No. BC3SB2	Sheet 1 of 1
Drilling Agency: EarthTech		Driller: B. Bell	
Drilling Equipment: Geoprobe		Date Started: 11/05/94	Total Depth (feet): 6
Drilling Method: Geoprobe		Date Finished: 11/08/94	Depth to Bedrock (feet): NA
Drilling Fluid NA		Number of Samples: 2	Depth to Water (feet): NA
Completion Information: filled w/ granular bentonite		Borehole Diameter (in): 1 1/16	Elevation and Datum: NA
		Logged by: A. Fox	
		Checked by: JSB	Date: 6/7/95

Depth (feet)	Sample Number	Sample Interval	Blow Count	Recovery	Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BC3SB2 0001	00-01'	NA	100%	0950	NA	0/0		SW	Sand, coarse to v. coarse grained with gravel, brown, trace organics	*stained layer 3" below grade
1										1'-4', Drive only	
4	BC3B2040	04'-06'	NA	NA	1135	NA	336/1.1		SW	Coarse - v. coarse sand with gravel, brown - gray brown, loose	Hydrocarbon Odor
6										TD = 6'	

Key * S/B = Sample reading / background reading; NA = not analyzed

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The Earth Technology Corporation

Borehole Log

Project Name: 110th FG, MICH ANG; Battle Creek, Mich		Project Number: 948901-08	
Borehole Location: Site Y: ~~Former fuel tank~~ Fire Training Area 3 JSB 6/3/95 ~~Area~~		Borehole No. BC3SB3	Sheet 1 of 1
Drilling Agency: EarthTech		Driller: B. Bell	
Drilling Equipment: Geoprobe		Date Started: 11/05/94	Total Depth (feet): 6
Drilling Method: Geoprobe		Date Finished: 11/08/94	Depth to Bedrock (feet): NA
Drilling Fluid: NA		Number of Samples: 2	Depth to Water (feet): NA
Completion Information: filled w/ granular bentonite		Borehole Diameter (in): 1 1/16	Elevation and Datum: NA
		Logged by: A. Fox	
		Checked by:	Date:

Depth (feet)	Sample Number	Sample Interval	Sample Blow Count	Sample Recovery	Sample Time	Field Analysis FID (ppm) S/B*	Field Analysis PID (ppm) S/B*	LOG Graphic	LOG USCS or Rock Type	Lithologic Description	Remarks
0	BC3SB3 0001	00-01'	NA	100%	0915	NA	0/0		SW	Sand, med grained, minor gravel, brown-dk. brown, organic rich	
1										1'-4', Drive only	
4	BC3B30406	04'-06'	NA	NA	1150	NA	1.4/0.1		SW	Sand, coarse - v. coarse with gravel, loose, moist	slight hydrocarbon odor
6										TD = 6'	

Key: * S/B = Sample reading / background reading; NA = not analyzed

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APPENDIX E: QA/QC EVALUATION SUMMARIES

APPENDIX E: DATA QUALITY ASSESSMENT

E.1 Introduction

A standardized Quality Assurance/Quality Control (QA/QC) program was followed during the Remedial Investigation (RI) at the 110th Fighter Wing, Michigan Air National Guard (ANG), Battle Creek, Michigan to ensure that analytical results accurately represent the environmental conditions at the sites. The RI was conducted using the Hazardous Waste Remedial Action Program (HAZWRAP) Level C (i.e., United States Environmental Protection Agency (EPA) Level III) QC requirements described in Requirements For Quality Control Of Analytical Data (DOE/HWP-65/R1, July 1990) and the guidelines and specifications described in the RI Work Plan.

A total of 72 environmental and 31 QC samples were collected during the RI. All water samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals. All soil samples were analyzed for metals, but not for VOCs and SVOCs. The number of environmental and field QC samples (i.e., trip blanks, field blanks, equipment rinseates, and field replicates) submitted for analysis are summarized in Table E-1.

Table E-1 Summary of Analytical Program
110th FW, MIANG, Battle Creek, Michigan

Sample Type	VOC[1]	SVOC CLP 3/90[2]	Metals CLP 3/90	Water Quality Parameters[3]
Confirmation Analyses				
Soil	36	40	46	
Water	26	26	26	14
Total	62	66	72	14
QA/QC Analyses				
Soil Duplicates	4	4	5	
Water Duplicates	4	4	4	2
Equipment Rinseates	9	9	9	9
Field Blanks	6	6	6	6
Trip Blanks	7			

[1]Soils analyzed using SW-846 Method 8240; waters were analyzed using SW-846 Method 8010/8020.
[2]One water sample delivery group analyzed by CLP 10/92.
[3]Nitrate, chloride, sulfate, and total dissolved solids (EPA 600/4-79-020, March 1983).

E.2 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements developed by data users to specify the quality of data obtained from field and laboratory data collection activities to support specific decisions or regulatory actions. DQOs also establish numeric limits for the data to allow the data user to determine if the data collected are of sufficient quality for use in their intended application. The data collected during the RI field effort will be used to develop a risk evaluation and recommendations for (1) developing and implementing immediate response plans if required, (2) taking no further action and preparing a Decision Document, (3) initiating focused feasibility studies and remedial measures, or (4) proceeding with feasibility studies. DQOs were established for precision, accuracy, representativeness, comparability, and completeness (PARCCs). The following sections summarize the DQOs established for the PARCCs parameters and the levels of agreement obtained during the RI.

E.2.1 Precision

Precision measures the reproducibility of measurements under a given set of conditions. Precision is expressed quantitatively as the measure of the variability of a group of measurements compared to their average value. The closer the measured values are to each other, the more precise the measurements. For this project, precision was defined as the reproducibility, or degree of agreement, among replicate measurements of the same quantity. Precision was expressed as the percent difference between results of duplicate samples for a given analyte. The Relative Percent Difference (RPD) was calculated as:

$$RPD = \frac{Abs(C_1 - C_2)}{\frac{C_1 + C_2}{2}} \; X \; 100$$

Where; C_1 = Concentration of analyte detected in the sample

C_2 = Concentration of the analyte detected in the duplicate

The RPD was then compared to established limits to determine the level of precision achieved. For this project overall precision was comprised of analytical and sampling precision. The objectives for analytical precision, sampling precision, and overall precision were to have 90% of the values calculated within the specified RPD range.

TABLE E-2 LABORATORY QUALITY CONTROL SUMMARY
SOIL MS/MSD VOLATILE ORGANIC COMPOUNDS
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Ranges	RPD Limits	Number Within Limits	Number Outside Limits
VOC										
Cholorbenzene	10	88-110	60-133	10	0	5	0-10	21	5	0
1,1-Dichloroethene	10	82-115	59-172	10	0	5	3-11	22	5	0
Trichloroethene	10	82-112	62-137	10	0	5	0-26	24	4	1
Benzene	10	81-116	66-142	10	0	5	0-4	21	5	0
Toluene	10	91-111	59-139	10	0	5	0-14	21	5	0

Analytical precision refers to the ability of the laboratory to reproduce measurements of a sample concentration. Analytical precision was assessed through the use of analytical replicate samples. Analytical precision, for VOC and SVOC, was determined using Matrix Spike/Matrix Spike Duplicates (MS/MSDs). The laboratory selected one sample in 20 and split the sample into two aliquots, to be used for MS/MSDs analysis. The first aliquot was analyzed for parameters of interest. The remaining aliquot was spiked with known quantities of the parameters of interest and analyzed twice. Analytical precision for metals analyses was determined using duplicate analyses of samples collected during the RI. Duplicate samples for metals analyses were prepared by subdividing one sample in 20 and analyzing both samples of the duplicate pair. The RPDs calculated were used as an indication of analytical precision for the analyses performed.

None of the 25 soil and two of the 184 water RPD values calculated from the VOC analyses exceeded control limits for analytical precision. Control limits for VOC MS/MSDs are detailed in Table E-2 and Table E-3. Two of 44 soil and none of the 37 water RPD values calculated for the SVOC analyses exceeded control limits for analytical precision. Control limits for SVOC MS/MSDs are detailed in Tables E-4, E-5 and E-5a. Seven of the 41 soil and nine of the 69 water RPD values calculated from the metals analyses were outside advisory control limits of $\pm 20\%$. Control limits for metals MS/MSDs are detailed in Tables E-6 and E-7. A total of 380 of the 400 RPD values calculated met QC criteria, this represents 95% precision. Based on 95% of the RPDs calculated meeting control limits and the acceptable laboratory QC, the DQO for analytical precision has been met.

Sampling precision refers to the ability of the sampling procedure to reproduce the conditions at the site. Sampling precision was assessed through the collection of field duplicates. Duplicate samples were collected at a rate of one in ten and submitted with the environmental samples for VOCs, SVOCs, and metals analyses. RPD values were calculated for all compounds and elements not qualified "B" or "R" during the data validation process. The RPDs were then used to measure the sampling precision. Four surface soil, one subsurface soil, and four groundwater duplicates were collected during the RI field effort. The duplicate samples were collected using the same procedures used to collect the environmental samples.

TABLE E-3 LABORATORY QUALITY CONTROL SUMMARY
WATER MS/MSD VOLATILE ORGANIC COMPOUNDS
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
8010										
Dibromomethane	8	76-101	42-172	8	0	4	4-20	20	4	0
1,2-Dichlorobenzene	8	79-106	1-208	8	0	4	4-10	20	4	0
1,3-Dichlorobenzene	8	80-104	7-187	8	0	4	1-11	20	4	0
1,4-Dichlorobenzene	8	80-106	42-143	8	0	4	5-11	20	4	0
1,1-Dichloroethane	8	75-104	47-132	8	0	4	2-19	20	4	0
1,2-Dichloroethane	8	71-106	51-147	8	0	4	3-0	20	4	0
1,1-Dichloroethene	8	83-109	28-167	8	0	4	1-11	20	4	0
trans-1,2-Dichloroethene	8	76-102	38-155	8	0	4	0-20	20	4	0
1,2-Dichloropropane	8	80-104	44-156	8	0	4	1-6	20	4	0
cis-1,3,Dichloropropene	8	73-106	22-178	8	0	4	5-10	20	4	0
trans-1,3,-Dichloropropene	8	72-108	22-178	8	0	4	5-8	20	4	0
Methylene Chloride	8	78-114	25-162	8	0	4	1-6	20	4	0
1,1,2,2-Tetrachloroethane	8	74-109	8-184	8	0	4	1-16	20	4	0
1,1,1,2-Tetrachloroethane	8	81-104	38-150	8	0	4	4-9	20	4	0

TABLE E-3 LABORATORY QUALITY CONTROL SUMMARY
WATER MS/MSD VOLATILE ORGANIC COMPOUNDS
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
8010										
Bromodichloromethane	8	66-105	42-172	8	0	4	1-19	20	4	0
Bromobenzene	8	70-104	8-184	8	0	4	0-18	20	4	0
Bromoform	8	42-111	13-159	8	0	4	9-56	20	3	1
Bromomethane	8	75-100	1-144	8	0	4	0-8	20	4	0
Bromochloromethane	8	79-101	49-133	8	0	4	2-8	20	4	0
Carbon tetrachloride	8	75-105	43-143	8	0	4	3-15	20	4	0
Chloroethane	8	75-113	46-137	8	0	4	0-12	20	4	0
Chloroform	8	73-107	49-133	8	0	4	0-19	20	4	0
Cholorbenzene	8	80-105	38-150	8	0	4	0-20	20	4	0
Chloromethane	8	75-100	1-193	8	0	4	0-8	20	4	0
2-Chlorotoluene	8	79-105	8-184	8	0	4	4-10	20	4	0
4-Chlorotoluene	8	75-106	8-184	8	0	4	6-8	20	4	0
1,2-Dibromoethane	8	74-97	24-191	8	0	4	0-6	20	4	0
Dibromochloromethane	8	55-101	24-191	8	0	4	7-31	20	3	1

TABLE E-3 LABORATORY QUALITY CONTROL SUMMARY
WATER MS/MSD VOLATILE ORGANIC COMPOUNDS
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
8020										
1,2-Dimethylbenzene	8	86-110	32-160	8	0	4	4-11	20	4	0
1,2-Dichlorobenzene	8	85-113	37-154	8	0	4	4-11	20	4	0
1,3-Dichlorobenzene	8	85-113	42-143	8	0	4	4-11	20	4	0
1,4-Dichlorobenzene	8	82-111	42-143	8	0	4	4-11	20	4	0

TABLE E-3 LABORATORY QUALITY CONTROL SUMMARY
WATER MS/MSD VOLATILE ORGANIC COMPOUNDS
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
8010										
Tetrachloroethene	8	79-102	26-162	8	0	4	0-14	20	4	0
1,1,1-Trichloroethane	8	77-113	41-138	8	0	4	0-16	20	4	0
1,1,2-Trichloroethane	8	75-108	39-136	8	0	4	0-9	20	4	0
Trichloroethene	8	79-102	35-146	8	0	4	0-9	20	4	0
1,2,3,-Trichloropropane	8	70-113	8-184	8	0	4	7-19	20	4	0
Vi nyl Chloride	8	81-100	26-163	8	0	4	0-8	20	4	0
8020										
Benzene	8	90-100	39-150	8	0	4	4-7	20	4	0
Ethyl benzene	8	86-108	32-160	8	0	4	1-8	20	4	0
Chlorobenzene	8	86-111	55-135	8	0	4	2-9	20	4	0
Methyl-tert-butyl-ether	8	80-100	39-150	8	0	4	4-17	20	4	0
Styrene	8	85-116	32-160	8	0	4	2-12	20	4	0
Toluene	8	88-103	46-148	8	0	4	2-15	20	4	0
1,4-Dimethylbenzene	8	81-103	32-160	8	0	4	2-10	20	4	0
1,3-Dimethylbenzene	8	85-109	32-160	8	0	4	3-10	20	4	0

TABLE E-5 LABORATORY QUALITY CONTROL SUMMARY:
WATER MS/MSD SEMIVOLATILE ORGANIC COMPOUNDS
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
Phenol	4	27-36	12-89	4	0	2	0-12	42	2	0
2-Chlorophenol	4	46-70	27-123	4	0	2	-8-6	40	2	0
1,4-Dichlorobenzene	4	54-72	36-97	4	0	2	-7-7	28	2	0
n-Nitroso-di-n-propylamine	4	76-85	41-116	4	0	2	-4-1	38	2	0
1,2,4-Trichlorobenzene	4	67-84	39-98	4	0	2	-1-14	28	2	0
4-Chloro-3-methylphenol	4	56-86	23-97	4	0	2	-2-7	42	2	0
Ancenapthene	4	58-83	46-118	4	0	2	5-6	31	2	0
4-Nitrophenol	4	27-38	10-80	4	0	2	0-14	50	2	0
2,4-Dinitrotoluene	4	61-72	24-96	4	0	2	2-4	38	2	0
Pentachlorophenol	4	50-76	9-103	4	0	2	-11-3	50	2	0
Pyrene	4	63-92	26-127	4	0	2	0-7	31	2	0

TABLE E-4 LABORATORY QUALITY CONTROL SUMMARY:
SOIL MS/MSD SEMIVOLATILE ORGANIC COMPOUNDS
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	MS Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	MSD Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
Phenol	8	70-113	12-110	4	4	4	3-25	42	4	0
2-Chlorophenol	8	68-113	27-123	7	1	4	4-22	40	4	0
1,4-Dichlorobenzene	8	57-110	36-97	7	1	4	9-30	28	3	1
n-Nitroso-di-n-propylamine	8	64-111	41-116	8	0	4	8-38	38	4	0
1,2,4-Trichlorobenzene	8	65-129	39-98	6	2	4	6-23	28	4	0
4-Chloro-3-methylphenol	8	72-130	23-97	6	2	4	1-23	42	4	0
Ancenapthene	8	62-109	46-118	6	2	4	2-24	31	3	1
4-Nitrophenol	8	46-121	10-80	5	3	4	0-23	50	4	0
2,4-Dinitrotoluene	8	53-122	24-96	4	4	4	0-20	38	4	0
Pentachlorophenol	8	46-116	9-103	7	1	4	6-34	50	4	0
Pyrene	8	52-280	26-127	6	2	4	1-9	31	4	0

TABLE E-6 LABORATORY QUALITY CONTROL SUMMARY: SOIL SPIKE AND DUPLICATE METALS

110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	Spike Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	Duplicate Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
Antimony	4	29.1-38.9	75-125	0	4	3	0-200	35	2	1
Arsenic	4	70.3-184.2	75-125	2	2	3	29.0-45.3	35	2	1
Barium	3	85.5-89.6	75-125	3	0	2	6.2-8.5	35	2	0
Beryllium	4	79.4-93.0	75-125	4	0	3	3.4-19.3	35	2	0
Cadmium	4	77.8-82.7	75-125	4	0	3	0-200	35	2	1
Chromium	4	76.5-91.0	75-125	4	0	3	9.4-23.6	35	2	0
Copper	4	90.9-102.6	75-125	4	0	3	0-5.1	35	2	1
Lead	7	78.0-248.9	75-125	6	1	4	1.3-112.5	35	3	1
Mercury	4	94.5-103.5	75-125	3	1	2	0	35	2	0
Nickel	4	81.3-85.7	75-125	4	0	3	0.3-14.9	35	2	0
Selenium	4	63.4-72.9	75-125	0	4	3	0-1.3	35	2	0
Silver	4	68.4-88.9	75-125	2	2	3	0	35	2	0
Thallium	4	78.1-90.0	75-125	4	0	3	0-200	35	2	1
Zinc	4	72.5-94.5	75-125	3	1	3	4.3-36.5	35	2	1

TABLE 5A LABORATORY QUALITY CONTROL SUMMARY:
WATER MS/MSD SEMIVOLATILE ORGANIC COMPOUNDS
110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Control Limits	Number Outside Control Limits	MSD Total No. Analyses	Range RPD	RPD Limits	Number Within Limits	Number Outside Limits
Phenol	2	75-80	40-120	2	0	1	6	40	1	0
bis (2-Chloroethyl)ether	2	75-82	50-110	2	0	1	9	40	1	0
2-Chlorophenol	2	78-86	50-110	2	0	1	10	40	1	0
n-Nitroso-di-n-propylamine	2	83-95	30-110	2	0	1	13	40	1	0
Hexachloroethane	2	62-71	20-110	2	0	1	14	40	1	0
Isophorone	2	74-86	50-110	2	0	1	15	40	1	0
1,2,4-Trichlorobenzene	2	72-83	40-100	2	0	1	14	40	1	0
Naphthalene	2	80-87	30-110	2	0	1	8	40	1	0
4-Chloroaniline	2	65-75	10-120	2	0	1	14	40	1	0
2,4,6-Trichlorophenol	2	68-74	40-120	2	0	1	8	40	1	0
2,4-Dinitrotoluene	2	54-59	30-120	2	0	1	9	40	1	0
Diethylphthalate	2	80-88	50-120	2	0	1	10	40	1	0
n-Nitrosodiphenylamine	2	47-52	30-110	2	0	1	10	40	1	0
Hexachlotobenzene	2	79-86	40-120	2	0	1	8	40	1	0
Benzo(a)pyrene	2	14-17	50-120	0	2	1	19	40	1	0

The overall project objective for sampling precision outlined in the Sampling and Analysis Plan was to have 90% of the values calculated for the sampling program within the specified RPD range of ± 20% for water samples, and ± 35% for soil samples.

The results of the RPD calculations show that 47 sample/duplicate pairs failed to meet the RPD criteria. A complete discussion of all replicate samples is presented in Section E.3.4. Based on the RPD values calculated 1062 of the 1109 RPDs calculated, from the sample/duplicate pairs, met the associated RPD criteria. This represents a sampling precision of 96%. As a result, the DQOs for analytical precision has been met.

Based on the results of the laboratory and sampling precision 1442 of the 1509 RPD values met the associated RPD criteria. These results represent an overall precision of 95.6%. As a result the DQOs for overall precision has not been met. The failure of the overall precision to meet the DQOs is due to the lack of agreement in the sample/duplicate pairs. As already discussed, these results had only marginal impact on the data. No corrective action was required based on the RPD values.

E.2.2 Accuracy

Accuracy measures the bias in a measurement system. Accuracy was defined as the degree of difference between measured or calculated values and the true value. The closer the numerical value of the measurement approaches the true value, or actual concentration, the more accurate the measurement. Overall project accuracy consists of both analytical and sampling accuracy.

Analytical accuracy is expressed as the percent recovery of a compound or element that has been added to the environmental sample at a known concentration before analyses. Analytical accuracy was determined using MS/MSD and surrogate recovery data. The following equation was used to calculate percent recovery:

$$\%R = \frac{A_r - A_0}{A_f} X\ 100$$

Where: A_r = Analyte concentration detected in the spiked sample

A_o = Analyte concentration detected in the unspiked sample

TABLE E-7 LABORATORY QUALITY CONTROL SUMMARY: WATER SPIKE AND DUPLICATE METALS

110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

	Accuracy					Precision				
	Spike Total No. Analyses	Percent Recovery Ranges	Percent Recovery Limits	Number Within Limits	Number Outside Limits	Duplicate Total No. Analyses	RPD Range	RPD Limits	Number Within Limits	Number Outside Limits
Aluminum	5	95.7-109	75-125	5	0	3	0-23.1	20	2	1
Antimony	5	92.6-116	75-125	5	0	3	0	20	3	0
Arsenic	5	104-111	75-125	5	0	3	0-200	20	1	2
Beryllium	5	95.8-112	75-125	5	0	3	0.6-4.7	20	3	0
Cadmium	5	73.2-114	75-125	4	1	3	0	20	3	0
Calcium	0		75-125			3	0.9-5.7	20	3	0
Chromium	5	93.9-117	75-125	5	0	3	0	20	3	0
Cobalt	5	92.5-117	75-125	5	0	3	0	20	3	0
Copper	5	95.7-122	75-125	5	0	3	0-11.2	20	3	0
Iron	5	89.3-129	75-125	4	1	3	1.3-200	20	2	1
Lead	5	72.7-118	75-125	3	2	3	0-200	20	2	1
Magnesium	0		75-125			3	0.6-6.8	20	3	0
Manganese	5	93.0-117	75-125	5	0	3	0.2-5.4	20	3	0
Mercury	5	70.7-100	75-125	3	2	3	0	20	3	0
Nickel	5	96.1-116	75-125	5	0	3	0	20	3	0
Potassium	0		75-125			3	0-200	20	2	1
Selenium	5	77.7-105	75-125	5	0	3	0	20	3	0
Silver	5	86.7-105	75-125	5	0	3	0	20	3	0
Sodium	0		75-125			3	2.1-4.2	20	3	0
Thallium	5	69.1-75	75-125	3	2	3	0	20	3	0
Vanadium	5	95.4-119	75-125	5	0	3	0-200	20	2	1
Zinc	5	92.6-101	75-125	5	0	3	18.2-52	20	1	2

evaluated with respect to the analytical accuracy DQOs. These results are not considered to have any adverse impact on the environmental data quality.

A total of 46 of the 1621 calculated percent recovery values exceeded control limits indicating that on average 97% accuracy was achieved. As a result, the DQOs for analytical accuracy has been met.

Sampling accuracy was maximized by adherence to the strict QA program presented in the RI Quality Assurance Project Plan (QAPP). All procedures (i.e., soil boring installation, soil sample collection procedures, well installation, well development, groundwater sample collection procedures, and health monitoring equipment calibration and operation) used during the RI were documented as standard operating procedures (SOPs). Field QA samples (i.e., trip blanks, field blanks, and equipment rinseates) were prepared such that all samples represented the particular site from which they were collected, and assessed any cross-contamination that may have occurred. The environmental samples associated with the appropriate field QA samples were qualified based on the contaminants detected in the field QA samples. Compounds and elements detected in associated environmental samples with concentrations less than five times (ten times for common laboratory contaminants) the concentration detected in the blank were considered as unreliable and were qualified "B" accordingly.

Trip blanks

A total of seven trip blanks were shipped with environmental samples to be analyzed for VOCs. 1,3-Dichlorobenzene, methylene chloride, toluene, trichloroethane, and xylenes were detected in one or more trip blanks. These concentrations could not be attributed to the laboratory environment, and were used to qualify environmental samples for cross-contamination. Trip blanks with detectable concentrations of contaminants are detailed in Section E.3.1

Field Blanks

Six field blanks were collected and analyzed with the environmental samples. The field blanks consisted of the American Society for Testing Materials (ASTM) Type II water and the potable

A_f = Analyte concentration added to the sample

Objectives for accuracy were to have 90% of the data within the specified percent recovery levels for that analyte. Analytical accuracy was qualitatively assessed by evaluating the following laboratory QC information: sample holding times, method blank, tuning and mass calibration (gas chromatographer/mass spectrometer (GC/MS) only), internal standard (GC/MS only), laboratory control sample, method blank spike recovery, and initial and continuing calibration results calculated from all analyses conducted on environmental samples. Analytical accuracy was quantitatively assessed by evaluating the percent recoveries of spikes and surrogates.

Percent Recoveries

None of the 50 soil and none of the 368 water percent recoveries were outside the control limits for MS/MSD analyses conducted on the samples collected and analyzed for VOCs. Established control limits for VOCs percent recovery values are presented in Tables E-2 and E-3. None of 120 soil and one of the 157 water surrogate percent recoveries were outside the control limits for surrogate analyses. All supporting VOC QC information cited above was also qualitatively evaluated with respect to the analytical accuracy DQOs.

Seventeen of the 88 soil and none of the 74 water percent recovery values calculated were outside the control limits for the MS/MSD analyses conducted on the samples collected and analyzed for SVOCs. Established control limits for SVOC percent recovery values are presented in Table E-4, E-5 and E-5A. Four of the 432 soil and four of the 180 water percent recovery values calculated were outside the control limits for the surrogate analyses conducted on the samples collected and analyzed for SVOCs. All supporting SVOC QC information cited above was also qualitatively evaluated with respect to the analytical accuracy DQOs.

Fourteen of the 57 soil and six of the 95 water metals percent recovery values from the matrix spike analyses conducted on the samples exceeded recovery limits of ± 25%. Established control limits for metals percent recovery values are presented in Table E-6 and E-7. All supporting target analyte metals QC information cited above were also qualitatively

location and time. Representativeness was assessed by reviewing the drilling and sample collection methods used during the RI at the Kellogg ANG. The reproducibility of a representative set of samples reflects the degree of heterogeneity of the sampled medium, as well as the effectiveness of the sampling techniques.

Soil samples were collected and submitted for laboratory analyses from Sites 1 and 3. Surface soil samples collected between 0 to 1 ft and 1 to 2 ft were collected using a stainless steel hand auger equipped with a one foot removable stainless steel liner. All other soil samples were collected from borings. All borings were advanced with a truck-mounted drilling rig using continuous-flight hollow stem augers. Soil samples were collected, from each boring, using a two foot split-spoon sampler equipped with four, six inch removable stainless steel liners. Samples were collected continuously from the surface to ten feet and at five foot centers to the water table for all borings not converted to monitoring wells. Samples were collected continuously from the surface to the water table and at five foot centers to final depth for all borings used as monitoring wells. Split-spoon samples were logged according to the Unified Soils Classification System and field-screened with a photoionization detector meter for total volatiles and with a field GC for benzene, toluene, ethylbenzene, and xylenes concentrations. Blow counts were recorded as a measure of the relative soil density. All borings, not used as monitoring wells, were backfilled with a cement/bentonite slurry to the surface. All borings were marked at the surface and surveyed. A minimum of two soil samples, from each boring, were submitted for laboratory analyses. The sample collected from just below the ground surface and the sample collected from unsaturated soils just above the water table were submitted for laboratory analyses. A third and fourth sample were sometimes submitted based on field GC results and/or lithology. Filtered groundwater samples, for metals analyses, were collected using a disposable polytetrafluoroethylene (PTFE) bailer and a disposable, 0.45 μm filter. Groundwater samples were obtained after development of each well. After well installation, all wells were allowed to recharge, were then purged, and sampled. The volume of water in each well casing was calculated prior to purging and three to four casing volumes were removed. A disposable PTFE bailer was used to remove the stagnant groundwater from each well. During well development the pH, temperature, and conductivity were measured and recorded, in addition the degree of turbidity and odor were described and recorded. The pH, temperature, and conductivity of the groundwater were measured and recorded before, during, and after purging, and prior to

water source used for the decontamination of equipment. Low levels of aluminum, barium, bromochloromethane, bromodichloromethane, bromoform, 2-chlorotoluene, 4-chlorotoluene, calcium, chloride, chloroform, chromium, copper, dibromochloromethane, iron, lead, magnesium, manganese, potassium, selenium, sodium, sulfate, tetrachloroethane, toluene, 1,1,1-trichloroethane, trichloroethene, xylene, and zinc were detected in selected field blanks collected during the RI. These concentrations could not be attributed to the laboratory environment, and were used to qualify environmental samples for cross-contamination. Detected compounds for the field blanks are detailed in Section E.3.2.

Equipment Rinseates

Nine equipment rinseates were collected by pouring ASTM Type II water over or through decontaminated sampling equipment. The equipment rinseates were analyzed with the environmental samples to document the effectiveness of the decontamination efforts. Aluminum, barium, benzene, calcium, chloride, chloroform, 2-chlorotoluene, 4-chlorotoluene, chromium, copper, 1,2-dichlorobenzene, lead, sodium, styrene, sulfate, tetrachloroethane, toluene, 1,1,1-trichloroethane, xylenes, and zinc were detected in the associated equipment rinseates. These concentrations could not be attributed to the laboratory environment, and were used to qualify the environmental samples for cross-contamination. The majority of the compounds and elements detected in the equipment rinseates were below the quantitation limit. All compounds and elements detected in the equipment rinseates are detailed in Section E.3.3.

Based on an evaluation of the compounds detected in the field QC samples overall field accuracy was deemed acceptable, except where noted. A complete discussion of field QC results is presented in Section E.3.

E.2.3 Representativeness

Representativeness expresses the degree to which the data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Sample representativeness was ensured, during the RI, by collecting sufficient samples of a population medium, properly distributed with respect to

remedial recommendations due to increased risk of indicating false positives or omitting compounds or elements that are present. Project completeness was defined as the percentage of data points used to prepare the risk characterization and recommendations for site remediation. The objective for project completeness was set at 90%.

Based on the evaluation of the laboratory QC results for the 7950 data points presented in Appendix E, these data were considered equal to 95.5% complete, and as such, were used as the basis of all recommendations presented in this report. A total of 357 data points were rejected for use because the data was qualified "R" indicating unreliable results or "B" indicating possible contamination from an outside source.

E.3 Field Quality Control Assessment

Field QC samples were collected, in an effort to assess field QC. These samples included trip blanks, field blanks, equipment rinseates, and field duplicate samples. The number of field QC samples collected were in accordance with HAZWRAP guidance as presented in DOE/HWP-69/R1. All field QC samples were collected and analyzed by the same SOPs and methods used for the 81 environmental samples. Table E-8 provides a cross-reference of the samples and their associated QC samples.

E.3.1 Trip Blanks

Trip blanks were used to check for cross-contamination during sample handling and shipping of samples to be analyzed for VOCs. A trip blank was shipped with each cooler containing samples to be analyzed for VOCs. All trip blanks were supplied by Compuchem Environmental Corporation in North Carolina. Compuchem prepared trip blanks using ASTM Type II water. The trip blanks were stored with unused sample bottles prior to being packed and shipped with the samples. A total of seven trip blanks were shipped with samples and analyzed for VOCs. Table E-9 summarizes the concentrations of the VOCs detected in the trip blanks used during the RI field effort. Methylene chloride, 1,3-dichlorobenzene, toluene, xylene, and trichloroethene were detected in trip blanks collected during the RI at the base. The contamination detected in the trip blanks can be attributed to several possible causes.

sampling. These data were collected to ensure a representative groundwater sample was collected.

Based on the evaluation of the factors described above and summarized in Section E.3 the samples collected during the RI are considered to be representative of the environmental conditions at the base.

E.2.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another and is limited to the other PARCCs parameters, because only when precision and accuracy are known can data sets be compared. To optimize comparability, only the specific methods and protocols specified in the RI QAPP were used to collect and analyze samples during the RI. By using consistent sampling and analysis procedures, all data sets are comparable within the two sites at the base, between the two sites, or among ANG facilities nationwide. This consistency ensures that remedial action decisions and priorities are based on a consistent data base.

All samples collected for VOC analyses were analyzed using SW-846 methods. Soils were analyzed using SW-846 Method 8240, water samples were analyzed using SW-846 Method 8010/8020. All samples collected for SVOC analyses were analyzed using CLP Method 3/90, with the exception of one water sample delivery group analyzed using CLP Method 10/92. All samples collected for metals analyses were analyzed using CLP method 3/90. All samples collected for the analysis of chloride, nitrate, dissolved solids, and sulfate were analyzed using EPA 600/4-79-020, March 1983. Based on the precision and accuracy assessment presented above, the data collected during the RI are considered to be comparable with the data collected during previous investigations.

E.2.5 Completeness

Completeness was defined as the percentage of useable data obtained from a measurement system. Useable data are those data not rejected during the data validation process. Values and concentrations qualified "R" or "B" are excluded from use in the risk characterization and

TABLE E-8 QC CROSS REFERENCE

110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

Sample ID	Sample Date		Associated QC Samples	
BC-BG-SS01	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG-SS02	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG-SS03	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG-SS03D	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG-SS04	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG1-05-07	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG2-05-07	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG3-05-07	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-BG4-05-07	12/17/94	BC-TB3	BC-FB1, BC-FB2	BC-ER2
BC-MW1-GW4	05/19/94	BC-TB1	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW2-GW4	05/19/94	BC-TB1	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW3-GW4	05/20/94			BC-ER1
BC-MW4-GW4	05/23/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER3
BC-MW4-GW5	12/17/94	BC-TB2	BC-FB1	
BC-MW5-GW4	05/23/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW6-GW4	05/22/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW7-GW4	05/24/94	BC-TB6	BC-FB1, BC-FB2, BC-FB3	BC-ER3
BC-MW8-GW4	05/24/94	BC-TB6	BC-FB1, BC-FB2, BC-FB3	BC-ER3
BC-MW9-GW4	05/23/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER3
BC-MW9-GW4D	05/23/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER3
BC-MW11-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW12-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW13-GW4	05/20/94			BC-ER1
BC-MW13-GW4D	05/20/94			BC-ER1
BC-MW14-GW4	05/22/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC-MW15-GW4	05/24/94	BC-TB6	BC-FB1, BC-FB2, BC-FB3	BC-ER3
BC-MW16-GW5	12/18/94	BC-TB2	BC-FB1	
BC1-B1-00-01	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B1-00-01D	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B1-05-07	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER4
BC1-B1-20-22	11/06/94	BC-TB1	BC-FB3, BC-FB6	BC-ER5
BC1-B2-00-01	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B2-10-12	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B2-20-22	11/06/94	BC-TB1	BC-FB3, BC-FB6	BC-ER5
BC1-B3-00-01	11/07/94	BC-TB1	BC-FB3, BC-FB6	BC-ER5
BC1-B3-20-22	11/08/94	BC-TB3	BC-FB3, BC-FB6	BC-ER6
BC1-B4-00-01	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B4-10-12	11/06/94	BC-TB1	BC-FB3, BC-FB6	BC-ER5
BC1-B5-00-01	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B5-00-01D	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B5-10-12	11/07/94	BC-TB3	BC-FB3, BC-FB6	BC-ER5
BC1-B5-20-22	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B7-00-01	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER7
BC1-B7-10-12	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER7
BC1-B8-00-01	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B8-20-22	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B9-00-01	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B11-00-01	11/10/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B11-19-23	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B11-19-23D	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B12-00-01	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER6
BC1-B12-20-22	11/07/94	BC-TB2	BC-FB3, BC-FB6	BC-ER5
BC1-B15-10-12	11/08/94	BC-TB3	BC-FB3, BC-FB6	BC-ER6

TABLE E-8 QC CROSS REFERENCE

110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

Sample ID	Sample Date	Associated QC Samples		
BC1-B18-15-17	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER7
BC1-B19-00-01	11/10/94	BC-TB4	BC-FB3, BC-FB6	BC-ER7
BC1-B19-20-22	11/09/94	BC-TB4	BC-FB3, BC-FB6	BC-ER7
BC1-MW1-GW5	12/18/94	BC-TB2	BC-FB1	
BC1-MW1-GW5D	12/18/94	BC-TB2	BC-FB1	
BC1-MW2-10-12	12/14/94	BC-TB1	BC-FB3, BC-FB6	
BC1-MW2-20-22	12/14/94	BC-TB1	BC-FB3, BC-FB6	
BC1-MW3-GW5	12/18/94	BC-TB5	BC-FB1	
BC1-SS11	12/18/94	BC-TB3	BC-FB3, BC-FB6	
BC1-SS12	12/18/94	BC-TB3	BC-FB3, BC-FB6	
BC1-SS13	12/18/94	BC-TB3	BC-FB3, BC-FB6	
BC1-SS14	12/18/94	BC-TB3	BC-FB3, BC-FB6	
BC2-MW1-GW4	05/23/94	BC-TB5	BC-FB1, BC-FB2, BC-FB3	BC-ER1
BC2-MW1-GW5	12/17/94	BC-TB2	BC-FB1	
BC3-B1-04-06	11/08/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3
BC3-B2-04-06	11/08/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3
BC3-B3-04-06	11/08/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3
BC3-MW1-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2	BC-ER2
BC3-MW1-GW4D	05/23/94	BC-TB4	BC-FB1, BC-FB2	BC-ER2
BC3-MW2-GW4	05/23/94	BC-TB5	BC-FB1, BC-FB2	BC-ER2
BC3-MW3-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2	BC-ER2
BC3-MW4-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2	BC-ER2
BC3-MW5-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2	BC-ER2
BC3-MW6-GW4	05/23/94	BC-TB4	BC-FB1, BC-FB2	BC-ER2
BC3-SB101	11/05/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3
BC3-SB201	11/05/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3
BC3-SB201	11/05/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3
BC3-SB301	11/05/94	BC-TB1	BC-FB3, BC-FB6	BC-ER3

TABLE E-9 ANALYTES DETECTED IN TRIP BLANKS

110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

Sample ID	Analyte	Result	Qualifier	Units
BC-TB01	Toluene	0.16	()	µg/ℓ
BC-TB01	o-Xylene	0.18	()	µg/ℓ
BC-TB01	1,3-Dichlorobenzene	0.19	()	µg/ℓ
BC-TB02	Toluene	0.27		µg/ℓ
BC-TB03	Toluene	0.27		µg/ℓ
BC-TB04	Toluene	0.32		µg/ℓ
BC-TB4	Methylene chloride	0.62		µg/ℓ
BC-TB5	p-Xylene	0.04		µg/ℓ
BC-TB6	Trichloroethene	0.10		µg/ℓ
BC-TB6	Toluene	0.16		µg/ℓ
BC-TB6	m-Xylene	0.05		µg/ℓ

Methylene chloride is a common laboratory contaminant and is frequently detected. The other contamination could be attributed to contamination from samples stored with the trip blanks at the laboratory.

E.3.2 Field Blanks

Field blanks were collected to provide baseline analytical data for the water used for equipment decontamination. A total of six field blanks were collected, including blanks for the ASTM Type II water and the potable water used as decontamination water. Field blanks were collected by randomly selecting sample containers, filling them with water from the sample source, and then preserving as appropriate for the required analyses. The blanks were analyzed in the same manner as the associated environmental samples. Low levels of aluminum, barium, bromochloromethane, bromodichloromethane, bromoform, 2-chlorotoluene, 4-chlorotoluene, calcium, chloride, chloroform, chromium, copper, dibromochloromethane, iron, lead, magnesium, manganese, potassium, selenium, sodium, sulfate, tetrachloroethane, toluene, 1,1,1-trichloroethane, trichloroethane, xylene, and zinc were detected in selected field blanks prepared during the RI. Table E-10 summarizes the concentrations of elements detected in the field blanks collected at the base. The Michigan ANG RI was conducted in three separate sampling events, field blanks were obtained for each sampling event. The low levels of compounds and elements detected in the field blanks are not considered to have contributed to any levels seen in the associated environmental samples.

E.3.3 Equipment Rinseates

Equipment rinseates were collected to check for cross-contamination introduced from sample to sample through the sampling equipment. All equipment rinseates were prepared by pouring ASTM Type II water through or over decontaminated sampling equipment. The equipment rinseates were preserved as appropriate for the required analyses and analyzed using the same methods as the associated environmental samples. Nine equipment rinseates were prepared from the equipment used to obtain environmental samples. Table E-11 summarizes the concentrations of elements detected in the equipment blanks collected at the base. Aluminum, barium, benzene, calcium, chloride, chloroform, 2-chlorotoluene, 4-chlorotoluene, chromium, copper, 1,2-dichlorobenzene, lead, sodium, styrene, sulfate, tetrachloroethane,

TABLE E-10 ANALYTES DETECTED IN FIELD BLANKS

110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

Sample ID	Analyte	Result	Qualifier	Units
BC-FB01	Chloroform	2.70		µg/ℓ
BC-FB01	Bromochloromethane	0.71		µg/ℓ
BC-FB01	Toluene	0.17	()	µg/ℓ
BC-FB01	Aluminum	123.00	()	µg/ℓ
BC-FB01	Barium	1.60	()	µg/ℓ
BC-FB01	Calcium	61.30	()	µg/ℓ
BC-FB01	Copper	2.10	()	µg/ℓ
BC-FB01	Iron	50.20	()	µg/ℓ
BC-FB01	Lead	1.70	()	µg/ℓ
BC-FB01	Magnesium	5.90	()	µg/ℓ
BC-FB01	Manganese	0.42	()	µg/ℓ
BC-FB01	Potassium	128.00	()	µg/ℓ
BC-FB01	Sodium	1130.00	()	µg/ℓ
BC-FB01	Zinc	0.70	()	µg/ℓ
BC-FB1	Chloroform	0.23		µg/ℓ
BC-FB1	1,1,1-Trichloroethane	0.09		µg/ℓ
BC-FB1	Trichloroethene	0.03		µg/ℓ
BC-FB1	Tetrachloroethene	0.07		µg/ℓ
BC-FB1	2-Chlorotoluene	3.90		µg/ℓ
BC-FB1	4-Chlorotoluene	0.46		µg/ℓ
BC-FB1	Benzene	0.04		µg/ℓ
BC-FB1	Toluene	4.60		µg/ℓ
BC-FB1	p-Xylene	0.20		µg/ℓ
BC-FB1	m-Xylene	0.63		µg/ℓ
BC-FB1	o-Xylene	0.53		µg/ℓ
BC-FB1	Styrene	0.43		µg/ℓ
BC-FB1	Chloride	0.00		mg/ℓ
BC-FB1	Sulfate	2.19		mg/ℓ
BC-FB02	Chloroform	15.00		µg/ℓ
BC-FB02	Dibromochloromethane	0.04	()	µg/ℓ
BC-FB02	Aluminum	197.00	()	µg/ℓ
BC-FB02	Barium	26.30	()	µg/ℓ
BC-FB02	Calcium	37100.00		µg/ℓ
BC-FB02	Copper	118.00		µg/ℓ
BC-FB02	Iron	65.00	()	µg/ℓ
BC-FB02	Lead	3.50		µg/ℓ
BC-FB02	Magnesium	10200.00		µg/ℓ
BC-FB02	Manganese	0.96	()	µg/ℓ
BC-FB02	Potassium	1970.00	()	µg/ℓ
BC-FB02	Sodium	6940.00		µg/ℓ
BC-FB02	Zinc	9.40	()	µg/ℓ
BC-FB2	Chloroform	2.20		µg/ℓ
BC-FB2	Bromochloromethane	0.17		µg/ℓ
BC-FB2	Bromodichloromethane	4.90		µg/ℓ
BC-FB2	Dibromochloromethane	6.90		µg/ℓ
BC-FB2	Bromoform	2.10	J	µg/ℓ
BC-FB2	Toluene	0.18		µg/ℓ
BC-FB2	Barium	136.00	()	µg/ℓ
BC-FB2	Calcium	81200.00		µg/ℓ
BC-FB2	Copper	44.50		µg/ℓ
BC-FB2	Iron	819.00		µg/ℓ
BC-FB2	Magnesium	21900.00		µg/ℓ

TABLE E-10 ANALYTES DETECTED IN FIELD BLANKS

110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

BC-FB2	Manganese	51.20		µg/ℓ
BC-FB2	Potassium	1030.00	()	µg/ℓ
BC-FB2	Sodium	10400.00		µg/ℓ
BC-FB2	Chloride	30.20		mg/ℓ
BC-FB2	Sulfate	38.90		mg/ℓ
BC-FB03	Barium	0.58	()	µg/ℓ
BC-FB03	Chromium	0.77	()	µg/ℓ
BC-FB03	Copper	0.55	()	µg/ℓ
BC-FB03	Zinc	0.34	()	µg/ℓ
BC-FB03	Toluene	1.50		µg/ℓ
BC-FB03	p-Xylene	0.18	()	µg/ℓ
BC-FB03	m-Xylene	0.18	()	µg/ℓ
BC-FB06	Arsenic	2.90	()	µg/ℓ
BC-FB06	Barium	135.00	()	µg/ℓ
BC-FB06	Chromium	2.90	()	µg/ℓ
BC-FB06	Copper	23.00	()	µg/ℓ
BC-FB06	Lead	3.60		µg/ℓ
BC-FB06	Selenium	3.40	()	µg/ℓ
BC-FB06	Zinc	638.00		µg/ℓ

TABLE E-11 ANALYTES DETECTED IN EQUIPMENT RINSEATES

110th Fighter Wing, Michigan ANG, Battle Creek, Michigan

BC-ER1	Chloride	0.00		mg/ℓ
BC-ER1	Dissolved Solids	366.00		mg/ℓ
BC-ER1	Sulfate	0.00		mg/ℓ
BC-ER1	Chloroform	0.22		µg/ℓ
BC-ER1	Tetrachloroethene	0.06		µg/ℓ
BC-ER1	2-Chlorotoluene	3.10		µg/ℓ
BC-ER1	4-Chlorotoluene	0.35		µg/ℓ
BC-ER1	1,2-Dichlorobenzene	0.08		µg/ℓ
BC-ER1	Toluene	3.30		µg/ℓ
BC-ER1	o-Xylene	0.41		µg/ℓ
BC-ER1	Styrene	0.19		µg/ℓ
BC-ER2	Chloroform	0.13		µg/ℓ
BC-ER2	1,1,1-Trichloroethane	0.04		µg/ℓ
BC-ER2	2-Chlorotoluene	1.90		µg/ℓ
BC-ER2	4-Chlorotoluene	0.20		µg/ℓ
BC-ER2	Benzene	0.04	J	µg/ℓ
BC-ER2	Toluene	2.10		µg/ℓ
BC-ER2	p-Xylene	0.07	J	µg/ℓ
BC-ER2	m-Xylene	0.24	J	µg/ℓ
BC-ER2	o-Xylene	0.30	J	µg/ℓ
BC-ER2	1,2-Dichlorobenzene	0.03		µg/ℓ
BC-ER02	Chloroform	3.00	()	µg/ℓ
BC-ER02	Lead	3.10		µg/ℓ
BC-ER3	2-Chlorotoluene	1.20	J	µg/ℓ
BC-ER3	Chloroform	0.17		µg/ℓ
BC-ER3	1,1,1-Trichloroethane	0.05		µg/ℓ
BC-ER3	Toluene	1.60		µg/ℓ
BC-ER3	Aluminum	126.00	()	µg/ℓ
BC-ER3	Calcium	79.00	()	µg/ℓ
BC-ER3	Sodium	359.00	()	µg/ℓ
BC-ER3	Zinc	5.30	()	µg/ℓ
BC-ER3	Chloride	0.00		mg/ℓ
BC-ER3	Dissolved Solids	199.00		mg/ℓ
BC-ER3	Sulfate	2.24		mg/ℓ
BC-ER03	Zinc	2.70	()	µg/ℓ
BC-ER03	Barium	0.64	()	µg/ℓ
BC-ER03	Chromium	0.88	()	µg/ℓ
BC-ER4	Chloroform	0.16		µg/ℓ
BC-ER4	2-Chlorotoluene	0.90	J	µg/ℓ
BC-ER4	p-Xylene	0.07		µg/ℓ
BC-ER4	m-Xylene	0.20		µg/ℓ
BC-ER4	o-Xylene	0.25		µg/ℓ
BC-ER4	Zinc	109.00		µg/ℓ
BC-ER05	Barium	0.46	()	µg/ℓ
BC-ER05	Chromium	0.70	()	µg/ℓ
BC-ER05	Copper	1.10	()	µg/ℓ
BC-ER05	Zinc	1.20	()	µg/ℓ
BC-ER05	Toluene	1.60	P	µg/ℓ
BC-ER06	Toluene	1.30		µg/ℓ
BC-ER07	Toluene	1.30	P	µg/ℓ

toluene, 1,1,1-trichloroethane, xylenes, and zinc were detected in equipment rinseates.

E.3.4 Field Replicates

Field replicates were used as a measure of sampling precision, sample collection reproducibility, and media variability during the RI at the base. Field RPD values were calculated only for compounds and elements not qualified "B" or "R" during the data validation process. A total of 46 soil samples, 26 water samples, 5 soil duplicate samples, and 4 duplicate water samples were collected. Increased percent differences were expected for all volatile analytes detected in soil samples, since all samples remained in stainless steel sleeves (i.e., not mixed) after the sampling equipment was retrieved from the borehole. The field replicate for each soil analyses was obtained from the adjacent sleeve, water samples were split into different sample containers on sampling. The results of the RPD calculations show that 47 sample/duplicate pairs failed to meet the RPD criteria. Based on the RPD values calculated, 1062 of the 1109 RPDs calculated, from the sample/duplicate pairs, met the associated RPD criteria. This represents a sampling precision of 96%. As a result, the DQOs for analytical precision has been met.

E.4 LABORATORY QUALITY CONTROL ASSESSMENT

All environmental samples collected at the Kellogg ANG base were analyzed using the test methods and general chemical methodology from the following references:

- ***Statement of Work For Organic Analysis, Multi-Media, Multi-Concentration***, EPA Contract Laboratory Program, 3/90 (VOCs [soil], SVOCs)
- ***Statement of Work For Organic Analysis, Multi-Media, Multi-Concentration***, EPA Contract Laboratory Program, 10/92 (SVOCs)
- ***Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods***, SW-846, Third Edition, September 1986, with 1989 revisions (VOCs [water], metals)
- ***Methods for Chemical Analyses of Water and Wastes***, EPA 600/4-79-020, EPA 1983 revisions (Sulfate, Chloride, Nitrate, and Total Dissolved Solids)

HAZWRAP Level C documentation was required and submitted by the laboratory for all analyses. All data were validated and qualified using the guidelines and specifications described in the following documents:

- ***Laboratory Data Validation functional Guidelines for Evaluating Inorganic Analyses,*** EPA Contract Laboratory Program, February 1988, (metals)
- ***Requirements for Quality Control of Analytical Data,*** Hazardous Waste Remedial Actions Program (DOE/HWP-65/R1), July 1990 (VOCs and SVOCs)

In addition to the above guidelines, additional steps were taken to make the data validation process clearer to the data user. The laboratory "J" qualifier, "B" qualifier for metals, was removed from detects below the quantitation limit and was replaced with a "( )" qualifier prior to validation. A "B" qualifier was used to indicate possible blank contamination. In these cases the 5x and 10x rule was applied.

All data validation qualifiers used were applied to the data as required by the aforementioned guidelines. A complete summary of all data obtained and the qualifiers applied to that data is presented in Appendix F.

APPENDIX F: LABORATORY DATA AND QA/QC VALIDATION SUMMARIES

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BGSS01		BGSS02		BGSS03		BGSS03		BGSS04		BGSB1	
SAMPLE ID:	BC-BG-SS01		BC-BG-SS02		BC-BG-SS03		BC-BG-SS03D		BC-BG-SS04		BC-BG1-05-07	
COLLECTION DATE:	12/17/94		12/17/94		12/17/94		12/17/94		12/17/94		12/17/94	
ASSOCIATED QC:	BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240												
1,1,1-Trichloroethane	6	U	6	U	6	U	6	U	6	U	6	U
1,1,2,2-Tetrachloroethane	11	U	11	U	11	U	12	U	11	U	12	U
1,1,2-Trichloroethane	6	U	6	U	6	U	6	U	6	U	6	U
1,1-Dichloroethane	6	U	6	U	6	U	6	U	6	U	6	U
1,1-Dichloroethene	6	U	6	U	6	U	6	U	6	U	6	U
1,2-Dichloroethane	6	U	6	U	6	U	6	U	6	U	6	U
1,2-Dichloroethene(Total)	-		-		-		-		-		-	
1,2-Dichloropropane	6	U	6	U	6	U	6	U	6	U	6	U
2-Butanone	22	U	22	U	23	U	23	U	22	U	24	U
2-Hexanone	17	U	17	U	17	U	17	U	17	U	18	U
4-Methyl-2-pentanone	17	U	17	U	17	U	17	U	17	U	18	U
Acetone	11	U	11	U	11	U	18	B	11	U	37	B
Benzene	6	U	6	U	6	U	6	U	6	U	6	U
Bromodichloromethane	6	U	6	U	6	U	6	U	6	U	6	U
Bromoform	11	U	11	U	11	U	12	U	11	U	12	U
Bromomethane	6	U	6	U	6	U	6	U	6	U	6	U
Carbon disulfide	6	U	6	U	6	U	6	U	6	U	6	U
Carbon tetrachloride	6	U	6	U	6	U	6	U	6	U	6	U
Chlorobenzene	6	U	6	U	6	U	6	U	6	U	6	U
Chloroethane	11	U	11	U	11	U	12	U	11	U	12	U
Chloroform	6	U	6	U	6	U	6	U	6	U	6	U
Chloromethane	11	U	11	U	11	U	12	U	11	U	12	U
Cis-1,2-Dichloroethene	6	U	6	U	6	U	6	U	6	U	6	U
Cis-1,3-Dichloropropene	6	U	6	U	6	U	6	U	6	U	6	U
Dibromochloromethane	6	U	6	U	6	U	6	U	6	U	6	U
Ethylbenzene	6	U	6	U	6	U	6	U	6	U	6	U
Methylene chloride	85	B	58	B	41	B	15	B	35	B	17	B
Styrene	6	U	6	U	6	U	6	U	6	U	6	U
Tetrachloroethene	6	U	6	U	6	U	6	U	6	U	6	U
Toluene	6	U	6	U	6	U	6	U	6	U	6	U
Trans-1,2-Dichloroethene	6	U	6	U	6	U	6	U	6	U	6	U
Trans-1,3-Dichloropropene	6	U	6	U	6	U	6	U	6	U	6	U
Trichloroethene	6	U	6	U	6	U	6	U	6	U	6	U
Vinyl acetate	11	U	11	U	11	U	12	U	11	U	12	U
Vinyl chloride	11	U	11	U	11	U	12	U	11	U	12	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BGSS01		BGSS02		BGSS03		BGSS03		BGSS04		BGSB1	
SAMPLE ID:	BC-BG-SS01		BC-BG-SS02		BC-BG-SS03		BC-BG-SS03D		BC-BG-SS04		BC-BG1-05-07	
COLLECTION DATE:	12/17/94		12/17/94		12/17/94		12/17/94		12/17/94		12/17/94	
ASSOCIATED QC:	BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	17	U	17	U	17	U	17	U	17	U	18	U
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	730	U	730	U	740	U	770	U	740	U	800	U
1,2-Dichlorobenzene	730	U	730	U	740	U	770	U	740	U	800	U
1,3-Dichlorobenzene	730	U	730	U	740	U	770	U	740	U	800	U
1,4-Dichlorobenzene	730	U	730	U	740	U	770	U	740	U	800	U
1-Methylnaphthalene	-		-		-		-		-		-	
2,2'-Oxybis(1-chloropropane)	730	U	730	U	740	U	770	U	740	U	800	U
2,4,5-Trichlorophenol	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
2,4,6-Trichlorophenol	730	U	730	U	740	U	770	U	740	U	800	U
2,4-Dichlorophenol	730	U	730	U	740	U	770	U	740	U	800	U
2,4-Dimethylphenol	730	U	730	U	740	U	770	U	740	U	800	U
2,4-Dinitrophenol	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
2,4-Dinitrotoluene	730	U	730	U	740	U	770	U	740	U	800	U
2,6-Dinitrotoluene	730	U	730	U	740	U	770	U	740	U	800	U
2-Chloronaphthalene	730	U	730	U	740	U	770	U	740	U	800	U
2-Chlorophenol	730	U	730	U	740	U	770	U	740	U	800	U
2-Methylnaphthalene	730	U	730	U	1900		1700		1600		800	U
2-Methylphenol	730	U	730	U	740	U	770	U	740	U	800	U
2-Nitroaniline	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
2-Nitrophenol	730	U	730	U	740	U	770	U	740	U	800	U
3,3'-Dichlorobenzidine	730	U	730	U	740	U	770	U	740	U	800	U
3-Nitroaniline	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
4,6-Dinitro-2-methylphenol	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
4-Bromophenyl phenyl ether	730	U	730	U	740	U	770	U	740	U	800	U
4-Chloro-3-methylphenol	730	U	730	U	740	U	770	U	740	U	800	U
4-Chloroaniline	730	U	730	U	740	U	770	U	740	U	800	U
4-Chlorophenyl phenyl ether	730	U	730	U	740	U	770	U	740	U	800	U
4-Methylphenol	730	U	730	U	740	U	770	U	740	U	800	U
4-Nitroaniline	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
4-Nitrophenol	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
Acenaphthene	730	U	730	U	920		780		780		800	U
Acenaphthylene	730	U	730	U	1300		1200		1000		800	U
Anthracene	730	U	730	U	820		670	()	880		800	U
Benzo(a)anthracene	730	U	730	U	7000		3100		5100		800	U

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BGSS01		BGSS02		BGSS03		BGSS03		BGSS04		BGSB1	
SAMPLE ID:	BC-BG-SS01		BC-BG-SS02		BC-BG-SS03		BC-BG-SS03D		BC-BG-SS04		BC-BG1-05-07	
COLLECTION DATE:	12/17/94		12/17/94		12/17/94		12/17/94		12/17/94		12/17/94	
ASSOCIATED QC:	BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	730	U	730	U	3700		3400		3400		800	U
Benzo(b)fluoranthene	730	U	730	U	13000		8200		12000		800	U
Benzo(g,h,i)perylene	730	U	730	U	1100		2200		860		800	U
Benzo(k)fluoranthene	730	U	730	U	16000		7200		15000		800	U
Butyl benzyl phthalate	730	U	730	U	740	U	770	U	740	U	800	U
Carbazole	730	U	730	U	1700		1600		1400		800	U
Chrysene	730	U	730	U	5900		5000		5200		800	U
Di-n-butyl phthalate	120	()	290	()	170	()	770	U	740	U	140	()
Di-n-octyl phthalate	730	U	730	U	740	U	770	U	740	U	800	U
Dibenzo(a,h)anthracene	730	U	730	U	490	()	830		370	()	800	U
Dibenzofuran	730	U	730	U	1100		1100		970		800	U
Diethyl phthalate	730	U	730	U	740	U	770	U	740	U	800	U
Dimethyl phthalate	730	U	730	U	740	U	770	U	740	U	800	U
Fluoranthene	730	U	730	U	24000		13000		23000		800	U
Fluorene	730	U	730	U	2000		2000		1500		800	U
Hexachlorobenzene	730	U	730	U	740	U	770	U	740	U	800	U
Hexachlorobutadiene	730	U	730	U	740	U	770	U	740	U	800	U
Hexachlorocyclopentadiene	730	U	730	U	740	U	770	U	740	U	800	U
Hexachloroethane	730	U	730	U	740	U	770	U	740	U	800	U
Indeno(1,2,3-cd)pyrene	730	U	730	U	1600		2700		1200		800	U
Isophorone	730	U	730	U	740	U	770	U	740	U	800	U
N-Nitroso-di-n-propylamine	730	U	730	U	740	U	770	U	740	U	800	U
N-Nitrosodiphenylamine(1)	730	U	730	U	740	U	770	U	740	U	800	U
Naphthalene	730	U	730	U	1700		1500		1100		800	U
Nitrobenzene	730	U	730	U	740	U	770	U	740	U	800	U
Pentachlorophenol	1800	U	1800	U	1800	U	1900	U	1800	U	2000	U
Phenanthrene	730	U	730	U	29000		13000		28000		800	U
Phenol	730	U	730	U	740	U	770	U	740	U	800	U
Pyrene	730	U	730	U	5900		11000		5600		800	U
bis(2-Chloroethoxy)methane	730	U	730	U	740	U	770	U	740	U	800	U
bis(2-Chloroethyl)ether	730	U	730	U	740	U	770	U	740	U	800	U
bis(2-Ethylhexyl)phthalate	730	U	730	U	740	U	770	U	740	U	800	U
Metals by CLP												
Antimony		R		R	0.27	()J		R		R		R
Arsenic	3	J	2.20	J	6.10	J	4.20	J	3.20	J	2.20	J

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BGSS01		BGSS02		BGSS03		BGSS03		BGSS04		BGSB1		
SAMPLE ID:	BC-BG-SS01		BC-BG-SS02		BC-BG-SS03		BC-BG-SS03D		BC-BG-SS04		BC-BG1-05-07		
COLLECTION DATE:	12/17/94		12/17/94		12/17/94		12/17/94		12/17/94		12/17/94		
ASSOCIATED QC:	BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	
Barium	36.90		13.90	()	37.50		35.10		47.80		6.10	()	
Beryllium	0.17	()	0.08	()B	0.18	()	0.18	()	0.17	()	0.06	()B	
Cadmium	0.06	U	0.05	U	0.06	U	0.06	U	0.06	U	0.06	U	
Chromium	6.80		3.60		8.30		6.50		12.80	J	4		
Chromuim, Cr+6	-		-		-		-		-		-		
Copper	4.90		2.60	()	5.70		5.10		4.30		4.10		
Lead	6.50		2.70		11.10		10.30		7.20		2.90		
Mercury	0.11	U	0.10	U	0.11	U	0.11	U	0.11	U	0.10	U	
Nickel	5.70		3.20	()	6.30		5.40		7.90		4.80	()	
Selenium	0.49	UJ	0.48	UJ	0.63	J	0.51	UJ	0.49	UJ	0.52	UJ	
Silver	0.50	UJ	0.49	UJ	0.51	UJ	0.53	UJ	0.50	UJ	0.54	UJ	
Thallium	0.30	U	0.31	()	0.38	()	0.32	U	0.39	()	0.32	U	
Zinc	17.10	J	8	J	20.10	J	18.10	J	15	J	13.70	J	

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BGSB2		BGSB3		BGSB4		1B1		1B1		1B1	
SAMPLE ID:	BC-BG2-05-07		BC-BG3-05-07		BC-BG4-05-07		BC1-B1-00-01		BC1-B1-00-01D		BC1-B1-05-07	
COLLECTION DATE:	12/17/94		12/17/94		12/17/94		11/07/94		11/07/94		11/07/94	
ASSOCIATED QC:	BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER4 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240												
1,1,1-Trichloroethane	5	U	5	U	5	U	6	U	6	U	6	U
1,1,2,2-Tetrachloroethane	11	U	11	U	10	U	11	U	11	U	11	U
1,1,2-Trichloroethane	5	U	5	U	5	U	6	U	6	U	6	U
1,1-Dichloroethane	5	U	5	U	5	U	6	U	6	U	6	U
1,1-Dichloroethene	5	U	5	U	5	U	6	U	6	U	6	U
1,2-Dichloroethane	5	U	5	U	5	U	6	U	6	U	6	U
1,2-Dichloroethene(Total)	-		-		-		-		-		-	
1,2-Dichloropropane	5	U	5	U	5	U	6	U	6	U	6	U
2-Butanone	22	U	22	U	21	U	23	U	23	U	22	U
2-Hexanone	16	U	16	U	16	U	17	U	17	U	17	U
4-Methyl-2-pentanone	16	U	16	U	16	U	17	U	17	U	17	U
Acetone	11	U	18	B	33	B	14	B	16	B	26	
Benzene	5	U	5	U	5	U	6	U	6	U	6	U
Bromodichloromethane	5	U	5	U	5	U	6	U	6	U	6	U
Bromoform	11	U	11	U	10	U	11	U	11	U	11	U
Bromomethane	5	U	5	U	5	U	6	U	6	U	6	U
Carbon disulfide	5	U	5	U	5	U	6	U	6	U	6	U
Carbon tetrachloride	5	U	5	U	5	U	6	U	6	U	6	U
Chlorobenzene	5	U	5	U	5	U	6	U	6	U	6	U
Chloroethane	11	U	11	U	10	U	11	U	11	U	11	U
Chloroform	5	U	5	U	5	U	6	U	6	U	6	U
Chloromethane	11	U	11	U	10	U	11	U	11	U	11	U
Cis-1,2-Dichloroethene	5	U	5	U	5	U	6	U	6	U	6	U
Cis-1,3-Dichloropropene	5	U	5	U	5	U	6	U	6	U	6	U
Dibromochloromethane	5	U	5	U	5	U	6	U	6	U	6	U
Ethylbenzene	5	U	5	U	5	U	6	U	6	U	6	U
Methylene chloride	25	B	16	B	17	B	12	B	14	B	11	B
Styrene	5	U	5	U	5	U	6	U	6	U	6	U
Tetrachloroethene	5	U	5	U	5	U	6	U	6	U	6	U
Toluene	5	U	5	U	5	U	6	U	6	U	6	U
Trans-1,2-Dichloroethene	5	U	5	U	5	U	6	U	6	U	6	U
Trans-1,3-Dichloropropene	5	U	5	U	5	U	6	U	6	U	6	U
Trichloroethene	5	U	5	U	5	U	6	U	6	U	6	U
Vinyl acetate	11	U	11	U	10	U	11	U	11	U	11	U
Vinyl chloride	11	U	11	U	10	U	11	U	11	U	11	U

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BGSB2		BGSB3		BGSB4		1B1		1B1		1B1	
SAMPLE ID:	BC-BG2-05-07		BC-BG3-05-07		BC-BG4-05-07		BC1-B1-00-01		BC1-B1-00-01D		BC1-B1-05-07	
COLLECTION DATE:	12/17/94		12/17/94		12/17/94		11/07/94		11/07/94		11/07/94	
ASSOCIATED QC:	BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER4 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	16	U	16	U	16	U	17	U	17	U	17	U
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	710	U	710	U	690	U	380	U	380	U	360	U
1,2-Dichlorobenzene	710	U	710	U	690	U	380	U	380	U	360	U
1,3-Dichlorobenzene	710	U	710	U	690	U	380	U	380	U	360	U
1,4-Dichlorobenzene	710	U	710	U	690	U	380	U	380	U	360	U
1-Methylnaphthalene	-		-		-		-		-		-	
2,2'-Oxybis(1-chloropropane)	710	U	710	U	690	U	380	U	380	U	360	U
2,4,5-Trichlorophenol	1700	U	1700	U	1700	U	910	U	910	U	880	U
2,4,6-Trichlorophenol	710	U	710	U	690	U	380	U	380	U	360	U
2,4-Dichlorophenol	710	U	710	U	690	U	380	U	380	U	360	U
2,4-Dimethylphenol	710	U	710	U	690	U	380	U	380	U	360	U
2,4-Dinitrophenol	1700	U	1700	U	1700	U	910	U	910	U	880	U
2,4-Dinitrotoluene	710	U	710	U	690	U	380	U	380	U	360	U
2,6-Dinitrotoluene	710	U	710	U	690	U	380	U	380	U	360	U
2-Chloronaphthalene	710	U	710	U	690	U	380	U	380	U	360	U
2-Chlorophenol	710	U	710	U	690	U	380	U	380	U	360	U
2-Methylnaphthalene	710	U	710	U	690	U	170	()	380	U	360	U
2-Methylphenol	710	U	710	U	690	U	380	U	380	U	360	U
2-Nitroaniline	1700	U	1700	U	1700	U	910	U	910	U	880	U
2-Nitrophenol	710	U	710	U	690	U	380	U	380	U	360	U
3,3'-Dichlorobenzidine	710	U	710	U	690	U	380	U	380	U	360	U
3-Nitroaniline	1700	U	1700	U	1700	U	910	U	910	U	880	U
4,6-Dinitro-2-methylphenol	1700	U	1700	U	1700	U	910	U	910	U	880	U
4-Bromophenyl phenyl ether	710	U	710	U	690	U	380	U	380	U	360	U
4-Chloro-3-methylphenol	710	U	710	U	690	U	380	U	380	U	360	U
4-Chloroaniline	710	U	710	U	690	U	380	U	380	U	360	U
4-Chlorophenyl phenyl ether	710	U	710	U	690	U	380	U	380	U	360	U
4-Methylphenol	710	U	710	U	690	U	380	U	380	U	360	U
4-Nitroaniline	1700	U	1700	U	1700	U	910	U	910	U	880	U
4-Nitrophenol	1700	U	1700	U	1700	U	910	U	910	U	880	U
Acenaphthene	710	U	710	U	690	U	700		46	()	360	U
Acenaphthylene	710	U	710	U	690	U	380	U	380	U	360	U
Anthracene	710	U	710	U	690	U	200	()	380	U	360	U
Benzo(a)anthracene	710	U	110	()	690	U	280	()	380	U	360	U

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BGSB2		BGSB3		BGSB4		1B1		1B1		1B1	
SAMPLE ID:	BC-BG2-05-07		BC-BG3-05-07		BC-BG4-05-07		BC1-B1-00-01		BC1-B1-00-01D		BC1-B1-05-07	
COLLECTION DATE:	12/17/94		12/17/94		12/17/94		11/07/94		11/07/94		11/07/94	
ASSOCIATED QC:	BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER4 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	710	U	92	()	690	U	210	()	380	U	360	U
Benzo(b)fluoranthene	710	U	240	()	690	U	370	()	48	()	360	U
Benzo(g,h,i)perylene	710	U	710	U	690	U	140	()	380	U	360	U
Benzo(k)fluoranthene	710	U	220	()	690	U	390		51	()	360	U
Butyl benzyl phthalate	710	U	710	U	690	U	380	U	380	U	360	U
Carbazole	710	U	710	U	690	U	98	()	380	U	360	U
Chrysene	710	U	190	()	690	U	250	()	380	U	360	U
Di-n-butyl phthalate	220	()	130	()	230	()	380	U	70	()	360	U
Di-n-octyl phthalate	710	U	710	U	690	U	380	U	380	U	360	U
Dibenzo(a,h)anthracene	710	U	710	U	690	U	380	U	380	U	360	U
Dibenzofuran	710	U	710	U	690	U	320	()	380	U	360	U
Diethyl phthalate	710	U	710	U	690	U	380	U	380	U	360	U
Dimethyl phthalate	710	U	710	U	690	U	380	U	380	U	360	U
Fluoranthene	80	()	430	()	690	U	780		94	()	360	U
Fluorene	710	U	710	U	690	U	290	()	380	U	360	U
Hexachlorobenzene	710	U	710	U	690	U	380	U	380	U	360	U
Hexachlorobutadiene	710	U	710	U	690	U	380	U	380	U	360	U
Hexachlorocyclopentadiene	710	U	710	U	690	U	380	U	380	U	360	U
Hexachloroethane	710	U	710	U	690	U	380	U	380	U	360	U
Indeno(1,2,3-cd)pyrene	710	U	710	U	690	U	120	()	380	U	360	U
Isophorone	710	U	710	U	690	U	380	U	380	U	360	U
N-Nitroso-di-n-propylamine	710	U	710	U	690	U	380	U	380	U	360	U
N-Nitrosodiphenylamine(1)	710	U	710	U	690	U	380	U	380	U	360	U
Naphthalene	710	U	710	U	690	U	110	()	380	U	360	U
Nitrobenzene	710	U	710	U	690	U	380	U	380	U	360	U
Pentachlorophenol	1700	U	1700	U	1700	U	910	U	910	U	880	U
Phenanthrene	710	U	470	()	690	U	990		85	()	360	U
Phenol	710	U	710	U	690	U	380	U	380	U	360	U
Pyrene	710	U	370	()	690	U	580		71	()	360	U
bis(2-Chloroethoxy)methane	710	U	710	U	690	U	380	U	380	U	360	U
bis(2-Chloroethyl)ether	710	U	710	U	690	U	380	U	380	U	360	U
bis(2-Ethylhexyl)phthalate	710	U	710	U	690	U	380	U	380	U	37	()
Metals by CLP												
Antimony	0.25	()J		R		R	0.13	UJ	0.14	UJ	0.13	UJ
Arsenic	2.80	J	4.80	J	3.10	J	3.90		4.30		4.80	

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BGSB2		BGSB3		BGSB4		1B1		1B1		1B1		
SAMPLE ID:	BC-BG2-05-07		BC-BG3-05-07		BC-BG4-05-07		BC1-B1-00-01		BC1-B1-00-01D		BC1-B1-05-07		
COLLECTION DATE:	12/17/94		12/17/94		12/17/94		11/07/94		11/07/94		11/07/94		
ASSOCIATED QC:	BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB3,BC-ER2 BC-FB1, BC-FB2		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER4 BC-FB3, BC-FB6		
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	
Barium	6.30	()	6.60	()	8.60	()	32.70		27.90		31.10		
Beryllium	0.06	()B	0.05	()B	0.04	()B	0.21	()	0.21	()	0.23	()	
Cadmium	0.05	U	0.05	U	0.05	U	0.03	U	0.03	U	0.03	U	
Chromium	4		4		5.50		8.70		8.20		11.20		
Chromuim, Cr+6	-		-		-		-		-		-		
Copper	3.80		3.80		3.70		5.70		6.30		5.90		
Lead	2.80		2.10		2.50		24.80		29.90		4.40		
Mercury	0.09	U	0.10	U	0.10	U	-		-		-		
Nickel	4.10	()	4.40		5.50		7.10		7.50		9.40		
Selenium	0.47	UJ	0.46	UJ	0.44	UJ	0.32	()J	0.32	UJ	0.30	UJ	
Silver	0.48	UJ	0.47	UJ	0.45	UJ	0.04	U	0.05	U	0.04	U	
Thallium	0.29	U	0.28	UJ	0.32	()	0.33	U	0.35	U	0.32	U	
Zinc	16.30	J	8.50	J	8.50	J	17.60	J	18.20	J	15.80	J	

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B1		1B2		1B2		1B2		1B3		1B3	
SAMPLE ID:	BC1-B1-20-22		BC1-B2-00-01		BC1-B2-10-12		BC1-B2-20-22		BC1-B3-00-01		BC1-B3-20-22	
COLLECTION DATE:	11/06/94		11/07/94		11/07/94		11/06/94		11/07/94		11/08/94	
ASSOCIATED QC:	BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB3,BC-ER6 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240												
1,1,1-Trichloroethane	6	U	6	U	5	U	5	U	6	U	6	U
1,1,2,2-Tetrachloroethane	12	U	11	U	11	U	11	U	11	U	11	U
1,1,2-Trichloroethane	6	U	6	U	5	U	5	U	6	U	6	U
1,1-Dichloroethane	6	U	6	U	5	U	5	U	6	U	6	U
1,1-Dichloroethene	6	U	6	U	5	U	5	U	6	U	6	U
1,2-Dichloroethane	6	U	6	U	5	U	5	U	6	U	6	U
1,2-Dichloroethene(Total)	-		-		-		-		-		-	
1,2-Dichloropropane	6	U	6	U	5	U	5	U	6	U	6	U
2-Butanone	24	U	23	U	22	U	22	U	22	U	23	U
2-Hexanone	18	U	17	U	16	U	16	U	17	U	17	U
4-Methyl-2-pentanone	18	U	17	U	16	U	16	U	17	U	17	U
Acetone	17	B	11	U	17		15	B	9	()	29	B
Benzene	6	U	6	U	5	U	5	U	6	U	6	U
Bromodichloromethane	6	U	6	U	5	U	5	U	6	U	6	U
Bromoform	12	U	11	U	11	U	11	U	11	U	11	U
Bromomethane	6	U	6	U	5	U	5	U	6	U	6	U
Carbon disulfide	6	U	6	U	5	U	5	U	6	U	6	U
Carbon tetrachloride	6	U	6	U	5	U	5	U	6	U	6	U
Chlorobenzene	6	U	6	U	5	U	5	U	6	U	6	U
Chloroethane	12	U	11	U	11	U	11	U	11	U	11	U
Chloroform	6	U	6	U	5	U	5	U	6	U	6	U
Chloromethane	12	U	11	U	11	U	11	U	11	U	11	U
Cis-1,2-Dichloroethene	6	U	6	U	5	U	5	U	6	U	6	U
Cis-1,3-Dichloropropene	6	U	6	U	5	U	5	U	6	U	6	U
Dibromochloromethane	6	U	6	U	5	U	5	U	6	U	6	U
Ethylbenzene	6	U	6	U	5	U	5	U	6	U	3	()
Methylene chloride	12	B	16	B	10	()B	9	()B	13	B	14	B
Styrene	6	U	6	U	5	U	5	U	6	U	6	U
Tetrachloroethene	6	U	6	U	5	U	5	U	6	U	6	U
Toluene	6	U	6	U	5	U	5	U	6	U	6	U
Trans-1,2-Dichloroethene	6	U	6	U	5	U	5	U	6	U	6	U
Trans-1,3-Dichloropropene	6	U	6	U	5	U	5	U	6	U	6	U
Trichloroethene	6	U	6	U	5	U	5	U	6	U	6	U
Vinyl acetate	12	U	11	U	11	U	11	U	11	U	11	U
Vinyl chloride	12	U	11	U	11	U	11	U	11	U	11	U

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B1		1B2		1B2		1B2		1B3		1B3	
SAMPLE ID:	BC1-B1-20-22		BC1-B2-00-01		BC1-B2-10-12		BC1-B2-20-22		BC1-B3-00-01		BC1-B3-20-22	
COLLECTION DATE:	11/06/94		11/07/94		11/07/94		11/06/94		11/07/94		11/08/94	
ASSOCIATED QC:	BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB3,BC-ER6 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	18	U	17	U	16	U	16	U	17	U	5	()
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	390	U	380	U	350	U	350	U	370	U	9400	U
1,2-Dichlorobenzene	390	U	380	U	350	U	350	U	370	U	9400	U
1,3-Dichlorobenzene	390	U	380	U	350	U	350	U	370	U	9400	U
1,4-Dichlorobenzene	390	U	380	U	350	U	350	U	370	U	9400	U
1-Methylnaphthalene	-		-		-		-		-		-	
2,2'-Oxybis(1-chloropropane)	390	U	380	U	350	U	350	U	370	U	9400	U
2,4,5-Trichlorophenol	950	U	910	U	850	U	860	U	900	U	23000	U
2,4,6-Trichlorophenol	390	U	380	U	350	U	350	U	370	U	9400	U
2,4-Dichlorophenol	390	U	380	U	350	U	350	U	370	U	9400	U
2,4-Dimethylphenol	390	U	380	U	350	U	350	U	370	U	9400	U
2,4-Dinitrophenol	950	U	910	U	850	U	860	U	900	U	23000	U
2,4-Dinitrotoluene	390	U	380	U	350	U	350	U	370	U	9400	U
2,6-Dinitrotoluene	390	U	380	U	350	U	350	U	370	U	9400	U
2-Chloronaphthalene	390	U	380	U	350	U	350	U	370	U	9400	U
2-Chlorophenol	390	U	380	U	350	U	350	U	370	U	9400	U
2-Methylnaphthalene	59	()	100	()	79	()	2000		370	U	74000	
2-Methylphenol	390	U	380	U	350	U	350	U	370	U	9400	U
2-Nitroaniline	950	U	910	U	850	U	860	U	900	U	23000	U
2-Nitrophenol	390	U	380	U	350	U	350	U	370	U	9400	U
3,3'-Dichlorobenzidine	390	U	380	U	350	U	350	U	370	U	9400	U
3-Nitroaniline	950	U	910	U	850	U	860	U	900	U	23000	U
4,6-Dinitro-2-methylphenol	950	U	910	U	850	U	860	U	900	U	23000	U
4-Bromophenyl phenyl ether	390	U	380	U	350	U	350	U	370	U	9400	U
4-Chloro-3-methylphenol	390	U	380	U	350	U	350	U	370	U	9400	U
4-Chloroaniline	390	U	380	U	350	U	350	U	370	U	9400	U
4-Chlorophenyl phenyl ether	390	U	380	U	350	U	350	U	370	U	9400	U
4-Methylphenol	390	U	380	U	350	U	350	U	370	U	9400	U
4-Nitroaniline	950	U	910	U	850	U	860	U	900	U	23000	U
4-Nitrophenol	950	U	910	U	850	U	860	U	900	U	23000	U
Acenaphthene	390	U	380	U	350	U	350	U	370	U	9400	U
Acenaphthylene	390	U	380	U	350	U	350	U	370	U	9400	U
Anthracene	390	U	380	U	350	U	350	U	43	()	9400	U
Benzo(a)anthracene	390	U	42	()	350	U	350	U	490		9400	U

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B1		1B2		1B2		1B2		1B3		1B3	
SAMPLE ID:	BC1-B1-20-22		BC1-B2-00-01		BC1-B2-10-12		BC1-B2-20-22		BC1-B3-00-01		BC1-B3-20-22	
COLLECTION DATE:	11/06/94		11/07/94		11/07/94		11/06/94		11/07/94		11/08/94	
ASSOCIATED QC:	BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB3,BC-ER6 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	390	U	55	()	350	U	350	U	480		9400	U
Benzo(b)fluoranthene	390	U	90	()	350	U	350	U	890		9400	U
Benzo(g,h,i)perylene	390	U	380	U	350	U	350	U	220	()	9400	U
Benzo(k)fluoranthene	390	U	95	()	350	U	350	U	940		9400	U
Butyl benzyl phthalate	390	U	380	U	350	U	350	U	370	U	9400	U
Carbazole	390	U	380	U	350	U	350	U	370	U	9400	U
Chrysene	390	U	84	()	350	U	350	U	530		9400	U
Di-n-butyl phthalate	390	U	380	U	350	U	350	U	370	U	9400	U
Di-n-octyl phthalate	390	U	380	U	350	U	350	U	370	U	9400	U
Dibenzo(a,h)anthracene	390	U	380	U	350	U	350	U	61	()	9400	U
Dibenzofuran	390	U	380	U	350	U	350	U	370	U	9400	U
Diethyl phthalate	390	U	380	U	350	U	350	U	370	U	9400	U
Dimethyl phthalate	390	U	380	U	350	U	350	U	370	U	9400	U
Fluoranthene	390	U	77	()	350	U	350	U	890		9400	U
Fluorene	62	()	380	U	350	U	350	U	370	U	6600	()
Hexachlorobenzene	390	U	380	U	350	U	350	U	370	U	9400	U
Hexachlorobutadiene	390	U	380	U	350	U	350	U	370	U	9400	U
Hexachlorocyclopentadiene	390	U	380	U	350	U	350	U	370	U	9400	U
Hexachloroethane	390	U	380	U	350	U	350	U	370	U	9400	U
Indeno(1,2,3-cd)pyrene	390	U	380	U	350	U	350	U	220	()	9400	U
Isophorone	390	U	380	U	350	U	350	U	370	U	9400	U
N-Nitroso-di-n-propylamine	390	U	380	U	350	U	350	U	370	U	9400	U
N-Nitrosodiphenylamine(1)	390	U	380	U	350	U	350	U	370	U	9400	U
Naphthalene	390	U	380	U	350	U	460		370	U	10000	
Nitrobenzene	390	U	380	U	350	U	350	U	370	U	9400	U
Pentachlorophenol	950	U	910	U	850	U	860	U	900	U	23000	U
Phenanthrene	390	U	67	()	350	U	190	()	210	()	9900	
Phenol	390	U	380	U	350	U	350	U	370	U	9400	U
Pyrene	390	U	110	()	350	U	350	U	750		9400	U
bis(2-Chloroethoxy)methane	390	U	380	U	350	U	350	U	370	U	9400	U
bis(2-Chloroethyl)ether	390	U	380	U	350	U	350	U	370	U	9400	U
bis(2-Ethylhexyl)phthalate	390	U	380	U	130	()	350	U	370	U	9400	U
Metals by CLP												
Antimony	0.14	UJ	0.13	UJ	0.20	()J	0.12	UJ	0.13	UJ	0.14	UJ
Arsenic	4.30		1.90		4.10		2.30		5.60		4.60	

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

	LOCATOR:	1B1		1B2		1B2		1B2		1B3		1B3	
	SAMPLE ID:	BC1-B1-20-22		BC1-B2-00-01		BC1-B2-10-12		BC1-B2-20-22		BC1-B3-00-01		BC1-B3-20-22	
	COLLECTION DATE:	11/06/94		11/07/94		11/07/94		11/06/94		11/07/94		11/08/94	
	ASSOCIATED QC:	BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB3,BC-ER6 BC-FB3, BC-FB6	
		RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium		18.30	()	9.60	()	7.60	()	9.10	()	25		14	()
Beryllium		0.16	()	0.07	()	0.07	()	0.08	()	0.21	()	0.14	()
Cadmium		0.04	U	0.03	U	0.03	U	0.08	()B	0.03	U	0.03	U
Chromium		8.60		4.40		48.40		4.30		8.80		10.30	
Chromuim, Cr+6		-		-		-		-		-		-	
Copper		7.40		6.90		5.70		4.40		7.80		9.60	
Lead		4.40		37.50		7		3.30		52.60		5.10	
Mercury		-		-		-		-		-		-	
Nickel		19.20		4.60		30.60		6.90		8.10		27.20	
Selenium		0.50	()J	0.31	UJ	0.30	UJ	0.29	UJ	0.31	UJ	0.32	UJ
Silver		0.05	U	0.04	U	0.04	U	0.04	U	0.04	U	0.05	U
Thallium		0.36	U	0.33	U	0.32	U	0.31	U	0.33	U	0.34	U
Zinc		27.30	J	12.80	J	13.20	J	20.20	J	24.30	J	17.30	J

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B4		1B4		1B5		1B5		1B5		1B5	
SAMPLE ID:	BC1-B4-00-01		BC1-B4-10-12		BC1-B5-00-01		BC1-B5-00-01D		BC1-B5-10-12		BC1-B5-20-22	
COLLECTION DATE:	11/09/94		11/06/94		11/09/94		11/09/94		11/07/94		11/07/94	
ASSOCIATED QC:	BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB3,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240												
1,1,1-Trichloroethane	6	U	5	U	5	U	5	U	6	U	5	U
1,1,2,2-Tetrachloroethane	11	U	11	U	11	U	11	U	11	U	11	U
1,1,2-Trichloroethane	6	U	5	U	5	U	5	U	6	U	5	U
1,1-Dichloroethane	6	U	5	U	5	U	5	U	6	U	5	U
1,1-Dichloroethene	6	U	5	U	5	U	5	U	6	U	5	U
1,2-Dichloroethane	6	U	5	U	5	U	5	U	6	U	5	U
1,2-Dichloroethene(Total)	-		-		-		-		-		-	
1,2-Dichloropropane	6	U	5	U	5	U	5	U	6	U	5	U
2-Butanone	22	U	21	U	22	U	22	U	22	U	21	U
2-Hexanone	17	U	16	U	16	U	16	U	17	U	16	U
4-Methyl-2-pentanone	17	U	16	U	16	U	16	U	17	U	16	U
Acetone	16	B	11	U	9	()B	11	U	12	B	29	B
Benzene	6	U	5	U	5	U	5	U	6	U	5	U
Bromodichloromethane	6	U	5	U	5	U	5	U	6	U	5	U
Bromoform	11	U	11	U	11	U	11	U	11	U	11	U
Bromomethane	6	U	5	U	5	U	5	U	6	U	5	U
Carbon disulfide	6	U	5	U	5	U	5	U	6	U	5	U
Carbon tetrachloride	6	U	5	U	5	U	5	U	6	U	5	U
Chlorobenzene	6	U	5	U	5	U	5	U	6	U	5	U
Chloroethane	11	U	11	U	11	U	11	U	11	U	11	U
Chloroform	6	U	5	U	5	U	5	U	6	U	5	U
Chloromethane	11	U	11	U	11	U	11	U	11	U	11	U
Cis-1,2-Dichloroethene	6	U	5	U	5	U	5	U	6	U	5	U
Cis-1,3-Dichloropropene	6	U	5	U	5	U	5	U	6	U	5	U
Dibromochloromethane	6	U	5	U	5	U	5	U	6	U	5	U
Ethylbenzene	6	U	5	U	5	U	5	U	6	U	5	U
Methylene chloride	9	()B	6	()B	9	()B	15	B	10	()B	20	B
Styrene	6	U	5	U	5	U	5	U	6	U	5	U
Tetrachloroethene	6	U	5	U	5	U	5	U	6	U	5	U
Toluene	6	U	5	U	5	U	5	U	6	U	5	U
Trans-1,2-Dichloroethene	6	U	5	U	5	U	5	U	6	U	5	U
Trans-1,3-Dichloropropene	6	U	5	U	5	U	5	U	6	U	5	U
Trichloroethene	6	U	5	U	5	U	5	U	6	U	5	U
Vinyl acetate	11	U	11	U	11	U	11	U	11	U	11	U
Vinyl chloride	11	U	11	U	11	U	11	U	11	U	11	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B4		1B4		1B5		1B5		1B5		1B5	
SAMPLE ID:	BC1-B4-00-01		BC1-B4-10-12		BC1-B5-00-01		BC1-B5-00-01D		BC1-B5-10-12		BC1-B5-20-22	
COLLECTION DATE:	11/09/94		11/06/94		11/09/94		11/09/94		11/07/94		11/07/94	
ASSOCIATED QC:	BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB3,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	17	U	16	U	16	U	16	U	17	U	16	U
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	370	U	350	U	360	U	360	U	370	U	350	U
1,2-Dichlorobenzene	370	U	350	U	360	U	360	U	370	U	350	U
1,3-Dichlorobenzene	370	U	350	U	360	U	360	U	370	U	350	U
1,4-Dichlorobenzene	370	U	350	U	360	U	360	U	370	U	350	U
1-Methylnaphthalene	-		-		-		-		-		-	
2,2'-Oxybis(1-chloropropane)	370	U	350	U	360	U	360	U	370	U	350	U
2,4,5-Trichlorophenol	890	U	840	U	880	U	880	U	890	U	840	U
2,4,6-Trichlorophenol	370	U	350	U	360	U	360	U	370	U	350	U
2,4-Dichlorophenol	370	U	350	U	360	U	360	U	370	U	350	U
2,4-Dimethylphenol	370	U	350	U	360	U	360	U	370	U	350	U
2,4-Dinitrophenol	890	U	840	U	880	U	880	U	890	U	840	U
2,4-Dinitrotoluene	370	U	350	U	360	U	360	U	370	U	350	U
2,6-Dinitrotoluene	370	U	350	U	360	U	360	U	370	U	350	U
2-Chloronaphthalene	370	U	350	U	360	U	360	U	370	U	350	U
2-Chlorophenol	370	U	350	U	360	U	360	U	370	U	350	U
2-Methylnaphthalene	370	U	350	U	360	U	360	U	370	U	350	U
2-Methylphenol	370	U	350	U	360	U	360	U	370	U	350	U
2-Nitroaniline	890	U	840	U	880	U	880	U	890	U	840	U
2-Nitrophenol	370	U	350	U	360	U	360	U	370	U	350	U
3,3'-Dichlorobenzidine	370	U	350	U	360	U	360	U	370	U	350	U
3-Nitroaniline	890	U	840	U	880	U	880	U	890	U	840	U
4,6-Dinitro-2-methylphenol	890	U	840	U	880	U	880	U	890	U	840	U
4-Bromophenyl phenyl ether	370	U	350	U	360	U	360	U	370	U	350	U
4-Chloro-3-methylphenol	370	U	350	U	360	U	360	U	370	U	350	U
4-Chloroaniline	370	U	350	U	360	U	360	U	370	U	350	U
4-Chlorophenyl phenyl ether	370	U	350	U	360	U	360	U	370	U	350	U
4-Methylphenol	370	U	350	U	360	U	360	U	370	U	350	U
4-Nitroaniline	890	U	840	U	880	U	880	U	890	U	840	U
4-Nitrophenol	890	U	840	U	880	U	880	U	890	U	840	U
Acenaphthene	370	U	350	U	360	U	360	U	370	U	350	U
Acenaphthylene	65	()	350	U	360	U	360	U	370	U	350	U
Anthracene	92	()	350	U	360	U	360	U	370	U	350	U
Benzo(a)anthracene	930		350	U	87	()	79	()	370	U	350	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B4		1B4		1B5		1B5		1B5		1B5	
SAMPLE ID:	BC1-B4-00-01		BC1-B4-10-12		BC1-B5-00-01		BC1-B5-00-01D		BC1-B5-10-12		BC1-B5-20-22	
COLLECTION DATE:	11/09/94		11/06/94		11/09/94		11/09/94		11/07/94		11/07/94	
ASSOCIATED QC:	BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB3,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	860		350	U	100	()	87	()	370	U	350	U
Benzo(b)fluoranthene	1500		350	U	200	()	190	()	370	U	350	U
Benzo(g,h,i)perylene	570		350	U	69	()	62	()	370	U	350	U
Benzo(k)fluoranthene	1600		350	U	210	()	200	()	370	U	350	U
Butyl benzyl phthalate	370	U	350	U	360	U	360	U	370	U	350	U
Carbazole	39	()	350	U	360	U	360	U	370	U	350	U
Chrysene	730		350	U	120	()	98	()	370	U	350	U
Di-n-butyl phthalate	66	()	350	U	49	()	47	()	46	()	350	U
Di-n-octyl phthalate	370	U	350	U	360	U	360	U	370	U	350	U
Dibenzo(a,h)anthracene	220	()	350	U	360	U	360	U	370	U	350	U
Dibenzofuran	370	U	350	U	360	U	360	U	370	U	350	U
Diethyl phthalate	370	U	350	U	360	U	360	U	370	U	350	U
Dimethyl phthalate	370	U	350	U	360	U	360	U	370	U	350	U
Fluoranthene	990		350	U	160	()	140	()	370	U	350	U
Fluorene	47	()	350	U	360	U	360	U	370	U	350	U
Hexachlorobenzene	370	U	350	U	360	U	360	U	370	U	350	U
Hexachlorobutadiene	370	U	350	U	360	U	360	U	370	U	350	U
Hexachlorocyclopentadiene	370	U	350	U	360	U	360	U	370	U	350	U
Hexachloroethane	370	U	350	U	360	U	360	U	370	U	350	U
Indeno(1,2,3-cd)pyrene	500		350	U	71	()	68	()	370	U	350	U
Isophorone	370	U	350	U	360	U	360	U	370	U	350	U
N-Nitroso-di-n-propylamine	370	U	350	U	360	U	360	U	370	U	350	U
N-Nitrosodiphenylamine(1)	370	U	350	U	360	U	360	U	370	U	350	U
Naphthalene	370	U	350	U	360	U	360	U	370	U	350	U
Nitrobenzene	370	U	350	U	360	U	360	U	370	U	350	U
Pentachlorophenol	890	U	840	U	880	U	880	U	890	U	840	U
Phenanthrene	420		350	U	56	()	56	()	370	U	350	U
Phenol	370	U	350	U	360	U	360	U	230	()	350	U
Pyrene	1000		350	U	140	()	130	()	370	U	350	U
bis(2-Chloroethoxy)methane	370	U	350	U	360	U	360	U	370	U	350	U
bis(2-Chloroethyl)ether	370	U	350	U	360	U	360	U	370	U	350	U
bis(2-Ethylhexyl)phthalate	370	U	350	U	41	()	360	U	370	U	270	()
Metals by CLP												
Antimony	0.13	UJ	0.12	UJ	0.13	UJ	0.13	UJ	0.14	UJ	0.22	()J
Arsenic	5.40		5.70		5.60		5.70		3.80		9.20	

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B4		1B4		1B5		1B5		1B5		1B5	
SAMPLE ID:	BC1-B4-00-01		BC1-B4-10-12		BC1-B5-00-01		BC1-B5-00-01D		BC1-B5-10-12		BC1-B5-20-22	
COLLECTION DATE:	11/09/94		11/06/94		11/09/94		11/09/94		11/07/94		11/07/94	
ASSOCIATED QC:	BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB1,BC-ER5 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB3,BC-ER5 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	34.90		7.30	()	30.80		28.70		14.80	()	11	()
Beryllium	0.21	()	0.09	()	0.21	()	0.21	()	0.15	()	0.16	()
Cadmium	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U	0.03	U
Chromium	8.80		9.60		8.40		8		6.60		8.70	
Chromuim, Cr+6	-		-		-		-		-		-	
Copper	5.90		4.30		6		6		4.20		5.80	
Lead	16		4.20		8.80		10		3.30		4.70	
Mercury	-		-		-		-		-		-	
Nickel	7.10		8.20		7.60		7.50		5.30		10.50	
Selenium	0.33	()J	0.29	UJ	0.64	J	0.30	UJ	0.32	UJ	0.28	UJ
Silver	0.04	U	0.12	()	0.04	U	0.04	U	0.05	U	0.04	U
Thallium	0.32	U	0.31	U	0.33	U	0.32	U	0.34	U	0.30	U
Zinc	25.50	J	13.80	J	19	J	18.60	J	11.60	J	13.90	J

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B7		1B7		1B8		1B8		1B9		1B11	
SAMPLE ID:	BC1-B7-00-01		BC1-B7-10-12		BC1-B8-00-01		BC1-B8-20-22		BC1-B9-00-01		BC1-B11-00-01	
COLLECTION DATE:	11/09/94		11/09/94		11/09/94		11/07/94		11/09/94		11/10/94	
ASSOCIATED QC:	BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240												
1,1,1-Trichloroethane	6	U	6	U	5	U	6	U	5	U	5	U
1,1,2,2-Tetrachloroethane	11	U	12	U	11	U	11	U	11	U	11	U
1,1,2-Trichloroethane	6	U	6	U	5	U	6	U	5	U	5	U
1,1-Dichloroethane	6	U	6	U	5	U	6	U	5	U	5	U
1,1-Dichloroethene	6	U	6	U	5	U	6	U	5	U	5	U
1,2-Dichloroethane	6	U	6	U	5	U	6	U	5	U	5	U
1,2-Dichloroethene(Total)	-		-		-		-		-		-	
1,2-Dichloropropane	6	U	6	U	5	U	6	U	5	U	5	U
2-Butanone	22	U	24	U	21	U	23	U	22	U	22	U
2-Hexanone	17	U	18	U	16	U	17	U	16	U	16	U
4-Methyl-2-pentanone	17	U	18	U	16	U	17	U	16	U	16	U
Acetone	11	U	12	U	9	()	15	B	11	U	20	B
Benzene	6	U	6	U	5	U	6	U	5	U	5	U
Bromodichloromethane	6	U	6	U	5	U	6	U	5	U	5	U
Bromoform	11	U	12	U	11	U	11	U	11	U	11	U
Bromomethane	6	U	6	U	5	U	6	U	5	U	5	U
Carbon disulfide	6	U	6	U	5	U	6	U	5	U	5	U
Carbon tetrachloride	6	U	6	U	5	U	6	U	5	U	5	U
Chlorobenzene	6	U	6	U	5	U	6	U	5	U	5	U
Chloroethane	11	U	12	U	11	U	11	U	11	U	11	U
Chloroform	6	U	6	U	5	U	6	U	5	U	5	U
Chloromethane	11	U	12	U	11	U	11	U	11	U	11	U
Cis-1,2-Dichloroethene	6	U	6	U	5	U	6	U	5	U	5	U
Cis-1,3-Dichloropropene	6	U	6	U	5	U	6	U	5	U	5	U
Dibromochloromethane	6	U	6	U	5	U	6	U	5	U	5	U
Ethylbenzene	6	U	6	U	5	U	6	U	5	U	5	U
Methylene chloride	8	()B	9	()B	11	B	13	B	10	()B	16	B
Styrene	6	U	6	U	5	U	6	U	5	U	5	U
Tetrachloroethene	6	U	6	U	5	U	6	U	5	U	5	U
Toluene	6	U	6	U	5	U	6	U	5	U	5	U
Trans-1,2-Dichloroethene	6	U	6	U	5	U	6	U	5	U	5	U
Trans-1,3-Dichloropropene	6	U	6	U	5	U	6	U	5	U	5	U
Trichloroethene	6	U	6	U	5	U	6	U	5	U	5	U
Vinyl acetate	11	U	12	U	11	U	11	U	11	U	11	U
Vinyl chloride	11	U	12	U	11	U	11	U	11	U	11	U

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B7		1B7		1B8		1B8		1B9		1B11	
SAMPLE ID:	BC1-B7-00-01		BC1-B7-10-12		BC1-B8-00-01		BC1-B8-20-22		BC1-B9-00-01		BC1-B11-00-01	
COLLECTION DATE:	11/09/94		11/09/94		11/09/94		11/07/94		11/09/94		11/10/94	
ASSOCIATED QC:	BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	17	U	18	U	16	U	17	U	16	U	16	U
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	370	U	390	U	350	U	370	U	360	U	360	U
1,2-Dichlorobenzene	370	U	390	U	350	U	370	U	360	U	360	U
1,3-Dichlorobenzene	370	U	390	U	350	U	370	U	360	U	360	U
1,4-Dichlorobenzene	370	U	390	U	350	U	370	U	360	U	360	U
1-Methylnaphthalene	-		-		-		-		-		-	
2,2'-Oxybis(1-chloropropane)	370	U	390	U	350	U	370	U	360	U	360	U
2,4,5-Trichlorophenol	890	U	950	U	850	U	900	U	880	U	880	U
2,4,6-Trichlorophenol	370	U	390	U	350	U	370	U	360	U	360	U
2,4-Dichlorophenol	370	U	390	U	350	U	370	U	360	U	360	U
2,4-Dimethylphenol	370	U	390	U	350	U	370	U	360	U	360	U
2,4-Dinitrophenol	890	U	950	U	850	U	900	U	880	U	880	U
2,4-Dinitrotoluene	370	U	390	U	350	U	370	U	360	U	360	U
2,6-Dinitrotoluene	370	U	390	U	350	U	370	U	360	U	360	U
2-Chloronaphthalene	370	U	390	U	350	U	370	U	360	U	360	U
2-Chlorophenol	370	U	390	U	350	U	370	U	360	U	360	U
2-Methylnaphthalene	370	U	390	U	350	U	370	U	360	U	360	U
2-Methylphenol	370	U	390	U	350	U	370	U	360	U	360	U
2-Nitroaniline	890	U	950	U	850	U	900	U	880	U	880	U
2-Nitrophenol	370	U	390	U	350	U	370	U	360	U	360	U
3,3'-Dichlorobenzidine	370	U	390	U	350	U	370	U	360	U	360	U
3-Nitroaniline	890	U	950	U	850	U	900	U	880	U	880	U
4,6-Dinitro-2-methylphenol	890	U	950	U	850	U	900	U	880	U	880	U
4-Bromophenyl phenyl ether	370	U	390	U	350	U	370	U	360	U	360	U
4-Chloro-3-methylphenol	370	U	390	U	350	U	370	U	360	U	360	U
4-Chloroaniline	370	U	390	U	350	U	370	U	360	U	360	U
4-Chlorophenyl phenyl ether	370	U	390	U	350	U	370	U	360	U	360	U
4-Methylphenol	370	U	390	U	350	U	370	U	360	U	360	U
4-Nitroaniline	890	U	950	U	850	U	900	U	880	U	880	U
4-Nitrophenol	890	U	950	U	850	U	900	U	880	U	880	U
Acenaphthene	370	U	390	U	350	U	370	U	360	U	360	U
Acenaphthylene	51	()	390	U	48	()	370	U	360	U	360	U
Anthracene	75	()	390	U	38	()	370	U	360	U	360	U
Benzo(a)anthracene	800		390	U	470		370	U	360	U	360	U

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B7		1B7		1B8		1B8		1B9		1B11	
SAMPLE ID:	BC1-B7-00-01		BC1-B7-10-12		BC1-B8-00-01		BC1-B8-20-22		BC1-B9-00-01		BC1-B11-00-01	
COLLECTION DATE:	11/09/94		11/09/94		11/09/94		11/07/94		11/09/94		11/10/94	
ASSOCIATED QC:	BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	740		390	U	600		370	U	360	U	360	U
Benzo(b)fluoranthene	1600		390	U	960		370	U	360	U	360	U
Benzo(g,h,i)perylene	300	()	390	U	430		370	U	360	U	360	U
Benzo(k)fluoranthene	1600		390	U	1000		370	U	360	U	360	U
Butyl benzyl phthalate	370	U	390	U	350	U	370	U	360	U	360	U
Carbazole	42	()	390	U	350	U	370	U	360	U	360	U
Chrysene	840		390	U	490		370	U	360	U	360	U
Di-n-butyl phthalate	50	()	60	()	46	()	370	U	61	()	60	()
Di-n-octyl phthalate	370	U	390	U	350	U	370	U	360	U	360	U
Dibenzo(a,h)anthracene	100	()	390	U	170	()	370	U	360	U	360	U
Dibenzofuran	370	U	390	U	350	U	370	U	360	U	360	U
Diethyl phthalate	370	U	390	U	350	U	370	U	360	U	360	U
Dimethyl phthalate	370	U	390	U	350	U	370	U	360	U	360	U
Fluoranthene	1100		390	U	600		370	U	360	U	360	U
Fluorene	38	()	390	U	350	U	370	U	360	U	360	U
Hexachlorobenzene	370	U	390	U	350	U	370	U	360	U	360	U
Hexachlorobutadiene	370	U	390	U	350	U	370	U	360	U	360	U
Hexachlorocyclopentadiene	370	U	390	U	350	U	370	U	360	U	360	U
Hexachloroethane	370	U	390	U	350	U	370	U	360	U	360	U
Indeno(1,2,3-cd)pyrene	330	()	390	U	400		370	U	360	U	360	U
Isophorone	370	U	390	U	350	U	370	U	360	U	360	U
N-Nitroso-di-n-propylamine	370	U	390	U	350	U	370	U	360	U	360	U
N-Nitrosodiphenylamine(1)	370	U	390	U	350	U	370	U	360	U	360	U
Naphthalene	370	U	390	U	350	U	370	U	360	U	360	U
Nitrobenzene	370	U	390	U	350	U	370	U	360	U	360	U
Pentachlorophenol	890	U	950	U	850	U	900	U	880	U	880	U
Phenanthrene	390		390	U	150	()	370	U	360	U	360	U
Phenol	370	U	390	U	350	U	370	U	360	U	360	U
Pyrene	1100		390	U	660		370	U	360	U	360	U
bis(2-Chloroethoxy)methane	370	U	390	U	350	U	370	U	360	U	360	U
bis(2-Chloroethyl)ether	370	U	390	U	350	U	370	U	360	U	360	U
bis(2-Ethylhexyl)phthalate	370	U	390	U	350	U	79	()	360	U	360	U
Metals by CLP												
Antimony	0.15	()J	0.19	()J	0.16	()J	0.13	UJ	0.13	UJ	0.19	()J
Arsenic	5.90		5.10		6.10		4.40		21.40		4.10	

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B7		1B7		1B8		1B8		1B9		1B11	
SAMPLE ID:	BC1-B7-00-01		BC1-B7-10-12		BC1-B8-00-01		BC1-B8-20-22		BC1-B9-00-01		BC1-B11-00-01	
COLLECTION DATE:	11/09/94		11/09/94		11/09/94		11/07/94		11/09/94		11/10/94	
ASSOCIATED QC:	BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	49.10		16.70	()	38.80		19.60	()	21.60	()	37	
Beryllium	0.30	()	0.12	()	0.19	()	0.10	()	0.22	()	0.27	()
Cadmium	0.03	U	0.04	U	0.03	U	0.03	U	0.03	U	0.03	U
Chromium	10.40		14		10.60		6.50		8.90		10.70	
Chromuim, Cr+6	-		-		-		-		-		-	
Copper	7.70		5.60		6.50		7.60		8.70		8.50	
Lead	13.90		3		101		6.60		17.50		19.50	
Mercury	-		-		-		-		-		-	
Nickel	9		11.40		8.20		10.60		9.10		8.50	
Selenium	0.31	UJ	0.33	UJ	0.29	UJ	0.31	UJ	0.31	UJ	0.31	UJ
Silver	0.04	U	0.05	U	0.04	U	0.04	U	0.04	U	1.90	
Thallium	0.33	U	0.36	U	0.31	U	0.33	U	0.33	U	0.33	U
Zinc	24.10	J	12.40	J	26.10	J	23.60	J	18.20	J	20.40	J

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B11		1B11		1B12		1B12		1B15		1B18	
SAMPLE ID:	BC1-B11-19-23		BC1-B11-19-23D		BC1-B12-00-01		BC1-B12-20-22		BC1-B15-10-12		BC1-B18-15-17	
COLLECTION DATE:	11/09/94		11/09/94		11/09/94		11/07/94		11/08/94		11/09/94	
ASSOCIATED QC:	BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB3,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER7 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240												
1,1,1-Trichloroethane	6	U	6	U	6	U	5	U	6	U	5	U
1,1,2,2-Tetrachloroethane	11	U	11	U	11	U	10	U	11	U	11	U
1,1,2-Trichloroethane	6	U	6	U	6	U	5	U	6	U	5	U
1,1-Dichloroethane	6	U	6	U	6	U	5	U	6	U	5	U
1,1-Dichloroethene	6	U	6	U	6	U	5	U	6	U	5	U
1,2-Dichloroethane	6	U	6	U	6	U	5	U	6	U	5	U
1,2-Dichloroethene(Total)	-		-		-		-		-		-	
1,2-Dichloropropane	6	U	6	U	6	U	5	U	6	U	5	U
2-Butanone	22	U	22	U	23	U	21	U	23	U	22	U
2-Hexanone	17	U	17	U	17	U	15	U	17	U	16	U
4-Methyl-2-pentanone	17	U	17	U	17	U	15	U	17	U	16	U
Acetone	8	()B	8	()B	41	B	14	B	23	B	17	B
Benzene	6	U	6	U	6	U	5	U	6	U	5	U
Bromodichloromethane	6	U	6	U	6	U	5	U	6	U	5	U
Bromoform	11	U	11	U	11	U	10	U	11	U	11	U
Bromomethane	6	U	6	U	6	U	5	U	6	U	5	U
Carbon disulfide	6	U	6	U	6	U	5	U	6	U	5	U
Carbon tetrachloride	6	U	6	U	6	U	5	U	6	U	5	U
Chlorobenzene	6	U	6	U	6	U	5	U	6	U	5	U
Chloroethane	11	U	11	U	11	U	10	U	11	U	11	U
Chloroform	6	U	6	U	6	U	5	U	6	U	5	U
Chloromethane	11	U	11	U	11	U	10	U	11	U	11	U
Cis-1,2-Dichloroethene	6	U	6	U	6	U	5	U	6	U	5	U
Cis-1,3-Dichloropropene	6	U	6	U	6	U	5	U	6	U	5	U
Dibromochloromethane	6	U	6	U	6	U	5	U	6	U	5	U
Ethylbenzene	6	U	6	U	6	U	5	U	6	U	5	U
Methylene chloride	10	()B	9	()B	15	B	9	()B	14	B	12	B
Styrene	6	U	6	U	6	U	5	U	6	U	5	U
Tetrachloroethene	6	U	6	U	6	U	5	U	6	U	5	U
Toluene	6	U	6	U	6	U	5	U	6	U	5	U
Trans-1,2-Dichloroethene	6	U	6	U	6	U	5	U	6	U	5	U
Trans-1,3-Dichloropropene	6	U	6	U	6	U	5	U	6	U	5	U
Trichloroethene	6	U	6	U	6	U	5	U	6	U	5	U
Vinyl acetate	11	U	11	U	11	U	10	U	11	U	11	U
Vinyl chloride	11	U	11	U	11	U	10	U	11	U	11	U

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B11		1B11		1B12		1B12		1B15		1B18	
SAMPLE ID:	BC1-B11-19-23		BC1-B11-19-23D		BC1-B12-00-01		BC1-B12-20-22		BC1-B15-10-12		BC1-B18-15-17	
COLLECTION DATE:	11/09/94		11/09/94		11/09/94		11/07/94		11/08/94		11/09/94	
ASSOCIATED QC:	BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB3,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER7 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	17	U	17	U	17	U	15	U	17	U	16	U
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	370	U	370	U	380	U	340	U	370	U	350	U
1,2-Dichlorobenzene	370	U	370	U	380	U	340	U	370	U	350	U
1,3-Dichlorobenzene	370	U	370	U	380	U	340	U	370	U	350	U
1,4-Dichlorobenzene	370	U	370	U	380	U	340	U	370	U	350	U
1-Methylnaphthalene	-		-		-		-		-		-	
2,2'-Oxybis(1-chloropropane)	370	U	370	U	380	U	340	U	370	U	350	U
2,4,5-Trichlorophenol	900	U	900	U	920	U	820	U	900	U	860	U
2,4,6-Trichlorophenol	370	U	370	U	380	U	340	U	370	U	350	U
2,4-Dichlorophenol	370	U	370	U	380	U	340	U	370	U	350	U
2,4-Dimethylphenol	370	U	370	U	380	U	340	U	370	U	350	U
2,4-Dinitrophenol	900	U	900	U	920	U	820	U	900	U	860	U
2,4-Dinitrotoluene	370	U	370	U	380	U	340	U	370	U	350	U
2,6-Dinitrotoluene	370	U	370	U	380	U	340	U	370	U	350	U
2-Chloronaphthalene	370	U	370	U	380	U	340	U	370	U	350	U
2-Chlorophenol	370	U	370	U	380	U	340	U	370	U	350	U
2-Methylnaphthalene	370	U	370	U	380	U	340	U	370	U	350	U
2-Methylphenol	370	U	370	U	380	U	340	U	370	U	350	U
2-Nitroaniline	900	U	900	U	920	U	820	U	900	U	860	U
2-Nitrophenol	370	U	370	U	380	U	340	U	370	U	350	U
3,3'-Dichlorobenzidine	370	U	370	U	380	U	340	U	370	U	350	U
3-Nitroaniline	900	U	900	U	920	U	820	U	900	U	860	U
4,6-Dinitro-2-methylphenol	900	U	900	U	920	U	820	U	900	U	860	U
4-Bromophenyl phenyl ether	370	U	370	U	380	U	340	U	370	U	350	U
4-Chloro-3-methylphenol	370	U	370	U	380	U	340	U	370	U	350	U
4-Chloroaniline	370	U	370	U	380	U	340	U	370	U	350	U
4-Chlorophenyl phenyl ether	370	U	370	U	380	U	340	U	370	U	350	U
4-Methylphenol	370	U	370	U	380	U	340	U	370	U	350	U
4-Nitroaniline	900	U	900	U	920	U	820	U	900	U	860	U
4-Nitrophenol	900	U	900	U	920	U	820	U	900	U	860	U
Acenaphthene	370	U	370	U	380	U	340	U	370	U	350	U
Acenaphthylene	370	U	370	U	380	U	340	U	370	U	350	U
Anthracene	370	U	370	U	380	U	340	U	370	U	350	U
Benzo(a)anthracene	370	U	370	U	380	U	340	U	370	U	350	U

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B11		1B11		1B12		1B12		1B15		1B18	
SAMPLE ID:	BC1-B11-19-23		BC1-B11-19-23D		BC1-B12-00-01		BC1-B12-20-22		BC1-B15-10-12		BC1-B18-15-17	
COLLECTION DATE:	11/09/94		11/09/94		11/09/94		11/07/94		11/08/94		11/09/94	
ASSOCIATED QC:	BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB3,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER7 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	370	U	370	U	380	U	340	U	370	U	350	U
Benzo(b)fluoranthene	370	U	370	U	84	()	340	U	370	U	350	U
Benzo(g,h,i)perylene	370	U	370	U	380	U	340	U	370	U	350	U
Benzo(k)fluoranthene	370	U	370	U	88	()	340	U	370	U	350	U
Butyl benzyl phthalate	370	U	370	U	380	U	340	U	370	U	350	U
Carbazole	370	U	370	U	380	U	340	U	370	U	350	U
Chrysene	370	U	370	U	52	()	340	U	370	U	350	U
Di-n-butyl phthalate	56	()	370	U	70	()	340	U	370	U	51	()
Di-n-octyl phthalate	370	U	370	U	380	U	340	U	370	U	350	U
Dibenzo(a,h)anthracene	370	U	370	U	380	U	340	U	370	U	350	U
Dibenzofuran	370	U	370	U	380	U	340	U	370	U	38	()
Diethyl phthalate	370	U	370	U	380	U	340	U	370	U	350	U
Dimethyl phthalate	370	U	370	U	380	U	340	U	370	U	350	U
Fluoranthene	370	U	370	U	58	()	340	U	370	U	350	U
Fluorene	370	U	370	U	380	U	340	U	370	U	350	U
Hexachlorobenzene	370	U	370	U	380	U	340	U	370	U	350	U
Hexachlorobutadiene	370	U	370	U	380	U	340	U	370	U	350	U
Hexachlorocyclopentadiene	370	U	370	U	380	U	340	U	370	U	350	U
Hexachloroethane	370	U	370	U	380	U	340	U	370	U	350	U
Indeno(1,2,3-cd)pyrene	370	U	370	U	380	U	340	U	370	U	350	U
Isophorone	370	U	370	U	380	U	340	U	370	U	350	U
N-Nitroso-di-n-propylamine	370	U	370	U	380	U	340	U	370	U	350	U
N-Nitrosodiphenylamine(1)	370	U	370	U	380	U	340	U	370	U	350	U
Naphthalene	370	U	370	U	380	U	340	U	370	U	350	U
Nitrobenzene	370	U	370	U	380	U	340	U	370	U	350	U
Pentachlorophenol	900	U	900	U	920	U	820	U	900	U	860	U
Phenanthrene	370	U	370	U	380	U	340	U	370	U	41	()
Phenol	370	U	370	U	380	U	340	U	370	U	130	()
Pyrene	370	U	370	U	62	()	340	U	370	U	350	U
bis(2-Chloroethoxy)methane	370	U	370	U	380	U	340	U	370	U	350	U
bis(2-Chloroethyl)ether	370	U	370	U	380	U	340	U	370	U	350	U
bis(2-Ethylhexyl)phthalate	370	U	1100		380	U	340	U	88	()	350	U
Metals by CLP												
Antimony	0.17	()J	0.22	()J	0.66	UJ	0.12	UJ	0.13	UJ	1.30	()J
Arsenic	2		2.20		8.10		1.80		3.50		16.20	

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

	LOCATOR:	1B11		1B11		1B12		1B12		1B15		1B18	
	SAMPLE ID:	BC1-B11-19-23		BC1-B11-19-23D		BC1-B12-00-01		BC1-B12-20-22		BC1-B15-10-12		BC1-B18-15-17	
	COLLECTION DATE:	11/09/94		11/09/94		11/09/94		11/07/94		11/08/94		11/09/94	
	ASSOCIATED QC:	BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER6 BC-FB3, BC-FB6		BC-TB2,BC-ER5 BC-FB3, BC-FB6		BC-TB3,BC-ER6 BC-FB3, BC-FB6		BC-TB4,BC-ER7 BC-FB3, BC-FB6	
		RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium		9.10	()	9.90	()	70.60	()	4.60	()	15.80	()	68.70	
Beryllium		0.11	()	0.11	()	0.31	()	0.05	()	0.10	()	0.11	()
Cadmium		0.03	U	0.03	U	0.17	U	0.03	U	0.03	U	0.22	()
Chromium		4.80		4.70		16		3.40		5		275	
Chromuim, Cr+6		-		-		-		-		-		-	
Copper		7.10		5.20		18.60		2.80		3.20		23.10	
Lead		3.10		3.90		3150		2.30		3		6.70	
Mercury		-		-		-		-		-		-	
Nickel		9.30		8.60		10.90	()	15.80		4.20	()	39.20	
Selenium		0.32	UJ	0.32	UJ	1.50	UJ	0.28	UJ	0.31	UJ	0.30	UJ
Silver		0.05	U	0.05	U	0.22	U	0.04	U	0.04	U	0.06	()
Thallium		0.34	U	0.34	U	1.70	U	0.30	U	0.33	U	0.32	U
Zinc		18.20	J	19	J	168	J	11.30	J	12.20	J	21.20	J

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B19		1B19		1MW2		1MW2		1SS11		1SS12	
SAMPLE ID:	BC1-B19-00-01		BC1-B19-20-22		BC1-MW2-10-12		BC1-MW2-20-22		BC1-SS11		BC1-SS12	
COLLECTION DATE:	11/10/94		11/09/94		12/14/94		12/14/94		12/18/94		12/18/94	
ASSOCIATED QC:	BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB1 BC-FB3, BC-FB6		BC-TB1 BC-FB3, BC-FB6		BC-TB3 BC-FB3, BC-FB6		BC-TB3 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240												
1,1,1-Trichloroethane	6	U	6	U	5	U	5	U	-		-	
1,1,2,2-Tetrachloroethane	11	U	11	U	11	U	10	U	-		-	
1,1,2-Trichloroethane	6	U	6	U	5	U	5	U	-		-	
1,1-Dichloroethane	6	U	6	U	5	U	5	U	-		-	
1,1-Dichloroethene	6	U	6	U	5	U	5	U	-		-	
1,2-Dichloroethane	6	U	6	U	5	U	5	U	-		-	
1,2-Dichloroethene(Total)	-		-		-		-		-		-	
1,2-Dichloropropane	6	U	6	U	5	U	5	U	-		-	
2-Butanone	22	U	23	U	22	U	20	U	-		-	
2-Hexanone	17	U	17	U	16	U	15	U	-		-	
4-Methyl-2-pentanone	17	U	17	U	16	U	15	U	-		-	
Acetone	13	B	7	()B	19	J	10	U	-		-	
Benzene	6	U	6	U	5	U	5	U	-		-	
Bromodichloromethane	6	U	6	U	5	U	5	U	-		-	
Bromoform	11	U	11	U	11	U	10	U	-		-	
Bromomethane	6	U	6	U	5	U	5	U	-		-	
Carbon disulfide	6	U	6	U	5	U	5	U	-		-	
Carbon tetrachloride	6	U	6	U	5	U	5	U	-		-	
Chlorobenzene	6	U	6	U	5	U	5	U	-		-	
Chloroethane	11	U	11	U	11	U	10	U	-		-	
Chloroform	6	U	6	U	5	U	5	U	-		-	
Chloromethane	11	U	11	U	11	U	10	U	-		-	
Cis-1,2-Dichloroethene	6	U	6	U	5	U	5	U	-		-	
Cis-1,3-Dichloropropene	6	U	6	U	5	U	5	U	-		-	
Dibromochloromethane	6	U	6	U	5	U	5	U	-		-	
Ethylbenzene	6	U	6	U	5	U	5	U	-		-	
Methylene chloride	12	B	15	B	21	B	22	B	-		-	
Styrene	6	U	6	U	5	U	5	U	-		-	
Tetrachloroethene	6	U	6	U	5	U	5	U	-		-	
Toluene	6	U	6	U	5	U	5	U	-		-	
Trans-1,2-Dichloroethene	6	U	6	U	5	U	5	U	-		-	
Trans-1,3-Dichloropropene	6	U	6	U	5	U	5	U	-		-	
Trichloroethene	6	U	6	U	5	U	5	U	-		-	
Vinyl acetate	11	U	11	U	11	U	10	U	-		-	
Vinyl chloride	11	U	11	U	11	U	10	U	-		-	

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B19		1B19		1MW2		1MW2		1SS11		1SS12	
SAMPLE ID:	BC1-B19-00-01		BC1-B19-20-22		BC1-MW2-10-12		BC1-MW2-20-22		BC1-SS11		BC1-SS12	
COLLECTION DATE:	11/10/94		11/09/94		12/14/94		12/14/94		12/18/94		12/18/94	
ASSOCIATED QC:	BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB1 BC-FB3, BC-FB6		BC-TB1 BC-FB3, BC-FB6		BC-TB3 BC-FB3, BC-FB6		BC-TB3 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	17	U	17	U	16	U	15	U	-		-	
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	370	U	370	U	350	U	340	U	730	U	740	U
1,2-Dichlorobenzene	370	U	370	U	350	U	340	U	730	U	740	U
1,3-Dichlorobenzene	370	U	370	U	350	U	340	U	730	U	740	U
1,4-Dichlorobenzene	370	U	370	U	350	U	340	U	730	U	740	U
1-Methylnaphthalene	-		-		350	U	340	U	-		-	
2,2'-Oxybis(1-chloropropane)	370	U	370	U	350	U	340	U	730	U	740	U
2,4,5-Trichlorophenol	900	U	910	U	860	U	810	U	1800	U	1800	U
2,4,6-Trichlorophenol	370	U	370	U	350	U	340	U	730	U	740	U
2,4-Dichlorophenol	370	U	370	U	350	U	340	U	730	U	740	U
2,4-Dimethylphenol	370	U	370	U	350	U	340	U	730	U	740	U
2,4-Dinitrophenol	900	U	910	U	860	U	810	U	1800	U	1800	U
2,4-Dinitrotoluene	370	U	370	U	350	U	340	U	730	U	740	U
2,6-Dinitrotoluene	370	U	370	U	350	U	340	U	730	U	740	U
2-Chloronaphthalene	370	U	370	U	350	U	340	U	730	U	740	U
2-Chlorophenol	370	U	370	U	350	U	340	U	730	U	740	U
2-Methylnaphthalene	370	U	370	U	350	U	340	U	730	U	740	U
2-Methylphenol	370	U	370	U	350	U	340	U	730	U	740	U
2-Nitroaniline	900	U	910	U	860	U	810	U	1800	U	1800	U
2-Nitrophenol	370	U	370	U	350	U	340	U	730	U	740	U
3,3'-Dichlorobenzidine	370	U	370	U	350	U	340	U	730	U	740	U
3-Nitroaniline	900	U	910	U	860	U	810	U	1800	U	1800	U
4,6-Dinitro-2-methylphenol	900	U	910	U	860	U	810	U	1800	U	1800	U
4-Bromophenyl phenyl ether	370	U	370	U	350	U	340	U	730	U	740	U
4-Chloro-3-methylphenol	370	U	370	U	350	U	340	U	730	U	740	U
4-Chloroaniline	370	U	370	U	350	U	340	U	730	U	740	U
4-Chlorophenyl phenyl ether	370	U	370	U	350	U	340	U	730	U	740	U
4-Methylphenol	370	U	370	U	350	U	340	U	730	U	740	U
4-Nitroaniline	900	U	910	U	860	U	810	U	1800	U	1800	U
4-Nitrophenol	900	U	910	U	860	U	810	U	1800	U	1800	U
Acenaphthene	370	U	370	U	350	U	340	U	730	U	740	U
Acenaphthylene	370	U	370	U	350	U	340	U	730	U	740	U
Anthracene	370	U	370	U	350	U	340	U	730	U	740	U
Benzo(a)anthracene	370	U	370	U	350	U	340	U	730	U	740	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1B19	1B19	1MW2	1MW2	1SS11	1SS12
SAMPLE ID:	BC1-B19-00-01	BC1-B19-20-22	BC1-MW2-10-12	BC1-MW2-20-22	BC1-SS11	BC1-SS12
COLLECTION DATE:	11/10/94	11/09/94	12/14/94	12/14/94	12/18/94	12/18/94
ASSOCIATED QC:	BC-TB4,BC-ER7 BC-FB3, BC-FB6	BC-TB4,BC-ER7 BC-FB3, BC-FB6	BC-TB1 BC-FB3, BC-FB6	BC-TB1 BC-FB3, BC-FB6	BC-TB3 BC-FB3, BC-FB6	BC-TB3 BC-FB3, BC-FB6

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	370	U	370	U	350	U	340	U	730	U	740	U
Benzo(b)fluoranthene	370	U	370	U	350	U	340	U	730	U	740	U
Benzo(g,h,i)perylene	370	U	370	U	350	U	340	U	730	U	740	U
Benzo(k)fluoranthene	370	U	370	U	350	U	340	U	730	U	740	U
Butyl benzyl phthalate	370	U	370	U	350	U	340	U	730	U	740	U
Carbazole	370	U	370	U	350	U	340	U	730	U	740	U
Chrysene	370	U	370	U	350	U	340	U	730	U	740	U
Di-n-butyl phthalate	54	()	370	U	68	()B	35	()B	730	U	740	U
Di-n-octyl phthalate	370	U	370	U	350	U	340	U	730	U	740	U
Dibenzo(a,h)anthracene	370	U	370	U	350	U	340	U	730	U	740	U
Dibenzofuran	370	U	370	U	350	U	340	U	730	U	740	U
Diethyl phthalate	370	U	370	U	350	U	340	U	730	U	740	U
Dimethyl phthalate	370	U	370	U	350	U	340	U	730	U	740	U
Fluoranthene	370	U	370	U	350	U	340	U	730	U	740	U
Fluorene	370	U	370	U	350	U	340	U	730	U	740	U
Hexachlorobenzene	370	U	370	U	350	U	340	U	730	U	740	U
Hexachlorobutadiene	370	U	370	U	350	U	340	U	730	U	740	U
Hexachlorocyclopentadiene	370	U	370	U	350	U	340	U	730	U	740	U
Hexachloroethane	370	U	370	U	350	U	340	U	730	U	740	U
Indeno(1,2,3-cd)pyrene	370	U	370	U	350	U	340	U	730	U	740	U
Isophorone	370	U	370	U	350	U	340	U	730	U	740	U
N-Nitroso-di-n-propylamine	370	U	370	U	350	U	340	U	730	U	740	U
N-Nitrosodiphenylamine(1)	370	U	370	U	350	U	340	U	730	U	740	U
Naphthalene	370	U	370	U	350	U	340	U	730	U	740	U
Nitrobenzene	370	U	370	U	350	U	340	U	730	U	740	U
Pentachlorophenol	900	U	910	U	860	U	810	U	1800	U	1800	U
Phenanthrene	370	U	370	U	350	U	340	U	730	U	740	U
Phenol	370	U	370	U	350	U	340	U	730	U	740	U
Pyrene	370	U	370	U	350	U	340	U	730	U	740	U
bis(2-Chloroethoxy)methane	370	U	370	U	350	U	340	U	730	U	740	U
bis(2-Chloroethyl)ether	370	U	370	U	350	U	340	U	730	U	740	U
bis(2-Ethylhexyl)phthalate	370	U	83	()	350	U	340	U	730	U	740	U
Metals by CLP												
Antimony	0.17	()J	0.14	UJ	0.20	UJ	0.19	UJ		R		R
Arsenic	5.70		1.20		3.80		13.90		7.10	J	5.90	J

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

	LOCATOR:	1B19		1B19		1MW2		1MW2		1SS11		1SS12	
	SAMPLE ID:	BC1-B19-00-01		BC1-B19-20-22		BC1-MW2-10-12		BC1-MW2-20-22		BC1-SS11		BC1-SS12	
	COLLECTION DATE:	11/10/94		11/09/94		12/14/94		12/14/94		12/18/94		12/18/94	
	ASSOCIATED QC:	BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB4,BC-ER7 BC-FB3, BC-FB6		BC-TB1 BC-FB3, BC-FB6		BC-TB1 BC-FB3, BC-FB6		BC-TB3 BC-FB3, BC-FB6		BC-TB3 BC-FB3, BC-FB6	
		RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium		30.20		7.90	()	10.30	()	11.40	()	20.30	()	33.10	
Beryllium		0.24	()	0.10	()	0.12	()	0.06	()	0.29	()	0.29	()
Cadmium		0.03	U	0.03	U	0.05	U	0.05	U	0.22	()J	0.07	U
Chromium		8.80		4.90		5.20		3.40		9.70		12.70	J
Chromuim, Cr+6		-		-		-		-		-		-	
Copper		6.50		3.20		4.30		5.20		8.20		9.70	
Lead		7.70		2.20		3.80	J	2.30	J	9.60		6.50	
Mercury		-		-		-		-		0.10	U	0.12	U
Nickel		7.80		12.20		4.80		4.80		8.40		10.80	
Selenium		0.32	UJ	0.32	UJ	0.65		0.73		1.10	J	0.58	J
Silver		0.05	U	0.16	()	0.06	UJ	0.06	UJ	0.49	UJ	0.56	UJ
Thallium		0.34	U	0.34	U	0.57	U	0.55	U	0.33	U	0.34	U
Zinc		17.10	J	10.10	J	15.50		8.50		22.70	J	21.30	J

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1SS13		1SS14		3B1		3B2		3B3		3SB101	
SAMPLE ID:	BC1-SS13		BC1-SS14		BC3-B1-04-06		BC3-B2-04-06		BC3-B3-04-06		BC3-SB101	
COLLECTION DATE:	12/18/94		12/18/94		11/08/94		11/08/94		11/08/94		11/05/94	
ASSOCIATED QC:	BC-TB3 BC-FB3, BC-FB6		BC-TB3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240												
1,1,1-Trichloroethane	-		-		-		-		-		-	
1,1,2,2-Tetrachloroethane	-		-		-		-		-		-	
1,1,2-Trichloroethane	-		-		-		-		-		-	
1,1-Dichloroethane	-		-		-		-		-		-	
1,1-Dichloroethene	-		-		-		-		-		-	
1,2-Dichloroethane	-		-		-		-		-		-	
1,2-Dichloroethene(Total)	-		-		-		-		-		-	
1,2-Dichloropropane	-		-		-		-		-		-	
2-Butanone	-		-		-		-		-		-	
2-Hexanone	-		-		-		-		-		-	
4-Methyl-2-pentanone	-		-		-		-		-		-	
Acetone	-		-		-		-		-		-	
Benzene	-		-		-		-		-		-	
Bromodichloromethane	-		-		-		-		-		-	
Bromoform	-		-		-		-		-		-	
Bromomethane	-		-		-		-		-		-	
Carbon disulfide	-		-		-		-		-		-	
Carbon tetrachloride	-		-		-		-		-		-	
Chlorobenzene	-		-		-		-		-		-	
Chloroethane	-		-		-		-		-		-	
Chloroform	-		-		-		-		-		-	
Chloromethane	-		-		-		-		-		-	
Cis-1,2-Dichloroethene	-		-		-		-		-		-	
Cis-1,3-Dichloropropene	-		-		-		-		-		-	
Dibromochloromethane	-		-		-		-		-		-	
Ethylbenzene	-		-		-		-		-		-	
Methylene chloride	-		-		-		-		-		-	
Styrene	-		-		-		-		-		-	
Tetrachloroethene	-		-		-		-		-		-	
Toluene	-		-		-		-		-		-	
Trans-1,2-Dichloroethene	-		-		-		-		-		-	
Trans-1,3-Dichloropropene	-		-		-		-		-		-	
Trichloroethene	-		-		-		-		-		-	
Vinyl acetate	-		-		-		-		-		-	
Vinyl chloride	-		-		-		-		-		-	

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1SS13		1SS14		3B1		3B2		3B3		3SB101	
SAMPLE ID:	BC1-SS13		BC1-SS14		BC3-B1-04-06		BC3-B2-04-06		BC3-B3-04-06		BC3-SB101	
COLLECTION DATE:	12/18/94		12/18/94		11/08/94		11/08/94		11/08/94		11/05/94	
ASSOCIATED QC:	BC-TB3 BC-FB3, BC-FB6		BC-TB3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	-		-		-		-		-		-	
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	760	U	720	U	-		-		-		-	
1,2-Dichlorobenzene	760	U	720	U	-		-		-		-	
1,3-Dichlorobenzene	760	U	720	U	-		-		-		-	
1,4-Dichlorobenzene	760	U	720	U	-		-		-		-	
1-Methylnaphthalene	-		-		-		-		-		-	
2,2'-Oxybis(1-chloropropane)	760	U	720	U	-		-		-		-	
2,4,5-Trichlorophenol	1800	U	1700	U	-		-		-		-	
2,4,6-Trichlorophenol	760	U	720	U	-		-		-		-	
2,4-Dichlorophenol	760	U	720	U	-		-		-		-	
2,4-Dimethylphenol	760	U	720	U	-		-		-		-	
2,4-Dinitrophenol	1800	U	1700	U	-		-		-		-	
2,4-Dinitrotoluene	760	U	720	U	-		-		-		-	
2,6-Dinitrotoluene	760	U	720	U	-		-		-		-	
2-Chloronaphthalene	760	U	720	U	-		-		-		-	
2-Chlorophenol	760	U	720	U	-		-		-		-	
2-Methylnaphthalene	760	U	720	U	-		-		-		-	
2-Methylphenol	760	U	720	U	-		-		-		-	
2-Nitroaniline	1800	U	1700	U	-		-		-		-	
2-Nitrophenol	760	U	720	U	-		-		-		-	
3,3'-Dichlorobenzidine	760	U	720	U	-		-		-		-	
3-Nitroaniline	1800	U	1700	U	-		-		-		-	
4,6-Dinitro-2-methylphenol	1800	U	1700	U	-		-		-		-	
4-Bromophenyl phenyl ether	760	U	720	U	-		-		-		-	
4-Chloro-3-methylphenol	760	U	720	U	-		-		-		-	
4-Chloroaniline	760	U	720	U	-		-		-		-	
4-Chlorophenyl phenyl ether	760	U	720	U	-		-		-		-	
4-Methylphenol	760	U	720	U	-		-		-		-	
4-Nitroaniline	1800	U	1700	U	-		-		-		-	
4-Nitrophenol	1800	U	1700	U	-		-		-		-	
Acenaphthene	760	U	720	U	-		-		-		-	
Acenaphthylene	760	U	720	U	-		-		-		-	
Anthracene	760	U	720	U	-		-		-		-	
Benzo(a)anthracene	760	U	720	U	-		-		-		-	

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1SS13		1SS14		3B1		3B2		3B3		3SB101	
SAMPLE ID:	BC1-SS13		BC1-SS14		BC3-B1-04-06		BC3-B2-04-06		BC3-B3-04-06		BC3-SB101	
COLLECTION DATE:	12/18/94		12/18/94		11/08/94		11/08/94		11/08/94		11/05/94	
ASSOCIATED QC:	BC-TB3 BC-FB3, BC-FB6		BC-TB3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	760	U	720	U	-		-		-		-	
Benzo(b)fluoranthene	760	U	720	U	-		-		-		-	
Benzo(g,h,i)perylene	760	U	720	U	-		-		-		-	
Benzo(k)fluoranthene	760	U	720	U	-		-		-		-	
Butyl benzyl phthalate	760	U	720	U	-		-		-		-	
Carbazole	760	U	720	U	-		-		-		-	
Chrysene	760	U	720	U	-		-		-		-	
Di-n-butyl phthalate	760	U	100	()	-		-		-		-	
Di-n-octyl phthalate	760	U	720	U	-		-		-		-	
Dibenzo(a,h)anthracene	760	U	720	U	-		-		-		-	
Dibenzofuran	760	U	720	U	-		-		-		-	
Diethyl phthalate	760	U	720	U	-		-		-		-	
Dimethyl phthalate	760	U	720	U	-		-		-		-	
Fluoranthene	760	U	720	U	-		-		-		-	
Fluorene	760	U	720	U	-		-		-		-	
Hexachlorobenzene	760	U	720	U	-		-		-		-	
Hexachlorobutadiene	760	U	720	U	-		-		-		-	
Hexachlorocyclopentadiene	760	U	720	U	-		-		-		-	
Hexachloroethane	760	U	720	U	-		-		-		-	
Indeno(1,2,3-cd)pyrene	760	U	720	U	-		-		-		-	
Isophorone	760	U	720	U	-		-		-		-	
N-Nitroso-di-n-propylamine	760	U	720	U	-		-		-		-	
N-Nitrosodiphenylamine(1)	760	U	720	U	-		-		-		-	
Naphthalene	760	U	720	U	-		-		-		-	
Nitrobenzene	760	U	720	U	-		-		-		-	
Pentachlorophenol	1800	U	1700	U	-		-		-		-	
Phenanthrene	760	U	720	U	-		-		-		-	
Phenol	760	U	720	U	-		-		-		-	
Pyrene	760	U	720	U	-		-		-		-	
bis(2-Chloroethoxy)methane	760	U	720	U	-		-		-		-	
bis(2-Chloroethyl)ether	760	U	720	U	-		-		-		-	
bis(2-Ethylhexyl)phthalate	760	U	720	U	-		-		-		-	
Metals by CLP												
Antimony		R		R	0.21	()J	1.20	UJ	0.15	()J	0.14	()J
Arsenic	8.50	J	4.80	J	5.60		5		5		3	

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

	LOCATOR:	1SS13		1SS14		3B1		3B2		3B3		3SB101	
	SAMPLE ID:	BC1-SS13		BC1-SS14		BC3-B1-04-06		BC3-B2-04-06		BC3-B3-04-06		BC3-SB101	
	COLLECTION DATE:	12/18/94		12/18/94		11/08/94		11/08/94		11/08/94		11/05/94	
	ASSOCIATED QC:	BC-TB3 BC-FB3, BC-FB6		BC-TB3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6	
		RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium		35.70		17.70	()	6.40	()	8	()	10.30	()	21.70	
Beryllium		0.40	()	0.16	()	0.10	()	0.08	()	0.13	()	0.13	()
Cadmium		0.07	()J	0.05	U	0.16	()	0.03	()	0.08	()	2.20	
Chromium		16.80	J	6.20		5.20	J	7.10	J	5.60	J	9.90	J
Chromuim, Cr+6		-		-		-		-		-		-	
Copper		12.50		5.70		5.70		5.30		5		20.30	
Lead		8.40		10.30		5.20		5.30		5.90		356	
Mercury		0.10	U	0.10	U	0.20	U	0.20	U	0.20	U	0.10	U
Nickel		13.70		6		5.80		12		4.80		5.20	
Selenium		0.60	J	0.50	UJ	3.40	UJ	3.40	UJ	3.40	UJ	0.36	UJ
Silver		0.60	UJ	0.51	UJ	0.50	U	0.50	U	0.09	()	0.08	()
Thallium		0.31	()	0.32	U	3	U	3	U	3	U	0.32	U
Zinc		24.40	J	13.70	J	11.70		12.70		11.50		62.30	

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	3SB201		3SB201		3SB301		BSB1		BSB1		BSB2	
SAMPLE ID:	BC3-SB201		BC3-SB201		BC3-SB301		BCB-B1-0002		BCB-B1-2527		BCB-B2-0002	
COLLECTION DATE:	11/05/94		11/05/94		11/05/94		07/13/94		07/13/94		07/13/94	
ASSOCIATED QC:	BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6							
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240												
1,1,1-Trichloroethane	-		-		-		11	U	11	U	11	U
1,1,2,2-Tetrachloroethane	-		-		-		11	U	11	U	11	U
1,1,2-Trichloroethane	-		-		-		11	U	11	U	11	U
1,1-Dichloroethane	-		-		-		11	U	11	U	11	U
1,1-Dichloroethene	-		-		-		11	U	11	U	11	U
1,2-Dichloroethane	-		-		-		11	U	11	U	11	U
1,2-Dichloroethene(Total)	-		-		-		11	U	11	U	11	U
1,2-Dichloropropane	-		-		-		11	U	11	U	11	U
2-Butanone	-		-		-		11	U	11	U	11	U
2-Hexanone	-		-		-		11	U	11	U	11	U
4-Methyl-2-pentanone	-		-		-		11	U	11	U	11	U
Acetone	-		-		-		29	B	32	B	37	B
Benzene	-		-		-		11	U	11	U	11	U
Bromodichloromethane	-		-		-		11	U	11	U	11	U
Bromoform	-		-		-		11	U	11	U	11	U
Bromomethane	-		-		-		11	U	11	U	11	U
Carbon disulfide	-		-		-		11	U	11	U	11	U
Carbon tetrachloride	-		-		-		11	U	11	U	11	U
Chlorobenzene	-		-		-		11	U	11	U	11	U
Chloroethane	-		-		-		11	U	11	U	11	U
Chloroform	-		-		-		11	U	11	U	11	U
Chloromethane	-		-		-		11	U	11	U	11	U
Cis-1,2-Dichloroethene	-		-		-		-		-		-	
Cis-1,3-Dichloropropene	-		-		-		11	U	11	U	11	U
Dibromochloromethane	-		-		-		11	U	11	U	11	U
Ethylbenzene	-		-		-		11	U	11	U	11	U
Methylene chloride	-		-		-		10	JB	9	JB	14	B
Styrene	-		-		-		11	U	11	U	11	U
Tetrachloroethene	-		-		-		11	U	11	U	1	J
Toluene	-		-		-		11	U	11	U	11	U
Trans-1,2-Dichloroethene	-		-		-		-		-		-	
Trans-1,3-Dichloropropene	-		-		-		11	U	11	U	11	U
Trichloroethene	-		-		-		11	U	11	U	11	U
Vinyl acetate	-		-		-		-		-		-	
Vinyl chloride	-		-		-		11	U	11	U	11	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	3SB201		3SB201		3SB301		BSB1		BSB1		BSB2	
SAMPLE ID:	BC3-SB201		BC3-SB201		BC3-SB301		BCB-B1-0002		BCB-B1-2527		BCB-B2-0002	
COLLECTION DATE:	11/05/94		11/05/94		11/05/94		07/13/94		07/13/94		07/13/94	
ASSOCIATED QC:	BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6							
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	-		-		-		11	U	11	U	11	U
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	-		-		-		360	U	340	U	350	U
1,2-Dichlorobenzene	-		-		-		360	U	340	U	350	U
1,3-Dichlorobenzene	-		-		-		360	U	340	U	350	U
1,4-Dichlorobenzene	-		-		-		360	U	340	U	350	U
1-Methylnaphthalene	-		-		-		-		-		-	
2,2'-Oxybis(1-chloropropane)	-		-		-		360	U	340	U	350	U
2,4,5-Trichlorophenol	-		-		-		870	U	830	U	840	U
2,4,6-Trichlorophenol	-		-		-		360	U	340	U	350	U
2,4-Dichlorophenol	-		-		-		360	U	340	U	350	U
2,4-Dimethylphenol	-		-		-		360	U	340	U	350	U
2,4-Dinitrophenol	-		-		-		870	U	830	U	840	U
2,4-Dinitrotoluene	-		-		-		360	U	340	U	350	U
2,6-Dinitrotoluene	-		-		-		360	U	340	U	350	U
2-Chloronaphthalene	-		-		-		360	U	340	U	350	U
2-Chlorophenol	-		-		-		360	U	340	U	350	U
2-Methylnaphthalene	-		-		-		360	U	340	U	350	U
2-Methylphenol	-		-		-		360	U	340	U	350	U
2-Nitroaniline	-		-		-		870	U	830	U	840	U
2-Nitrophenol	-		-		-		360	U	340	U	350	U
3,3'-Dichlorobenzidine	-		-		-		360	U	340	U	350	U
3-Nitroaniline	-		-		-		870	U	830	U	840	U
4,6-Dinitro-2-methylphenol	-		-		-		870	U	830	U	840	U
4-Bromophenyl phenyl ether	-		-		-		360	U	340	U	350	U
4-Chloro-3-methylphenol	-		-		-		360	U	340	U	350	U
4-Chloroaniline	-		-		-		360	U	340	U	350	U
4-Chlorophenyl phenyl ether	-		-		-		360	U	340	U	350	U
4-Methylphenol	-		-		-		360	U	340	U	350	U
4-Nitroaniline	-		-		-		870	U	830	U	840	U
4-Nitrophenol	-		-		-		870	U	830	U	840	U
Acenaphthene	-		-		-		360	U	340	U	350	U
Acenaphthylene	-		-		-		360	U	340	U	350	U
Anthracene	-		-		-		82	J	340	U	70	J
Benzo(a)anthracene	-		-		-		680		340	U	310	J

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	3SB201		3SB201		3SB301		BSB1		BSB1		BSB2	
SAMPLE ID:	BC3-SB201		BC3-SB201		BC3-SB301		BCB-B1-0002		BCB-B1-2527		BCB-B2-0002	
COLLECTION DATE:	11/05/94		11/05/94		11/05/94		07/13/94		07/13/94		07/13/94	
ASSOCIATED QC:	BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6							
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	-		-		-		760		340	U	210	J
Benzo(b)fluoranthene	-		-		-		1300	X	340	U	440	X
Benzo(g,h,i)perylene	-		-		-		300	J	340	U	120	J
Benzo(k)fluoranthene	-		-		-		1800	X	340	U	600	X
Butyl benzyl phthalate	-		-		-		360	U	340	U	350	U
Carbazole	-		-		-		65	J	340	U	350	U
Chrysene	-		-		-		850		340	U	260	J
Di-n-butyl phthalate	-		-		-		45	J	45	J	350	U
Di-n-octyl phthalate	-		-		-		360	U	340	U	350	U
Dibenzo(a,h)anthracene	-		-		-		130	J	340	U	30	J
Dibenzofuran	-		-		-		360	U	340	U	350	U
Diethyl phthalate	-		-		-		360	U	340	U	350	U
Dimethyl phthalate	-		-		-		360	U	340	U	350	U
Fluoranthene	-		-		-		1200		340	U	410	
Fluorene	-		-		-		44	J	340	U	350	U
Hexachlorobenzene	-		-		-		360	U	340	U	350	U
Hexachlorobutadiene	-		-		-		360	U	340	U	350	U
Hexachlorocyclopentadiene	-		-		-		360	U	340	U	350	U
Hexachloroethane	-		-		-		360	U	340	U	350	U
Indeno(1,2,3-cd)pyrene	-		-		-		540		340	U	160	J
Isophorone	-		-		-		360	U	340	U	350	U
N-Nitroso-di-n-propylamine	-		-		-		360	U	340	U	350	U
N-Nitrosodiphenylamine(1)	-		-		-		360	U	340	U	350	U
Naphthalene	-		-		-		360	U	340	U	350	U
Nitrobenzene	-		-		-		360	U	340	U	350	U
Pentachlorophenol	-		-		-		870	U	830	U	840	U
Phenanthrene	-		-		-		650		340	U	210	J
Phenol	-		-		-		360	U	340	U	350	U
Pyrene	-		-		-		930		340	U	330	J
bis(2-Chloroethoxy)methane	-		-		-		360	U	340	U	350	U
bis(2-Chloroethyl)ether	-		-		-		360	U	340	U	350	U
bis(2-Ethylhexyl)phthalate	-		-		-		230	J	340	U	160	J
Metals by CLP												
Antimony	0.36	()J	0.36	()J	0.72	()J	3.30	UN	3.20	UN	3.20	UN
Arsenic	3.70		3.70		5.90		7.60	AN	2	N	3	AN

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	3SB201		3SB201		3SB301		BSB1		BSB1		BSB2		
SAMPLE ID:	BC3-SB201		BC3-SB201		BC3-SB301		BCB-B1-0002		BCB-B1-2527		BCB-B2-0002		
COLLECTION DATE:	11/05/94		11/05/94		11/05/94		07/13/94		07/13/94		07/13/94		
ASSOCIATED QC:	BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6		BC-TB1,BC-ER3 BC-FB3, BC-FB6								
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	
Barium	22.50		22.50		102		-		-		-		
Beryllium	0.12	()	0.12	()	0.18	()	0.21	B	0.12	U	0.16	B	
Cadmium	2.20		2.20		8.60		0.37	UN	0.36	UN	2.70	N	
Chromium	27.40	J	27.40	J	61.90	J	9.90	N	3.30	N	58.10	N	
Chromuim, Cr+6	-		-		-		0	U	0	U	0.02		
Copper	19.40		19.40		42.20		12.40		2.50	B	24.60		
Lead	244		244		609		36.30		2.20	A*	200		
Mercury	0.10	U	0.10	U	0.11	U	0.11	U	0.10	U	0.11	U	
Nickel	7.20		7.20		8.60		8.90		4.20	U	4.30	U	
Selenium	0.36	UJ	0.36	UJ	0.37	UJ	0.43	UN	0.41	UWN	0.42	UWN	
Silver	0.09	()	0.09	()	0.17	()	0.44	U	0.42	U	0.43	U	
Thallium	0.32	U	0.32	U	0.33	U	0.39	U	0.38	U	0.38	U	
Zinc	649		649		217		41.20	EN	12.80	EN	112	EN	

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BSB2	BSB3	BSB3	BSB4	BSB4	BSB4
SAMPLE ID:	BCB-B2-2022	BCB-B3-0002	BCB-B3-1011	BCB-B4-0002	BCB-B4-0507	BCB-B4-1012
COLLECTION DATE:	07/13/94	07/13/94	07/13/94	07/13/94	07/13/94	07/13/94
ASSOCIATED QC:						

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Volatiles Compounds by 8240												
1,1,1-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethene(Total)	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloropropane	10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone	10	U	10	U	10	U	10	U	10	U	10	U
2-Hexanone	10	U	10	U	10	U	10	U	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U	10	U	10	U
Acetone	27	B	25	B	25	B	23	B	24	B	21	B
Benzene	10	U	10	U	10	U	10	U	10	U	10	U
Bromodichloromethane	10	U	10	U	10	U	10	U	10	U	10	U
Bromoform	10	U	10	U	10	U	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U	10	U	10	U	10	U
Carbon disulfide	10	U	10	U	10	U	10	U	10	U	10	U
Carbon tetrachloride	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
Chloroethane	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	10	U	10	U	10	U	10	U	10	U	10	U
Chloromethane	10	U	10	U	10	U	10	U	10	U	10	U
Cis-1,2-Dichloroethene	-		-		-		-		-		-	
Cis-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U	10	U	10	U	10	U
Ethylbenzene	10	U	10	U	10	U	10	U	10	U	10	U
Methylene chloride	7	JB	51	B	7	JB	9	JB	0	(B)	9	JB
Styrene	10	U	10	U	10	U	10	U	10	U	10	U
Tetrachloroethene	10	U	10	U	10	U	10	U	10	U	10	U
Toluene	10	U	10	U	10	U	10	U	10	U	10	U
Trans-1,2-Dichloroethene	-		-		-		-		-		-	
Trans-1,3-Dichloropropene	10	U	10	U	10	U	10	U	10	U	10	U
Trichloroethene	10	U	10	U	10	U	10	U	10	U	10	U
Vinyl acetate	-		-		-		-		-		-	
Vinyl chloride	10	U	10	U	10	U	10	U	10	U	10	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BSB2	BSB3	BSB3	BSB4	BSB4	BSB4
SAMPLE ID:	BCB-B2-2022	BCB-B3-0002	BCB-B3-1011	BCB-B4-0002	BCB-B4-0507	BCB-B4-1012
COLLECTION DATE:	07/13/94	07/13/94	07/13/94	07/13/94	07/13/94	07/13/94
ASSOCIATED QC:						

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Xylenes (Total)	10	U	10	U	10	U	10	U	10	U	10	U
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	340	U	340	U	340	U	340	U	340	U	340	U
1,2-Dichlorobenzene	340	U	340	U	340	U	340	U	340	U	340	U
1,3-Dichlorobenzene	340	U	340	U	340	U	340	U	340	U	340	U
1,4-Dichlorobenzene	340	U	340	U	340	U	340	U	340	U	340	U
1-Methylnaphthalene	-		-		-		-		-		-	
2,2'-Oxybis(1-chloropropane)	340	U	340	U	340	U	340	U	340	U	340	U
2,4,5-Trichlorophenol	820	U	830	U	820	U	820	U	810	U	820	U
2,4,6-Trichlorophenol	340	U	340	U	340	U	340	U	340	U	340	U
2,4-Dichlorophenol	340	U	340	U	340	U	340	U	340	U	340	U
2,4-Dimethylphenol	340	U	340	U	340	U	340	U	340	U	340	U
2,4-Dinitrophenol	820	U	830	U	820	U	820	U	810	U	820	U
2,4-Dinitrotoluene	340	U	340	U	340	U	340	U	340	U	340	U
2,6-Dinitrotoluene	340	U	340	U	340	U	340	U	340	U	340	U
2-Chloronaphthalene	340	U	340	U	340	U	340	U	340	U	340	U
2-Chlorophenol	340	U	340	U	340	U	340	U	340	U	340	U
2-Methylnaphthalene	340	U	340	U	340	U	340	U	340	U	340	U
2-Methylphenol	340	U	340	U	340	U	340	U	340	U	340	U
2-Nitroaniline	820	U	830	U	820	U	820	U	810	U	820	U
2-Nitrophenol	340	U	340	U	340	U	340	U	340	U	340	U
3,3'-Dichlorobenzidine	340	U	340	U	340	U	340	U	340	U	340	U
3-Nitroaniline	820	U	830	U	820	U	820	U	810	U	820	U
4,6-Dinitro-2-methylphenol	820	U	830	U	820	U	820	U	810	U	820	U
4-Bromophenyl phenyl ether	340	U	340	U	340	U	340	U	340	U	340	U
4-Chloro-3-methylphenol	340	U	340	U	340	U	340	U	340	U	340	U
4-Chloroaniline	340	U	340	U	340	U	340	U	340	U	340	U
4-Chlorophenyl phenyl ether	340	U	340	U	340	U	340	U	340	U	340	U
4-Methylphenol	340	U	340	U	340	U	340	U	340	U	340	U
4-Nitroaniline	820	U	830	U	820	U	820	U	810	U	820	U
4-Nitrophenol	820	U	830	U	820	U	820	U	810	U	820	U
Acenaphthene	340	U	340	U	340	U	340	U	340	U	340	U
Acenaphthylene	340	U	340	U	340	U	340	U	340	U	340	U
Anthracene	340	U	49	J	340	U	340	U	340	U	340	U
Benzo(a)anthracene	340	U	490		340	U	55	J	340	U	340	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BSB2	BSB3	BSB3	BSB4	BSB4	BSB4
SAMPLE ID:	BCB-B2-2022	BCB-B3-0002	BCB-B3-1011	BCB-B4-0002	BCB-B4-0507	BCB-B4-1012
COLLECTION DATE:	07/13/94	07/13/94	07/13/94	07/13/94	07/13/94	07/13/94
ASSOCIATED QC:						

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Benzo(a)pyrene	340	U	520		340	U	56	J	340	U	340	U
Benzo(b)fluoranthene	340	U	1000	X	340	U	100	XJ	340	U	340	U
Benzo(g,h,i)perylene	340	U	100	J	340	U	340	U	340	U	340	U
Benzo(k)fluoranthene	340	U	1400	X	340	U	140	XJ	340	U	340	U
Butyl benzyl phthalate	340	U	340	U	340	U	340	U	340	U	340	U
Carbazole	340	U	340	U	340	U	340	U	340	U	340	U
Chrysene	340	U	590		340	U	74	J	340	U	340	U
Di-n-butyl phthalate	48	J	340	U	340	U	340	U	340	U	140	J
Di-n-octyl phthalate	340	U	340	U	340	U	340	U	340	U	340	U
Dibenzo(a,h)anthracene	340	U	85	J	340	U	340	U	340	U	340	U
Dibenzofuran	340	U	340	U	340	U	340	U	340	U	340	U
Diethyl phthalate	340	U	340	U	340	U	340	U	340	U	340	U
Dimethyl phthalate	340	U	340	U	340	U	340	U	340	U	340	U
Fluoranthene	340	U	850		340	U	140	J	340	U	340	U
Fluorene	340	U	340	U	340	U	340	U	340	U	340	U
Hexachlorobenzene	340	U	340	U	340	U	340	U	340	U	340	U
Hexachlorobutadiene	340	U	340	U	340	U	340	U	340	U	340	U
Hexachlorocyclopentadiene	340	U	340	U	340	U	340	U	340	U	340	U
Hexachloroethane	340	U	340	U	340	U	340	U	340	U	340	U
Indeno(1,2,3-cd)pyrene	340	U	220	J	340	U	340	U	340	U	340	U
Isophorone	340	U	340	U	340	U	340	U	340	U	340	U
N-Nitroso-di-n-propylamine	340	U	340	U	340	U	340	U	340	U	340	U
N-Nitrosodiphenylamine(1)	340	U	340	U	340	U	340	U	340	U	340	U
Naphthalene	340	U	340	U	340	U	340	U	340	U	340	U
Nitrobenzene	340	U	340	U	340	U	340	U	340	U	340	U
Pentachlorophenol	820	U	830	U	820	U	820	U	810	U	820	U
Phenanthrene	340	U	330	J	340	U	80	J	340	U	340	U
Phenol	340	U	340	U	340	U	340	U	340	U	340	U
Pyrene	340	U	650		340	U	100	J	340	U	340	U
bis(2-Chloroethoxy)methane	340	U	340	U	340	U	340	U	340	U	340	U
bis(2-Chloroethyl)ether	340	U	340	U	340	U	340	U	340	U	340	U
bis(2-Ethylhexyl)phthalate	340		340	U	340	U	340	U	340	U	375	J
Metals by CLP												
Antimony	3.50	N	3.10	UN	4.70	N	3.20	N	3.80	L	3.10	U
Arsenic	5.30	N	8.70	N	8.50	N	11.40	N	12.70	L	1.90	N

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BSB2	BSB3	BSB3	BSB4	BSB4	BSB4
SAMPLE ID:	BCB-B2-2022	BCB-B3-0002	BCB-B3-1011	BCB-B4-0002	BCB-B4-0507	BCB-B4-1012
COLLECTION DATE:	07/13/94	07/13/94	07/13/94	07/13/94	07/13/94	07/13/94
ASSOCIATED QC:						

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Barium	-		-		-		-		-		-	
Beryllium	0.12	B	0.22	B	0.22	B	0.11	U	0.13	()	0.11	U
Cadmium	0.35	UN	0.35	U	0.35	UN	0.35	UN	0.35	UL	0.35	U
Chromium	8.50	N	6.80	N	8.20	N	7.30	N	8	L	5.45	N*
Chromuim, Cr+6	0	U	0	U	0	U	0	U	0	U	0	U
Copper	6.40		6.10		6.80		7.30		4.40		3.80	
Lead	3.40	*	13.70	*	6.50	*	16.20	*	4.50		1.95	N*
Mercury	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	
Nickel	15.10		9		10.90		10.30		6.90		12.40	*
Selenium	0.40	UWN	0.41	UWN	0.40	UWN	0.40	UWN	0.40	UL	0.40	U
Silver	0.41	U	0.42	U	0.41	U	0.41	U	0.41	U	0.41	U
Thallium	0.37	UW	0.38	U	0.37	UW	0.37	U	0.37	U	0.37	U
Zinc	17.80	EN	25	EN	18.40	EN	36.50	EN	29.90	L	11.25	EN

Appendix F: Complete Analytical Database

110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCB4
SAMPLE ID:	BCB-B4-1012D
COLLECTION DATE:	07/13/94
ASSOCIATED QC:	

	RESULT	QUAL
Volatiles Compounds by 8240		
1,1,1-Trichloroethane	11	U
1,1,2,2-Tetrachloroethane	11	U
1,1,2-Trichloroethane	11	U
1,1-Dichloroethane	11	U
1,1-Dichloroethene	11	U
1,2-Dichloroethane	11	U
1,2-Dichloroethene(Total)	11	U
1,2-Dichloropropane	11	U
2-Butanone	11	U
2-Hexanone	11	U
4-Methyl-2-pentanone	11	U
Acetone	44	B
Benzene	11	U
Bromodichloromethane	11	U
Bromoform	11	U
Bromomethane	11	U
Carbon disulfide	11	U
Carbon tetrachloride	11	U
Chlorobenzene	11	U
Chloroethane	11	U
Chloroform	11	U
Chloromethane	11	U
Cis-1,2-Dichloroethene	-	
Cis-1,3-Dichloropropene	11	U
Dibromochloromethane	11	U
Ethylbenzene	11	U
Methylene chloride	10	JB
Styrene	11	U
Tetrachloroethene	11	U
Toluene	11	U
Trans-1,2-Dichloroethene	-	
Trans-1,3-Dichloropropene	11	U
Trichloroethene	11	U
Vinyl acetate	-	
Vinyl chloride	11	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR: BCB4
SAMPLE ID: BCB-B4-1012D
COLLECTION DATE: 07/13/94
ASSOCIATED QC:

	RESULT	QUAL
Xylenes (Total)	11	U
Semivolatiles Compounds by CLP		
1,2,4-Trichlorobenzene	380	U
1,2-Dichlorobenzene	380	U
1,3-Dichlorobenzene	380	U
1,4-Dichlorobenzene	380	U
1-Methylnaphthalene	-	
2,2'-Oxybis(1-chloropropane)	380	U
2,4,5-Trichlorophenol	910	U
2,4,6-Trichlorophenol	380	U
2,4-Dichlorophenol	380	U
2,4-Dimethylphenol	380	U
2,4-Dinitrophenol	910	U
2,4-Dinitrotoluene	380	U
2,6-Dinitrotoluene	380	U
2-Chloronaphthalene	380	U
2-Chlorophenol	380	U
2-Methylnaphthalene	380	U
2-Methylphenol	380	U
2-Nitroaniline	910	U
2-Nitrophenol	380	U
3,3'-Dichlorobenzidine	380	U
3-Nitroaniline	910	U
4,6-Dinitro-2-methylphenol	910	U
4-Bromophenyl phenyl ether	380	U
4-Chloro-3-methylphenol	380	U
4-Chloroaniline	380	U
4-Chlorophenyl phenyl ether	380	U
4-Methylphenol	380	U
4-Nitroaniline	910	U
4-Nitrophenol	910	U
Acenaphthene	380	U
Acenaphthylene	380	U
Anthracene	380	U
Benzo(a)anthracene	380	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR: BCB4
SAMPLE ID: BCB-B4-1012D
COLLECTION DATE: 07/13/94
ASSOCIATED QC:

	RESULT	QUAL
Benzo(a)pyrene	380	U
Benzo(b)fluoranthene	380	U
Benzo(g,h,i)perylene	380	U
Benzo(k)fluoranthene	380	U
Butyl benzyl phthalate	380	U
Carbazole	380	U
Chrysene	380	U
Di-n-butyl phthalate	140	J
Di-n-octyl phthalate	380	U
Dibenzo(a,h)anthracene	380	U
Dibenzofuran	380	U
Diethyl phthalate	380	U
Dimethyl phthalate	380	U
Fluoranthene	380	U
Fluorene	380	U
Hexachlorobenzene	380	U
Hexachlorobutadiene	380	U
Hexachlorocyclopentadiene	380	U
Hexachloroethane	380	U
Indeno(1,2,3-cd)pyrene	380	U
Isophorone	380	U
N-Nitroso-di-n-propylamine	380	U
N-Nitrosodiphenylamine(1)	380	U
Naphthalene	380	U
Nitrobenzene	380	U
Pentachlorophenol	910	U
Phenanthrene	380	U
Phenol	380	U
Pyrene	380	U
bis(2-Chloroethoxy)methane	380	U
bis(2-Chloroethyl)ether	380	U
bis(2-Ethylhexyl)phthalate	600	
Metals by CLP		
Antimony	3.50	U*
Arsenic	1.70	N

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR: BCB4
SAMPLE ID: BCB-B4-1012D
COLLECTION DATE: 07/13/94
ASSOCIATED QC:

	RESULT	QUAL
Barium	-	
Beryllium	0.13	U
Cadmium	0.39	U
Chromium	4.70	*
Chromuim, Cr+6	0	U
Copper	2.80	B
Lead	2.10	N
Mercury	0.15	
Nickel	13.50	*
Selenium	0.45	UWN
Silver	0.46	U
Thallium	0.41	U
Zinc	9.10	E

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW1		BCMW2		BCMW3		BCMW4		BCMW4		BCMW5	
SAMPLE ID:	BC-MW1-GW4		BC-MW2-GW4		BC-MW3-GW4		BC-MW4-GW4		BC-MW4-GW5		BC-MW5-GW4	
COLLECTION DATE:	05/19/94		05/19/94		05/20/94		05/23/94		12/17/94		05/23/94	
ASSOCIATED QC:	BC-TB1,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB1,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-ER1		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB2, BC-FB1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Halogenated Volatiles Compounds by 8010												
1,1,1,2-Tetrachloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1,1-Trichloroethane	0.35	U	0.03		0.07		0.52		0.47	B	0.20	B
1,1,2,2-Tetrachloroethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
1,1,2-Trichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,1-Dichloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.19	
1,1-Dichloroethene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2,3-Trichloropropane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dibromoethane (Ethylene di	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dichlorobenzene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,2-Dichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.28	
1,2-Dichloropropane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
2-Chloroethyl vinyl ether	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
2-Chlorotoluene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
4-Chlorotoluene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Bromobenzene	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U
Bromochloromethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Bromodichloromethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Bromoform	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U
Carbon tetrachloride	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chlorobenzene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	0.35	U	0.07	B	0.05	B	0.35	U	0.01	()B	0.35	U
Chloromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cis-1,3-Dichloropropene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromochloromethane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromomethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Methylene chloride	0.12	B	0.38	B	0.30	B	0.24	B	0.03	()B	0.26	B
Tetrachloroethene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Trans-1,2-Dichloroethene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Trans-1,3-Dichloropropene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Trichloroethene	0.30	U	0.30	U	0.70		2.10		2.10	B	1.90	
Vinyl chloride	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW1		BCMW2		BCMW3		BCMW4		BCMW4		BCMW5	
SAMPLE ID:	BC-MW1-GW4		BC-MW2-GW4		BC-MW3-GW4		BC-MW4-GW4		BC-MW4-GW5		BC-MW5-GW4	
COLLECTION DATE:	05/19/94		05/19/94		05/20/94		05/23/94		12/17/94		05/23/94	
ASSOCIATED QC:	BC-TB1,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB1,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-ER1		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB2, BC-FB1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Aromatic Volatiles Compounds by 8020												
1,2-Dichlorobenzene	0.15	U	0.15	U	0.15	U	0.06	B	0.15	U	0.15	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.04	B	0.20	U	0.20	U
1,4-Dichlorobenzene	0.15	U	0.15	U	0.15	U	0.05	B	0.15	U	0.15	U
Benzene	0.35	U	0.35	U	0.35	U	0.06	B	0.35	U	0.06	B
Chlorobenzene	0.25	U	0.25	U	0.25	U	0.04		0.25	U	0.25	U
Ethylbenzene	0.02		0.20	U	0.20	U	0.20	U	0.20	U	0.06	B
Methyl-tert-butyl ether	0.10		5	U	5	U	0.22		5	U	5	U
Styrene	0.25	U	0.25	U	0.25	U	0.04	B	0.25	U	0.25	U
Toluene	0.25	U	0.25	U	0.25	U	0.11	B	0.25	U	0.03	B
m+p-Xylene	-		0.50	U	0.50	U	-		0.50	U	-	
m-Xylene	0.02	B	-		-		0.05	B	-		0.04	B
o-Xylene	0.20	U	0.20	U	0.20	U	0.05	B	0.20	U	0.20	U
p-Xylene	0.01	B	-		-		0.25	U	-		0.25	U
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	5	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	-		10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	-		10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	-		10	U
2,2'-Oxybis(1-chloropropane)	-		-		-		-		5	U	-	
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	20	U	20	U	20	U	20	U	5	U	20	U
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	5	U	10	U
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	5	U	10	U
2,4-Dinitrophenol	40	U	40	U	40	U	40	U	20	U	40	U
2,4-Dinitrotoluene	10	U	10	U	10	U	10	U	5	U	10	U
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	5	U	10	U
2-Chloronaphthalene	10	U	10	U	10	U	10	U	5	U	10	U
2-Chlorophenol	10	U	10	U	10	U	10	U	5	U	10	U
2-Methylnaphthalene	10	U	10	U	10	U	10	U	5	U	10	U
2-Methylphenol	10	U	10	U	10	U	10	U	5	U	10	U
2-Nitroaniline	10	U	10	U	10	U	10	U	20	U	10	U
2-Nitrophenol	10	U	10	U	10	U	10	U	5	U	10	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW1		BCMW2		BCMW3		BCMW4		BCMW4		BCMW5	
SAMPLE ID:	BC-MW1-GW4		BC-MW2-GW4		BC-MW3-GW4		BC-MW4-GW4		BC-MW4-GW5		BC-MW5-GW4	
COLLECTION DATE:	05/19/94		05/19/94		05/20/94		05/23/94		12/17/94		05/23/94	
ASSOCIATED QC:	BC-TB1,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB1,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-ER1		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB2, BC-FB1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
3,3'-Dichlorobenzidine	10	U	10	U	10	U	10	U	5	U	10	U
3-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U
4,6-Dinitro-2-methylphenol	30	U	30	U	30	U	30	U	20	U	30	U
4-Bromophenyl phenyl ether	10	U	10	U	10	U	10	U	5	U	10	U
4-Chloro-3-methylphenol	10	U	10	U	10	U	10	U	5	U	10	U
4-Chloroaniline	10	U	10	U	10	U	10	U	5	U	10	U
4-Chlorophenyl phenyl ether	10	U	10	U	10	U	10	U	5	U	10	U
4-Methylphenol	10	U	10	U	10	U	10	U	5	U	10	U
4-Nitroaniline	10	U	10	U	10	U	10	U	20	U	10	U
4-Nitrophenol	10	U	10	U	10	U	10	U	20	U	10	U
Acenaphthene	10	U	10	U	10	U	10	U	5	U	10	U
Acenaphthylene	10	U	10	U	10	U	10	U	5	U	10	U
Anthracene	10	U	10	U	10	U	10	U	5	U	10	U
Benzo(a)anthracene	10	U	10	U	10	U	10	U	5	U	10	U
Benzo(a)pyrene	10	U	10	U	10	U	10	U	5	U	10	U
Benzo(b)fluoranthene	10	U	10	U	10	U	10	U	5	U	10	U
Benzo(g,h,i)perylene	10	U	10	U	10	U	10	U	5	U	10	U
Benzo(k)fluoranthene	10	U	10	U	10	U	10	U	5	U	10	U
Benzoic acid	100	U	100	U	100	U	100	U	-		100	U
Benzyl alcohol	10	U	10	U	10	U	10	U	-		10	U
Butyl benzyl phthalate	10	U	10	U	10	U	10	U	5	U	10	U
Chrysene	10	U	10	U	10	U	10	U	5	U	10	U
Di-n-butyl phthalate	2	B	2	B	2	B	2	B	5	U	2	B
Di-n-octyl phthalate	10	U	10	U	10	U	10	U	5	U	10	U
Dibenzo(a,h)anthracene	10	U	10	U	10	U	10	U	5	U	10	U
Dibenzofuran	10	U	10	U	10	U	10	U	5	U	10	U
Diethyl phthalate	10	U	10	U	10	U	10	U	5	U	10	U
Dimethyl phthalate	10	U	10	U	10	U	10	U	5	U	10	U
Fluoranthene	10	U	10	U	10	U	10	U	5	U	10	U
Fluorene	10	U	10	U	10	U	10	U	5	U	10	U
Hexachlorobenzene	10	U	10	U	10	U	10	U	5	U	10	U
Hexachlorobutadiene	10	U	10	U	10	U	10	U	5	U	10	U
Hexachlorocyclopentadiene	10	U	10	U	10	U	10	U	5	U	10	U
Hexachloroethane	10	U	10	U	10	U	10	U	5	U	10	U
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	U	10	U	5	U	10	U
Isophorone	10	U	10	U	10	U	10	U	5	U	10	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW1		BCMW2		BCMW3		BCMW4		BCMW4		BCMW5	
SAMPLE ID:	BC-MW1-GW4		BC-MW2-GW4		BC-MW3-GW4		BC-MW4-GW4		BC-MW4-GW5		BC-MW5-GW4	
COLLECTION DATE:	05/19/94		05/19/94		05/20/94		05/23/94		12/17/94		05/23/94	
ASSOCIATED QC:	BC-TB1,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB1,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-ER1		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB2, BC-FB1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
N-Nitroso-di-n-propylamine	10	U	10	U	10	U	10	U	5	U	10	U
N-Nitrosodiphenylamine(1)	10	U	10	U	10	U	10	U	5	U	10	U
Naphthalene	10	U	10	U	10	U	10	U	5	U	10	U
Nitrobenzene	10	U	10	U	10	U	10	U	5	U	10	U
Pentachlorophenol	20	U	20	U	20	U	20	U	20	U	20	U
Phenanthrene	10	U	10	U	10	U	10	U	5	U	10	U
Phenol	10	U	10	U	10	U	10	U	5	U	10	U
Pyrene	10	U	10	U	10	U	10	U	5	U	10	U
bis(2-Chloroethoxy)methane	10	U	10	U	10	U	10	U	5	U	10	U
bis(2-Chloroethyl)ether	20	U	20	U	20	U	20	U	5	U	20	U
bis(2-Chloroisopropyl)ether	10	U	10	U	10	U	10	U	-		10	U
bis(2-Ethylhexyl)phthalate	10	U	1	B	4		4	B	5	U	8	B
Metals by CLP												
Aluminum	62.20	U	62.20	U	62.20	U	62.20	U	79.90	()	122	()
Antimony	55.30	U	55.30	U	55.30	U	55.30	U	1.90	U	33.30	U
Arsenic	2.60	UJ	2.60	U	2.60	U	2.60	U	2.20	U	9.30	()
Barium	24.10	()	28.80	()	45.20	()	52.40	()	46.60	()	93.70	()B
Beryllium	0.30	U	0.30	U	0.30	U	0.30	U	0.10	U	0.70	U
Cadmium	4.50	UJ	4.50	UJ	4.50	UJ	4.50	UJ	0.50	U	4.70	U
Calcium	97400		78600		88800		109000		104000		107000	
Chromium	6	U	6	U	6	U	6	U	2.20	U	6.60	U
Cobalt	9	U	9	U	9	U	9	U	0.50	U	6.30	U
Copper	1.50	U	2.40	()B	4.40	()B	5.10	()B	4.70	()	10.60	U
Iron	32.80	()B	24.40	U	24.40	U	24.40	U	27.20	U	364	J
Lead	1.80	U	1.80	U	1.80	UJ	1.80	UJ	1.60	U	1.80	UJ
Magnesium	19900		18600		20900		25300		24000		23700	
Manganese	1.20	U	1.20	U	1.20	U	2.40	()B	5.70	()	42.40	B
Mercury	0.20	U	0.20	U	0.20	U	0.20	U	0.20	UJ	0.20	U
Nickel	16.60	U	16.60	U	16.60	U	16.60	U	1.50	U	38.80	U
Potassium	714	U	931	()	3990	()	5350		4770	()	2309.30	U
Selenium	3.40	UJ	3.40	UJ	3.40	UJ	3.40	U	4.40	U	3.40	U
Silver	3.40	U	3.40	U	3.40	U	3.40	U	4.50	U	5.90	U
Sodium	3420	()	3590	()	29600		66500		26300		67100	J
Thallium	2.60	U	2.60	UJ	2.60	UJ	3.30	()B	2.70	UJ	2.60	UJ
Vanadium	3.50	U	3.50	U	3.50	U	3.50	U	0.50	U	5.30	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW1		BCMW2		BCMW3		BCMW4		BCMW4		BCMW5	
SAMPLE ID:	BC-MW1-GW4		BC-MW2-GW4		BC-MW3-GW4		BC-MW4-GW4		BC-MW4-GW5		BC-MW5-GW4	
COLLECTION DATE:	05/19/94		05/19/94		05/20/94		05/23/94		12/17/94		05/23/94	
ASSOCIATED QC:	BC-TB1,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB1,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-ER1		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB2, BC-FB1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Zinc	4.70	()B	6.50	()B	12	()B	11.20	()B	2.50	()	11.40	()
Water Parameters by EPA 600/4-79-020												
Chloride	10	B	7.23	B	71.40		152		-		159	
Sulfate	32.50	B	16.70	B	22.40		33.90		-		28.80	B
Dissolved Solids	354		301		437		636		-		608	

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW6		BCMW7		BCMW8		BCMW9		BCMW9		BCMW11	
SAMPLE ID:	BC-MW6-GW4		BC-MW7-GW4		BC-MW8-GW4		BC-MW9-GW4		BC-MW9-GW4D		BC-MW11-GW4	
COLLECTION DATE:	05/22/94		05/24/94		05/24/94		05/23/94		05/23/94		05/23/94	
ASSOCIATED QC:	BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB4,BC-ER1 BC-FB1, BC-FB2, BC-FB3	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Halogenated Volatiles Compounds by 8010												
1,1,1,2-Tetrachloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1,1-Trichloroethane	0.35	U	0.35	U	0.35	U	0.09	B	0.35	U	0.35	U
1,1,2,2-Tetrachloroethane	0.35		0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
1,1,2-Trichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,1-Dichloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1-Dichloroethene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2,3-Trichloropropane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dibromoethane (Ethylene di	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dichlorobenzene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,2-Dichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,2-Dichloropropane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
2-Chloroethyl vinyl ether	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
2-Chlorotoluene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
4-Chlorotoluene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Bromobenzene	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U
Bromochloromethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Bromodichloromethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Bromoform	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U
Carbon tetrachloride	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chlorobenzene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	0.35	U	0.35	U	0.35	U	0.09	B	0.35	U	0.35	U
Chloromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cis-1,3-Dichloropropene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromochloromethane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromomethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Methylene chloride	0.51	B	0.38	B	0.34	B	0.54	B	0.39	B	0.42	B
Tetrachloroethene	0.11	B	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Trans-1,2-Dichloroethene	0.30	U	0.15		0.30	U	0.30	U	0.30	U	0.30	U
Trans-1,3-Dichloropropene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Trichloroethene	0.50		3.60		0.30	U	0.30	U	0.30	U	0.30	U
Vinyl chloride	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW6		BCMW7		BCMW8		BCMW9		BCMW9		BCMW11	
SAMPLE ID:	BC-MW6-GW4		BC-MW7-GW4		BC-MW8-GW4		BC-MW9-GW4		BC-MW9-GW4D		BC-MW11-GW4	
COLLECTION DATE:	05/22/94		05/24/94		05/24/94		05/23/94		05/23/94		05/23/94	
ASSOCIATED QC:	BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB4,BC-ER1 BC-FB1, BC-FB2, BC-FB3	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Aromatic Volatiles Compounds by 8020												
1,2-Dichlorobenzene	0.15	U	0.15	U	0.03	B	0.15	U	0.05	B	0.15	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.12	B	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.15	U	0.15	U	0.05	B	0.15	U	0.15	U	0.04	B
Benzene	0.35	U	0.03	B	0.35	U	0.05	B	0.35	U	0.35	U
Chlorobenzene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Ethylbenzene	0.20	U	0.20	U	0.08	B	0.06	B	0.20	U	0.20	U
Methyl-tert-butyl ether	5	U	5	U	5	U	5	U	5	U	5	U
Styrene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Toluene	0.09	B	0.10	B	0.25	U	0.45	U	0.25	U	0.13	B
m+p-Xylene	0.50	U	0.50	U	-		-		0.50	U	0.50	U
m-Xylene	-		-		0.12	B	0.07	B	-		-	
o-Xylene	0.20	U	0.20	U	0.06	B	0.20	U	0.20	U	0.20	U
p-Xylene	-		-		0.06	B	0.03	B	-		-	
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
2,2'-Oxybis(1-chloropropane)	-		-		-		-		-		-	
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U	20	U		R
2,4,6-Trichlorophenol	20	U	20	U	20	U	20	U	20	U		R
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	10	U		R
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	10	U		R
2,4-Dinitrophenol	40	U	40	U	40	U	40	U	40	U	40	U
2,4-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	10	U
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	10	U
2-Chloronaphthalene	10	U	10	U	10	U	10	U	10	U	10	U
2-Chlorophenol	10	U	10	U	10	U	10	U	10	U		R
2-Methylnaphthalene	10	U	10	U	10	U	10	U	10	U	10	U
2-Methylphenol	10	U	10	U	10	U	10	U	10	U		R
2-Nitroaniline	10	U	10	U	10	U	10	U	10	U	10	U
2-Nitrophenol	10	U	10	U	10	U	10	U	10	U		R

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW6		BCMW7		BCMW8		BCMW9		BCMW9		BCMW11	
SAMPLE ID:	BC-MW6-GW4		BC-MW7-GW4		BC-MW8-GW4		BC-MW9-GW4		BC-MW9-GW4D		BC-MW11-GW4	
COLLECTION DATE:	05/22/94		05/24/94		05/24/94		05/23/94		05/23/94		05/23/94	
ASSOCIATED QC:	BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB4,BC-ER1 BC-FB1, BC-FB2, BC-FB3	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
3,3'-Dichlorobenzidine	10	U	10	U	10	U	10	U	10	U	10	U
3-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U
4,6-Dinitro-2-methylphenol	30	U	30	U	30	U	30	U	30	U		R
4-Bromophenyl phenyl ether	10	U	10	U	10	U	10	U	10	U	10	U
4-Chloro-3-methylphenol	10	U	10	U	10	U	10	U	10	U		R
4-Chloroaniline	10	U	10	U	10	U	10	U	10	U	10	U
4-Chlorophenyl phenyl ether	10	U	10	U	10	U	10	U	10	U	10	U
4-Methylphenol	10	U	10	U	10	U	10	U	10	U		R
4-Nitroaniline	10	U	10	U	10	U	10	U	10	U	10	U
4-Nitrophenol	10	U	10	U	10	U	10	U	10	U		R
Acenaphthene	10	U	10	U	10	U	10	U	10	U	10	U
Acenaphthylene	10	U	10	U	10	U	10	U	10	U	10	U
Anthracene	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)anthracene	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(a)pyrene	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(b)fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(g,h,i)perylene	10	U	10	U	10	U	10	U	10	U	10	U
Benzo(k)fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U
Benzoic acid	100	U	100	U	100	U	4	J	3	J	100	U
Benzyl alcohol	10	U	10	U	10	U	10	U	10	U	10	U
Butyl benzyl phthalate	10	U	10	U	10	U	10	U	10	U	10	U
Chrysene	10	U	10	U	10	U	10	U	10	U	10	U
Di-n-butyl phthalate	2	B	10	U	10	U	2	B	2	B	1	J
Di-n-octyl phthalate	10	U	10	U	10	U	10	U	10	U	10	U
Dibenzo(a,h)anthracene	10	U	10	U	10	U	10	U	10	U	10	U
Dibenzofuran	10	U	10	U	10	U	10	U	10	U	10	U
Diethyl phthalate	10	U	10	U	10	U	10	U	10	U	10	U
Dimethyl phthalate	10	U	10	U	10	U	10	U	10	U	10	U
Fluoranthene	10	U	10	U	10	U	10	U	10	U	10	U
Fluorene	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorobenzene	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorobutadiene	10	U	10	U	10	U	10	U	10	U	10	U
Hexachlorocyclopentadiene	10	U	10	U	10	U	10	U	10	U	10	U
Hexachloroethane	10	U	10	U	10	U	10	U	10	U	10	U
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	U	10	U	10	U	10	U
Isophorone	10	U	10	U	10	U	10	U	10	U	10	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW6		BCMW7		BCMW8		BCMW9		BCMW9		BCMW11	
SAMPLE ID:	BC-MW6-GW4		BC-MW7-GW4		BC-MW8-GW4		BC-MW9-GW4		BC-MW9-GW4D		BC-MW11-GW4	
COLLECTION DATE:	05/22/94		05/24/94		05/24/94		05/23/94		05/23/94		05/23/94	
ASSOCIATED QC:	BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB4,BC-ER1 BC-FB1, BC-FB2, BC-FB3	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
N-Nitroso-di-n-propylamine	10	U	10	U	10	U	10	U	10	U	10	U
N-Nitrosodiphenylamine(1)	10	U	10	U	10	U	10	U	10	U	10	U
Naphthalene	10	U	10	U	10	U	10	U	10	U	10	U
Nitrobenzene	10	U	10	U	10	U	10	U	10	U	10	U
Pentachlorophenol	20	U	20	U	20	U	20	U	20	U		R
Phenanthrene	10	U	10	U	10	U	10	U	10	U	10	U
Phenol	10	U	10	U	10	U	10	U	10	U		R
Pyrene	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Chloroethoxy)methane	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Chloroethyl)ether	20	U	20	U	20	U	20	U	20	U	20	U
bis(2-Chloroisopropyl)ether	10	U	10	U	10	U	10	U	10	U	10	U
bis(2-Ethylhexyl)phthalate	3	B	1		2		1	B	3	B	2	J
Metals by CLP												
Aluminum	139	()	137	()	156	()	188	()	62.20	U	62.20	U
Antimony	33.30	U	33.30	U	33.30	U	33.30	U	55.30	U	55.30	U
Arsenic	3.40	()	2.60	U	2.60	U	2.60	U	2.60	U	2.60	U
Barium	34.20	()B	27.60	()B	24.90	()B	26.30	()B	22.40	()	40.50	()
Beryllium	0.70	U	0.70	U	0.70	U	0.70	U	0.36	()B	0.30	U
Cadmium	4.70	U	4.70	U	4.70	U	4.70	U	4.50	UJ	4.50	UJ
Calcium	80700		72900		78000		68200		67600		47300	
Chromium	6.60	U	6.60	U	6.60	U	6.60	U	6	U	6	U
Cobalt	6.30	U	6.30	U	6.30	U	6.30	U	9	U	9	U
Copper	10.60	U	10.60	U	10.60	U	10.60	U	1.50	U	1.70	()B
Iron	45.30	()J	94.50	()J	191	J	634	J	546		24.40	U
Lead	1.80	UJ	1.80	UJ	1.80	UJ	2	()J	1.80	U	5	
Magnesium	20500		16900		19500		16600		16000		8440	
Manganese	17.50	B	6.30	U	6.30	U	167		164		2770	
Mercury	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	38.80	U	38.80	U	38.80	U	38.80	U	16.60	U	16.60	U
Potassium	2309.30	U	2309.30	U	2309.30	U	2309.30	U	714	U	1840	()
Selenium	3.40	U	3.40	U	3.40	U	3.40	U	3.40	UJ	3.40	U
Silver	5.90	U	5.90	U	5.90	U	5.90	U	3.40	U	3.40	U
Sodium	26000	J	2750	()	4650	()	3100	()	2620	()	2040	()
Thallium	2.60	UJ	2.60	UJ	2.60	UJ	2.60	UJ	5.60	()B	2.80	()B
Vanadium	5.30	U	5.30	U	5.30	U	5.30	U	3.50	U	3.50	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW6		BCMW7		BCMW8		BCMW9		BCMW9		BCMW11	
SAMPLE ID:	BC-MW6-GW4		BC-MW7-GW4		BC-MW8-GW4		BC-MW9-GW4		BC-MW9-GW4D		BC-MW11-GW4	
COLLECTION DATE:	05/22/94		05/24/94		05/24/94		05/23/94		05/23/94		05/23/94	
ASSOCIATED QC:	BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB5,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB4,BC-ER1 BC-FB1, BC-FB2, BC-FB3	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Zinc	5.70	()	8	()	20.60		10.30	()	15.80	()B	16.80	()B
Water Parameters by EPA 600/4-79-020												
Chloride	58.10		5.86	B	9.16	B	-		3.31	B	0	
Sulfate	8.56		22.50	B	29.80	B	-		15.20	B	8.19	B
Dissolved Solids	387		295		326		-		263		172	

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW12		BCMW13		BCMW13		BCMW14		BCMW15		BCMW16	
SAMPLE ID:	BC-MW12-GW4		BC-MW13-GW4		BC-MW13-GW4D		BC-MW14-GW4		BC-MW15-GW4		BC-MW16-GW5	
COLLECTION DATE:	05/23/94		05/20/94		05/20/94		05/22/94		05/24/94		12/18/94	
ASSOCIATED QC:	BC-TB4,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-ER1		BC-ER1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB2 BC-FB1	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Halogenated Volatiles Compounds by 8010												
1,1,1,2-Tetrachloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1,1-Trichloroethane	0.35	U	0.35	U	0.35	U	-		0.35	U	0.25	()
1,1,2,2-Tetrachloroethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
1,1,2-Trichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,1-Dichloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1-Dichloroethene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2,3-Trichloropropane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dibromoethane (Ethylene di	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dichlorobenzene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,2-Dichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,2-Dichloropropane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
2-Chloroethyl vinyl ether	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
2-Chlorotoluene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
4-Chlorotoluene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Bromobenzene	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U
Bromochloromethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Bromodichloromethane	0.40	U	0.40	U	0.40	U	0.40	U	0.08	B	0.40	U
Bromoform	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U
Carbon tetrachloride	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chlorobenzene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	0.35	U	0.06		0.35	U	0.35	U	0.05	B	0.35	U
Chloromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cis-1,3-Dichloropropene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromochloromethane	0.30	U	0.30	U	0.30	U	0.30	U	0.12	B	0.30	U
Dibromomethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Methylene chloride	0.31	B	0.34	B	0.30	B	0.59	B	0.61	B	0.01	()
Tetrachloroethene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	4.60	
Trans-1,2-Dichloroethene	0.30	U	0.30	U	0.30	U	0.30	U	0.04		0.30	U
Trans-1,3-Dichloropropene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Trichloroethene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	3.20	
Vinyl chloride	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW12		BCMW13		BCMW13		BCMW14		BCMW15		BCMW16	
SAMPLE ID:	BC-MW12-GW4		BC-MW13-GW4		BC-MW13-GW4D		BC-MW14-GW4		BC-MW15-GW4		BC-MW16-GW5	
COLLECTION DATE:	05/23/94		05/20/94		05/20/94		05/22/94		05/24/94		12/18/94	
ASSOCIATED QC:	BC-TB4,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-ER1		BC-ER1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB2 BC-FB1	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Aromatic Volatiles Compounds by 8020												
1,2-Dichlorobenzene	0.15	U	0.03		0.15	U	0.06	B	0.15	U	0.15	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.05	B	0.20	U	0.20	U
1,4-Dichlorobenzene	0.15	U	0.03	B	0.15	U	0.07	B	0.15	U	0.15	U
Benzene	0.35	U	0.35	U	0.35	U	0.08	B	0.04		0.35	U
Chlorobenzene	0.25	U	0.25	U	0.25	U	0.06		0.25	U	0.25	U
Ethylbenzene	0.20	U	0.20	U	0.20	U	0.06	B	0.20	U	0.20	U
Methyl-tert-butyl ether	5	U	5	U	5	U	0.08		5	U	5	U
Styrene	0.25	U	0.25	U	0.25	U	0.06	B	0.25	U	0.25	U
Toluene	0.24	B	0.02	B	0.25	U	0.14	B	0.11	B	0.25	U
m + p-Xylene	0.50	U	0.50	U	0.50	U	-		0.50	U	0.50	U
m-Xylene	-		-		-		0.07	B	-		-	
o-Xylene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
p-Xylene	-		-		-		0.05	B	-		-	
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	10	U	10	U	10	U	10	U	10	U	5	U
1,2-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	-	
1,3-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	-	
1,4-Dichlorobenzene	10	U	10	U	10	U	10	U	10	U	-	
2,2'-Oxybis(1-chloropropane)	-		-		-		-		-		5	U
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	5	U
2,4-Dichlorophenol	10	U	10	U	10	U	10	U	10	U	5	U
2,4-Dimethylphenol	10	U	10	U	10	U	10	U	10	U	5	U
2,4-Dinitrophenol	40	U	40	U	40	U	40	U	40	U	20	U
2,4-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	5	U
2,6-Dinitrotoluene	10	U	10	U	10	U	10	U	10	U	5	U
2-Chloronaphthalene	10	U	10	U	10	U	10	U	10	U	5	U
2-Chlorophenol	10	U	10	U	10	U	10	U	10	U	5	U
2-Methylnaphthalene	10	U	10	U	10	U	10	U	10	U	5	U
2-Methylphenol	10	U	10	U	10	U	10	U	10	U	5	U
2-Nitroaniline	10	U	10	U	10	U	10	U	10	U	20	U
2-Nitrophenol	10	U	10	U	10	U	10	U	10	U	5	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW12		BCMW13		BCMW13		BCMW14		BCMW15		BCMW16	
SAMPLE ID:	BC-MW12-GW4		BC-MW13-GW4		BC-MW13-GW4D		BC-MW14-GW4		BC-MW15-GW4		BC-MW16-GW5	
COLLECTION DATE:	05/23/94		05/20/94		05/20/94		05/22/94		05/24/94		12/18/94	
ASSOCIATED QC:	BC-TB4,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-ER1		BC-ER1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB2 BC-FB1	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
3,3'-Dichlorobenzidine	10	U	10	U	10	U	10	U	10	U	5	U
3-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U
4,6-Dinitro-2-methylphenol	30	U	30	U	30	U	30	U	30	U	20	U
4-Bromophenyl phenyl ether	10	U	10	U	10	U	10	U	10	U	5	U
4-Chloro-3-methylphenol	10	U	10	U	10	U	10	U	10	U	5	U
4-Chloroaniline	10	U	10	U	10	U	10	U	10	U	5	U
4-Chlorophenyl phenyl ether	10	U	10	U	10	U	10	U	10	U	5	U
4-Methylphenol	10	U	10	U	10	U	10	U	10	U	5	U
4-Nitroaniline	10	U	10	U	10	U	10	U	10	U	20	U
4-Nitrophenol	10	U	10	U	10	U	10	U	10	U	20	U
Acenaphthene	10	U	10	U	10	U	10	U	10	U	5	U
Acenaphthylene	10	U	10	U	10	U	10	U	10	U	5	U
Anthracene	10	U	10	U	10	U	10	U	10	U	5	U
Benzo(a)anthracene	10	U	10	U	10	U	10	U	10	U	5	U
Benzo(a)pyrene	10	U	10	U	10	U	10	U	10	U	5	U
Benzo(b)fluoranthene	10	U	10	U	10	U	10	U	10	U	5	U
Benzo(g,h,i)perylene	10	U	10	U	10	U	10	U	10	U	5	U
Benzo(k)fluoranthene	10	U	10	U	10	U	10	U	10	U	5	U
Benzoic acid	2	J	100	U	100	U	100	U	100	U	-	
Benzyl alcohol	10	U	10	U	10	U	10	U	10	U	-	
Butyl benzyl phthalate	10	U	10	U	10	U	10	U	10	U	5	U
Chrysene	10	U	10	U	10	U	10	U	10	U	5	U
Di-n-butyl phthalate	2	B	2	B	2	B	2	B	10	U	5	U
Di-n-octyl phthalate	10	U	10	U	10	U	10	U	10	U	5	U
Dibenzo(a,h)anthracene	10	U	10	U	10	U	10	U	10	U	5	U
Dibenzofuran	10	U	10	U	10	U	10	U	10	U	5	U
Diethyl phthalate	10	U	10	U	10	U	10	U	10	U	5	U
Dimethyl phthalate	10	U	10	U	10	U	10	U	10	U	5	U
Fluoranthene	10	U	10	U	10	U	10	U	10	U	5	U
Fluorene	10	U	10	U	10	U	10	U	10	U	5	U
Hexachlorobenzene	10	U	10	U	10	U	10	U	10	U	5	U
Hexachlorobutadiene	10	U	10	U	10	U	10	U	10	U	5	U
Hexachlorocyclopentadiene	10	U	10	U	10	U	10	U	10	U	5	U
Hexachloroethane	10	U	10	U	10	U	10	U	10	U	5	U
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	U	10	U	10	U	5	U
Isophorone	10	U	10	U	10	U	10	U	10	U	5	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW12		BCMW13		BCMW13		BCMW14		BCMW15		BCMW16	
SAMPLE ID:	BC-MW12-GW4		BC-MW13-GW4		BC-MW13-GW4D		BC-MW14-GW4		BC-MW15-GW4		BC-MW16-GW5	
COLLECTION DATE:	05/23/94		05/20/94		05/20/94		05/22/94		05/24/94		12/18/94	
ASSOCIATED QC:	BC-TB4,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-ER1		BC-ER1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB2 BC-FB1	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
N-Nitroso-di-n-propylamine	10	U	10	U	10	U	10	U	10	U	5	U
N-Nitrosodiphenylamine(1)	10	U	10	U	10	U	10	U	10	U	5	U
Naphthalene	10	U	10	U	10	U	10	U	10	U	5	U
Nitrobenzene	10	U	10	U	10	U	10	U	10	U	5	U
Pentachlorophenol	20	U	20	U	20	U	20	U	20	U	20	U
Phenanthrene	10	U	10	U	10	U	10	U	10	U	5	U
Phenol	10	U	10	U	10	U	10	U	10	U	5	U
Pyrene	10	U	10	U	10	U	10	U	10	U	5	U
bis(2-Chloroethoxy)methane	10	U	10	U	10	U	10	U	10	U	5	U
bis(2-Chloroethyl)ether	20	U	20	U	20	U	20	U	20	U	5	U
bis(2-Chloroisopropyl)ether	10	U	10	U	10	U	10	U	10	U	-	
bis(2-Ethylhexyl)phthalate	22		41		16		6	B	37		5	U
Metals by CLP												
Aluminum	62.20	U	62.20	U	62.20	U	62.20	U	166	()	91	()
Antimony	55.30	U	55.30	U	55.30	U	58.90		33.30	U	1.90	U
Arsenic	2.60	U	5	()B	2.60	U	7.70	()B	4.10	()	2.20	U
Barium	57	()	86.90	()	89.70	()	75.10	()	64.40	()B	39.30	()
Beryllium	0.30	U	0.30	U	0.30	U	0.30	U	0.70	U	0.10	U
Cadmium	4.50	UJ	4.50	UJ	4.50	UJ	4.50	UJ	4.70	U	0.50	U
Calcium	66200		104000		105000		76800		72700		93400	
Chromium	6	U	6	U	6	U	6	U	6.60	U	2.20	U
Cobalt	9	U	9	U	9	U	9	U	6.30	U	0.50	U
Copper	3.70	()B	1.70	()B	1.50	U	1.50	U	10.60	U	3.70	()
Iron	808		819		917		2100	J	1060	J	27.20	U
Lead	1.80	UJ	1.80	U	1.80	U	1.80	U	1.80	UJ	1.60	U
Magnesium	17600		24800		25400		20600		17200		18600	
Manganese	201		200		205		79.40		230		4.80	()
Mercury	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	UJ
Nickel	16.60	U	16.60	U	16.60	U	16.60	U	48		1.50	U
Potassium	2440	()	1440	()	1280	()	767	()	2309.30	U	1650	()
Selenium	3.40	UJ	3.40	UJ	3.40	UJ	3.40	U	3.40	U	4.40	U
Silver	3.40	U	3.40	U	3.40	U	3.40	U	5.90	U	4.50	U
Sodium	8520		11100		11400		3330	()	3070	()	21600	
Thallium	4.90	()B	2.60	UJ	2.60	UJ	3.30	()B	2.60	UJ	2.70	UJ
Vanadium	3.50	U	3.50	U	3.50	U	3.50	U	5.30	U	0.50	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	BCMW12		BCMW13		BCMW13		BCMW14		BCMW15		BCMW16	
SAMPLE ID:	BC-MW12-GW4		BC-MW13-GW4		BC-MW13-GW4D		BC-MW14-GW4		BC-MW15-GW4		BC-MW16-GW5	
COLLECTION DATE:	05/23/94		05/20/94		05/20/94		05/22/94		05/24/94		12/18/94	
ASSOCIATED QC:	BC-TB4,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-ER1		BC-ER1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB6,BC-ER3 BC-FB1, BC-FB2, BC-FB3		BC-TB2 BC-FB1	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Zinc	21.40	B	28	B	11.20	()B	15.90	()B	68.50		3.50	()
Water Parameters by EPA 600/4-79-020												
Chloride	13.30	B	36.30		36.70	B	8.87	B	3.83	B	-	
Sulfate	29.40	B	37		42.90	B	32.60	B	23.20	B	-	
Dissolved Solids	220		428		402		324		306		-	

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1MW1	1MW1	1MW3	2MW1	2MW1	3MW1
SAMPLE ID:	BC1-MW1-GW5	BC1-MW1-GW5D	BC1-MW3-GW5	BC2-MW1-GW4	BC2-MW1-GW5	BC3-MW1-GW4
COLLECTION DATE:	12/18/94	12/18/94	12/18/94	05/23/94	12/17/94	05/23/94
ASSOCIATED QC:	BC-TB2 BC-FB1	BC-TB2 BC-FB1	BC-TB5 BC-FB1	BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3	BC-TB2 BC-FB1	BC-TB4,BC-ER2 BC-FB1, BC-FB2

	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Halogenated Volatiles Compounds by 8010												
1,1,1,2-Tetrachloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1,1-Trichloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.02	B
1,1,2,2-Tetrachloroethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
1,1,2-Trichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,1-Dichloroethane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1-Dichloroethene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2,3-Trichloropropane	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dibromoethane (Ethylene di	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dichlorobenzene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,2-Dichloroethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
1,2-Dichloropropane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
2-Chloroethyl vinyl ether	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
2-Chlorotoluene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
4-Chlorotoluene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Bromobenzene	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U	0.85	U
Bromochloromethane	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Bromodichloromethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Bromoform	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U	0.45	U
Carbon tetrachloride	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chlorobenzene	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U	0.35	U
Chloroethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	0.35	U	0.35	U	0.00	()B	0.35	U	0.35	U	0.06	B
Chloromethane	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cis-1,3-Dichloropropene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromochloromethane	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromomethane	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
Methylene chloride	1.20	B	0.02	()B	1.40	B	0.41	B	0.66	()	0.94	B
Tetrachloroethene	0.26	()B	0.30	U	0.30	U	0.20	B	0.30	U	0.30	U
Trans-1,2-Dichloroethene	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U	0.30	U
Trans-1,3-Dichloropropene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Trichloroethene	0.30	U	0.30	U	0.30	U	0.10	B	0.30	U	0.30	U
Vinyl chloride	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U	0.55	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1MW1		1MW1		1MW3		2MW1		2MW1		3MW1	
SAMPLE ID:	BC1-MW1-GW5		BC1-MW1-GW5D		BC1-MW3-GW5		BC2-MW1-GW4		BC2-MW1-GW5		BC3-MW1-GW4	
COLLECTION DATE:	12/18/94		12/18/94		12/18/94		05/23/94		12/17/94		05/23/94	
ASSOCIATED QC:	BC-TB2 BC-FB1		BC-TB2 BC-FB1		BC-TB5 BC-FB1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB2 BC-FB1		BC-TB4,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Aromatic Volatiles Compounds by 8020												
1,2-Dichlorobenzene	0.15	U	0.15	U	0.15	U	0.14	B	0.15	U	0.15	U
1,3-Dichlorobenzene	0.20	U	0.20	U	0.20	U	0.46		0.20	U	0.20	U
1,4-Dichlorobenzene	0.15	U	0.15	U	0.15	U	0.29	B	0.19		0.03	B
Benzene	0.35	U	0.35	U	0.25	()	0.05	B	0.35	U	0.35	U
Chlorobenzene	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Ethylbenzene	0.20	U	0.20	U	0.20	U	1	J	0.18	()B	0.20	U
Methyl-tert-butyl ether	5	U	5	U	5	U	5	U	5	U	5	U
Styrene	0.25	U	0.25	U	0.25	U	0.96	B	0.25	U	0.25	U
Toluene	0.25	U	0.25	U	0.21	()	0.25	U	0.25	U	0.08	B
m+p-Xylene	0.50	U	-		-		-		-		0.50	U
m-Xylene	-		0.18	()	0.13	()	0.20	B	0.10	()B	-	
o-Xylene	0.20	U	0.20	U	0.20	U	0.11	B	0.19	()B	0.20	U
p-Xylene	-		0.18	()	0.13	()	0.14	B	0.10	()B	-	
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	5	U	5	U	5	U	10	U	5	U	10	U
1,2-Dichlorobenzene	-		-		-		10	U	-		10	U
1,3-Dichlorobenzene	-		-		-		10	U	-		10	U
1,4-Dichlorobenzene	-		-		-		10	U	-		10	U
2,2'-Oxybis(1-chloropropane)	5	U	5	U	5	U	-		5	U	-	
2,4,5-Trichlorophenol	20	U	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	5	U	5	U	5	U	20	U	5	U	20	U
2,4-Dichlorophenol	5	U	5	U	5	U	10	U	5	U	10	U
2,4-Dimethylphenol	5	U	5	U	5	U	10	U	5	U	10	U
2,4-Dinitrophenol	20	U	20	U	20	U	40	U	20	U	40	U
2,4-Dinitrotoluene	5	U	5	U	5	U	10	U	5	U	10	U
2,6-Dinitrotoluene	5	U	5	U	5	U	10	U	5	U	10	U
2-Chloronaphthalene	5	U	5	U	5	U	10	U	5	U	10	U
2-Chlorophenol	5	U	5	U	5	U	10	U	5	U	10	U
2-Methylnaphthalene	5	U	5	U	5	U	5		6		10	U
2-Methylphenol	5	U	5	U	5	U	10	U	5	U	10	U
2-Nitroaniline	20	U	20	U	20	U	10	U	20	U	10	U
2-Nitrophenol	5	U	5	U	5	U	10	U	5	U	10	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1MW1		1MW1		1MW3		2MW1		2MW1		3MW1	
SAMPLE ID:	BC1-MW1-GW5		BC1-MW1-GW5D		BC1-MW3-GW5		BC2-MW1-GW4		BC2-MW1-GW5		BC3-MW1-GW4	
COLLECTION DATE:	12/18/94		12/18/94		12/18/94		05/23/94		12/17/94		05/23/94	
ASSOCIATED QC:	BC-TB2 BC-FB1		BC-TB2 BC-FB1		BC-TB5 BC-FB1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB2 BC-FB1		BC-TB4,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
3,3'-Dichlorobenzidine	5	U	5	U	5	U	10	U	5	U	10	U
3-Nitroaniline	20	U	20	U	20	U	20	U	20	U	20	U
4,6-Dinitro-2-methylphenol	20	U	20	U	20	U	30	U	20	U	30	U
4-Bromophenyl phenyl ether	5	U	5	U	5	U	10	U	5	U	10	U
4-Chloro-3-methylphenol	5	U	5	U	5	U	10	U	5	U	10	U
4-Chloroaniline	5	U	5	U	5	U	10	U	5	U	10	U
4-Chlorophenyl phenyl ether	5	U	5	U	5	U	10	U	5	U	10	U
4-Methylphenol	5	U	5	U	5	U	10	U	5	U	10	U
4-Nitroaniline	20	U	20	U	20	U	10	U	20	U	10	U
4-Nitrophenol	20	U	20	U	20	U	10	U	20	U	10	U
Acenaphthene	5	U	5	U	5	U	10	U	5	U	10	U
Acenaphthylene	5	U	5	U	5	U	10	U	5	U	10	U
Anthracene	5	U	5	U	5	U	10	U	5	U	10	U
Benzo(a)anthracene	5	U	5	U	5	U	10	U	5	U	10	U
Benzo(a)pyrene	5	U	5	U	5	U	10	U	5	U	10	U
Benzo(b)fluoranthene	5	U	5	U	5	U	10	U	5	U	10	U
Benzo(g,h,i)perylene	5	U	5	U	5	U	10	U	5	U	10	U
Benzo(k)fluoranthene	5	U	-		5	U	10	U	-		10	U
Benzoic acid	-		-		-		100	U	-		100	U
Benzyl alcohol	-		-		-		10	U	-		10	U
Butyl benzyl phthalate	5	U	5	U	5	U	10	U	5	U	10	U
Chrysene	5	U	5	U	5	U	10	U	5	U	10	U
Di-n-butyl phthalate	0.50	()	0.80	()	5	U	2	B	5	U	2	B
Di-n-octyl phthalate	5	U	5	U	5	U	10	U	5	U	10	U
Dibenzo(a,h)anthracene	5	U	5	U	5	U	10	U	5	U	10	U
Dibenzofuran	5	U	5	U	5	U	10	U	5	U	10	U
Diethyl phthalate	5	U	5	U	5	U	10	U	5	U	10	U
Dimethyl phthalate	5	U	5	U	5	U	10	U	5	U	10	U
Fluoranthene	5	U	5	U	5	U	10	U	5	U	10	U
Fluorene	5	U	5	U	5	U	10	U	5	U	10	U
Hexachlorobenzene	5	U	5	U	5	U	10	U	5	U	10	U
Hexachlorobutadiene	5	U	5	U	5	U	10	U	5	U	10	U
Hexachlorocyclopentadiene	5	U	5	U	5	U	10	U	5	U	10	U
Hexachloroethane	5	U	5	U	5	U	10	U	5	U	10	U
Indeno(1,2,3-cd)pyrene	5	U	5	U	5	U	10	U	5	U	10	U
Isophorone	5	U	5	U	5	U	10	U	5	U	10	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1MW1		1MW1		1MW3		2MW1		2MW1		3MW1	
SAMPLE ID:	BC1-MW1-GW5		BC1-MW1-GW5D		BC1-MW3-GW5		BC2-MW1-GW4		BC2-MW1-GW5		BC3-MW1-GW4	
COLLECTION DATE:	12/18/94		12/18/94		12/18/94		05/23/94		12/17/94		05/23/94	
ASSOCIATED QC:	BC-TB2 BC-FB1		BC-TB2 BC-FB1		BC-TB5 BC-FB1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB2 BC-FB1		BC-TB4,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
N-Nitroso-di-n-propylamine	5	U	5	U	5	U	10	U	5	U	10	U
N-Nitrosodiphenylamine(1)	5	U	5	U	5	U	10	U	5	U	10	U
Naphthalene	5	U	5	U	5	U	5		3	()	10	U
Nitrobenzene	5	U	5	U	5	U	10	U	5	U	10	U
Pentachlorophenol	20	U	20	U	20	U	20	U	20	U	20	U
Phenanthrene	5	U	5	U	5	U	10	U	5	U	10	U
Phenol	5	U	5	U	5	U	10	U	5	U	10	U
Pyrene	5	U	5	U	5	U	10	U	5	U	10	U
bis(2-Chloroethoxy)methane	5	U	5	U	5	U	10	U	5	U	10	U
bis(2-Chloroethyl)ether	5	U	5	U	5	U	20	U	5	U	20	U
bis(2-Chloroisopropyl)ether	-		-		-		10	U	-		10	U
bis(2-Ethylhexyl)phthalate	5	U	5	U	5	U	7	B	5	U	14	B
Metals by CLP												
Aluminum	90.80	()	63.20	()	95.10	()	129	()B	86.50	()	62.20	U
Antimony	1.90	U	1.90	U	1.90	U	33.30	U	1.90	U	55.30	U
Arsenic	2.20	U	2.20	U	2.20	U	2.60	U	2.20	U	3.50	()B
Barium	84	()	85.60	()	50.20	()	39.90	()B	53.40	()	24.60	()
Beryllium	0.10	U	0.10	U	0.10	U	0.70	U	0.10	U	0.30	U
Cadmium	0.50	U	0.50	U	0.50	U	4.70	U	0.50	U	4.50	UJ
Calcium	112000		116000		72400		76700		93400		76900	
Chromium	2.20	U	2.20	U	2.20	U	6.60	U	2.20	U	6	U
Cobalt	0.50	U	0.50	U	0.50	U	6.30	U	0.89	()	9	U
Copper	3.70	()	5.60	()	4.50	()	10.60	U	7.50	()	1.50	U
Iron	27.20	U	27.20	U	1130		430	J	843		852	
Lead	2.30	()	1.60	U	2.80	()	1.80	UJ	1.60	U	1.80	U
Magnesium	17100		18000		16300		19800		22200		16600	
Manganese	89		96.20		114		246	B	266		203	
Mercury	0.20	UJ	0.20	UJ	0.20	UJ	0.20	U	0.20	UJ	0.20	U
Nickel	1.50	U	1.50	U	1.50	U	38.80	U	3.50	()	16.60	U
Potassium	1880	()	1970	()	1650	()	2309.30	U	1860	()	714	U
Selenium	4.40	U	4.40	U	4.40	U	3.40	U	4.40	U	3.40	UJ
Silver	4.50	U	4.50	U	4.50	U	5.90	U	4.50	U	3.40	U
Sodium	27100		27800		6040		21100	J	17300		1780	()
Thallium	2.70	UJ	2.70	UJ	2.70	UJ	2.60	U	2.70	UJ	2.60	UJ
Vanadium	0.54	()	0.50	U	0.50	U	5.30	U	0.50	U	3.50	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	1MW1		1MW1		1MW3		2MW1		2MW1		3MW1	
SAMPLE ID:	BC1-MW1-GW5		BC1-MW1-GW5D		BC1-MW3-GW5		BC2-MW1-GW4		BC2-MW1-GW5		BC3-MW1-GW4	
COLLECTION DATE:	12/18/94		12/18/94		12/18/94		05/23/94		12/17/94		05/23/94	
ASSOCIATED QC:	BC-TB2 BC-FB1		BC-TB2 BC-FB1		BC-TB5 BC-FB1		BC-TB5,BC-ER1 BC-FB1, BC-FB2, BC-FB3		BC-TB2 BC-FB1		BC-TB4,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Zinc	0.69	()	2.20	()	2.30	()	11.60	()	8.50	()	4.70	()B
Water Parameters by EPA 600/4-79-020												
Chloride	-		-		-		37.90	B	-		-	
Sulfate	-		-		-		13.20	B	-		-	
Dissolved Solids	-		-		-		360		-		-	

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

	3MW1		3MW2		3MW3		3MW4		3MW5		3MW6	
LOCATOR:												
SAMPLE ID:	BC3-MW1-GW4D		BC3-MW2-GW4		BC3-MW3-GW4		BC3-MW4-GW4		BC3-MW5-GW4		BC3-MW6-GW4	
COLLECTION DATE:	05/23/94		05/23/94		05/23/94		05/23/94		05/23/94		05/23/94	
ASSOCIATED QC:	BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB5,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Halogenated Volatiles Compounds by 8010												
1,1,1,2-Tetrachloroethane	0.35	U	1.80	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1,1-Trichloroethane	0.35	U	1.80	U	0.03	B	0.35	U	0.35	U	0.35	U
1,1,2,2-Tetrachloroethane	0.40	U	2	U	0.40	U	0.40	U	0.40	U	0.40	U
1,1,2-Trichloroethane	0.25	U	1.20	U	0.25	U	0.25	U	0.25	U	0.25	U
1,1-Dichloroethane	0.35	U	1.80	U	0.35	U	0.35	U	0.35	U	0.35	U
1,1-Dichloroethene	0.35	U	1.80	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2,3-Trichloropropane	0.35	U	1.80	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dibromoethane (Ethylene di	0.35	U	1.80	U	0.35	U	0.35	U	0.35	U	0.35	U
1,2-Dichlorobenzene	0.30	U	1.50	U	0.30	U	0.30	U	0.30	U	0.30	U
1,2-Dichloroethane	0.25	U	1.20	U	0.25	U	0.25	U	0.25	U	0.25	U
1,2-Dichloropropane	0.30	U	1.50	U	0.30	U	0.30	U	0.30	U	0.30	U
1,3-Dichlorobenzene	0.20	U	1	U	0.20	U	0.20	U	0.20	U	0.20	U
1,4-Dichlorobenzene	0.20	U	1	U	0.20	U	0.20	U	0.20	U	0.20	U
2-Chloroethyl vinyl ether	0.40	U	2	U	0.40	U	0.40	U	0.40	U	0.40	U
2-Chlorotoluene	0.25	U	1.20	U	0.25	U	0.25	U	0.25	U	0.25	U
4-Chlorotoluene	0.35	U	1.80	U	0.35	U	0.35	U	0.35	U	0.35	U
Bromobenzene	0.85	U	4.20	U	0.85	U	0.85	U	0.85	U	0.85	U
Bromochloromethane	0.25	U	1.20	U	0.25	U	0.25	U	0.25	U	0.25	U
Bromodichloromethane	0.40	U	2	U	0.40	U	0.40	U	0.40	U	0.40	U
Bromoform	0.50	U	2.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Bromomethane	0.45	U	2.20	U	0.45	U	0.45	U	0.45	U	0.45	U
Carbon tetrachloride	0.35	U	1.80	U	0.35	U	0.35	U	0.35	U	0.35	U
Chlorobenzene	0.35	U	1.80	U	0.35	U	0.35	U	0.35	U	0.35	U
Chloroethane	0.50	U	2.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Chloroform	0.35	U	1.80	U	0.04	B	0.35	U	0.35	U	0.35	U
Chloromethane	0.50	U	2.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Cis-1,3-Dichloropropene	0.30	U	1.50	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromochloromethane	0.30	U	1.50	U	0.30	U	0.30	U	0.30	U	0.30	U
Dibromomethane	0.40	U	2	U	0.40	U	0.40	U	0.40	U	0.40	U
Methylene chloride	0.41	B	0.67	B	1.10	B	0.45	B	0.45	B	0.53	B
Tetrachloroethene	0.30	U	0.74		0.30	U	0.30	U	0.30	U	0.30	U
Trans-1,2-Dichloroethene	0.30	U	1.50	U	0.30	U	0.30	U	0.30	U	0.30	U
Trans-1,3-Dichloropropene	0.25	U	1.20	U	0.25	U	0.25	U	0.25	U	0.25	U
Trichloroethene	0.30	U	1.50	U	0.30	U	0.29		0.30	U	0.30	U
Vinyl chloride	0.55	U	2.80	U	0.55	U	0.55	U	0.55	U	0.55	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	3MW1		3MW2		3MW3		3MW4		3MW5		3MW6	
SAMPLE ID:	BC3-MW1-GW4D		BC3-MW2-GW4		BC3-MW3-GW4		BC3-MW4-GW4		BC3-MW5-GW4		BC3-MW6-GW4	
COLLECTION DATE:	05/23/94		05/23/94		05/23/94		05/23/94		05/23/94		05/23/94	
ASSOCIATED QC:	BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB5,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Aromatic Volatiles Compounds by 8020												
1,2-Dichlorobenzene	0.04	B	1.80		0.15	U	0.15	U	0.15	U	0.15	U
1,3-Dichlorobenzene	0.20	U	2.30		0.20	U	0.20	U	0.20	U	0.04	B
1,4-Dichlorobenzene	0.06	U	7		0.15	U	0.04	B	0.15	U	0.07	B
Benzene	0.35	U	17		0.35	U	0.04	B	0.04	B	0.11	B
Chlorobenzene	0.25	U	0.29		0.25	U	0.25	U	0.25	U	0.25	U
Ethylbenzene	0.20	U	47		0.20	U	0.89	J	0.06	B	0.16	U
Methyl-tert-butyl ether	5	U	25	U	5	U	5	U	5	U	5	U
Styrene	0.25	U	0.80	B	0.25	U	0.02	B	0.25	U	0.25	U
Toluene	0.05	B	1.20	B	0.25	U	2.30	B	0.13	B	0.42	B
m+p-Xylene	-		-		0.50	U	-		0.50	U	-	
m-Xylene	0.09	B	160		-		2.70	B	-		0.14	U
o-Xylene	0.20	U	11		0.20	U	1.20	B	0.20	U	0.11	B
p-Xylene	0.04	B	63		-		0.13	B	-		0.06	U
Semivolatiles Compounds by CLP												
1,2,4-Trichlorobenzene	10	U	10	U	10	UJ	10	U	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U	10	UJ	10	U	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U	10	UJ	10	U	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U	10	UJ	10	U	10	U	10	U
2,2'-Oxybis(1-chloropropane)	-		-		-		-		-		-	
2,4,5-Trichlorophenol	20	U	20	U		R	20	U	20	U	20	U
2,4,6-Trichlorophenol	20	U	20	U		R	20	U	20	U	20	U
2,4-Dichlorophenol	10	U	10	U		R	10	U	10	U	10	U
2,4-Dimethylphenol	10	U	5			R	10	U	10	U	10	U
2,4-Dinitrophenol	40	U	40	U	40	UJ	40	U	40	U	40	U
2,4-Dinitrotoluene	10	U	10	U	10	UJ	10	U	10	U	10	U
2,6-Dinitrotoluene	10	U	10	U	10	UJ	10	U	10	U	10	U
2-Chloronaphthalene	10	U	10	U	10	UJ	10	U	10	U	10	U
2-Chlorophenol	10	U	10	U		R	10	U	10	U	10	U
2-Methylnaphthalene	10	U	8		10	UJ	10	U	10	U	10	U
2-Methylphenol	10	U	10	U		R	10	U	10	U	10	U
2-Nitroaniline	10	U	10	U	10	UJ	10	U	10	U	10	U
2-Nitrophenol	10	U	10	U		R	10	U	10	U	10	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	3MW1		3MW2		3MW3		3MW4		3MW5		3MW6	
SAMPLE ID:	BC3-MW1-GW4D		BC3-MW2-GW4		BC3-MW3-GW4		BC3-MW4-GW4		BC3-MW5-GW4		BC3-MW6-GW4	
COLLECTION DATE:	05/23/94		05/23/94		05/23/94		05/23/94		05/23/94		05/23/94	
ASSOCIATED QC:	BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB5,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
3,3'-Dichlorobenzidine	10	U	10	U	10	UJ	10	U	10	U	10	U
3-Nitroaniline	20	U	20	U	20	UJ	20	U	20	U	20	U
4,6-Dinitro-2-methylphenol	30	U	30	U		R	30	U	30	U	30	U
4-Bromophenyl phenyl ether	10	U	10	U	10	UJ	10	U	10	U	10	U
4-Chloro-3-methylphenol	10	U	10	U		R	10	U	10	U	10	U
4-Chloroaniline	10	U	10	U	10	UJ	10	U	10	U	10	U
4-Chlorophenyl phenyl ether	10	U	10	U	10	UJ	10	U	10	U	10	U
4-Methylphenol	10	U	17		10	UJ	10	U	10	U	10	U
4-Nitroaniline	10	U	10	U	10	UJ	10	U	10	U	10	U
4-Nitrophenol	10	U	10	U	10	UJ	10	U	10	U	10	U
Acenaphthene	10	U	10	U	10	UJ	10	U	10	U	10	U
Acenaphthylene	10	U	10	U	10	UJ	10	U	10	U	10	U
Anthracene	10	U	10	U	10	UJ	10	U	10	U	10	U
Benzo(a)anthracene	10	U	10	U	10	UJ	10	U	10	U	10	U
Benzo(a)pyrene	10	U	10	U	10	UJ	10	U	10	U	10	U
Benzo(b)fluoranthene	10	U	10	U	10	UJ	10	U	10	U	10	U
Benzo(g,h,i)perylene	10	U	10	U	10	UJ	10	U	10	U	10	U
Benzo(k)fluoranthene	10	U	10	U	10	UJ	10	U	10	U	10	U
Benzoic acid	100	U	100	U	100	UJ	100	U	100	U	100	U
Benzyl alcohol	10	U	10	U	10	UJ	10	U	10	U	10	U
Butyl benzyl phthalate	10	U	10	U	10	UJ	10	U	10	U	10	U
Chrysene	10	U	10	U	10	UJ	10	U	10	U	10	U
Di-n-butyl phthalate	2	B	3	B	1	J	2	B	2	B	2	B
Di-n-octyl phthalate	10	U	10	U	10	UJ	10	U	10	U	10	U
Dibenzo(a,h)anthracene	10	U	10	U	10	UJ	10	U	10	U	10	U
Dibenzofuran	10	U	10	U	10	UJ	10	U	10	U	10	U
Diethyl phthalate	10	U	10	U	10	UJ	10	U	10	U	10	U
Dimethyl phthalate	10	U	10	U	10	UJ	10	U	10	U	10	U
Fluoranthene	10	U	10	U	10	UJ	10	U	10	U	10	U
Fluorene	10	U	10	U	10	UJ	10	U	10	U	10	U
Hexachlorobenzene	10	U	10	U	10	UJ	10	U	10	U	10	U
Hexachlorobutadiene	10	U	10	U	10	UJ	10	U	10	U	10	U
Hexachlorocyclopentadiene	10	U	10	U	10	UJ	10	U	10	U	10	U
Hexachloroethane	10	U	10	U	10	UJ	10	U	10	U	10	U
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	UJ	10	U	10	U	10	U
Isophorone	10	U	10	U	10	UJ	10	U	10	U	10	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	3MW1		3MW2		3MW3		3MW4		3MW5		3MW6	
SAMPLE ID:	BC3-MW1-GW4D		BC3-MW2-GW4		BC3-MW3-GW4		BC3-MW4-GW4		BC3-MW5-GW4		BC3-MW6-GW4	
COLLECTION DATE:	05/23/94		05/23/94		05/23/94		05/23/94		05/23/94		05/23/94	
ASSOCIATED QC:	BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB5,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
N-Nitroso-di-n-propylamine	10	U	10	U	10	UJ	10	U	10	U	10	U
N-Nitrosodiphenylamine(1)	10	U	10	U	10	UJ	10	U	10	U	10	U
Naphthalene	10	U	24		10	UJ	10	U	10	U	10	U
Nitrobenzene	10	U	10	U	10	UJ	10	U	10	U	10	U
Pentachlorophenol	20	U	20	U		R	20	U	20	U	20	U
Phenanthrene	10	U	10	U	10	UJ	10	U	10	U	10	U
Phenol	10	U	10	U		R	10	U	10	U	10	U
Pyrene	10	U	10	U	10	UJ	10	U	10	U	10	U
bis(2-Chloroethoxy)methane	10	U	10	U	10	UJ	10	U	10	U	10	U
bis(2-Chloroethyl)ether	20	U	20	U	20	UJ	20	U	20	U	20	U
bis(2-Chloroisopropyl)ether	10	U	10	U	10	UJ	10	U	10	U	10	U
bis(2-Ethylhexyl)phthalate	23		4	B	2	J	11	B	6	B	3	B
Metals by CLP												
Aluminum	62.20	U	84.70	U	62.20	U	62.20	U	102	()B	62.20	U
Antimony	59		33.30	U	55.30	U	58.80		55.30	U	55.30	U
Arsenic	4.60	()B	39.20		2.60	U	2.60	U	3.30	()B	2.60	U
Barium	23.90	()	121	()B	16.10	()	90.90	()	19.10	()	35.60	()
Beryllium	0.30	U	0.70	U	0.30	U	0.30	U	0.30	U	0.30	U
Cadmium	4.50	UJ	4.70	U	4.50	UJ	4.50	U	4.50	UJ	4.50	UJ
Calcium	76000		91700		58200		27900		66700		76600	
Chromium	6	U	6.60	U	6	U	6.20	()	6	U	6	U
Cobalt	9	U	6.30	U	9	U	9	U	9	U	9	U
Copper	1.50	U	10.60	U	1.50	U	1.50	U	1.50	U	1.50	U
Iron	273	B	6670	J	98.30	()B	24.40	U	197	B	24.40	U
Lead	1.80	U	1.80	UJ	1.80	U	1.80	U	1.80	U	1.80	U
Magnesium	16200		16000		12400		4680	()	15000		16500	
Manganese	186		374	J	1.20	U	1.20	U	5.70	()B	149	
Mercury	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Nickel	16.60	U	38.80	U	16.60	U	16.60	U	16.60	U	16.60	U
Potassium	714	U	2309.30	U	843	()	1300	()	714	U	714	U
Selenium	3.40	U	3.40	U	3.40	UJ	3.40	U	3.40	UJ	3.40	UJ
Silver	3.40	U	5.90	U	3.40	UJ	3.40	U	3.40	U	3.40	U
Sodium	1660	()	2140	()	1270	()	2890	()	1470	()	2220	()
Thallium	2.60	UJ	2.60	UJ	2.60	UJ	2.60	U	2.60	U	2.60	UJ
Vanadium	3.50	U	5.30	U	3.50	U	3.50	U	3.50	U	3.50	U

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

LOCATOR:	3MW1		3MW2		3MW3		3MW4		3MW5		3MW6	
SAMPLE ID:	BC3-MW1-GW4D		BC3-MW2-GW4		BC3-MW3-GW4		BC3-MW4-GW4		BC3-MW5-GW4		BC3-MW6-GW4	
COLLECTION DATE:	05/23/94		05/23/94		05/23/94		05/23/94		05/23/94		05/23/94	
ASSOCIATED QC:	BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB5,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2		BC-TB4,BC-ER2 BC-FB1, BC-FB2	
	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL	RESULT	QUAL
Zinc	4.10	U	12.80	()	12.10	()B	5.60	()B	14	()B	12.10	()B
Water Parameters by EPA 600/4-79-020												
Chloride	-		-		-		-		-		-	
Sulfate	-		-		-		-		-		-	
Dissolved Solids	-		-		-		-		-		-	

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

Criteria for organic compounds is the highest of the Type C Generic Industrial or type B 20 times drinking water values; for inorganic compounds criteria is the highest of the background, Type A default value or the Type B 20 times the drinking water values.

mg/kg	milligrams/kilogram
µg/kg	micrograms/kilogram
ID	Insufficient data available to develop criteria
NS	Not Sampled

Result Qualifiers

(1)	Results are presented in units of mg/ℓ
(a)	Results are presented in units of µg/kg
(b)	Results are presented in units of mg/kg
(c)	Criteria does not exist

Data Validation Qualifiers

()	Result is between the detection limit and the quantitation limit
B	Value is unreliable due to blank contamination value
J	Reported value is estimated
U	Compound analyzed for but not detected
R	Result is unreliable

Laboratory Qualifiers

A	Result produced from a single point method-of-standard addition
B	Analyte also detected in associated blank (organic)
B	Result between IDL and CRDL (inorganic)
E	Chemical or physical interference during analysis
J	Reported value is estimated
N	Matrix related interference in the sample
U	Compound analyzed for but not detected
X	Sample specific qualifier
*	Non-homogeneous sample matrix

Appendix F: Complete Analytical Database
110th FG, MIANG, Battle Creek, Michigan

Criteria for organic compounds are the Type B health-based drinking water values; for inorganic compounds they are the highest of the background or the Type B health-based drinking water values.

mg/ℓ	milligrams/liter
µg/ℓ	micrograms/liter
ID	Insufficient data available to develop criteria
NS	Not Sampled

Result Qualifiers

(a)	Results are presented in units of µg/ℓ
(b)	Results are presented in units of mg/ℓ
(c)	Criteria does not exist

Data Validation Qualifiers

()	Result is between the detection limit and the quantitation limit
B	Value is unreliable due to blank contamination value
J	Reported value is estimated
U	Compound analyzed for but not detected
R	Result is unreliable

Laboratory Qualifiers

A	Result produced from a single point method-of-standard addition
B	Analyte also detected in associated blank (organic)
B	Result between IDL and CRDL (inorganic)
E	Chemical or physical interference during analysis
J	Reported value is estimated
N	Matrix related interference in the sample
U	Compound analyzed for but not detected
X	Sample specific qualifier
*	Non-homogeneous sample matrix

Laville

KAR Laboratories, Inc.
4425 Manchester Road
Kalamazoo, MI 49002

(616) 381-9666

INVOICE

Earth Technologies
683 Emory Valley Rd.
Oak Ridge, TN 37830

Attn: Mr. Jack Briegel

Project No.: **941428**
Date Activated: 5/19/94
Date Reported: 5/27/94
PO#: 94PG-063-DC4

Project Desc.: Analysis of aqueous samples for ANG-BC (ET #948901-08).

Quan	Item
21	Nitrogen, nitrate

Quoted Price of 15.00 per sample (21 samples)	315.00
TOTAL DUE	$315.00

Please indicate Project No. 941428 on check stub or voucher.

I.D. #38-2476290
A FINANCE CHARGE OF 1 1/2% PER MONTH (18% PER YEAR)
WILL BE ADDED TO BALANCES AFTER 30 DAYS

ANALYTICAL RESULTS

To: Earth Technologies

Project No: 941428
Report Date: 5/27/94

Project Desc.: Analysis of aqueous samples for ANG-BC (ET #948901-08).

Sample No.:941428-01 Type:aqueous Rec'd: 5/19/94
Sampled: 5/19/94 1445 By:CF of ET
ID: **"BC-MW1-GW4"**

Nitrogen, nitrate	*3.4*	*mg/L*

Sample No.:941428-02 Type:aqueous Rec'd: 5/19/94
Sampled: 5/19/94 1220 By:CF of ET
ID: **"BC-MW2-GW4"**

Nitrogen, nitrate	*2.1*	*mg/L*

Sample No.:941428-03 Type:aqueous Rec'd: 5/20/94
Sampled: 5/20/94 1050 By:CF of ET
ID: **"BC-MW3-GW4"**

Nitrogen, nitrate	*3.6*	*mg/L*

Sample No.:941428-04 Type:aqueous Rec'd: 5/20/94
Sampled: 5/20/94 1405 By:CF of ET
ID: **"BC-MW7-GW4"**

Nitrogen, nitrate	*<0.2*	*mg/L*

Sample No.:941428-05 Type:aqueous Rec'd: 5/20/94
Sampled: 5/20/94 1415 By:CF of ET
ID: **"BC-MW8-GW4"**

Nitrogen, nitrate	*1.2*	*mg/L*

Sample No.:941428-06 Type:aqueous Rec'd: 5/20/94
Sampled: 5/20/94 0815 By:CF of ET
ID: **"BC-MW13-GW4"**

Nitrogen, nitrate	*<0.2*	*mg/L*

Sample No.:941428-07 Type:aqueous Rec'd: 5/20/94
Sampled: 5/20/94 1400 By:CF of ET
ID: **"BC-MW15-GW4"**

Nitrogen, nitrate	*0.8*	*mg/L*

ANALYTICAL RESULTS

To: Earth Technologies

Project No: 941428
Report Date: 5/27/94

Project Desc.: Analysis of aqueous samples for ANG-BC (ET #948901-08).

Sample No.:941428-08 Type:aqueous Rec'd: 5/20/94
Sampled: 5/20/94 0845 By:CF of ET
ID: **"BC-MW16-GW4"**

Nitrogen, nitrate	*<0.2*	*mg/L*

Sample No.:941428-09 Type:aqueous Rec'd: 5/20/94
Sampled: 5/20/94 1540 By:CF of ET
ID: **"BC-ER1"**

Nitrogen, nitrate	*<0.2*	*mg/L*

Sample No.:941428-10 Type:aqueous Rec'd: 5/20/94
Sampled: 5/20/94 1510 By:CF of ET
ID: **"BC-FB2"**

Nitrogen, nitrate	*<0.2*	*mg/L*

Sample No.:941428-11 Type:aqueous Rec'd: 5/20/94
Sampled: 5/20/94 1340 By:CF of ET
ID: **"BC-FB3"**

Nitrogen, nitrate	*<0.2*	*mg/L*

Sample No.:941428-12 Type:aqueous Rec'd: 5/23/94
Sampled: 5/23/94 1130 By:CF of ET
ID: **"BC2-MW1-GW4"**

Nitrogen, nitrate	*0.3*	*mg/L*

Sample No.:941428-13 Type:aqueous Rec'd: 5/23/94
Sampled: 5/23/94 0810 By:CF of ET
ID: **"BC-MW4-GW4"**

Nitrogen, nitrate	*4.0*	*mg/L*

ANALYTICAL RESULTS

To: Earth Technologies

Project No: 941428
Report Date: 5/27/94

Project Desc.: Analysis of aqueous samples for ANG-BC (ET #948901-08).

Sample No.:941428-14 Type:aqueous Rec'd: 5/23/94
Sampled: 5/23/94 1025 By:CF of ET
ID: **"BC-MW5-GW4"**

Nitrogen, nitrate *1.9 mg/L*

Sample No.:941428-15 Type:aqueous Rec'd: 5/23/94
Sampled: 5/22/94 1447 By:CF of ET
ID: **"BC-MW6-GW4"**

Nitrogen, nitrate *0.4 mg/L*

Sample No.:941428-16 Type:aqueous Rec'd: 5/23/94
Sampled: 5/22/94 1610 By:CF of ET
ID: **"BC-MW9-GW4"** BC-MW14-GW4

Nitrogen, nitrate *<0.2 mg/L*

Sample No.:941428-17 Type:aqueous Rec'd: 5/23/94
Sampled: 5/22/94 1040 By:CF of ET
ID: **"BC-MW11-GW4"**

Nitrogen, nitrate *1.8 mg/L*

Sample No.:941428-18 Type:aqueous Rec'd: 5/23/94
Sampled: 5/22/94 1130 By:CF of ET
ID: **"BC-MW12-GW4"**

Nitrogen, nitrate *0.6 mg/L*

Sample No.:941428-19 Type:aqueous Rec'd: 5/24/94
Sampled: 5/23/94 1600 By:CF of ET
ID: **"BC-MW9-GW4"**

Nitrogen, nitrate *0.4 mg/L*

Sample No.:941428-20 Type:aqueous Rec'd: 5/24/94
Sampled: 5/23/94 1615 By:CF of ET
ID: **"BC-MW18-GW4"**

Nitrogen, nitrate *0.4 mg/L*

ANALYTICAL RESULTS

To: Earth Technologies

Project No: 941428
Report Date: 5/27/94

Project Desc.: Analysis of aqueous samples for ANG-BC (ET #948901-08).

Sample No.:941428-21 Type:aqueous Rec'd: 5/24/94
Sampled: 5/24/94 1320 By:CF of ET
ID: **"BC-ER3"**

Nitrogen, nitrate	*<0.2 mg/L*

Unless otherwise noted, test results represent the sample(s) as they were received.

KAR Laboratories, Inc.
4425 Manchester Road
Kalamazoo, MI 49002

(616) 381-9666

ANALYTICAL REPORT

To: Earth Technologies
683 Emory Valley Rd.
Oak Ridge, TN 37830

Attn: Mr. Jack Briegel

Proj. No.:	941428
Client No.:	1660
Date Activated:	5/19/94
Date Promised:	6/01/94
Date Reported:	5/27/94
PO#:	94PG-063-DC4

Project Desc.: Analysis of aqueous samples for ANG-BC (ET #948901-08).

Dear Client:

Attached you will find test results for Project No. 941428. Please refer to this Project No. if you have any questions regarding this work. Unless noted otherwise all tests were performed within the maximum U.S. EPA allowable holding times.

Respectfully submitted,
KAR Laboratories, Inc.

William H. Bouma

Michael J. Jaeger
Director of Laboratories

{ SEMI-VOLATILE ORGANICS }
{ USEPA-8270 B/N/A SCAN }

{ EARTH TECH - OAK RIDGE }
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 17-May-1995 Sampling
Sample: BC1MW2GW6

Submittal Number 32429- 11
Date Sampled: 05/17/95 Time: 09:20
Date Received: 05/17/95 Time: 13:45
Analysis Date: 05/31/95
Lab Sample No: 117910

Parameter	Result ug/l	Parameter	Result ug/l
Acenaphthene	{ 14 }	2,4-Dimethylphenol	<5.0
Acenaphthylene	<5.0	4,6-Dinitro-2-Methylphenol	<20
Anthracene	<5.0	2,4-Dinitrophenol	<20
Benzo (a) Anthracene	<5.0	2,4-Dinitrotoluene	<5.0
Benzo (a) Pyrene	<5.0	2,6-Dinitrotoluene	<5.0
Benzo (b&k) Fluoranthene	<5.0	Fluoranthene	<5.0
Benzo (g,h,i,) Perylene	<5.0	Fluorene	{ 18 }
Benzoic Acid	<50	Hexachlorobenzene	<5.0
Benzyl Alcohol	<50	Hexachlorobutadiene	<5.0
Bis (2-Chloroethoxy)-Methane	<5.0	Hexachlorocyclopentadiene	<5.0
Bis (2-Chloroethyl) Ether	<5.0	Hexachloroethane	<5.0
Bis (2-Chloroisopropyl)-Ether	<5.0	Indeno (1,2,3-cd) Pyrene	<5.0
Bis (2-ethylhexyl)-Phthalate	<5.0	Isophorone	<5.0
4-Bromophenyl Phenylether	<5.0	2-Methylnaphthalene	<5.0
Butyl Benzyl Phthalate	<5.0	2-Methylphenol	<5.0
4-Chloro-3-Methylphenol	<5.0	4-Methylphenol	<5.0
4-Chloroaniline	<20	N-Nitrosodi-n-Propylamine	<5.0
2-Chloronaphthalene	<5.0	N-Nitroso-di-Phenylamine	<5.0
2-Chlorophenol	<5.0	Naphthalene	<5.0
4-Chlorophenylphenyl-Ether	<5.0	2-Nitroaniline	<20
Chrysene	<5.0	3-Nitroaniline	<20
Di-n-Butylphthalate	<5.0	4-Nitroaniline	<20
Di-n-Octylphthalate	<5.0	Nitrobenzene	<5.0
Dibenzo (a,h) Anthracene	<5.0	2-Nitrophenol	<5.0
Dibenzofuran	<5.0	4-Nitrophenol	<20
1,2-Dichlorobenzene	<5.0	Pentachlorophenol	<20
1,3-Dichlorobenzene	<5.0	Phenanthrene	{ 28 }
1,4-Dichlorobenzene	<5.0	Phenol	<5.0
3,3'-Dichlorobenzidine	<20	Pyrene	<5.0
2,4-Dichlorophenol	<5.0	1,2,4-Trichlorobenzene	<5.0

{ SEMI-VOLATILE ORGANICS }
{ USEPA-8270 B/N/A SCAN }

{ EARTH TECH - OAK RIDGE }
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 17-May-1995 Sampling
Sample: BC1MW2GW6

Submittal Number 32429- 11
Date Sampled: 05/17/95 Time: 09:20
Date Received: 05/17/95 Time: 13:45
Analysis Date: 05/31/95
Lab Sample No: 117910

Parameter	Result ug/l	Parameter	Result ug/l
Diethylphthalate	<5.0	2,4,5-Trichlorophenol	<50
Dimethylphthalate	<5.0	2,4,6-Trichlorophenol	<5.0

PRELIMINARY

FAX NO. 6105420435 EARTH TECH GR MI JUN- 6-95 TUE 14:22

ANALYTICAL REPORT

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 17-May-1995 Sampling

Submittal Number: 32429- 11
Location:
CCS Number .00
CCS Manager: Jack Briegel

	BC1MW2GW6	Reporting Limit	Units
Lab Sample No:	117910		
Arsenic, Total	53	1.0	ug/l
Cadmium, Total	<0.2	0.2	ug/l
Chromium, Total	<50	50	ug/l
Copper, Total	<10	10	ug/l
Lead, Total	<1.0	1.0	ug/l
Mercury, Total	<0.2	0.2	ug/l
Selenium, Total	<2.0	2.0	ug/l
Silver, Total	<0.2	0.2	ug/l
Zinc, Total	<20	20	ug/l
Antimony, Total	<2.0	2.0	ug/l
Beryllium, Total	<10	10	ug/l
Nickel, Total	<10	10	ug/l
Thallium, Total	<2.0	2.0	ug/l
Barium, Total	180	10	ug/l
Semi-Volatile Organics USEPA-8270 B/N/A Scan	Enclosed		
Volatile Organics USEPA-8260	Enclosed		
Sampled by:	J.Briegel		
Date Sampled:	05/17/95		
Time Sampled:	09:20		
Date Received:	05/17/95		
Time Received:	13:45		

PRELIMINARY

{ VOLATILE ORGANICS }
{ USEPA-8260 }

{ EARTH TECH - OAK RIDGE }
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 17-May-1995 Sampling
Sample: BC1MW2GW6

Submittal Number 32429- 11
Date Sampled: 05/17/95 Time: 09:20
Date Received: 05/17/95 Time: 13:45
Analysis Date: 05/23/95
Lab Sample No: 117910

Parameter	Result ug/l	Parameter	Result ug/l
1,2-Dichloroethylene-(total)	<2.0	Chlorobenzene	<1.0
1,1-Dichloroethylene	<1.0	Chloroethane	<1.0
1,1-Dichloroethane	<1.0	Chloroform	<1.0
1,1,1-Trichloroethane	<1.0	Chloromethane	<1.0
1,2-Dichloroethane	<1.0	cis-1,3-Dichloropropylene	<1.0
1,2-Dichloropropane	<1.0	Dibromochloromethane	<1.0
1,1,2,2-Tetrachloroethane	<1.0	Ethylbenzene	<1.0
1,1,2-Trichloroethane	<1.0	2-Butanone (MEK)	<50
2-Chloroethyl Vinyl Ether	<10	Methylene Chloride	<1.0
2-Hexanone	<50	Styrene	<1.0
4-Methyl-2-Pentanone	<50	Tetrachloroethylene	<1.0
Acetone	<50	Toluene	<1.0
Benzene	<1.0	trans-1,3-Dichloropropene	<1.0
Bromomethane	<1.0	Trichloroethylene	<1.0
Bromodichloromethane	<1.0	Vinyl Acetate	<10
Bromoform	<1.0	Vinyl Chloride	<1.0
Carbon Disulfide	<5.0	Xylene, Total	<3.0
Carbon Tetrachloride	<1.0		

PRELIMINARY

DATA VALIDATION REPORT
INORGANIC METALS (Priority Pollutants) ANALYSES
EPA CLP ILM03.0
Case#: 500639 SDG#: 936480
Battle Creek, Michigan

Samples:

BCER1	BCER2	BCFB1	BCFB2
BCMW1GW4	BCMW2GW4	BC3MW1GW4	BC3MW3GW4
BC3MW4GW4	BC3MW5GW4	BC3MW6GW4	BCMW11GW4
BCMW12GW4	BCMW13GW4	BCMW14GW4	BCMW16GW4
BCMW18GW4	BCMW3GW4	BCMW4GW4	BC3MW17GW4

I. **Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

II. **Calibration:** Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA. No qualifiers were added to the data due to calibration error.

III. **Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of several elements. Sample results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

Sample ID #	Compound	Qualifier
BCER1	Zn	B
BCER2	Zn	B
BCFB2	Zn	B
BCMW1GW4	Fe	B
	Zn	B
BCMW2GW4	Cu	B
	Zn	B
BC3MW1GW4	As	B
	Zn	B
BC3MW3GW4	Fe	B

Sample ID #	Compound	Qualifier
	Zn	B
BCER7	Pb	B
BC3MW4GW4	Zn	B
BC3MW5GW4	As	B
	Fe	B
	Mn	B
	Zn	B
BC3MW6GW4	Zn	B
BCMW11GW4	Cu	B
	Tl	B
	Zn	B
BCMW12GW4	Cu	B
	Tl	B
	Zn	B
BCMW13GW4	As	B
	Cu	B
	Zn	B
BCMW14GW4	As	B
	Tl	B
	Zn	B
BCMW3GW4	Cu	B
	Zn	B
BCMW4GW4	Cu	B
	Mn	B
	Tl	B
	Zn	B
BC3MW17GW4	As	B
	Fe	B
BCMW16GW4	Zn	B
BCMW18GW4	Be	B

IV. ICP Interference Check Sample (ICS) Analyses: Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

V. **Duplicate Sample Analyses:** Acceptable/All criteria met

All duplicate sample analyses were found to be within control limits. No qualifiers were added to the data.

VI. **Spike Analyses:** Acceptable/All criteria met

One compound was found to be outside control limits in matrix spike analysis: cadmium. Cadmium was not detected in any sample in the package. In all samples, cadmium was qualified "UJ", not detected, estimated.

VII. **Serial Dilutions:** Acceptable/All criteria met

Serial dilution analysis indicated two elements outside control limits: iron and zinc. No sample detects were found to be > 50 x IDL. No qualifiers were added to the data.

VIII. **Laboratory Control Sample (LCS) Analyses:** Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%. No qualifiers were added to the data.

DATA VALIDATION REPORT
INORGANIC METALS (Priority Pollutants) ANALYSES
EPA CLP ILM03.0
Case#: 500639 SDG#: 936485
Battle Creek, Michigan

Samples:

BCER3	BC2MW1GW4	BC3MW2GW4	BCMW15GW4
BCMW5GW4	BCMW6GW9	BCMW7GW9	BCMW8GW9
BCMW9GW4			

I. Sample Holding Times: Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

II. Calibration: Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA. No qualifiers were added to the data due to calibration error.

III. Blank Analyses: Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of barium. Results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

Sample ID #	Compound	Qualifier
BC2MW1GW4	Ba	B
BC3MW2GW4	Ba	B
BCMW15GW4	Ba	B
BCMW5GW4	Ba	B
BCMW6GW4	Ba	B
BCMW7GW4	Ba	B
BCMW8GW4	Ba	B
BCMW9GW4	Ba	B

IV. ICP Interference Check Sample (ICS) Analyses: Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

V. Laboratory Control Sample (LCS) Analyses: Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%, with one exception: Silver indicated %recovery of 67.5%. No qualifiers were added to the data.

VI. Spike/Duplicate: Acceptable/All criteria met

Three elements were found to be outside control limits for %recovery in matrix spike analysis: lead, thallium, and iron. Sample detects were qualified as follows:

Sample ID #	Element	Qualifier
BCER3	Fe	UJ
	Pb	UJ
	Tl	UJ
BC2MW1GW4	Fe	J
	Pb	UJ
	Tl	UJ
BC3MW2GW4	Fe	J
	Pb	UJ
	Tl	UJ
BCMW5GW4	Fe	J
	Pb	UJ
	Tl	UJ
BCMW6GW4	Fe	J
	Pb	UJ
	Tl	UJ
BCMW7GW4	Fe	J
	Pb	UJ
	Tl	UJ
BCMW8GW4	Fe	J
	Pb	UJ
	Tl	UJ
BCMW9GW4	Fe	J
	Pb	UJ
	Tl	UJ

VII. Duplicate analyses: Acceptable/All criteria met

All duplicate sample analyses were found to be within control limits. No qualifiers were added to the data.

VIII. Serial Dilutions: Acceptable/All criteria met

Serial dilution analysis indicated five elements outside control limits: Al, Fe, Mn, Na, and Zn. No sample contained any of these analytes at concentrations > 50 x IDL. No qualifiers were added to the data.

DATA VALIDATION REPORT
INORGANIC METALS (LEAD) ANALYSES
EPA CLP ILM03.0
Case#: 500639 SDG#: 958857
Battle Creek, Michigan

Samples:

BCER6 BCER7

I. **Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

II. **Calibration:** Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA. No qualifiers were added to the data due to calibration error.

III. **Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of lead. Results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

Sample ID #	Compound	Qualifier
BCER6	Pb	B
BCER7	Pb	B

IV. **ICP Interference Check Sample (ICS) Analyses:** Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

V. **Laboratory Control Sample (LCS) Analyses:** Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%. No qualifiers were added to the data.

Matrix Spike tests were not performed.
Duplicate analyses were not performed.
Serial Dilutions were not performed.

DATA VALIDATION REPORT
INORGANIC METALS (PRIORITY POLLUTANTS) ANALYSES
EPA CLP ILM03.0
Case#: 500639 SDG#: 295884
Battle Creek, Michigan

Samples:

BCER3	BCER5	BCFB3	BCFB6

I. **Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

II. **Calibration:** Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA. No qualifiers were added to the data due to calibration error.

III. **Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of three elements: antimony, beryllium, and zinc. Results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

IV. **ICP Interference Check Sample (ICS) Analyses:** Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

V. **Laboratory Control Sample (LCS) Analyses:** Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%. No qualifiers were added to the data.

Matrix Spike tests were not performed.
Duplicate analyses were not performed.
Serial Dilutions were not performed.

DATA VALIDATION REPORT
INORGANIC METALS (LEAD) ANALYSES
EPA CLP ILM03.0
Case#: 500639 SDG#: 983913
Battle Creek, Michigan

Samples:

1MW22022 1MW21012

I. **Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

II. **Calibration:** Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA. No qualifiers were added to the data due to calibration error.

III. **Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated no presence of lead. No qualifiers were added to the data.

IV. **ICP Interference Check Sample (ICS) Analyses:** Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

V. **Duplicates:** Acceptable/All criteria met

Duplicate analysis indicated lead was outside control limits of (+/-)2x CRDL for %RPD. Both samples were qualified "J", estimated, based on duplicate sample analysis.

VI. **Spike Analysis:** Acceptable/All criteria met

All spike recoveries were found to be within control limits. No qualifiers were added to the data.

VII. Serial Dilutions: Acceptable/All criteria met

All serial dilution results did not apply to the detected concentrations of lead, as detects were < 50 x IDL. No qualifiers were added to the data.

VIII. Laboratory Control Sample (LCS) Analyses: Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%. No qualifiers were added to the data.

DATA VALIDATION REPORT
INORGANIC METALS (LEAD) ANALYSES
EPA CLP ILM03.0
Case#: 500639 SDG#: 938939
Battle Creek, Michigan

Sample:

BCER02

I. **Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

II. **Calibration:** Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA. No qualifiers were added to the data due to calibration error.

III. **Blank Analyses:** Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of lead. Results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

Sample ID #	Compound	Qualifier
BCER02	Pb	B

IV. **ICP Interference Check Sample (ICS) Analyses:** Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

V. **Laboratory Control Sample (LCS) Analyses:** Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%. No qualifiers were added to the data.

Matrix Spike tests were not performed.
Duplicate analyses were not performed.
Serial Dilutions were not performed.

DATA VALIDATION REPORT
INORGANIC METALS (Priority Pollutants) ANALYSES
EPA CLP ILM03.0
Case#: 50063 SDG#: 983957
Battle Creek, Michigan

Samples:

BCBGSS04	BCBGSS01	BCBGSS02	BCBGSS03
BCBG20507	BCBG30507	BCBG40507	BCBG10507
BC1SS14	BC1SS11	BC1SS12	BC1SS13
BCBGSS03D			

I. Sample Holding Times: Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

II. Calibration: Acceptable/With the following exceptions:

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA, with one exception; initial calibration of sample BCBG30507 indicated %recovery for thallium of 111.5%. Thallium was qualified "UJ", not detected, estimated for this sample. No other qualifiers were added to the data due to calibration error.

III. Blank Analyses: Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of beryllium. Results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

Sample ID #	Compound	Qualifier
BCBGSS02	Be	B
BCBG20507	Be	B
BCBG30507	Be	B
BCBG40507	Be	B
BCBG10507	Be	B

IV. ICP Interference Check Sample (ICS) Analyses: Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the 80-120% recovery range. No qualifiers were added to the data.

V. **Serial Dilution Analysis:** Acceptable/All criteria met

Five-fold serial dilution analysis indicated four analytes outside control limits; Antimony, beryllium, selenium, and nickel. All detected concentrations of these elements were < IDL, and no qualifiers were added to the data.

VI. **Duplicate Sample Analysis:** Acceptable/All criteria met

Duplicate sample analysis indicated two analytes outside control limits; arsenic and chromium. The following qualifiers were added to the following analytes, based on results of duplicate sample analysis:

Sample ID #	Compound	Qualifier
BCBGSS04	As	J
	Cr	J
BCBGSS01	As	J
BCBGSS02	As	J
BCBGSS02	As	J
BCBGSS03	As	J
BCBG20507	As	J
BCBG30507	As	J
BCBG40507	As	J
BCBG10507	As	J
BC1SS14	As	J
BC1SS11	As	J
BC1SS12	As	J
BC1SS13	As	J
BCBGSS03D	As	J

VII. **Spike Analysis:** Matrix spike analysis indicated several elements outside control limits for low %RPD: Antimony, selenium, silver, zinc, and arsenic. Data were qualified "J", estimated, where detected, and "UJ", not detected, estimated, where not detected:

Sample ID #	Compound	Qualifier
BCBGSS04	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R
BCBGSS01	Se	UJ
	Ag	UJ
	Zn	J

Sample ID #	Compound	Qualifier
	Sb	R
BCBGSS02	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R
BCBGSS03	Se	J
	Ag	UJ
	Zn	J
	Sb	J
BCBG20507	Se	UJ
	Ag	UJ
	Zn	J
	Sb	J
BCBG30507	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R
BCBG40507	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R
BCBG10507	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R
BC1SS14	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R
BC1SS11	Se	J
	Ag	UJ
	Zn	J
	Sb	R
BC1SS12	Se	J
	Ag	UJ
	Zn	J
	Sb	R

Sample ID #	Compound	Qualifier
BC1SS13	Se	J
	Ag	UJ
	Zn	J
	Sb	R
BCBGSS03D	Se	UJ
	Ag	UJ
	Zn	J
	Sb	R

Data for antimony were qualified "R", unusable, where antimony was not detected, due to very low recoveries in spike analysis.

VIII. Laboratory Control Sample (LCS) Analyses: Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125% with one exception: silver was found to have 0% recovery. No qualifiers were added to the data.

DATA VALIDATION REPORT
INORGANIC METALS (Priority Pollutants) ANALYSES
EPA CLP SW-846 ILM03.0
Case#: 50063 SDG#: 298397
Battle Creek, Michigan

Samples:

BC2MW1GW5	BCMW4GW5	BC1MW1GW5D	BCFB01
BCFB02	BCMW16GW5	BC1MW1GW5	

I. Sample Holding Times: Acceptable/All criteria were met.

All samples were analyzed within the required holding time of 180 days. No qualifiers were added to the data.

II. Calibration: Acceptable/All criteria were met.

The required number of standards for the initial calibration were analyzed. All correlation coefficients were equal to or greater than 0.995.

The laboratory analyzed a continuing calibration verification (CCV) standard at the required frequency of one every ten samples. The percent recoveries of the CCV associated with the environmental sample results were within control limits of 90-110% for ICP and GFAA, with the exception of thallium. No detects > IDL were reported, and no qualifiers were added to the data due to calibration error.

III. Blank Analyses: Acceptable/With the following exceptions:

Method and Preparation blank analysis indicated the presence of many elements in associated method blanks. Results greater than IDL and less than 5 times blank concentration were qualified "B", blank contamination:

Sample ID #	Compound	Qualifier
BCFB01	Al	B
	Ba	B
	Ca	B
	Cu	B
	Fe	B
	Pb	B
	Mg	B
	Mn	B
	K	B
	Na	B

Sample ID #	Compound	Qualifier
	Zn	B
BCFB02	Al	B
	Ca	B
	Fe	B
	Pb	B
	Mg	B
	Mn	B
	K	B
	Na	B
	Zn	B
BC2MW1GW5	Al	B
	Ba	B
	Ca	B
	Co	B
	Cu	B
	Mg	B
	Ni	B
	K	B
BCMW4GW5	Al	B
	Ba	B
	Ca	B
	Cu	B
	Mg	B
	K	B
	Zn	B
BC1MW3GW5	Al	B
	Ba	B
	Ca	B
	Cu	B
	Pb	B
	Mg	B
	K	B
	Na	B
	Zn	B
B1MW1GW5D	Al	B
	Ba	B
	Ca	B

Sample ID #	Compound	Qualifier
	Cu	B
	Mg	B
	K	B
	Na	B
	Zn	B
BCMW16GW5	Al	B
	Ba	B
	Ca	B
	Cu	B
	Mg	B
	K	B
	Zn	B
BC1MW1GW5	Al	B
	Ba	B
	Ca	B
	Cu	B
	Mg	B
	K	B
	Zn	B

IV. ICP Interference Check Sample (ICS) Analyses: Acceptable/All criteria met

Interference check samples were analyzed at the beginning and end of each ICP analytical run. The percent recoveries were within the required 80-120% recovery range. No qualifiers were added to the data.

V. Laboratory Control Sample (LCS) Analyses: Acceptable/All criteria met

LCS analysis was performed, and all %recoveries were found to be within control limits of 75-125%. No qualifiers were added to the data.

VI. Spike Analyses: Matrix spike analysis indicated two elements outside of control limits for %recovery: thallium and mercury. No detects were reported for either element in any sample. "UJ", not detected, estimated, qualifiers were added to the data for thallium and mercury in all samples in the SDG.

VII. Duplicate Analyses: Duplicate sample analysis indicated several elements outside control limits for RPD. Detects for these elements were qualified "J", estimated, and non-detects were qualified "UJ", not detected, estimated, as follows:

Sample ID #	Compound	Qualifier
BC2MW1GW5	Fe	J
	Zn	J
BCMW4GW5	Fe	UJ
BC1MW3GW5	Fe	J
B1MW1GW5D	Fe	UJ
BCMW16GW5	Fe	UJ
BC1MW1GW5	Fe	UJ

VIII. Serial Dilutions: Acceptable/All criteria met

Serial dilution analysis indicated several elements outside control limits. None of the elements outside control limits were present in any sample at concentrations > 50 times IDL. No qualifiers were added to the data.

DATA VALIDATION REPORT
SEMIVOLATILE ORGANIC COMPOUND ANALYSES
EPA CLP 3/90 SOW OLM01.9
Case#: 29588 SDG#: 00003
Battle Creek, Michigan

Samples:

BCER5	BCER6	BCER7	BCFB3
BCFB6			

I. **Sample Holding Times:** Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

II. **GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

III. **Initial and Continuing Calibration:** Acceptable/All criteria met.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly. No qualifiers were added to the data based on initial calibrations.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). The following compound exhibited a percent difference (%D) value greater than the required value of (+/-) 25% in the corresponding sample (BCER7) analysis: 2,4,6-Tribromophenol. 2,4,6-Tribromophenol was qualified "UJ" in the sample.

IV. **Blank Analyses:** Acceptable/All criteria met.

Method blanks were analyzed at the required frequency. No target analytes were detected in the associated method blanks. Qualifiers were not added to the data.

V. **Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits. No qualifiers were added to the data.

VI. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria met.

All matrix spike analyses were within control limits. No qualifiers were added due to MS/MSD results.

VII. Internal Standards Performance: Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of >100% or <50% of the continuing calibration internal standard area, and all internal retention times were within (+/-) 30 seconds of the associated continuing calibration internal standard retention time.

VIII. System Performance: Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

DATA VALIDATION REPORT
SEMIVOLATILE ORGANIC COMPOUND ANALYSES
EPA CLP 3/90 SOW OLM01.9
Case#: 29839 SDG#: 00005
Battle Creek, Michigan

Samples:

BCFB01	B1MW1GW5D	BC1MW1GW5	BC1MW3GW5
BCFB02	BC2MW1GW5	BCMW16GW5	

I. **Sample Holding Times:** Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

II. **GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

III. **Initial and Continuing Calibration:** Acceptable/With the following exceptions.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly. No qualifiers were added for initial calibrations.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). The following analytes exhibited percent difference (%D) values greater than the required value of (+/-) 25% in the corresponding samples' analyses: BCFB01, BCFB02; 2,4-dinitrophenol, 4-nitrophenol, bis(2-ethylhexyl)phthalate, di-n-octylphthalate; BC1MW1GW5, BC1MW3GW5, BCMW4GW5; 2,2'-oxybis(1-chloropropane), 4-chloroaniline, benzo(k)fluoranthene; B1MW1GW5D; bis(2-chlorethyl)ether, N-nitroso-di-n-propylamine, hexachlorobutadiene, 4-nitrophenol, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, 4-chloro-2(phenylmethyl)phenol. None of the samples contained detects of these analytes, all associated samples were qualified "UJ".

IV. **Blank Analyses:** Acceptable/All criteria met.

Method blanks were analyzed at the required frequency. No target analytes were detected in the associated method blanks. No qualifiers were added to the data.

V. **Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits. No qualifiers were added to the data.

VI. Matrix Spike/Matrix Spike Duplicate:

NOT PERFORMED.

VII. Internal Standards Performance: Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of >100% or <50% of the continuing calibration internal standard area, and all internal retention times were within (+/-) 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers added.

VIII. System Performance: Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

DATA VALIDATION REPORT
SEMIVOLATILE ORGANIC COMPOUND ANALYSES
EPA CLP 3/90 SOW OLM01.9
Case#: 29839 SDG#: 00038
Battle Creek, Michigan

Sample:

BCER02

I. **Sample Holding Times:** Acceptable/All criteria met.

The sample was extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

II. **GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

III. **Initial and Continuing Calibration:** Acceptable/All criteria met

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly. No qualifiers were added to the data based on initial calibrations.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). The following seven analytes exhibited a percent difference (%D) value greater than the required value of (+/-) 25% in the corresponding sample (BCER02) analysis: Pentachlorophenol, 4-nitroaniline, hexachlorobenzene, pyrene, butylbenzylphthalate, bis (2-ethylhexyl) phthalate, and di-n-octylphthalate. The sample contained no detects for these compounds, the compounds were qualified "UJ".

IV. **Blank Analyses:** Acceptable/All criteria met.

Method blanks were analyzed at the required frequency. No target analytes were detected in the associated method blanks. Qualifiers were not added to the data.

V. **Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits. No qualifiers were added to the data.

VI. **Matrix Spike/Matrix Spike Duplicate:**

NOT PERFORMED.

VII. Internal Standards Performance: Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of >100% or <50% of the continuing calibration internal standard area, and all internal retention times were within (+/-) 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers were added to the data.

VIII. System Performance: Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

DATA VALIDATION REPORT
SEMIVOLATILE ORGANIC COMPOUND ANALYSES
EPA CLP 3/90 SOW OLM01.9
Case#: 29839 SDG#: 00043
Battle Creek, Michigan

Samples:

1MW21012	1MW22022	BC1SS11	BC1SS12
BC1SS13	BC1SS14	BCBG10507	BCBG20507
BCBG30507	BCBG40507	BCBGSS01	BCBGSS02
BCBGSS03	BCBGSS03D	BCBGSS04	BCBGSS04DL
BCBGSS03DL	BCBGSS03DDL		

I. **Sample Holding Times:** Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

II. **GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

III. **Initial and Continuing Calibration:** Acceptable/All criteria met.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). Many analytes were outside the control limit of (+/-) 25% for %difference for several instruments. None of the samples contained detects for any of these analytes, the analytes were qualified "UJ" in the associated samples.

IV. **Blank Analyses:** Acceptable/All criteria met.

Method blanks were analyzed at the required frequency. Target analytes were detected in some associated method blanks, and "B", blank contamination, qualifiers were added to the data as follows:

Sample ID #	Compound	Qualifier
1MW21012	di-n-butylphthalate	B
1MW22022	di-n-butylphthalate	B

V. **Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits, with the following exceptions: BC1SS12 (PHL high recovery), BCBG20507 (PHL high recovery), and BCBGSS02 (PHL high recovery). No qualifiers were added to the data.

VI. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria met.

All matrix spike analyses were within control limits, with three exceptions: % Recoveries were high for pyrene in both the spike and duplicate, and %RPDs were outside limits for 1,4-dichlorobenzene and acenaphthene. No qualifiers were added due to MS/MSD results alone.

VII. **Internal Standards Performance:** Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of >100% or <50% of the continuing calibration internal standard area, and all internal retention times were within (+/-) 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers added.

VIII. **System Performance:** Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

DATA VALIDATION REPORT
SEMIVOLATILE ORGANIC COMPOUND ANALYSES
EPA CLP 3/90 SOW OLM01.9
Case#: 28743 SDG#: 00064
Battle Creek, Michigan

Samples:

BCMW9GW4	BC2MW1GW4	BCMW5GW4	BCMW6GW4
BC3MW2GW4	BCER3	BCMW15GW4	BCMW8GW4
BCMW7GW4	BCER4		

I. Sample Holding Times: Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

II. GC/MS Instrument Performance Check: Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

III. Initial and Continuing Calibration: Acceptable/All criteria met.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly, with one exception: Benzoic acid was found to be outside control limits for %RSD. One sample (BCMW9GW4) was found to contain benzoic acid, and the data was qualified "J", estimated. No other qualifiers were added due to initial calibrations.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). The following analytes exhibited percent difference (%D) values greater than the required value of (+/-) 25% in the corresponding samples' analyses: Samples BCMW15GW4, BCMW7GW4, BCER3, BCER4, and BCMW8GW4; benzo(g,h,i)perylene. Samples BCMW5GW4, BCMW6GW4, BC2MW1GW4, and BCMW9GW4; benzoic acid and bis (2-ethylhexyl) phthalate. None of the samples contained detects for these analytes, the associated analytes were qualified "UJ".

IV. Blank Analyses: Acceptable/All criteria met.

Method blanks were analyzed at the required frequency. Target analytes were detected in the associated method blanks. Qualifiers were added to the data as follows:

Sample ID #	Compound	Qualifier
BCMW9GW4	di-n-butyl phthalate	B
	bis(2-ethylhexyl) phthalate	B
BC2MW1GW4	di-n-butyl phthalate	B
	bis(2-ethylhexyl) phthalate	B

Sample ID #	Compound	Qualifier
BC3MW2GW4	di-n-butyl phthalate	B
	bis(2-ethylhexyl) phthalate	B
BCMW5GW4	di-n-butyl phthalate	B
	bis(2-ethylhexyl) phthalate	B
BCMW6GW4	di-n-butyl phthalate	B
	bis(2-ethylhexyl) phthalate	B

V. **Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits. No qualifiers were added to the data.

VI. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria met.

All matrix spike analyses were within control limits. No qualifiers were added due to MS/MSD results alone.

VII. **Internal Standards Performance:** Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of >100% or <50% of the continuing calibration internal standard area, and all internal retention times were within (+/-) 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers added.

VIII. **System Performance:** Acceptable.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

DATA VALIDATION REPORT
SEMIVOLATILE ORGANIC COMPOUND ANALYSES
EPA CLP 3/90 SOW OLM01.9
Case#: 29588 SDG#: 00082
Battle Creek, Michigan

Samples:

B1B110001	B1B111923	B1B11923D	B1B181517
B1B190001	B1B192022	BC1B70001	BC1B71012
BC1B90001			

I. **Sample Holding Times:** Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

II. **GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

III. **Initial and Continuing Calibration:** Acceptable/All criteria met.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly, with one exception: all initial calibrations were outside control limits for one compound, 2,4-dinitrophenol. No detects were reported for 2,4-dinitrophenol, and no qualifiers were added to the data.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (>0.05). One compound exhibited a percent difference (%D) value greater than the required value of (+/-) 25% in the corresponding samples' analyses: 4-nitrophenol. None of the samples contained detects for 4-nitrophenol, 4-nitrophenol was qualified "UJ" in the associated samples.

Blank Analyses: Acceptable/All criteria met.

Method blanks were analyzed at the required frequency. No target analytes were detected in the associated method blanks. Qualifiers were not added to the data.

V. **Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits. No qualifiers were added to the data.

VI. Matrix Spike/Matrix Spike Duplicate: Acceptable/All criteria met.

All matrix spike analyses were within control limits, with the following exceptions: phenol, 4-nitrophenol, and 2,4-dinitrotoluene all exhibited %recoveries above the upper control limits. No detects were reported for any of these analytes, and no qualifiers were added due to MS/MSD results alone.

VII. Internal Standards Performance: Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of >100% or <50% of the continuing calibration internal standard area, and all internal retention times were within (+/-) 30 seconds of the associated continuing calibration internal standard retention time.

VIII. System Performance: Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

DATA VALIDATION REPORT
SEMIVOLATILE ORGANIC COMPOUND ANALYSES
EPA CLP SOW 3/90 OLM01.9
Case#: 500639 SDG#: 03
Battle Creek, Michigan

Samples:

BCMW1GW4	BCMW2GW4	BCMW16GW4	BCMW3GW4
BCMW13GW4	C3MW17GW4	BCFB2	BCMW14GW4
BC3MW6GW4	BCMW11GW4	BC3MW4GW4	BCER2
BC3MW3GW4	BC3MW5GW4	BCMW12GW4	BC3MW1GW4
BCMW4GW4	BCMW18GW4	BC3MW3GW4RE	BCFB1
BCMW11GW4RE	BCER1		

I. Sample Holding Times: Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days, with two exceptions: repeated analysis of BC3MW3GW4 (BC3MW3GW4RE) and BCMW11GW4 (BCMW11GW4) took place outside of required holding times. All nondetects in these samples were qualified "UJ", not detected, estimated, and all detects were qualified "J", estimated.

II. GC/MS Instrument Performance Check: Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

III. Initial and Continuing Calibration: Acceptable/All criteria were met.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). The following analytes exhibited percent difference (%D) values greater than the required value of (+/-) 25% in the corresponding samples' analyses: Samples BCER1, BCFB1, BCFB2, BCMW1GW4; bis (2-chloroisopropyl)ether, benzoic acid, 4-chloroaniline, 2-nitroaniline, benzo(k)fluoroanthene, and benzo (g,h,i) perylene. Samples BCER2, BCMW16GW4, BCMW3GW4, BCMW11GW4, BCMW12GW4, BCMW13GW4, BC3MW4GW4, BC3MW5GW4, BC3MW6GW4, BCMW2GW4, BC3MW1GW4, BC3MW3GW4; benzoic acid, 2-nitroaniline, butylbenzylphthalate, and benzo (k) fluoranthene. Samples BC3MW3GW4RE, BCMW12GW4RE; benzoic acid. Samples BCMW14GW4, BCMW18GW4, BCMW4GW4; benzoic acid and bis (2-chlorethoxy) methane. Detected concentrations of these analytes were qualified "J", estimated, and nondetects were qualified "UJ".

IV. **Blank Analyses:** Acceptable/All criteria were met.

Method blanks were analyzed at the required frequency. Several analytes were detected in method blanks associated with the environmental samples, and "B", blank contamination, qualifiers were added to the data as follows:

Sample ID #	Compound	Qualifier
BC3MW4GW4	di-n-butylphthalate	B
	bis(2-ethylhexyl)phthalate	B
BC3MW3GW4	di-n-butylphthalate	B
	bis(2-ethylhexyl)phthalate	B
BC3MW6GW4	di-n-butylphthalate	B
	bis(2-ethylhexyl)phthalate	B
BCMW11GW4	di-n-butylphthalate	B
	bis(2-ethylhexyl)phthalate	B
BCMW12GW4	di-n-butylphthalate	B
BCMW13GW4	di-n-butylphthalate	B
BCMW14GW4	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BCMW16GW4	di-n-butylphthalate	B
BCER1	di-n-butylphthalate	B
BCER2	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BCFB1	di-n-butylphthalate	B
BCFB2	di-n-butylphthalate	B
BCMW1GW4	di-n-butylphthalate	B
BCMW2GW4	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BC3MW1GW4	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BC3MW3GW4	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BCMW18GW4	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BCMW3GW4	di-n-butylphthalate	B
BCMW4GW4	bis(2-ethylhexyl)phthalate	B
	di-n-butylphthalate	B
BC3MW17GW4	di-n-butylphthalate	B

V. **Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking compound recoveries were within control limits, with the following exceptions: Samples BC3MW3GW4RE, BCMW11GW4, and BCMW11GW4RE reported multiple surrogate recoveries outside control limits. Data were qualified as follows:

Sample ID #	Compound	Qualifier
BC3MW3GW4RE	phenol	R
	2-chlorophenol	R
	2-methylphenol	R
	4-methylphenol	R
	2-nitrophenol	R
	2,4-dimethylphenol	R
	2,4-dichlorophenol	R
	4-chloro-3-methylphenol	R
	2,4,6-trichlorophenol	R
	2,4,5-trichlorophenol	R
	2,4-dinitrophenol	R
	4-nitrophenol	R
	4,6-dinitro-2-methylphenol	R
	pentachlorophenol	R
	di-n-butylphthalate	J
	bis(2-ethylhexyl)phthalate	J
BCMW11GW4RE	phenol	R
	2-chlorophenol	R
	2-methylphenol	R
	4-methylphenol	R
	2-nitrophenol	R
	2,4-dimethylphenol	R
	2,4-dichlorophenol	R
	4-chloro-3-methylphenol	R
	2,4,6-trichlorophenol	R
	2,4,5-trichlorophenol	R
	2,4-dinitrophenol	R
	4-nitrophenol	R
	4,6-dinitro-2-methylphenol	R
	pentachlorophenol	R
	di-n-butylphthalate	J
	bis(2-ethylhexyl)phthalate	J
BCMW11GW4	phenol	R

Sample ID #	Compound	Qualifier
	2-chlorophenol	R
	2-methylphenol	R
	4-methylphenol	R
	2-nitrophenol	R
	2,4-dimethylphenol	R
	2,4-dichlorophenol	R
	4-chloro-3-methylphenol	R
	2,4,6-trichlorophenol	R
	2,4,5-trichlorophenol	R
	2,4-dinitrophenol	R
	4-nitrophenol	R
	4,6-dinitro-2-methylphenol	R
	pentachlorophenol	R

VI. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

All matrix spike analyses were within control limits. No qualifiers were added due to MS/MSD results alone.

VII. **Internal Standards Performance:** Acceptable/All criteria were met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of >100% or <50% of the continuing calibration internal standard area, and all internal retention times were within (+/-) 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers added.

VIII. **System Performance:** Acceptable/All criteria were met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

DATA VALIDATION REPORT
SEMIVOLATILE ORGANIC COMPOUND ANALYSES
EPA CLP SOW 3/90 OLM01.9
Case#: 29588 SDG#: 00006
Battle Creek, Michigan

Samples:

BC1B10001	BC1B10507	BC1B12022	BC1B20001
BC1B21012	BC1B22022	BC1B30001	BC1B32022
BC1B40001	BC1B41012	BC1B51012	BC1B52022
BC1B82022	B1B10001D	B1B151012	B1B122022
B1B120001	B1B50001	B1B50001D	B1B80001

I. **Sample Holding Times:** Acceptable/All criteria met.

All samples were extracted within the required holding time of 14 days, and analyzed within the required holding time of 40 days. No action taken.

II. **GC/MS Instrument Performance Check:** Acceptable/All criteria met.

DFTPP was analyzed at the beginning of each 12-hour analytical sequence, as required. All DFTPP ion abundance data were provided, and all results were within specified control limits.

III. **Initial and Continuing Calibration:** Acceptable/All criteria met.

All relative response factors (RRF) in the initial calibrations were above the 0.05 lower control limit. All %RSD (Percent Relative Standard Deviations) in initial calibrations were technically acceptable (< 30%) and were calculated correctly, with one exception: 2,4-dinitrophenol was found to be outside control limits for %RSD in the following samples: B1B151012, BC1B32022, and BC1B51012. No detects were reported for 2,4-dinitrophenol, and no qualifiers were added due %RSD less than 50%.

Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable (> 0.05). The following calibrations exhibited percent difference (%D) values greater than the required value of (+/-) 25% in the corresponding samples' analyses: B1B120001, B1B50001, B1B50001d, B1B80001, and BC1B40001: 4-nitrophenol; BC182022: 2,4-dinitrophenol, 2,2'-oxybis (1-chloropropane). None of the samples contained detects of these analytes, associated non-detects were qualified "UJ".

IV. **Blank Analyses:** Acceptable/All criteria met.

No compound sought in any environmental sample was detected in any method blank. No qualifiers were added to the data based on method blank contamination.

V. **Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking compound recoveries were within control limits. No qualifiers were added to the data.

VI. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria met.

All matrix spike analyses were within control limits No detects were reported for phenol, and no qualifiers were added due to MS/MSD results alone.

VII. **Internal Standards Performance:** Acceptable/All criteria met.

Analysis of areas and retention times for internal standards was conducted. All internal standard areas within the technical acceptance window of >100% or <50% of the continuing calibration internal standard area, and all internal retention times were within (+/-) 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers added.

VIII. **System Performance:** No qualifiers added.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control limits, and stable during the course of these analyses.

DATA VALIDATION REPORT
VOLATILE ORGANIC COMPOUND ANALYSES
EPA SW-846 8010/8020
CASE#: 29588 SDG#: 00001
Battle Creek, Michigan

Samples:

BCFB3 BCTB1

I. **Sample Holding Times:** Acceptable/All criteria were met.

All samples were initially analyzed within the required holding time of 14 days for preserved water samples. All samples were analyzed within 14 days of sampling. No action taken.

II. **Initial and Continuing Calibration:** Acceptable/With the following exceptions: Relative response factors (RRF)and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly. Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable.

Many analytes were found to be outside control limits in continuing calibrations, the analytes were not detected. Non-detects were qualified "UJ".

III. **Blank Analyses:** Acceptable/With the following exceptions:

Method blank analysis indicated several analytes were present in the method blanks associated with the samples. Analytes detected in the samples were qualified "B", blank contamination, according to the 5x/10x rule, as detailed below:

Sample ID #	Compound	Qualifier
BCTB1	methylene chloride	B
	p-xylene	B
	m-xylene	B
	1,2-dichlorobenzene	B
BCFB3	methylene chloride	B
	p-xylene	B
	m-xylene	B
	1,4-dichlorobenzene	B

IV. **Surrogate Recovery:** Acceptable/All criteria met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were required.

V. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria met.

All Matrix Spike/Matrix Spike Duplicate results were acceptable. No qualifiers required.

VI. **System Performance:** Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

DATA VALIDATION REPORT
VOLATILE ORGANIC COMPOUND ANALYSES
EPA SW-846 8240
Case: 29588 SDG: 00009
Battle Creek, Michigan

Samples:

B1B10001D	B1B120001	B1B122022	B1B151012
B1B150001D	B1B80001	BC1B10001	BC1B10507
BC1B12022	BC1B20001	BC1B21012	BC1B22022
BC1B30001	BC1B32022	BC1B40001	BC1B41012
BC1B50001	BC1B51012	BC1B52022	BC1B82022

I. Sample Holding Times: Acceptable/All criteria were met

All samples were analyzed within the required time of 14 days. No qualifiers were added to the data.

II. GC/MS Instrument Performance Check: Acceptable/All criteria were met.

Bromoflurobenzene (BFB) was analyzed at the beginning of each 12-hour analytical sequence, s required. All BFB ion abundance data were provided, and all results fell within allowable limits.

III. Initial and Continuing Calibration: Acceptable/With the following exceptions.

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly, with the following exceptions: Two analytes were found to be outside control limits for %difference: methylene chloride and acetone. Neither analyte was detected in any of the environmental samples, qualifiers were not added to the data since the %differences were less than 50%.

Continuing calibration was performed at the proper frequency, and all RRF were technically acceptable. Several analytes indicated %difference outside control limits. None of the analytes were detected in any of the environmental samples, the analytes were qualified "UJ" in associated samples.

IV. Blank Analyses: Acceptable/With the following exceptions.

Method blanks were analyzed at the required frequency. Several common contaminants were detected in the associated method blanks. "B", blank contamination, qualifiers were added to the data as a result of method blank contamination:

Sample ID #	Compound	Qualifier
B1B10001D	methylene chloride	B
	acetone	B
B1B120001	methylene chloride	B
	acetone	B

Sample ID #	Compound	Qualifier
B1B122022	methylene chloride	B
	acetone	B
B1B151012	methylene chloride	B
	acetone	B
B1B150001D	methylene chloride	B
B1B80001	methylene chloride	B
BC1B10001	methylene chloride	B
	acetone	B
BC1B10507	methylene chloride	B
BC1B12022	methylene chloride	B
	acetone	B
BC1B20001	methylene chloride	B
BC1B21012	methylene chloride	B
BC1B22022	methylene chloride	B
	acetone	B
BC1B30001	methylene chloride	B
BC1B32022	methylene chloride	B
	acetone	B
BC1B40001	methylene chloride	B
	acetone	B
BC1B41012	methylene chloride	B
BC1B50001	methylene chloride	B
	acetone	B
BC1B51012	methylene chloride	B
	acetone	B
BC1B52022	methylene chloride	B
	acetone	B
BC1B82022	methylene chloride	B
	acetone	B

V. **Surrogate Recovery:** Acceptable/All Criteria Met

All surrogate spiking analytes recoveries were within control limits. No qualifiers were added to the data.

VI. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All Criteria Met

All Matrix Spike and Matrix Spike Duplicate results were found to be within control limits. No qualifiers were added to the data.

VII. **Internal Standards Performance:** Acceptable/All criteria met.

All internal standard area counts were within the technical acceptance window of + 100% or -50%, and all internal retention times were within plus or minus 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers were added to the data.

VIII. **System Performance:** Acceptable/All criteria met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

DATA VALIDATION REPORT
VOLATILE ORGANIC COMPOUND ANALYSES
EPA SW-846 8240
Case: 29839 SDG: 00011
Battle Creek, Michigan

Samples:

1MW22022 1MW21012

I. Sample Holding Times: Acceptable/All criteria were met

All samples were analyzed within the required time of 14 days. No qualifiers were added to the data.

II. GC/MS Instrument Performance Check: Acceptable/All criteria were met.

Bromoflurobenzene (BFB) was analyzed at the beginning of each 12-hour analytical sequence, s required. All BFB ion abundance data were provided, and all results fell within allowable limits.

III. Initial and Continuing Calibration: Acceptable/All criteria were met.

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly, with two exceptions: acetone and methylene chloride were found to be outside control limits for %RSD. Acetone was qualified "J" in sample 1MW21012, acetone was qualified "UJ" in 1MW22022. Methylene chloride was previously qualified "B", blank contamination, for both samples.

Continuing calibration was performed at the proper frequency, and all RRF were technically acceptable. Three analytes indicated %difference outside control limits. No detects were reported for these analytes, the analytes were qualified "UJ" in the samples.

IV. Blank Analyses: Acceptable/All criteria were met.

Method blanks were analyzed at the required frequency. Water sample method blanks did not indicate any baseline blank contamination, with one exception: methylene chloride. "B", blank contamination, qualifiers were added to each detect as a result of method blank contamination.

Sample ID #	Compound	Qualifier
1MW22022	methylene chloride	B
1MW21012	methylene chloride	B

V. **Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were added to the data.

VI. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

Matrix Spike analysis results were all within control limits. No qualifiers were added to the data.

VII. **Internal Standards Performance:** Acceptable/All criteria were met.

All internal standard area counts were within the technical acceptance window of + 100% or -50%, and all internal retention times were within plus or minus 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers were added to the data.

VIII. **System Performance:** Acceptable/All criteria were met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

DATA VALIDATION REPORT
VOLATILE ORGANIC COMPOUND ANALYSES
EPA SW-846 8240
Case: 29839 SDG: 00036
Battle Creek, Michigan

Samples:

BCTB3 BCER02

I. **Sample Holding Times:** Acceptable/All criteria were met

All samples were analyzed within the required time of 14 days. No qualifiers were added to the data.

II. **GC/MS Instrument Performance Check:** Acceptable/All criteria were met.

Bromoflurobenzene (BFB) was analyzed at the beginning of the 12-hour analytical sequence, as required. All BFB ion abundance data were provided, and all results fell within allowable limits.

III. **Initial and Continuing Calibration:** Acceptable/All criteria were met.

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibration were technically acceptable and calculated correctly. No qualifiers were added to the data for initial calibration.

Continuing calibration was performed at the proper frequency, and all RRF were technically acceptable. Four analytes indicated %difference outside control limits: 1,1,1-TCA, carbon tetrachloride, bromodichloromethane, and 4-methyl-2-pentanone. No detects were reported for the analytes, the analytes were qualified "UJ" in the associated samples.

IV. **Blank Analyses:** Acceptable/All criteria were met.

Method blanks were analyzed at the required frequency. Water sample method blanks did not indicate any baseline blank contamination, with one exception: methylene chloride. "B", blank contamination, qualifiers were added to the data for both samples as a result of method blank contamination by methylene chloride.

Sample ID #	Compound	Qualifier
BCTB3	methylene chloride	B
BCER02	methylene chloride	B

V. **Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were added to the data.

VI. Matrix Spike/Matrix Spike Duplicate:

NOT PERFORMED.

VII. Internal Standards Performance: Acceptable/All criteria were met.

All internal standard area counts were within the technical acceptance window of + 100% or -50%, and all internal retention times were within plus or minus 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers were added to the data.

VIII. System Performance: Acceptable/All criteria were met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

DATA VALIDATION REPORT
VOLATILE ORGANIC COMPOUND ANALYSES
EPA SW-846 8010/8020
CASE#: 29588 SDG#: 00049
Battle Creek, Michigan

Samples:

BCFB6	BCER6	BCTB3	BCER5
BCTB2	BCTB4	BCER7	

I. **Sample Holding Times:** Acceptable/All criteria were met.

All samples were initially analyzed within the required holding time of 14 days for preserved water samples. No action taken.

II. **Initial and Continuing Calibration:** Acceptable/With the following exceptions: Relative response factors (RRF)and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly. Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable. Several analytes reported %differences outside acceptable ranges. All associated sample detects were qualified "J", non-detects were qualified "UJ".

III. **Blank Analyses:** Acceptable/With the following exception

Method blank analysis indicated several analytes were present in the method blanks associated with the samples. Analytes detected in the samples were qualified "B", blank contamination, according to the 5x/10x rule, as detailed below:

Sample ID #	Compound	Qualifier
BCER5	methylene chloride	B
BCER6	methylene chloride	B
BCER7	methylene chloride	B
BCFB6	methylene chloride	B
	chloromethane	B
	chloroform	B
	tetrachloroethene	B
	ethylbenzene	B
	p-xylene	B
	m-xylene	B
	1,4-dichlorobenzene	B
	1,2-dichlorobenzene	B
BCTB2	methylene chloride	B
	chloroform	B

Sample ID #	Compound	Qualifier
BCTB3	methylene chloride	B
	chloroform	B
BCTB4	methylene chloride	B
	chloroform	B

IV. **Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were required.

V. **Matrix Spike/Matrix Spike Duplicate:**

NOT PERFORMED.

VI. **System Performance:** Acceptable/All criteria were met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

DATA VALIDATION REPORT
VOLATILE ORGANIC COMPOUND ANALYSES
EPA SW-846 8240
Case: 29839 SDG: 00050
Battle Creek, Michigan

Samples:

BCBG10507	BCBG20507	BCBG30507	BCBG40507
BCBGSS01	BCBGSS02	BCBGSS03	BCBGSS04

I. **Sample Holding Times:** Acceptable/All criteria were met.

All samples were analyzed within the required time of 14 days. No qualifiers were added to the data.

II. **GC/MS Instrument Performance Check:** Acceptable/All criteria were met.

Bromoflurobenzene (BFB) was analyzed at the beginning of each 12-hour analytical sequence, as required. All BFB ion abundance data were provided, and all results fell within allowable limits.

III. **Initial and Continuing Calibration:** Acceptable/All criteria were met.

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly, with two exceptions: acetone and methylene chloride were found to be outside control limits for %RSD. All detects for methylene chloride and acetone were qualified "J", methylene chloride and acetone were detected in all samples.

Continuing calibration was performed at the proper frequency, and all RRF were technically acceptable. All %differences were within control limits, and no qualifiers were added to the data.

IV. **Blank Analyses:** Acceptable/All criteria were met.

Method blanks were analyzed at the required frequency. Methylene chloride and acetone were detected in the associated blanks, and "B", blank contamination, qualifiers were added to the data as a result of method blank contamination:

Sample ID #	Compound	Qualifier
BCBG10507	methylene chloride	B
	acetone	B
BCBG20507	methylene chloride	B
BCBG30507	methylene chloride	B
	acetone	B
BCBG40507	methylene chloride	B
	acetone	B

Sample ID #	Compound	Qualifier
BCBGSS01	methylene chloride	B
BCBGSS02	methylene chloride	B
BCBGSS03	methylene chloride	B
BCBGSS03D	methylene chloride	B
	acetone	B
BCBGSS04	methylene chloride	B

V. **Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were added to the data.

VI. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

One compound was found to be outside control limits for %RPD: Trichloroethene. No qualifiers were added to the data, as all detects were qualified "B", blank contamination previously.

VII. **Internal Standards Performance:** Acceptable/All criteria were met.

All internal standard area counts were within the technical acceptance window of + 100% or -50%, and all internal retention times were within plus or minus 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers were added to the data.

VIII. **System Performance:** Acceptable/All criteria were met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

DATA VALIDATION REPORT
VOLATILE ORGANIC COMPOUND ANALYSES
EPA SW-846 8240
Case: 29588 SDG: 00095
Battle Creek, Michigan

Samples:

B1B110001	B1B190001	BC1B70001	BC1B90001
B1B111923	B1B11923D	B1B192022	BC1B71012
B1B181517			

I. **Sample Holding Times:** Acceptable/All criteria were met

All samples were analyzed within the required time of 14 days. No qualifiers were added to the data.

II. **GC/MS Instrument Performance Check:** Acceptable/All criteria were met.

Bromoflurobenzene (BFB) was analyzed at the beginning of each 12-hour analytical sequence, as required. All BFB ion abundance data were provided, and all results fell within allowable limits.

III. **Initial and Continuing Calibration:** Acceptable/All criteria were met.

Relative response factors (RRF) and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly, with two exceptions: acetone and methylene chloride were found to be outside control limits for %RSD. All detects for both analytes were qualified "J", acetone and methylene chloride were detected in all samples.

Continuing calibration was performed at the proper frequency, and all RRF were technically acceptable. Many analytes indicated %differences outside control limits. None of the analytes were detected in any sample, the analytes were qualified "UJ" in the associated samples.

IV. **Blank Analyses:** Acceptable.

Method blanks were analyzed at the required frequency. Method blank analysis indicated the presence of two analytes in each blank: methylene chloride and acetone. "B", blank contamination qualifiers were added to the data as a result of method blank contamination:

Sample ID #	Compound	Qualifier
B1B110001	methylene chloride	B
	acetone	B
B1B190001	methylene chloride	B
	acetone	B
BC1B70001	methylene chloride	B

Sample ID #	Compound	Qualifier
BC1B90001	methylene chloride	B
B1B111923	methylene chloride	B
	acetone	B
B1B11923D	methylene chloride	B
	acetone	B
B1B192022	methylene chloride	B
	acetone	B
BC1B71012	methylene chloride	B
B1B181517	methylene chloride	B
	acetone	B

V. **Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were added to the data.

VI. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

All matrix spike and matrix spike duplicate results were within control limits. No qualifiers were added to the data.

VII. **Internal Standards Performance:** Acceptable/All criteria were met.

All internal standard area counts were within the technical acceptance window of + 100% or -50%, and all internal retention times were within plus or minus 30 seconds of the associated continuing calibration internal standard retention time. No qualifiers were added to the data.

VIII. **System Performance:** Acceptable

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

DATA VALIDATION REPORT
VOLATILE ORGANIC COMPOUND ANALYSES
EPA SW-846 8010/8020
CASE#: 28743 SDG#: 455
Battle Creek, Michigan

Samples:

BCMW1GW4	BCMW2GW4	BC3MW4GW4	BCMW13GW4
BC3MW17GW4	BC3MW6GW4	BCMW3GW4	BC3MW3GW4
BC3MW5GW4	BCMW18GW4	BCMW4GW4	BCTB1
BCTB4	BCER2	BCER1	BCMW11GW4
BCMW12GW4	BCMW16GW4	BC3MW1GW4	BCFB1

I. **Sample Holding Times:** Acceptable/All criteria were met.

All samples were initially analyzed within the required holding time of 14 days for preserved water samples. Confirmation analyses took place within required holding times. No qualifiers were added to the data.

II. **Initial and Continuing Calibration:** Acceptable/With the following exceptions:

Relative response factors (RRF)and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly. Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable. Several analytes reported %differences exceeding criteria. All associated sample detects were qualified "J", all non-detects were qualified "UJ".

III. **Blank Analyses:** Acceptable/With the following exceptions:

Method blank analysis indicated several analytes were present in the method blanks associated with the samples. Analytes detected in the samples were qualified "B", blank contamination, according to the 5x/10x rule, as detailed below:

Sample ID #	Compound	Qualifier
BCTB1	methylene chloride	B
BCMW1GW4	methylene chloride	B
BCMW2GW4	methylene chloride	B
BCFB1	methylene chloride	B
	ethylbenzene	B
	1,3-dichlorobenzene	B
	1,2-dichlorobenzene	B
	1,4-dichlorobenzene	B
BCMW16GW4	methylene chloride	B

Sample ID #	Compound	Qualifier
BC3MW4GW4	methylene chloride	B
	styrene	B
	1,4-dichlorobenzene	B
BCMW13GW4	methylene chloride	B
	toluene	B
	1,4-dichlorobenzene	B
BCER1	methylene chloride	B
	ethylbenzene	B
	1,3-dichlorobenzene	B
	1,4-dichlorobenzene	B
BC3MW17GW4	methylene chloride	B
	toluene	B
	p-xylene	B
	m-xylene	B
	1,4-dichlorobenzene	B
	1,2-dichlorobenzene	B
BC3MW6GW4	ethylbenzene	B
	p-xylene	B
	m-xylene	B
	1,3-dichlorobenzene	B
	1,4-dichlorobenzene	B
BCMW11GW4	methylene chloride	B
	1,4-dichlorobenzene	B
BCMW3GW4	methylene chloride	B
BCER2	methylene chloride	B
	ethylbenzene	B
	styrene	B
	1,3-dichlorobenzene	B
	1,4-dichlorobenzene	B
BC3MW3GW4	methylene chloride	B
BC3MW5GW4	methylene chloride	B
	benzene	B
	toluene	B
	ethylbenzene	B
BCMW12GW4	methylene chloride	B
	toluene	B
BC3MW1GW4	1,4-dichlorobenzene	B

Sample ID #	Compound	Qualifier
BCMW4GW4	methylene chloride	B
	benzene	B
	1,3-dichlorobenzene	B
	1,4-dichlorobenzene	B

IV. **Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were added to the data.

V. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

All Matrix Spike/Matrix Spike Duplicate results were within control limits. No qualifiers were added to the data.

VI. **System Performance:** Acceptable/All criteria were met.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

DATA VALIDATION REPORT
VOLATILE ORGANIC COMPOUND ANALYSES
EPA SW-846 / 8010/8020
CASE#: 28743 SDG#: 456
Battle Creek, Michigan

Samples:

BCMW9GW4	BCMW14GW4	BC2MW1GW4	BCMW5GW4
BC3MW2GW4	BCMW15GW4	BCMW8GW4	BCMW7GW4
BCTB5	BCTB6	BCER3	BCER4
BCFB2	BCMW6GW4		

I. **Sample Holding Times:** Acceptable/All criteria were met.

All samples were initially analyzed within the required holding time of 14 days from the date of sampling for preserved water samples. No action taken.

II. **Initial and Continuing Calibration:** Acceptable/With the following exceptions:

Relative response factors (RRF)and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly. Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable. All associated sample detects were qualified "J", all non-detects were qualified "UJ".

III. **Blank Analyses:** Acceptable/With the following exceptions:

Method blank analysis indicated several analytes were present in the method blanks associated with the samples. Analytes detected in the samples were qualified "B", blank contamination, according to the 5x/10x rule, as detailed below:

Sample ID #	Compound	Qualifier
BCMW9GW4	methylene chloride	B
	toluene	B
	ethylbenzene	B
	benzene	B
	o-xylene	B
BCMW14GW4	methylene chloride	B
	benzene	B
	toluene	B
	ethylbenzene	B
	o-xylene	B
	1,3-dichlorobenzene	B

Sample ID #	Compound	Qualifier
	1,4-dichlorobenzene	B
	1,2-dichlorobenzene	B
BC2MW1GW4	methylene chloride	B
	benzene	B
	o-xylene	B
	1,4-dichlorobenzene	B
	1,2-dichlorobenzene	B
BCMW5GW4	methylene chloride	B
	ethylbenzene	B
	benzene	B
	toluene	B
	o-xylene	B
BCMW6GW4	methylene chloride	B
	toluene	B
BC3MW2GW4	methylene chloride	B
	toluene	B
BCTB5	methylene chloride	B
	toluene	B
	o-xylene	B
	1,2-dichlorobenzene	B
BCTB6	methylene chloride	B
BCER3	methylene chloride	B
	benzene	B
	ethylbenzene	B
	m-xylene	B
	1,3-dichlorobenzene	B
	1,4-dichlorobenzene	B
	1,2-dichlorobenzene	B
BCMW15GW4	methylene chloride	B
BCMW8GW4	methylene chloride	B
	ethylbenzene	B
	o-xylene	B
	p-xylene	B
	1,3-dichlorobenzene	B
	1,2-dichlorobenzene	B
	1,4-dichlorobenzene	B
BCMW7GW4	methylene chloride	B

Sample ID #	Compound	Qualifier
	toluene	B
BCER4	methylene chloride	B
	benzene	B
	toluene	B
	ethylbenzene	B
	styrene	B
	1,3-dichlorobenzene	B
	1,2-dichlorobenzene	B
	1,4-dichlorobenzene	B
BCFB2	1,4-dichlorobenzene	B
	methylene chloride	B

IV. **Surrogate Recovery:** Acceptable/All criteria were met.

All surrogate spiking analytes recoveries were within control limits. No qualifiers were required.

V. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

All Matrix Spike/Matrix Spike Duplicate results were acceptable. Two analytes, dibromochloromethane and bromoform, were outside control limits for %RPD. No qualifiers were added to the data based on MS/MSD results alone.

VI. **System Performance:** Acceptable.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

DATA VALIDATION REPORT
VOLATILE ORGANIC COMPOUND ANALYSES
EPA SW-846 8010/8020
CASE#: 29839 SDG#: 00036
Battle Creek, Michigan

Samples:

B1MW1GW5D	BC1MW1GW5	BC1MW3GW5	BC2MW1GW5
BCFB01	BCFB02	BCMW4GW5	BCMW16GW5
BCTB01	BCTB02		

I. **Sample Holding Times:** Acceptable/All criteria were met.

All samples were initially analyzed within the required holding time of 14 days for preserved water samples. Confirmation analyses took place within required holding times. No qualifiers were added to the data.

II. **Initial and Continuing Calibration:** Acceptable/With the following exceptions:

Relative response factors (RRF)and percent relative standard deviations (%RSD) in initial calibrations were technically acceptable and calculated correctly. Continuing calibrations were performed at the proper frequency, and all RRF were technically acceptable. Several compounds exceeded criteria for %difference, associated detects for those analytes were qualified "J", non-detects were qualified "UJ".

III. **Blank Analyses:** Acceptable/With the following exceptions:

Method blank analysis indicated several analytes were present in method blanks associated with the samples. Analytes detected in the samples were qualified "B", blank contamination, according to the 5x/10x rule, as detailed below:

Sample ID #	Compound	Qualifier
B1MW1GW5D	methylene chloride	B
	chloroform	B
	1,1,1-trichloroethane	B
	1,1,2,2-TCA	B
	1,2,3-trichloropropane	B
	bromobenzene	B
BC1MW1GW5	methylene chloride	B
	1,1,1-trichloroethane	B
	carbon tetrachloride	B
	trichloroethene	B
	1,1,2,2-tetrachloroethane	B
	bromobenzene	B

Sample ID #	Compound	Qualifier
BC1MW3GW5	methylene chloride	B
	chloroform	B
	1,1,1-trichloroethane	B
	carbon tetrachloride	B
	1,1,2,2-TCA	B
BC2MW1GW5	benzene	B
	toluene	B
	ethylbenzene	B
	p-xylene	B
	m-xylene	B
	o-xylene	B
	1,3-dichlorobenzene	B
BCFB01	methylene chloride	B
	1,1,1-trichloroethane	B
	trichloroethene	B
	tetrachloroethene	B
	1,1,2,2-TCA	B
	1,3-dichlorobenzene	B
	1,4-dichlorobenzene	B
	1,2-dichlorobenzene	B
BCFB02	methylene chloride	B
	1,1,1-trichloroethane	B
	2-CEVE	B
	tetrachloroethene	B
	1,1,2,2-TCA	B
BCMW4GW5	methylene chloride	B
	chloroform	B
	1,1,2,2-TCA	B
	bromobenzene	B
	4-chlorotoluene	B
	1,2-dichlorobenzene	B
BCMW16GW5	methylene chloride	B
	carbon tetrachloride	B
	chlorobenzene	B
	1,1,2,2-TCA	B
	bromobenzene	B
	4-chlorotoluene	B
	1,4-dichlorobenzene	B

IV. **Surrogate Recovery:** Acceptable/With the following exceptions:

All surrogate spiking analytes recoveries were within control limits, with two exceptions: samples TB02 and B1MW1GW5D indicated low recoveries for surrogate spiking analytes. "J", detected, estimated, and "UJ", not detected, estimated qualifiers were added to the data for these samples.

V. **Matrix Spike/Matrix Spike Duplicate:** Acceptable/All criteria were met.

All Matrix Spike/Matrix Spike Duplicate results were within control limits. No qualifiers were added to the data.

VI. **System Performance:** Acceptable.

No signs of degraded instrument performance were noted. The analytical system was determined to be in tune, within control, and stable during the course of these analyses.

APPENDIX G: CHAIN OF CUSTODY FORMS

CC# BC5/794 01 1 of 2

Chain of Custody Record

The Earth Technology Corporation

Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Lab job no.: _____
Date 05-18-94
Page 1 of X 2

614701 705 710 714 | 614723 724 725 726 | 614727 728 729 730

Client Earth Technology
Address 683 Enery Valley Rd.
Project Name / Number 948901-08
Contract / Purchase Order / Quote

Project Manager J. Briegel
Telephone No. 616-482-9404
Fax. No. 616-481-3834
Samplers: (Signature) Orig

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation: Temp.	Preservation: Chemical	No. of Containers	Analysis Required: VOC	SVOC 8015/8010	Metals 3270	CL,SO4,TDS 5xWET	Remarks
	BC-FB1	BC	5-18	1630	water	40 ml vial		HCl	4	✓				Dropped 2nd 05-20-94
	BC-FB1	BC	5-18	1630	"	Plastic 1ltr		HNO3	1			✓		
	BC-FB1	BC	5-18	1630	"	Plastic 1ltr			1				✓	
	BC-FB1	BC	"	"	"	Amber 1ltr			2		✓			
	BC-FB1	BC	"	"	"	40 ml vial		HCl	2	✓				Corrected Sample #'s
	BC-TB1	"	"	"	"	40ml vial		HCl	4	✓				BC-MW2-GW4
	~~BC-MW2~~	BC	5-19		"	40ml vial		HCl						BC-MW2-GW4
	~~BC-MW2~~	"	"		"	Plastic 1ltr		HNO3	1			✓		BC-MW2-GW4
	~~BC-MW2~~	"	"		"	Plastic 1ltr			1				✓	BC-MW2-GW4
5/19/94	~~BC-MW2~~	"	"		"	Amber 1ltr			2		✓			BC-MW1-GW4
	~~BC-MW1~~	"	"	1445	"	40 ml vial		HCl	4	✓				BC-MW1-GW4
	~~BC-MW1~~	"	"	1445	"	Plastic 1ltr		HNO3	1			✓		BC-MW1-GW4
	~~BC-MW1~~	"	"	1445	"	Plastic 1ltr			1				✓	BC-MW1-GW4

Relinquished by		Date	Received by:		Relinquished by:		Date	Received by:	
Signature	J Briegel	5/19/94	Signature		Signature			Signature	
Printed	Jack Briegel		Printed	BATTEN	Printed			Printed	
Company	Earth Technology	Time 1600	Company	Courier	Company		Time	Company	
Reason			Reason	5/22/94 0825	Reason			Reason	

Method of Shipment: Fedex
Shipment No: #776654049 3
Special Instructions:

Comments:
RECEIVED IN GOOD CONDITION 05-23-94

After analysis, samples are to be:
- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

COC # BC 5/19/94-01 2 of 2

Chain of Custody Record

Lab job no.: _____
Date 5-19-94
Page 2 of 2

The Earth Technology Corporation
Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Client Earth Technology
Address 6815 Ethory Valley Rd Oak Ridge TN 94890l-08
Project Name / Number
Contract / Purchase Order / Quote

Project Manager J. Briegel
Telephone No. 6l6-483-9404
Fax. No. 6l6-48l-3834
Samplers: (Signature)

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation Temp.	Preservation Chemical	No. of Containers	VOCs	SVOCs	Metals	8015 TDS	Remarks
	BC-MW1	BC	5-19	1445	water	Amber 1 ltr 6147061			2	✓				corrected sample # BC-MW1-GW4 Dropped 2ND 05-20-94

RECEIVED IN GOOD CONDITION 05/20/94 05-20-94

Relinquished by:	Date	Received by:	Relinquished by:	Date	Received by:
Signature J Briegel	5/19/94	Signature	Signature		Signature
Printed Jack Briegel	Time 1600	Printed V BATTEN	Printed	Time	Printed
Company Earth Tech		Company Cogniche	Company		Company
Reason		Reason 5/20/94 0905	Reason		Reason

Method of Shipment: Fedex
Shipment No. # 7766540493
Special Instructions:

Comments:

After analysis, samples are to be:
- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

COC BC-5/20/94-2 1 of 2

Chain of Custody Record

The Earth Technology Corporation

Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Lab job no.: _____
Date 5-20-94
Page 1 of 2

Client Earth Technology
Address 683 Emory Valley Rd. Oak Ridge, TN 948901-08
Project Name / Number _____
Contract / Purchase Order / Quote _____

Project Manager J. Briegel
Telephone No. 616-483-9404
Fax. No. 616-481-3834
Samplers: *(Signature)* _____

(11)

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation Temp.	Preservation Chemical	No. of Containers	VOCs 8010/8020	SVOCs 8270	Metals 6010/7000	Cl SO4 TDS	Remarks
BC-MW13-GW4	BC	BC	5-20	0815	Water	40 ml vial	4°	HCl	4	✓				615099 615115
BC-MW13-GW4	"	"	"	"	"	Amber 1ltr	"		2		✓			103
BC-MW13-GW4	"	"	"	"	"	Plastic 1ltr	"	HNO3	1			✓		108
BC-MW13-GW4	"	"	"	"	"	Plastic 1ltr	"		1				✓	100
BC-MW13-GW4	"	"	1050	"	"	40 ml vial	"	HCl	4	✓				104
BC-MW13-GW4	"	"		"	"	Amber 1ltr	"		2		✓			109
BC-MW13-GW4	"	"		"	"	Plastic 1ltr	"	HNO3	1			✓		114
BC-MW13-GW4	"	"		"	"	Plastic 1ltr	"		1				✓	101
BC-MW16-GW4	"	"	0845	"	"	40 ml vial	"	HCl	4	✓				105
BC-MW16-GW4	"	"	"	"	"	Amber 1ltr	"		2		✓			110
BC-MW16-GW4	"	"	"	"	"	Plastic 1ltr	"	HNO3	1			✓		

SAMPLES REC'D IN GOOD CONDITION
M.J. 5/21/94

Relinquished by:
Signature JBriegel
Printed Jack Briegel
Company EarthTech
Reason _____
Date 5/20/94
Time 1500

Received by:
Signature _____
Printed _____
Company _____
Reason _____

Relinquished by:
Signature _____
Printed _____
Company _____
Reason _____
Date _____
Time _____

Received by:
Signature Melissa Stevens
Printed Melissa Stevens
Company CompuChem Env.
Reason _____

Method of Shipment Fedex
Shipment No. _____
Special Instructions: _____

Comments: _____

After analysis, samples are to be:
- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

COC# BC 5 2094-07 2 of 2

Chain of Custody Record

Lab job no.: _____

Date _____

Page 2 of 2

The Earth Technology Corporation

Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Client Earth Technology

Address 683 Emory Valley Rd Oak Ridge, TN

Project Name / Number 948901-08

Contract / Purchase Order / Quote _____

Project Manager J. Briegel

Telephone No. 6116-483-9404

Fax. No. 6116-481-3834

Samplers: (Signature) _____

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation Temp.	Preservation Chemical	No. of Containers	VOCs 8010/8020	8 VOCs 8270	Metals SW846	Cl SO4 TDS	Remarks
BC-HW16-GW4		BC	5-20	0845	Water	Plastic 1ltr	4°		1				✓	615113 106 111 116 102 107
~~BC-FB~~														
BC-ER1		"	5-19	1540	"	Plastic 1ltr	"		1				✓	Did not Receive BC-TB2 MS 5/31/94
BC-ER1		"	"	"	"	Plastic 1ltr	"	HNO3	1		✓			
BC-ER1		"	"	"	"	Amber 1ltr	"		2	✓				
BC-FB2		"	"	1510	"	Plastic 1ltr	"		1				✓	
BC-FB2		"	"	"	"	Plastic 1ltr	"	HNO3	1		✓			Did not Received VOAs for BC-FB2 MS 5/31/94.
BC-FB2		"	"	"	"	Amber 1ltr	"		2	✓				
BC-ER1		"	"	1540	"	40 ml vial	"	HCl	4	✓				
mf BC-FB2		"	"	1510	"	"	"	"	4	✓				
BC-TB2		"	"	0800	"	"	"	"	2	✓				~~SAMPLES REC'D IN GOOD CONDITION~~ MS 5/31/94.
mf BC-FB2		"	5-20	1440	"	"	"	HCl						

Relinquished by:	Date	Received by:	Relinquished by:	Date	Received by:
Signature JSBriegel	5/20/94	Signature	Signature		Signature Melissa Stevens
Printed Jack Briegel	Time 1500	Printed	Printed	Time	Printed Melissa Stevens
Company EarthTech		Company	Company		Company CompuChem Env
Reason		Reason	Reason		Reason

Method of Shipment: Fedex

Shipment No. _____

Special Instructions: _____

Comments: _____

After analysis, samples are to be:

- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

OCBLS 2594-01 1 of 3

Chain of Custody Record

(13)

The Earth Technology Corporation

Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Lab job no.:
Date 5-23-94
Page 1 of 3

Client Earth Technology
Address 683 Emory Valley Rd. Oak Ridge TN 37716
Project Name / Number 948901-08
Contract / Purchase Order / Quote

Project Manager J. Briegel
Telephone No. 615-483-9404
Fax. No. 615-481-3834
Samplers: (Signature)

Deleted all dash from ID's. ID's used BCMW11GW4 BCMW12GW4 BC3MW17GW4 All metals filtered MLS 5/24/94.

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation Temp.	Preservation Chemical	No. of Containers	VOCs 8010/8020	8VOCs 8270	Metals 6010	Cl SOx TDS					Remarks
1	BC-MW11-GW4	BC	5-23	1040	Water	40 ml vial	4°	HCl	4	✓								RECEIVED IN GOOD CONDITION MLS 5/24/94
1	BC-MW11-GW4		"	"		Plastic ltr		HNO3	1			✓						Metals only-HNO3
1	BC-MW11-GW4		"	"		Plastic ltr			1				✓					
1	BC-MW11-GW4		"	"		Amber ltr			2		✓							
	BC-MW12-GW4		"	1130		40 ml vial		HCl	4	✓								
	BC-MW12-GW4		"	"		Plastic ltr		HNO3	2			✓	✓					
	BC-MW12-GW4		"	"		Amber ltr			2		✓							
	BC3-MW1-GW4		"	0740		40 ml vial		HCl	8	✓								Extra volumes for MS/MSD
	BC3-MW1-GW4		"	"		Amber ltr			4		✓							
	BC3-MW1-GW4		"	"		Plastic ltr		HNO3	2			✓						Metals only
1	BC3-MW17-GW4		"	0830		40 ml vial		HCl	4	✓								
1	BC3-MW17-GW4		"	"		Amber ltr			2		✓							

Relinquished by:	Date	Received by:	Relinquished by:	Date	Received by:
Signature J Briegel	5/23	Signature 615253	Signature 615259	5/24/94	Signature Melissa Stevens
Printed Earth Tech.	94	Printed 262	Printed 2168		Printed MELISSA STEVENS
Company J. Briegel	Time	Company 271	Company 279	Time	Company Bonner Chem
Reason	1430	Reason 272	Reason	0830	Reason

Method of Shipment: Fedex
Shipment No. 157678933 42
Special Instructions:

Comments: 251 260 258 267 277 278

After analysis, samples are to be:
- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

COCBC52394-01 2 of 3

Chain of Custody Record

(12)

Lab job no.: _____

Date 5-23-94

Page 2 of 3

The Earth Technology Corporation

Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Client Earth Technology

Address 683 Emory Valley Rd. Oak Ridge, TN 37716

Project Name / Number 948901-08

Contract / Purchase Order / Quote _____

Project Manager J. Briegel

Telephone No. 615-483-9404

Fax. No. 615-481-3834

Samplers: (Signature)

Analysis Required

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation Temp.	Preservation Chemical	No. of Containers	VOC's 5010/8240	SVOC's 8270	Metals 3005	Cl, SO4, TDS	Remarks
BC-MW17-GW4	BC	5-20	0800	Water	Plastic 1ltr	4°	HNO3	1			✓			ID used CMW17GW4
BCJ-MW6-GW4		5-21	0850		40 ml vial		HCl	4	✓					6152269 6152257
BCJ-MW6-GW4		"	"		Amber 1ltr			2		✓				252 266
BCJ-MW6-GW4		"	"		Plastic 1ltr			1			✓			261 276
BCJ-MW5-GW4		"	0935		40 ml vial		HCl	4	✓					270
BCJ-MW5-GW4		"	"		Amber 1ltr			2		✓				254
BCJ-MW5-GW4		"	"		Plastic 1ltr		HNO3	1			✓			263
BCJ-MW3-GW4		"	1650		40 ml vial		HCl	4	✓					256
BCJ-MW3-GW4			"		Amber 1ltr			2		✓				265
BCJ-MW3-GW4			"		Plastic 1ltr		HNO3	1			✓			275
BCJ-MW4-GW4		5-21	1418		40 ml vial		HCl	4	✓					RECEIVED IN GOOD CONDITION MS 5/24/94
BCJ-MW4-GW4		"	"		Amber 1ltr			2		✓				

Relinquished by
Signature J Briegel
Printed J Briegel
Company EarthTech
Reason _____
Date 5/23/94
Time 1430

Received by:
Signature _____
Printed _____
Company _____
Reason _____

Relinquished by:
Signature _____
Printed _____
Company _____
Reason _____
Date 5/24/94
Time 0830

Received by:
Signature Melissa Stevens
Printed MELISSA STEVENS
Company CompuChem
Reason _____

Method of Shipment: Fedex
Shipment No. 157678933 47
Special Instructions: _____

Comments: _____

After analysis, samples are to be:
- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

EOC BC523403 3 of 3

Chain of Custody Record

(6)

Lab job no.: _____
Date 5-23-94
Page 3 of 3

The Earth Technology Corporation
Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Client Earth Technology
Address 683 Ehoey Valley Rd. Oak Ridge, TN 37786
Project Name / Number 948901-08
Contract / Purchase Order / Quote

Project Manager J. Bricgel
Telephone No. 615-483-9404
Fax. No. 615-481-3834
Samplers: (Signature)

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation: Temp.	Preservation: Chemical	No. of Containers	VOCs 8240	SVOCs 8270	Metals 6010	Cl 8041 TDS	Remarks
BC3-MW4-GW4	BC-MW4-GW4	BC	5-21	1418	water	Plastic Htr	4°	HNO3	1					TD used. BC3MW4GW4 also deleted dash from the ID. MS 5/24/94
BC-EB2			"	1850		40 ml vial		HCl	4					
BC-EB2			"	"		Amber Htr			2					
BC-EB2			"	"		Plastic Htr		HNO3	1					~~Metals only - HNO3~~
BC-TB4			5-21	1630		40 ml vial		HCl	2					615255 264 274 280 273

JSB 5/23/94

RECEIVED IN GOOD CONDITION MS 5/24/94

Relinquished by:	Date	Received by:	Relinquished by:	Date	Received by:
Signature J Bricgel	5/23/94	Signature	Signature	5/24/94	Signature Melissa Stevens
Printed J Bricgel	Time 1430	Printed	Printed	Time 0830	Printed MELISSA STEVENS
Company Earth Tech		Company	Company		Company Compuchem
Reason		Reason	Reason		Reason

Method of Shipment: Fedex
Shipment No. 157678973342
Special Instructions:

Comments:

After analysis, samples are to be:
- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

COC BC5/24/94-02 Pg 1 of 4

No 2414

CHAIN-OF-CUSTODY RECORD

(10)

COMPUCHEM
ENVIRONMENTAL
CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: Compuchem	Project Name: 948901-08	Field Point-of-Contact: J. Briegel
	Sampler Name: Carol Frye	Telephone No: 615-483-9404
Carrier: Fedex Airbill No.: 1567893176	Sampler Signature: Carol Frye	Sampling for project complete? Y or N (See Note 1.)
		Project-specific (PS) or Batch (B) QC: ____

Box #1 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil/Sediment/Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other: ____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other: ____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other

Box #5: H - High, M - Medium, L - Low

Sample ID (Organics: 9 characters max, inorganics: 6 characters; see Note 2)	Date: Year: 1994	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC/MS	SV-GC/MS	Pest/PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC/TOX	O&G/TPH	Phenols	Other	Remarks/Comments
BCMW5GW4	5/23	10:25	2	~~B~~	F			1							X								~~Cl SO4~~ 565
BCMW5GW4	5/23	10:25	"	E	U			1															Cl SO4 TDS 567
BCMW14GW4	5/20	16:10	"	E	U			1															Cl SO4 TDS 570
BCMW14GW4	5/20	16:10	"	B	F			1							X								571
BC2MW1GW4	5/23	11:30	"	B	F			1							X								577
BC2MW1GW4	5/23	11:30	"	E	U			1															Cl SO4 TDS 579
BCMW6GW4	5/22	14:47	"	E	U			1															Cl SO4 TDS 580
BCMW6GW4	5/20	14:47	"	B	F			1							X								581
BCMW4GW4	5/23	08:10	"	B	F			1							X								
BCMW4GW4	5/23	08:10	"	E	U			1															Cl SO4 TDS

metals filtered only

Remarks/Comments

615572 · 575

Client's Special Instructions:

Lab: Received In Good Condition? Y or N	Describe Problems, If Any:				Sample storage time requested? ____ (in days, see Note 3)
#1 Relinquished By: (Sig.) J. Briegel	Date: 5/24/94	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:
Company Name: Sparta Tech	Time: 16:30	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig.) Melissa Jones	Date: 5/25/94	#2 Received By (Sig.)	Date:	#3 Received By: (Sig.)	Date: DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: CompuChem	Time: 0840	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP inorganics diskette required, ID limited to maximum of six characters.
Note (3): Samples stored 90 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

COC BCS2494-02 2 of 4

No 2412

CHAIN-OF-CUSTODY RECORD

(10)

COMPUCHEM
ENVIRONMENTAL
CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: Compuchem	Project Name: 948901-08	Field Point-of-Contact: Jack Biegel
	Sampler Name: C. Frye	Telephone No: 615-483-9404
Carrier: Fedex Airbill No.: 156789317 6	Sampler Signature: C. Frye	Sampling for project complete? Y or N (See Note 1.)
		Project-specific (PS) or Batch (B) QC: ____

Box #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil/Sediment/Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other: ____

Box #2: A. HCl; B. HNO_3; C. $NaHSO_4$; D. $Na_2S_2O_3$; E. Ice Only; O. Other: ____; N. Not Preserved

Box #3: F. Filtered; U. Unfiltered

Box #4: C. CLP 3/90; S. SW-846; W. CWA 600-series; L. Low Conc. CLP; R. Radiological; T. TCLP; O. Other

Box #5: H - High; M - Medium; L - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; see Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC/MS	SV-GC/MS	Pest/PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC/TOX	O&G/TPH	Phenols	Other	Remarks/Comments
BCMW18GW4	5/23	16:15	2	B	F			1							X								615545
BCMW18GW4	5/23	16:15	"	E	U			1															615542
BCMW96W4	5/23	16:00	"	E	U			2															Cl 804 TDS
BCMW96W4	5/23	16:00	"	B	F			2							X								Cl 804 TDS Extra volume for MS/MSDS
BCJMW26W4	5/23	17:55	"	B	F			1							X								615563
BCMW96W4	5/23	16:00	"	E	U			4															615547
BCMW18GW4	5/23	16:15	"	E	U			2															615551
BCMW58W4	5/23	10:[illegible]	"	E	U			2															615581
BCMW63W4	5/23	14:47	"	E	U			2															615545
BCMW14GW4	5/[illegible]	16:10	"	E	U			2															L542

Extra volume for MS/MSDS

SV analysis per client CBM 5/25/94

BCMW14GW4 Received 1 Amber Liter broken. 5/25/94

Client's Special Instructions:

Lab: Received In Good Condition? Y or N — Describe Problems, If Any:							
#1 Relinquished By: (Sig.) C. Frye / J. Biegel	Date: 5/24/94	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested?____ (in days, see Note 3)	
Company Name: Earth Tech	Time: 1630	Company Name:	Time:	Company Name:	Time:		
#1 Received By: (Sig.) M. Flynn Stevens	Date: 5/25/94	#2 Received By (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)	
Company Name: CompuChem	Time: 0840	Company Name:	Time:	Company Name:	Time:		

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.
Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

LOC BC52494-02 3 of 4

№ 2468

CHAIN-OF-CUSTODY RECORD

COMPUCHEM
ENVIRONMENTAL
CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

(2)

Ship to: Compuchem	Project Name: 948901-08	Field Point-of-Contact: S. Briggel
	Sampler Name: Carol Frye	Telephone No: 615-483-9404
Carrier: Fedex	Airbill No.: 1567893176	Sampling for project complete? Y or N (See Note 1.)
	Sampler Signature: Carol Frye	Project-specific (PS) or Batch (B) QC: ____

Box #1 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil/Sediment/Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other: ____

Box #2: A. HCl; B. HNO_3; C. $NaHSO_4$; D. $Na_2S_2O_3$; E. Ice Only; O. Other: ____; N. Not Preserved

Box #3: F. Filtered; U. Unfiltered

Box #4: C. CLP 3/90; S. SW-846; W. CWA 600-series; L. Low Conc. CLP; R. Radiological; T. TCLP; O. Other

Box #5: H - High; M - Medium; L - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; see Note 2)	Date: Year: 1994	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC/MS	SV-GC/MS	Pest/PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC/TOX	O&G/TPH	Phenols	Other	Remarks/Comments
BCHW186W4	5/23	16:15	2	A	U			4		X													615517; L516;
BCHW4GW4	5/23	08:10	2	A	U			4		X													
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					

Client's Special Instructions:

Lab: Received in Good Condition? Y or N — Describe Problems, If Any:

#1 Relinquished By: (Sig.)		Date: 5/24/94	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? ____ (in days, see Note 3)
Company Name: Ecotech		Time: 1630	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.)		Date: 5/25/94	#2 Received By (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: CompuChem		Time: 0840	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP inorganics diskette required, ID limited to maximum of six characters.
Note (3): Samples stored 60 days after data report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

COC 52499-02 Page 1 of 1

No 2472

CHAIN-OF-CUSTODY RECORD

(9)

COMPUCHEM
ENVIRONMENTAL
CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: Compuchem	Project Name: 948901-08	Field Point-of-Contact: J. Briegel
	Sampler Name: Carol Frye	Telephone No: 615-483-9404
Carrier: Fedex	Airbill No.: 156789317 6	Sampling for project complete? Y or N (See Note 1.)
	Sampler Signature: Carol Frye	Project-specific (PS) or Batch (B) QC: ____

Box #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil/Sediment/Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other: ____

Box #2: A. HCl; B. HNO_3; C. $NaHSO_4$; D. $Na_2S_2O_3$; E. Ice Only; O. Other: ____; N. Not Preserved

Box #3: F. Filtered; U. Unfiltered

Box #4: C. CLP 3/90; S. SW-846; W. CWA 600-series; L. Low Conc. CLP; R. Radiological; T. TCLP; O. Other

Box #5: H - High; M - Medium; L - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; see Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC/MS	SV-GC/MS	Pest/PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC/TOX	O&G/TPH	Phenols	Other
BC3MW2SW4	5/23	17:55	2	E	U	S	M	2			X											
BC2MW1GW4	5/23	11:30	2	E	U	S		1			X											
BCMW4GW4	5/23	8:10	2	E	U	S		2			X											
BLTB5	5/23	15:50	6	A	U	S	L	2														
BC2MW1BW4	5/23	11:30	2	~~A~~	U			4		X												
BCMW14SW9	5/22	16:10	2	A	U			4		X												
BCMW5GW4	5/23	10:25	2	A	U			4		X												
BCMW9GW4	5/23	16:00	2	A	U			~~8~~ 4		X												
BCMW~~8~~6GW4	5/22	14:47	2	A	U			4		X												
BCMW2SW4	5/23	17:55	2	A	U			4		X												

Remarks/Comments

615546
543
540

one bottle was broken

Client note.
VOA analysis 615512
615521 518
531 519
534 520

Extra volume for MS/MSDS

VOA bottles labelled → BC3MW2GW4
CBH 5/25/94

Client's Special Instructions:

Lab: Received in Good Condition? Y or N — Describe Problems, If Any:

#1 Relinquished By: (Sig.) C. Smoger	Date: 5/24/94	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested?____ (in days, see Note 3)
Company Name: EarthTech	Time: 16:30	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) Melissa Stinson	Date: 5/25/94	#2 Received By (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: CompuChem	Time: 0840	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.
Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

615944 950 972 970 | 615945 952 978 979 | 615946 956 983 | 615986 947 958 | 615998 943 949 | 615962 964 904 | 615896 900 919 917 918 | 615930 928 929 935 931 | 615932 927 924 926

No 2483

CHAIN-OF-CUSTODY RECORD

COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to.	Project Name: 948901-08	Field Point-of-Contact: Jack Briegel
	Sampler Name: Carol Frye	Telephone No: 615-483-9404
		Sampling for project complete? Y or N (See Note 1.)
Carrier: Fedex	Airbill No.: 156189331	Sampler Signature: Carol Frye
		Project-specific (PS) or Batch (B) QC: ____

Box #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil/Sediment/Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other: ____

Box #2: A. HCl; B. HNO_3; C. $NaHSO_4$; D. $Na_2S_2O_3$; E. Ice Only; O. Other: ____; N. Not Preserved

Box #3: F. Filtered; U. Unfiltered

Box #4: C. CLP 3/90; S. SW-846; W. CWA 600-series; L. Low Conc. CLP; R. Radiological; T. TCLP; O. Other

Box #5: H - High; M - Medium; L - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; see Note 2)	Date: Year: 19 94	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC/MS	SV-GC/MS	Pest/PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC/TOX	O&G/TPH	Phenols	Other	Remarks/Comments
BCMW156W4	5/24	10:40	2	A,B				8		X	X				X								Cl SO4 TDS
BCMW86W4	5/24	11:30	2	A,B				8		X	X				X								Cl SO4 TDS also used BCMW86W4
BCMW76W4	5/24	10:50	2	A,B				8		X	X				X								Cl SO4 TDS also used BCMW76W4
BCER4	5/24	15:40	4 jars	A,B				7		X	X				X								metals - priority pollutant list also used BCER4
BCERJ	5/24	13:50	4 jars	AB				8		X	X				X								Cl SO4 TDS also used BCER3
BC5B70001	5/24	13:45	5					1	MS/MSD	X	X				X								soils metals - priority poll. list
BC5B90203	5/24	15:10	5					1	DUP	X	X				X								" " " " "
BC5B10020	5/24	14:05	5					1		X	X				X				Bottle ID: BC5B100203 Use BC5B100203 per client tle (OSE 5/26/94					" " " " "
BC5B80001	5/24	14:20	5					1		X	X				X								" " " " "
BC5B70203	5/24	13:58	5					1		X	X				X								" " " " "

* Use one jar of soil (any one) sample for extra volume for MS/MSD

Client's Special Instructions:

Lab: Received in Good Condition? Y or N	Describe Problems, If Any:					Sample storage time requested? ____ (in days, see Note 3)
#1 Relinquished By: (Sig.)	Date: 5/25/94	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	
Company Name: EarthTech	Time: 1700	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.)	Date: 5/26/94	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: CompuChem	Time: 0830	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

615916 615939 615942
908 940 948
912 923
941 921
922
938
936
937

No 2478

CHAIN-OF-CUSTODY RECORD

COMPUCHEM
ENVIRONMENTAL
CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to:

Project Name: 948901-08

Field Point-of-Contact: Jack Briegel

Telephone No: 615-483-9404

Sampler Name: Carol Frye

Sampling for project complete? Y or N (See Note 1.)

Project-specific (PS) or Batch (B) QC: ____

Carrier: Fedex Airbill No.: 156789336

Sampler Signature: Carol Frye

Box #1 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment/Sludge 6. Trip Blank 7. Oil 8. Waste 9. Other: ____

Box #2: A. HCl B. HNO_3 C. $NaHSO_4$ D. $Na_2S_2O_3$ E. Ice Only O. Other: ____ N. Not Preserved

Box #3: F. Filtered U. Unfiltered

Box #4: C. CLP 3/90 S. SW-846 W. CWA 600-series L. Low Conc. CLP R. Radiological T. TCLP O. Other

Box #5: H - High M - Medium L - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; see Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC/MS	SV-GC/MS	Pest/PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC/TOX	O&G/TPH	Phenols	Other	Remarks/Comments
BC5B60203	5/24	13:30	5					1		X	X				X								soils metals priority poll list
BC5B60001	5/24	13:15	5					1		X	X				X								" " " " "
BC5B90001	5/24	14:55	5					1		X	X				X								" " " " "
BC5B80203	5/24	14:40	5					1		X	X				X								" " " " "
BCFB2	5/24	13:15	4	A				4		X													resample
BCTB6	5/24	1400	6	A				2		X													
	/	:																					
	/	:																					
	/	:																					
	/	:																					

Client's Special Instructions:

Lab: Received In Good Condition? Y or N Describe Problems, If Any:

#1 Relinquished By: (Sig.) J Briegel	Date: 5/25/94	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested?____ (in days, see Note 3)
Company Name: ECT&H Tech	Time: 1400	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) J Burdie	Date: 5-26-94	#2 Received By (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: CompuChem	Time: 0830	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP Inorganics diskette required, ID limited to maximum of six characters.
Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

COC # BC 5/19/94 02

Chain of Custody Record

Lab job no.: _____

Date _____

Page 1 of 1

The Earth Technology Corporation

Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Client Earth Technology

Address 633 Emory Valley Rd
Oak Ridge TN 37831

Project Name / Number 94396108

Contract / Purchase Order / Quote _____

Project Manager J. Briegel

Telephone No. 615 483-9404

Fax. No. 615 481-7334

Samplers: *(Signature)* _____

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation: Temp.	Preservation: Chemical	No. of Containers	Analysis Required: VOC's	SVOC's	Metals	Cl solv. TAL	Nitrates	Remarks
BC-MW3-BW1	BW1	BC	5-19	1310	Wat.	Plastic 125ml			1					✓	
BC-MW3-BW1	BW1	BC	"	1445	"	"			1					✓	

Relinquished by:	Date	Received by:	Relinquished by:	Date	Received by:
Signature Carol Fryer	5/19	Signature	Signature		Signature
Printed Carol Fryer	Time 1440	Printed	Printed	Time	Printed
Company Earth Tech		Company	Company		Company
Reason		Reason	Reason		Reason

Method of Shipment: _____

Shipment No. _____

Special Instructions: _____

Comments: _____

After analysis, samples are to be:

- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

TOC # BC 948701-08

Chain of Custody Record

The Earth Technology Corporation

Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Lab job no.: _____

Date 5-30-94

Page 1 of 1

Client Earth Technology

Address 683 Emory Valley Rd. Oak Ridge, TN 37716

Project Name / Number 948701-08

Contract / Purchase Order / Quote _____

Project Manager J. Briegel

Telephone No. 615-483-9404

Fax. No. 615-481-3834

Samplers: *(Signature)* [signature]

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation: Temp.	Preservation: Chemical	Analysis Required: No. of Containers	Analysis Required: [illegible]	Analysis Required: [illegible]	Analysis Required: [illegible]	Analysis Required: [illegible]	Analysis Required: [illegible]	Analysis Required: [illegible]	Remarks
	BC-FB3	BC	05-26	1340	water	Plastic			1	✓						
	BC-MW16-GW4	"	"	0845	"	"			1	✓						
	BC-MW13-GW4	"	"	0815	"	"			1	✓						
	BC-MW3-GW4	"	"	1050	"	"			1	✓						
	BC-MW7-GW4	"	"	1405	"	"			1	✓						
	BC-MW8-GW4	"	"	1415	"	"			1	✓						
	BC-MW15-GW4	"	"	1405	"	"			1	✓						
	BC-ER1	"	"	1540	"	"			1	✓						
	BC-FB2	"	"	1570	"	"			1	✓						

Relinquished by:	Date	Received by:	Relinquished by:	Date	Received by:
Signature [signature]	5-30	Signature [signature]	Signature _____		Signature _____
Printed Chad Frye	Time	Printed MATT BALMER	Printed _____	Time	Printed _____
Company Earth Tech	1575	Company KAR LABORATORIES	Company _____		Company _____
Reason _____		Reason _____	Reason _____		Reason _____

Method of Shipment: _____

Shipment No. _____

Special Instructions: _____

Comments: _____

After analysis, samples are to be:

- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

Chain of Custody Record

Lab job no.: _____

Date _____

Page _____ of _____

The Earth Technology Corporation

Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Client Earth Technology

Address 683 Emory Valley Rd. Oak Ridge TN 37716

Project Name / Number 948901-08

Contract / Purchase Order / Quote _____

Project Manager J. Briegel

Telephone No. 615-483-9404

Fax. No. 615-481-3824

Samplers: *(Signature)* C. Fuge

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation Temp.	Preservation Chemical	No. of Containers	Analysis Required								Remarks
	BC-MW11-GW-4	BC	5-23	1040	Comp	Plastic			1	✓								
	BC-MW12-GW-4	"	"	1130	"	"			1	✓								
	BC-MW6-GW-4	"	"	1447	"	"			1	✓								
	BC-MW9-GW-4	"	"	1615	"	"			1	✓								
	BC2-MW1-GW-4	"	5-23	1130	"	"			1	✓								
	BC-MW4-GW-4 (5 Dup)	"	"	1025	"	"			1	✓								
	BC-MW4-GW-4	"	"	0816	"	"			1	✓								

Relinquished by:
Signature Carol Fuge
Printed Carol Fuge
Company Earth Tech
Reason _____

Date 5-24-94
Time 1300

Received by:
Signature _____
Printed _____
Company _____
Reason _____

Relinquished by:
Signature _____
Printed _____
Company _____
Reason _____

Date _____
Time _____

Received by:
Signature _____
Printed _____
Company _____
Reason _____

Method of Shipment: _____

Shipment No. _____

Special Instructions: _____

Comments: _____

After analysis, samples are to be:

- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

Chain of Custody Record

The Earth Technology Corporation

Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Lab job no.: _____

Date 5-31-94

Page 1 of 1

Client Earth Technology

Address 683 Emory Valley Rd. Oak Ridge TN 37716

Project Name / Number 241890.01.03

Contract / Purchase Order / Quote _____

Project Manager J Bogel

Telephone No. 615-483-9404

Fax. No. 615-481-3834

Samplers: *(Signature)* Carol Tye

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation: Temp.	Preservation: Chemical	No. of Containers	Unfiltered	Analysis Required	Remarks
BC-MW8-GW4		BC	5-23	1615	Grab	1 Liter Plastic			1	✓		
BC-EA3		BC	5-24	0850	"	"			1	✓		
BC-MW9-GW4		"	5-23	1600	"	"			2	✓		Extra [illegible]

Relinquished by:
Signature Carol Tye
Printed Carol Tye
Company Earth Tech
Reason _____

Date 5-31-94

Time 1700

Received by:
Signature _____
Printed _____
Company _____
Reason _____

Relinquished by:
Signature _____
Printed _____
Company _____
Reason _____

Date _____

Time _____

Received by:
Signature _____
Printed _____
Company _____
Reason _____

Method of Shipment: _____

Shipment No. _____

Special Instructions: _____

Comments: _____

After analysis, samples are to be:
- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

page 1 of 2
#29588

4575

CHAIN-OF-CUSTODY RECORD

COMPUCHEM ENVIRONMENTAL CORPORATION
3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709
1-800-833-5097

Ship to: EARTH TECH

Project Name: JOHNSON, MIANG Battle Creek, Mich

Sampler Name: J. Briegel

Carrier: FEDEX Airbill No.: 956980040 2

Sampler Signature: J Briegel

Field Point-of-Contact: 615 483-9404

Telephone No.: 616 580-1224

Sampling for project complete? Y or (N) (See Note 1)

Project-specific (PS) or Batch (B) QC: PS.

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other _____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other _____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other _____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
~~3B1~~	/	:			JSB 10/5/94																		
3SB101	11/5	:	S	E	NA	S	M	1							✓								Priority pollutant list metals plus barium
3SB201	11/5	:	S	E	NA	S	M	1							✓								
3SB2D1	11/5	:	S	E	NA	S	M	1	MS and dup						✓								
3SB301	11/5	:	S	E	NA	S	M	1							✓								
~~BCER3~~	11/5	:	~~4~~ S JSB 11/5/94	B,E	U	S	L	1							✓								
~~BCTB1~~	11/6	12:20	6	A,E	U	S	L	2		✓													trip blank
~~BCFB3~~	11/6	11:30	9	A,E	U	S	L	2		✓													Field blank
~~BCFB3~~	11/6	17:30	9	~~A~~ E	U	S	L	2		✓													
~~BCFB3~~	11/6	17:30	9	B,E	U	S	L	1							✓								

Client's Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) J Briegel	Date: 11/7	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? _____ (In days, see Note 3)
Company Name: EARTH TECH	Time: 1700	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) Janice Rancken	Date: 11/8	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: Compuchem	Time: 8:30	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

#27587 4576

CompuChem Environmental Corporation
3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709
1-800-833-5097

CHAIN-OF-CUSTODY RECORD

EARTH TECH

Ship to:

Project Name: HOMEG MANG Battle Creek, Mich

Sampler Name: J. Briegel

Carrier: Fedex Airbill No.: 956980040 2

Sampler Signature: J. Briegel

Field Point-of-Contact: 615 483-9404 616 580-1224

Telephone No.:

Sampling for project complete? Y or N (See Note 1)

Project-specific (PS) or Batch (B) QC: ____

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other ____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other ____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other ____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: ~~Metals~~ Lead	Mercury	Cyanides	Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
BC1B220222	11/6	11:15	S	E	—	S	M	1		L													8240 VOC SS steel liner
BC1B120222	11/6	12:00	S	E	—	S	M	1		L													" " " "
BC1B410122	11/6	15:45	S	E	—	S	L	1		L													" " " "
BC1B220222	11/6	11:15	S	E	—	C,S	~~X~~ M	1		L					L								8030 jar CLP SVOC, Lead
BC1B120222	11/6	12:00	S	E	—	C,S	M	1		L					L								" " " "
BC1B410122	11/6	1545	S	E	—	C,S	L	1		L					L								" " " "
	/	:																					
	/	:																					
	/	:																					
	/	:																					

Client's Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) J. Briegel	Date: 11/7	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? ____ (In days, see Note 3)
Company Name: EARTH TECH	Time: 1700	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) Laura Landon	Date: 11/8	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: Compuchem	Time: 8:00am	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

1 of 3

CHAIN-OF-CUSTODY RECORD

28588 4570

COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

(615) 580-1204

Ship to: EARTH TECH 683 EMORY VALLEY RD OAK RIDGE, TN 37830	Project Name: HOMER GILMAN REMEDIAL INVEST	Field Point-of-Contact: (615) 483-9404
	Sampler Name: J.S. BRUEGEL	Telephone No.:
		Sampling for project complete? Y or (N) (See Note 1)
Carrier: Fedex Airbill No.: 956980035 4	Sampler Signature: J.S. Bruegel	Project-specific (PS) or Batch (B) QC: PS

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other _____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other _____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other _____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19 94	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals (Pb only)	Mercury	Cyanides	Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
BC1B2	11/6	17:25	6	A	—	C,S	L	2	✓	✓													8240
BC1B105071	11/5	13:20	5	E	—	S	M	1	✓	✓													8240
BC1B105071	11/5	13:20	5	E	—	C,S	M	1	✓	✓				✓									CLP 3/90 SVOC, SW846, lead
BC1B2101 2	11/5	11:40	5	E	—	S	L	1	✓	✓													8240
BC1B2101 2	11/5	11:40	5	E	—	C,S	L	1	✓	✓				✓									CLP 3/90 SVOC, SW846 lead
BC1B5202 2	11/7	11:40	5	E	—	S	L	1	✓	✓													8240
BC1B5202 2	11/7	11:40	5	E	—	C,S	L	1	✓	✓				✓									CLP 3/90 SVOC, SW846 lead
BC1B8202 2	11/10	11:7	5	E	—	S	L	1	✓	✓													8240
BC1B8202 2	11/10	11:7	5	E	—	C,S	L	1	✓	✓				✓									CLP 3/90 SVOC, SW846 lead
BC1B	/	:																					
					J SB		1+8	94															

Client's Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) J.S. Bruegel	Date: 11/8	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? _____ (In days, see Note 3)
Company Name: Earth Tech	Time: 1715	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) Janice Saunders	Date: 11/9	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: Compuchem	Time: 8:45 AM	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

CHAIN-OF-CUSTODY RECORD # 29588

4553

COMPUCHEM ENVIRONMENTAL CORPORATION
3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709
1-800-833-5097

Ship to: EarthTech	Project Name: 110th FG/MIANG Battle Creek, Mich	Field Point-of-Contact: J. Briegel
	Sampler Name: J. Briegel	Telephone No.:
		Sampling for project complete? Y or N (See Note 1)
Carrier: Fedex Airbill No.: 869800354	Sampler Signature: J. Briegel	Project-specific (PS) or Batch (B) QC: PS

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other _____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other _____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other _____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19 94	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals Pb only	Mercury	Cyanides	Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
B1B122022	11/7	14:45	5	E	–	S	L	1		✓													* BC1B122022 on jar 8240
B1B122022	11/7	14:45	5	E	–	C,S	L	1		✓					✓								* BC1B122022 on jar CLP 3/90, SW846
BC1B30001	11/7	10:10	5	E	–	S	L	1		✓													8240
BC1B30001	11/7	10:10	5	E	–	C,S	L	1		✓					✓								CLP 3/90; SW846-lead
BCERS	11/7	17:15	4	A,E	–	S	L	2		✓													8240
BCERS	11/7	17:15	4	E	–	C	L	2		✓													CLP 3/90
BCERS	11/7	17:15	4	B,E	–	S	L	1							✓								SW846
BC1B10001	11/7	09:30	5	E	–	S	L	1		✓													8240
BC1B10001	11/7	09:30	5	E	–	C	L	1		✓					✓								CLP 3/90 – SW846-lead
BC1B	/	:					JSB		11/8/94														

Client's Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) J. Briegel	Date: 11/8	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? _____ (In days, see Note 3)
Company Name: EarthTech	Time: 1715	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) Tanya Rayden	Date: 11/9	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: Compuchem	Time: 8:45 am	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

3 of 3

CHAIN-OF-CUSTODY RECORD

#29588

4577

COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: EARTH TECH	Project Name: 110 MFG	Field Point-of-Contact: J. Briegel
	Sampler Name: MIANG J Briegel	Telephone No.: (615)783-9404 - 616 580-1224
		Sampling for project complete? Y or N (See Note 1)
Carrier: Fedex	Airbill No.: 956980035	Sampler Signature: J Briegel
		Project-specific (PS) or Batch (B) QC: PS

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other _____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other _____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other _____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19 97	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC/MS	SV-GC/MS	Pest/PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals 4 6 mth	Mercury	Cyanides	Other: Radiologicals	TOC/TOX	O&G/TPH	Phenols	Other	Remarks / Comments
B1B10001D	11/7	09:30	5	E	–	S	L	1	DUP + MS/MSD														* Jar says BC1B10001D 8240
B1B10001D	11/7	09:30	5	E	–	C,S	L	1			✓				✓								* Jar says BC1B10001D SW846 Lead, CLP 3/90 SVOC
BC1B20001	11/7	09:00	5	E	–	S	L	1		✓													8240
BC1B20001	11/7	09:00	5	E	–	C,S	L	1			✓				✓								Lead SW846, CLP 3/90 SVOC
	/	:																					
	/	:																					* EB1B10001D + JSS 11/8 BH BC1B10001 are a dup. pair use for MS/MSD
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					

JSS 11/8/97

Client's Special Instructions:

Lab: Received in Good Condition? Y or N — **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) J Briegel	Date: 11/8	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? _____ (In days, see Note 3)
Company Name: Earth Tech	Time: 1715	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) Jamie Bowden	Date: 11/9	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: Compuchem	Time: 9:45 am	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

CompuChem Environmental Corporation
3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709
1-800-833-5097

CHAIN-OF-CUSTODY RECORD

29605

Ship to: EARTH TECH, 683 Emory Valley Rd, Oak Ridge Tenn

Project Name: 110th FG, MIANG Battle Creek, Mich

Sampler Name: J. Briegel

Carrier: Fedex Airbill No.: 956980039 1

Sampler Signature: J. Briegel

Field Point-of-Contact: J. Briegel

Telephone No.: 615 483-9404, 616 580-1274

Sampling for project complete? Y or (N) (See Note 1)

Project-specific (PS) or Batch (B) QC: B

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other ____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other ____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other ____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Radiologicals	Other: TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
BECGW1	11/8	15:25	2	A,E	—	C	M-H	2		✓													10/92 low level
BECGW1	11/8	15:25	2	E	—	C	M-H	2			✓												10/92 low level
BCCGW1	11/8	15:25	2	B,E	U,F	C	M	~~12~~ 35							✓								Priority poll. list plus furan
BCCGW1F	11/8	15:25	2	B,E	F	C	M	1							✓								" " " "
BCB2101Z	11/8	14:00	5	E	—	T	L-M	2														✓	Semivolatile fraction TCLP
	/	:																					
Note to Don Tomiak — this is followup work for our July 1994 field event																							
please bill separately 94890101-06; if QA/QC is a problem call.																							
	/	:																					
	/	:																					

Client's Special Instructions:

Lab: Received in Good Condition? Y or N — **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) J. Briegel	Date: 11/9	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? ____ (In days, see Note 3)
Company Name: EARTH TECH	Time: 1725	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) Teresa Hopkins	Date: 11/10	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: Compuchem	Time: 8:20	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

1 of 2

CHAIN-OF-CUSTODY RECORD

29588. J. Briegel 4578

COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: EARTH TECH 683 Emory Valley Rd Oak Ridge, TN	Project Name: HOMEC. MANF Battle Creek, Mich	Field Point-of-Contact: 616 580-1224
	Sampler Name: J. Briegel	Telephone No.: Sampling for project complete? Y or N (See Note 1)
Carrier: Fedex Airbill No.: 956980039	Sampler Signature: J. Briegel	Project-specific (PS) or Batch (B) QC: PS

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other Field blank

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other _____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other _____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals (Field Lab)	Mercury	Cyanides	Radiologicals	Other: TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
BCTB3	11/8	:	W	A,E	–	S	L	2		✓													trip blank
BCER6	11/9	08:00	4	A,E	–	S	L	2		✓													
BCER6	11/9	08:00	4	E	–	C	L	2		✓													
BCER6	11/9	08:00	4	E,B	–	S	L	1						✓									
BCFB6	11/8	18:00	9	A,E	–	S	L	2		✓													field blank potable water
BCFB6	11/8	18:00	9	E	–	C	L	2		✓													
BCFB6	11/8	18:00	9	E,B	–	S	L	1													✓		metals priority poll. list
BC3B30406	11/8	11:50	5	E	–	S	M	1													✓		plus barium
BC3B20406	11/8	11:35	5	E	–	S	M	1													✓		" " " "
BC3B10406	11/8	11:20	5	E	–	S	M	1													✓		" " " "

Client's Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) J. Briegel	Date: 11/9	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? _____ (In days, see Note 3)
Company Name: Earth Tech	Time: 1720	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) Jamie Lansley	Date: 11/10	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: Compuchem	Time: 8:20	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

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4580

CHAIN-OF-CUSTODY RECORD 29588

COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: EARTH TECH
683 Emory Valley Rd
Oak Ridge TN

Project Name: 110th FG MANG — Battle Creek, Mich

Sampler Name: J. Bruegel

Carrier: Fedex Airbill No.: 956980039

Sampler Signature: J. Bruegel

Field Point-of-Contact: J. Bruegel

Telephone No.:

Sampling for project complete? Y or N (See Note 1)

Project-specific (PS) or Batch (B) QC: ____

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other ____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other ____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other ____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals Lead	Metals	Mercury	Cyanides	Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
~~BC1B15~~	/	:				~~JSB~~	~~++~~	~~1~~	~~LL~~														
B1B15101211/18	0930	5	E	—	S	L	1	L															8240
B1B15101211/18	0930	5	E	—	GS	L	1	L		L				L									CLP 3/90 SVOC, SW846 Lead
BC1B51012 11/18	10:50	5	E	—	C,S	L	1	L		L				L									poor recovery, help — 8240, CLP 3/90 SVOC, SW846 Lead
BC1B32022 11/18	17:15	5	E	—	C	M-H	1	L															fuel odor 8240
BC1B32022 11/18	17:15	5	E	—	GS	M-H	1	L		L				L									fuel odor - CLP 3/90 SVOC SW846 Lead
	/	:																					
	/	:																					
	/	:																					
	/	:																					

Client's Special Instructions:

Lab: Received in Good Condition? Y or N — **Describe Problems, If Any:**

#1 Relinquished By: (Sig.)	Date:	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? ____ (In days, see Note 3)	
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:		
#1 Received By: (Sig.) Tom Roby	Date: 11/0	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)	
Company Name: Compuchem	Time: 8:30a	Company Name:	Time:	Company Name:	Time:		

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

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4559

CHAIN-OF-CUSTODY RECORD

29588

COMPUCHEM
ENVIRONMENTAL
CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: Earth Tech
683 Emory Valley Rd
Oak Ridge Tn 37830

Project Name: Michigan ANG Battle Creek, Mic

Field Point-of-Contact: J. Briegel

Telephone No.: (615) 483-9404

Sampler Name: J. Briegel

Sampling for project complete? (Y) or N (See Note 1)

Carrier: Fedex Airbill No.: 956980038O

Sampler Signature: J Briegel

Project-specific (PS) or Batch (B) QC: PS

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other _____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other _____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other _____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals (Total)	Mercury	Cyanides	Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
BCTB4	11/9	18:30	6	A,E	–	C	L	2		✓													trip blank
BCER7	11/9	18:05	4	A,E	–	C	L	2		✓													rinsate from hand auger
BCER7	11/9	18:05	4	E	–	C	L	2			✓												" " "
BCER7	11/9	18:05	4	B,E	–	S	L	1							✓								" " "
B1B12000 1	11/9	14:25	5	E	–	S	L	1		✓													8240
B1B12000 1	11/9	14:25	5	E	–	C,S	L	1			✓				✓								3/90 CLP, SW846 Pb
BC1B40001	11/9	0900	5	E	–	S	L	1		✓													8240
BC1B40001	11/9	09:00	5	E	–	C,S	M	1			✓				✓								3/90 CLP SW846 Pb, field duplicate
BC1B50001	11/9	09:35	5	E	–	S	L	1		✓													8240 ~~pleas~~
JSB 11/10/94 ~~BC1B50001~~ B1B50001D	11/9	09:35	5	E	–	S	L	1		✓													~~please~~

Client's Special Instructions:

JSB 11/10/94

Lab: Received in Good Condition? Y or N — Describe Problems, If Any:

#1 Relinquished By: (Sig.) J Briegel	Date 11/10	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? _____ (In days, see Note 3)
Company Name: Earth Tech	Time: 1205	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) Melinda Steele	Date 11/10/94	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: CompuChem	Time 07:45	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

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4563

29588

CHAIN-OF-CUSTODY RECORD

COMPUCHEM
ENVIRONMENTAL
CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: See page 1	Project Name:	Field Point-of-Contact:
	Sampler Name:	Telephone No.:
		Sampling for project complete? Y or N (See Note 1)
Carrier: Airbill No.:	Sampler Signature:	Project-specific (PS) or Batch (B) QC: ____

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other ____

Box #2: A. HCl; B. HNO_3; C. $NaHSO_4$; D. $Na_2S_2O_3$; E. Ice Only; O. Other ____; N. Not Preserved

Box #3: F. Filtered; U. Unfiltered

Box #4: C. CLP 3/90; S. SW-846; W. CWA 600-series; L. Low Conc. CLP; R. Radiological; T. TCLP; O. Other ____

Box #5: H. - High; M. - Medium; L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals (4 ml)	Mercury	Cyanides	Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
B1B50001	11/9	09:35	S	E	–	C,S	M	1	MS	✓					✓								field duplicate pair
B1B50001D	11/9	09:35	S	E	–	C,S	M	1	MSD JSB 11/10	✓					✓								CLP 3/90 and SW846
B1B80001	11/9	11:25	S	E	–	S	L-M	1		✓													8240
B1B80001	11/9	11:25	S	E	–	C,S	L-M	1							✓								CLP 3/90 and SW846
B1B11000	11/10	10:30	S	E	–	S	L	1		✓													8240
B1B11000	11/10	10:30	S	E	–	C,S	L	1							✓								CLP 3/90 and SW846
B1B11~~20~~19235 JSB	11/9	15:40	S	E	–	S	L	1		✓													8240
B1B11~~20~~19235 JSB	11/9	15:40	S	E	–	C,S	L	1							✓								CLP 3/90 and SW846
B1	/	:		JSB	11/10/94																		
B1	/	:		JSB	11/10/94																		
B																							

~~Received a Dup to B1BH1923D. ID used.~~

MS 11/11/94

Client's Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) Stephen Mezzell	Date: 11/10	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:
Company Name: Environ Tech	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig.) Melissa Stevens	Date: 11/11/94	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:
Company Name: CompuChem	Time: 0745	Company Name:	Time:	Company Name:	Time:

Sample storage time requested? ____ (In days, see Note 3)

DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

3 of 4

CHAIN-OF-CUSTODY RECORD

29588

COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: See Page 1	Project Name:	Field Point-of-Contact:
	Sampler Name:	Telephone No.:
		Sampling for project complete? Y or N (See Note 1)
Carrier: Airbill No.:	Sampler Signature:	Project-specific (PS) or Batch (B) QC: ____

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other ____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other ____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other ____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Metals lead only	Inorganics: Mercury	Cyanides	Other: Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
B1B11X923D	11/9	15:40	S	E	—	C,S	L	1	MS/MSD	✓					✓								BIBI1923 and IBIIK23D are field dup pair
B1B11X923D	11/9	15:40	S	E	—	S	L	1		✓													use for MS/MSD also 8240, CLP 3/90/ Lead SW846
BC1B90001	11/9	15:20	S	E	—	S	L	1		✓													8240,
BC1B90001	11/9	15:20	S	E	—	C,S	L	1		✓					✓								CLP 3/90 SW846 Lead
~~BCB790001~~	11/9	14:55	S	E	—	S	L	1		✓													8240
BC1B70001	11/9	14:55	S	E	—	C,S	L	1		✓					✓								CLP 3/90, SW846 lead
BC1B70002	11/9	11:45	S	E	—	S	L	1		✓													8240
BC1B70002	11/9	11:45	S	E	—	C,S	L	1		✓					✓								CLP 3/90, SW846 lead
B&1BT90001	11/10	10:50	S	E	—	C	L	1		✓													8240
B&1B190001	11/10	10:50	S	E	—	C,S	L	1		✓					✓								CLP 3/90, SW846 lead

Client's Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) Brezel	Date: 11/16	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? ____ (In days, see Note 3)
Company Name: Earth Tech	Time: 17:00	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.)	Date: 11/17	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: CompuChem	Time: 07:45	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

4 of 4

CHAIN-OF-CUSTODY RECORD

29588

4562

CompuChem Environmental Corporation

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: See Page 1

Project Name:

Sampler Name:

Sampler Signature:

Field Point-of-Contact:

Telephone No.:

Sampling for project complete? Y or N (See Note 1)

Project-specific (PS) or Batch (B) QC: ____

Carrier: Airbill No.:

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other ____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other ____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other ____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals (Lead ONLY)	Mercury	Cyanides	Other: Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
BrB1920222	11/9	10:55	S	E	—	S	L	1	✓	✓					✓								8240
BlB1920222	11/9	10:53	S	E	—	C,S	L	1			✓				✓								CLP 3/90, SW846 Lead poor recovery, try to get all aliquots from 1 cooler
BlB1815117	11/9	09:05	S	E	—	C,S	H	1	✓	✓					✓								
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					

JSB 11/10

Client's Special Instructions:

Lab: Received in Good Condition? Y or N — **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) Bruce	Date: 11/10	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:
Company Name: EarthTech	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig.) Melissa Stec	Date: 11/11/94	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:
Company Name: CompuChem	Time: 0745	Company Name:	Time:	Company Name:	Time:

Sample storage time requested? ____ (In days, see Note 3)

DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

EARTH TECH
OAK RIDGE

4542

29839.

COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

CHAIN-OF-CUSTODY RECORD

Ship to: COMPUCHEM 3306 Chapel Hill RTP, NC	Project Name: 110th FG, MIANG, RI	Field Point-of-Contact: J. BRIEGEL
	Sampler Name: S. SMITH	Telephone No.: (615) 483-9404
		Sampling for project complete? Y or (N) (See Note 1)
Carrier: FEDEX Airbill No.: 351945 7211	Sampler Signature:	Project-specific (PS) or Batch (B) QC: PS

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other Field blank

Box #2: A. HCl; B. HNO_3; C. $NaHSO_4$; D. $Na_2S_2O_3$; E. Ice Only; O. Other ____; N. Not Preserved

Box #3: F. Filtered; U. Unfiltered

Box #4: C. CLP 3/90; S. SW-846; W. CWA 600-series; L. Low Conc. CLP; R. Radiological; T. TCLP; O. Other ____

Box #5: H. - High; M. - Medium; L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19 94	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC/MS	SV-GC/MS	Pest/PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC/TOX	O&G/TPH	Phenols	Other
BCFB01	~~12/15~~ 12/16	~~8:25~~ 07:50	W	A	NA	S	L	4					↘									
BCFB01	12/16	07:50	9	E	|	L	L	2		↘												
BCFB01	12/16	07:50	9	B	|	S	L	1						↘								
BCFB02	12/16	8:25	9	A	|	S	L	4				↘										
BCFB02	12/16	8:25	9	E	|	L	L	2		↘												
BCFB02	12/16	8:25	9	B	|	S	L	1						↘								
BCTB01	12/16	16:45	6	A.	▽	S	L	2					↘									
1MW2202	12/14	13:37	5	E	|	S,C	M	1		↘	↘				↘							
1MW2101	12/14	13:25	5	E	▽	S,C	M	1		↘	↘				↘							
	/	:																				

Remarks / Comments

need to add 1 methyl naphthalene to SVOC list

all waters for
SW846 8010/8020
CLP 10/92 SVOC low level
metal P.P list plus barium

small volumes - can I omit please run for 8240, CLP SVOCs and (Pb - trace ICP method)
VOCs = low level - (Field screen)
SVOCs = med conc. - (Field screen)
Pb = ? med con

Client's Special Instructions:

Lab: Received in Good Condition? Y or N — **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) J Briegel	Date: 12/16	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? ____ (In days, see Note 3)
Company Name: EARTH TECH	Time: 1700	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) M. Stowe	Date:	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: CompuChem	Time:	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

1 of 4 #99829

4546

CHAIN-OF-CUSTODY RECORD

CompuChem Environmental Corporation
3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709
1-800-833-5097

Ship to: EARTH TECH OAK RIDGE

Project Name: 110th FG, MIANG Battle Creek, Mich

Sampler Name: J Briegel

Sampler Signature: J Briegel

Field Point-of-Contact: J. Briegel

Telephone No.: 615 483-9404

Sampling for project complete? Y or N (See Note 1)

Project-specific (PS) or Batch (B) QC: PS HAZWRAP

Carrier: FEDEX Airbill No.: 351945 7130

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other _____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other _____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other _____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
BCERO2	12/18	17:15	4	E	U	S	L	2		✓													8240
BCERO2	12/18	17:15	4	↓	↓	C	L	2		✓													CLP
BCERO2	12/18	17:15	4	↓	↓	S	L	1							✓									prior. poll. list plus barium
BCBGSS01	12/17	11:45	5	↓	↓	S	L	1		✓														8240 (s.steel sleeve)
BCBGSS01	12/17	11:45	5	↓	↓	C,S	L	1		✓					✓									CLP svoc, p.p list metals plus Ba
BCBGSS02	12/17	12:10	↓	↓	↓	S	L	1		✓														8240 (sleeve)
BCBGSS02	12/17	12:10	↓	↓	↓	C,S	L	1		✓					✓									CLP SVOC; pp list metals plus Ba
BCBGSS03	12/17	10:10	↓	↓	↓	S	L	1	MS/MSD	✓														8240 (sleeve)
BCBGSS03	12/17	10:10	↓	↓	↓	C,S	M	1	MS/MSD	✓					✓									CLP SVOC; pp list metals plus Ba
BCBGSS03D	12/17	10:10	↓	↓	↓	S	L	1	MS/MSD	✓														8240 (sleeve)

Client's Special Instructions: BCBGSS03 and 03D are a duplicate pair — use for MS/MSD

Lab: Received in Good Condition? Y or N **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) J Briegel ET	Date: 12/19	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:
Company Name:	Time: 700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig.) M Stevens	Date: 12/20	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:
Company Name: CompuChem	Time: 0800	Company Name:	Time:	Company Name:	Time:

Sample storage time requested? _____ (In days, see Note 3)

DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

#29839

4545

COMPUCHEM ENVIRONMENTAL CORPORATION
3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709
1-800-833-5097

CHAIN-OF-CUSTODY RECORD

Ship to: ~~EARTH TECH~~ ~~COMPUCHEM~~ OAK RIDGE TN	Project Name: 110th FG, MIANG, RI	Field Point-of-Contact: J. BRIEGEL
	Sampler Name: S. SMITH	Telephone No.: (615) 483-9404
		Sampling for project complete? Y or N (See Note 1)
Carrier: FEDEX Airbill No.: 3519457130	Sampler Signature: Sam Smith	Project-specific (PS) or Batch (B) QC: PS

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other _____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other _____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other _____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
BCBGJ0507	12/16	15:30	S	E	U	C,S	L	1		✓					✓								CLP SVOC, metals P.P list plus Ba
BC1SS05	12/17	13:05	S	E	U	C,S	M	1		✓					✓								CLP SVOC, Pb ~~metals PP list~~ 12/19/94 JSD
BC1SS06	12/17	13:50	S	E	U	C,S	M	1		✓					✓								" " "
BC1SS07	12/17	14:15	S	E	U	C,S	M	1		✓					✓								" " "
BC1SS08	12/17	14:55	S	E	U	C,S	M	1		✓					✓								" " "
BC1SS09	12/17	15:30	S	E	U	C,S	M	1		✓					✓								" " "
BC1SS10	12/17	16:00	S	E	U	C,S	M	1		✓					✓								" " "
BC1SS11	12/17	16:30	S	E	U	C,S	M	1		✓					✓								" " "
BC1SS12	12/17	16:55	S	E	U	C,S	M	1	JSD	✓					✓								" " "
BC1SS13	12/18	09:00	S	E	U	C,S	M	1		✓					✓								" " "

Client's Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) S. Smith S.E.T.	Date: 12/19	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig.) M. Stone	Date: 12/20/94	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:
Company Name: Compu Chem	Time: 0800	Company Name:	Time:	Company Name:	Time:

Sample storage time requested? _____ (In days, see Note 3)

DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

3 of 4

#29839

4574

CHAIN-OF-CUSTODY RECORD

CompuChem Environmental Corporation
3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709
1-800-833-5097

Ship to: EARTH TECH OAK RIDGE, TN	Project Name: 110th FG, MIANG Battle Creek, MICH	Field Point-of-Contact: J. Briegel
	Sampler Name: J. Briegel	Telephone No.: (615) 483-9404
		Sampling for project complete? Y or N (See Note 1)
Carrier: FEDEX Airbill No.: 351945 7130	Sampler Signature: J. Briegel	Project-specific (PS) or Batch (B) QC: PS HAZWRAP

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other _____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other _____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other _____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC/MS	SV-GC/MS	Pest/PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Radiologicals	TOC/TOX	O&G/TPH	Phenols	Other	Remarks / Comments
BCBG5S03D (5S-93 J30)	12/17	10:10	5	E	U	C,S	M	1	MS/MSD	✓	✓				✓								CLP SVOC: p.p. list plus barium
BCBG5S04	12/17	10:35	5	E	U	S	L	1	✓		✓												8240; sleeve
BCBG5S04	12/17	10:35	5	E	U	C,S	M	1		✓	✓				✓								CLP SVOC, pp list plus Ba
BCTB3	12/9	14:50	6	A	U	C	L	2	✓														8240 - trip blank
BCBG4050 7	12/16	15:47	5	E	U	C	L	1	✓	✓													8240
BCBG4050 7	12/16	15:47	5	E	U	C,S (J30)	L	1		✓	✓				✓								CLP, p.p. list metals plus Ba
BCBG2050 7	12/16	14:41	5	E	U	C,S	L	1	✓	✓	✓				✓								8240, CLP SVOC, metals
BCBG1050 7	12/16	13:57	5	E	U	S	L	1	✓		✓												8240
BCBG1050 7	12/16	13:57	5	E	U	C,S	L	1		✓	✓				✓								CLP SVOC, metals plus Ba
BCBG3050 7 (J30)	12/16	15:30	5	E	U	S	L	1	✓														8240

Client's Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) J. Briegel ET	Date: 12/19	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? _____ (In days, see Note 3)
Company Name:	Time: 730	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) M. Stallings	Date: 12/20/96	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: CompuChem	Time: 0800	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

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29839

4681

CHAIN-OF-CUSTODY RECORD

COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: EARTH TECH OAK RIDGE	Project Name: 110th FG, MANG BATTLE CREEK, MICH	Field Point-of-Contact: J. BRIEGEL
	Sampler Name: J. BRIEGEL	Telephone No.: (615) 483-9404
	Sampler Signature: [signature]	Sampling for project complete? Y or N (See Note 1)
Carrier: FEDEX Airbill No.: 351945 7130		Project-specific (PS) or Batch (B) QC: PS HAZWRAP

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other _____

Box #2: A. HCl; B. HNO_3; C. $NaHSO_4$; D. $Na_2S_2O_3$; E. Ice Only; O. Other _____; N. Not Preserved

Box #3: F. Filtered; U. Unfiltered

Box #4: C. CLP 3/90; S. SW-846; W. CWA 600-series; L. Low Conc. CLP; R. Radiological; T. TCLP; O. Other _____

Box #5: H. - High; M. - Medium; L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 1994	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
BC1SS14	12/18	09:30	S	E	U	GS	M	1		✓					✓								CLP SVOC plus Barium
BC1SS15	12/18	09:50	S	E	U	GS	M	1		✓					✓								" "
	/	:																					
	/	:	HOLD ALL SAMPLES LABELLED WITH A																				
	/	:	"BC1" - PREFIX; ANALYZE ~~BC1~~ "BCBG";																				
	/	:																					
	/	:	and the RINSATE AND TRIP BLANK																				
	/	:																					
	/	:																					
	/	:																					

Client's Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) [signature]	Date: 12/19	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:
Company Name: EIT	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig.) [signature]	Date: 12/19	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:
Company Name: CompuChem	Time: 0800	Company Name:	Time:	Company Name:	Time:

Sample storage time requested? _____ (In days, see Note 3)

DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

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29839

CHAIN-OF-CUSTODY RECORD

COMPUCHEM ENVIRONMENTAL CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: EARTH TECH OAK RIDGE, TN	Project Name: 10TH FG, MIANG BATTLE CREEK, MI	Field Point-of-Contact: J. BRIEGEL
	Sampler Name: S. SMITH	Telephone No.: 615/483-9404
		Sampling for project complete? Y or N (See Note 1)
Carrier: FED EX Airbill No.: 351945714	Sampler Signature:	Project-specific (PS) or Batch (B) QC: PS H2WP

BOX #1: 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other _____

Box #2: A. HCl, B. HNO_3, C. $NaHSO_4$, D. $Na_2S_2O_3$, E. Ice Only, O. Other _____, N. Not Preserved

Box #3: F. Filtered, U. Unfiltered

Box #4: C. CLP 3/90, S. SW-846, W. CWA 600-series, L. Low Conc. CLP, R. Radiological, T. TCLP, O. Other _____

Box #5: H. - High, M. - Medium, L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 19__	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Radiologicals	Other: TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
BCMW16GW5	12/18	10:45	2	B	F		L	1							✓								TAL METALS
BCMW16GW5	12/18	10:45	2	E	U		L	1														✓	CHLORIDE/SULFATE
BC1MW1GW5	12/18	13:23	2	A	U		L	8	MS/MSD					✓									8010/8020
BC1MW1GW5	12/18	13:23	2	E	U		L	4	MS/MSD		✓												LOW LEVEL CLP
BC1MW1GW5	12/18	13:23	2	B	F		L	2	MS/MSD						✓								PP METALS + BARIUM
B1MW1GW5D	12/18	13:23	2	A	U		L	4						✓									8010/8020
B1MW1GW5D	12/18	13:23	2	E	U		L	2			✓												PP METALS + BARIUM 55
B1MW1GW5D	12/18	13:23	2	B	F		L	1							✓								LOW LEVEL CLP
BC1MW3GW5	12/18	14:55	2	A	U		L	4						✓									8010/8020
BC1MW3GW5	12/18	14:55	2	E	U		L	2			✓												LOW LEVEL CLP

Client's Special Instructions:

Lab: Received in Good Condition? Y or N — **Describe Problems, If Any:**

#1 Relinquished By: (Sig.) J Briegel	Date: 12/19	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:
Company Name: ETD	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig.) J. Purdie	Date: 12/20/14	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:
Company Name: CompuChem	Time: 0830	Company Name:	Time:	Company Name:	Time:

Sample storage time requested? _____ (In days, see Note 3)

DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

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29839

CHAIN-OF-CUSTODY RECORD

COMPUCHEM
ENVIRONMENTAL
CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: EARTH TECH OAK RIDGE, TN	Project Name: 110TH FG, MIANG BATTLECREEK, MI	Field Point-of-Contact: J BRIEGEL
	Sampler Name: S. SMITH	Telephone No.: 615/483-9404
		Sampling for project complete? Y or N (See Note 1)
Carrier: FEDEX Airbill No.: 351945714 1	Sampler Signature:	Project-specific (PS) or Batch (B) QC: PS H2WP

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other _____

Box #2: A. HCl; B. HNO_3; C. $NaHSO_4$; D. $Na_2S_2O_3$; E. Ice Only; O. Other _____; N. Not Preserved

Box #3: F. Filtered; U. Unfiltered

Box #4: C. CLP 3/90; S. SW-846; W. CWA 600-series; L. Low Conc. CLP; R. Radiological; T. TCLP; O. Other _____

Box #5: H. - High; M. - Medium; L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 1994	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Radiologicals	Other: TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
BCTBØ2	12/17	12:20	6	A	U		L	2						✓									Trip blank
BC2MW1GW5	12/17	17:19	2	A	U		L	4						✓									8010/8020
BC2MW1GW5	12/17	17:19	2	E	U		L	2			✓												LOW LEVEL CLP
BC2MW1GW5	12/17	17:19	2	B	F		L	1							✓								PP LIST + BARIUM
BCMW4GW5	12/17	13:10	2	A	U		L	4						✓									8010/8020
BCMW4GW5	12/17	13:10	2	E	U		L	2			✓												LOW LEVEL CLP
BCMW4GW5	12/17	13:10	2	B	F		L	1							✓								TAL METALS
BCMW4GW5	12/17	13:10	2	E	U		L	1														✓	CHLORIDE, SULFATE
BCMW1GW5	12/18	10:45	2	A	U		L	4						✓									8010/8020
BCMW1GW5	12/18	10:45	2	E	U		L	2			✓												LOW LEVEL CLP

Client's Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, If Any:**

#1 Relinquished By: (Sig.)	E. Briegel	Date: 12/19	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? _____ (In days, see Note 3)
Company Name:		Time: 1700	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.)	J. Purdie	Date: 12/20/94	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name:	CompuChem	Time: 0830	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

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CHAIN-OF-CUSTODY RECORD

29039

COMPUCHEM
ENVIRONMENTAL
CORPORATION

3306 Chapel Hill/Nelson Highway
Research Triangle Park, NC 27709

1-800-833-5097

Ship to: EARTH TECH OAK RIDGE, TN	Project Name: 110TH FG, MIANG BATTLE CREEK, MI	Field Point-of-Contact: J BRIEGEL
	Sampler Name: S. SMITH	Telephone No.: 615/483-9404
		Sampling for project complete? Y or N (See Note 1)
Carrier: FED EX Airbill No.: 351945714	Sampler Signature:	Project-specific (PS) or Batch (B) QC: PS HZwP

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other _____

Box #2: A. HCl; B. HNO_3; C. $NaHSO_4$; D. $Na_2S_2O_3$; E. Ice Only; O. Other _____; N. Not Preserved

Box #3: F. Filtered; U. Unfiltered

Box #4: C. CLP 3/90; S. SW-846; W. CWA 600-series; L. Low Conc. CLP; R. Radiological; T. TCLP; O. Other _____

Box #5: H. - High; M. - Medium; L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 1994	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organics Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
BC1MW36W5	12/18	14:55	2	B	F		L	1							✓								PP METALS + BARIUM
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					

JR 12/19/94

Client's Special Instructions:

Lab: Received in Good Condition? Y or N	Describe Problems, If Any:						
#1 Relinquished By: (Sig.)	Date: 12/19	#2 Relinquished By: (Sig.)	Date:	#3 Relinquished By: (Sig.)	Date:	Sample storage time requested? _____ (In days, see Note 3)	
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:		
#1 Received By: (Sig.)	Date: 12.20.94	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)	
Company Name:	Time: 0930	Company Name:	Time:	Company Name:	Time:		

J. Purdie E.D. CompuChem

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. **Note (2):** If CLP Inorganics diskette required, ID limited to maximum of six characters.

Note (3): Samples stored 60 days after date report mailed at no extra charge. **Note (4):** All lab copies of data destroyed after five years unless client requests and pays for return of copies; annual storage fee billed in January of year six.

WW Engineering & Science
A Summit Company
5565 Glenwood Hills Pkwy SE • PO Box 874 • Grand Rapids, MI 49588-0874

Chain of Custody Record
Analytical Services

COC No.
No 70807

WWES Proj. Mgr.	Project Name: Pat Lee Creek 110th Ave
WWES Proj. No.	Sampler (Print):
	Sampler Signature:

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	For Lab Use Only: Sample No.	Filtered Date/Time
11/2	1500	W		X	BCFB2			VOC screen		
11/2	1505	W		X	1GWG			VOC screen		
11/2		W		X	BCFB1			VOC screen		
								HOT!! high PID, strong odor		

Container Type: 1 2 3 4 5 / 6 7 8 9 10 / 11 12 13 14 15 / 16 17 18 19 20

No's Correspond to Bottle Packing List

For Lab Use Only: Rack/Tray No: ; Lab Project #

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
[signature]	1515		[signature]	7 Nov 94 1500		

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

BSL/Charts/Chain of Custody

WW Engineering & Science
A Summit Company
5555 Glenwood Hills Pkwy SE • PO Box 874 • Grand Rapids, MI 49588-0874

Chain of Custody Record

Analytical Services

COC No.
№ 69353

WWES Proj. Mgr.: J. Biegel
Project Name: 110th FG, MICHIGAN ANG
WWES Proj. No.:
Sampler (Print): J B R I E G E L
Sampler Signature: J Biegel

Note to Greg
Reed - please make sure 2-methylnaphthalene is on PNA list
JSB

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	Sample No.	Filtered Date/Time
11/2	1730	W		✓	1GW8	2	2	"Field" screen VOCs - no odor - no PID response		
11/2	1730	W			1GW8	1	2	PNA's 7 day turn		
11/2	1505	W			1GW6	1	2	PNA's 7 day turn		

For Lab Use Only
Rack/Tray No:
Lab Project #

Container Type: 1 = 1 liter amber, 2 = 500 ml amber, 3 = VOA vial, 4 = 500 ml plastic, 5 = other

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
J Biegel	1800	Brent Reed		11/2/94 8:00pm		

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

11/2

NML

WW Engineering & Science
A Summit Company
5555 Glenwood Hills Pkwy SE • PO Box 874 • Grand Rapids, MI 49588-0874

Chain of Custody Record
Analytical Services

COC No.
No 70809

WWES Proj. Mgr.	Project Name	For Lab Use Only
J. Bruegel	110th FG MIANG, Battle Creek	Rack/Tray No:
WWES Proj. No.	Sampler (Print) J. BRUEGEL	Lab Project #
27001.01	Sampler Signature J. Bruegel (Time Fax)	

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	Sample No.	Filtered Date/Time
11/3	0730	W		X	BCER1	3	1	VOC, PNA - "Field" methods		
11/3	0910	W		X	1GW4	2	1	VOC field screen - no fuel odor - moderate PNAs		
11/3	1030	W		X	1GW3 MS/MSD 11/3/94	5	1	VOC and PNA "Field" methods - extra VOCs for matrix spike		
11/3	1030	W		X	1GW3D	3	1	VOC and PNA "Field" methods - duplicate of	1GW3	

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
Denis Fox	11/3/94 2:30 PM	Don Moran 11/3/94 2 30PM				

* Matrix (Water (W), Wastewater (WW), Soil (S), Sludge (SG), Air (A), Waste (WASTE))

WW Engineering & Science
A Summit Company
5555 Glenwood Hills Pkwy SE • PO Box 874 • Grand Rapids, MI 49588-0874

Chain of Custody Record
Analytical Services

COC No.
№ 70810

| WWES Proj. Mgr. | Project Name | | |

WW Engineering & Science
A Summit Company
5555 Glenwood Hills Pkwy SE • PO Box 874 • Grand Rapids, MI 49588-0874

Chain of Custody Record
Analytical Services

COC No. 112 65353

WWES Proj. Mgr.	Project Name	No's Correspond to Bottle Packing List	For Lab Use Only
J Briegel	110th FG, MICH ANG	both samples had slight mod odors.	Rack/Tray No:
WWES Proj. No.	Sampler (Print): J B R I E G E L		Lab Project #
27001.01	Sampler Signature: J Briegel for Fox		

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	Sample No.	Filtered Date/Time
11/4	1700	W		✓	BC2MW1	2	1	VOC "field" method		
11/4	1645	W		✓	1GW9	2	1	VOC "field method		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
Dave Fox	11/5/94 12:45			11/5/94 12:45		

Matrix: Water (W), Waste (WW), (SO) Sludge, Air, Waste (OIL)

WW Engineering & Science
A Summit Company
5555 Glenwood Hills Pkwy SE • PO Box 874 • Grand Rapids, MI 49588-0874

Chain of Custody Record
Analytical Services

COC No. NB 65354

WWES Proj. Mgr.	Project Name
S. Briegel	110th FG, MICH ANG
WWES Proj. No.	**Sampler (Print)** A F O X
32429	**Sampler Signature** A. Fox

both samples had slight - mod. odors.

For Lab Use Only
Rack/Tray No:
Lab Project #

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	Sample No.	Filtered Date/Time
11/4	1700	W		✓	BC2MW1	1	2	PNA 8270		
11/4	1645	W		✓	1GW9	1	2	PNA 8270		

Container Type: 1 2 3 4 5 / 6 7 8 9 10 / 11 12 13 14 15 / 16 17 18 19 20

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
Ana Fox	11/5/94 12:45			11/5/94 12:45		

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

WW Engineering & Science
A Summit Company
5555 Glenwood Hills Pkwy SE • PO Box 874 • Grand Rapids, MI 49588-0874

Chain of Custody Record
Analytical Services

COC No. № 65355

WWES Proj. Mgr.	Project Name	No's Correspond to Bottle Packing List	For Lab Use Only
S. Briegel	IRON, FE, MICH ANG		Rack/Tray No:
WWES Proj. No.	Sampler (Print): J B B I E G E L		Lab Project #
27001.01	Sampler Signature:		

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	Sample No.	Filtered Date/Time
11/6	1130	Soil		X	1B205057	2	1	PID = 0 VOC, PAH/PNA		
11/6	1140	Soil		X	1B210127	2	1	PID = 10 VOC, PAH/PNA		
11/6	1150	Soil		X	1B215177	2	1	PID = 300 VOC, PAH/PNA		
11/6	1200	Soil		X	1B220227	2	1	PID = 20 VOC/PAH/PNA		
11/6	1320	Soil		X	1B105077	2	1	PID = 3.2 VOC PAH/PNA		
11/6	1350	Soil		X	1B110127	2	1	PID = 9.3 VOC PAH/PNA		
11/6	1410	Soil		X	1B115177	2	1	PID = 7.3 VOC PAH/PNA		
11/6	1438	Soil		X	1B120227	2	1	PID = >2500 VOC PAH/PNA		
11/6	1535	Soil		X	1B405077	2	1	PID = 0.6 VOC PAH/PNA		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
	11/6/94 18:40			11/6/94 18:40		

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLDG), Air, Waste (WSTE)

WW Engineering & Science
A Summit Company
5555 Glenwood Hills Pkwy SE • PO Box 874 • Grand Rapids, MI 49588-0874

Chain of Custody Record
Analytical Services

COC No.
Nº 69353

WWES Proj. Mgr.	Project Name
J. Briegel	110th FG, MICH ANG
WWES Proj. No.	**Sampler (Print)** J B R I E G E L
27001.01	**Sampler Signature**

For Lab Use Only
Rack/Tray No:
Lab Project #

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	Sample No.	Filtered Date/Time
11/6	1545	Soil		X	1B41012	4	(1)	PID=298 VOC, PAH/PNA		
				X	1B41012D					
11/6	1610	Soil		X	1B41517	2	(1)	PID=2.5 VOC, PAH/PNA soil		
11/6	1450	W		X	BCER3	2	(1)	VOC only		
11/6	1455	Soil		X	1B12527	4	(1)	PID=2.5		
				X	1B12527D					
11/6	1710	Soil		X	BCICONB	1	(1)	PNA		
11/6	1700	Soil		X	BCICONA	1	(1)	PNA		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
	11/6/94 18:40			11/6/94 18:40		

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

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Chain of Custody Record
Analytical Services

COC No.
№ 69353

| WWES Proj. Mgr. | Project Name | | |

EARTH TECH

5555 Glenwood Hills Pkwy SE • PO Box 874 • Grand Rapids, MI 49588-0874

Chain of Custody Record

Analytical Services

COC No. N2 17243

Project Manager	Project Name	For Lab Use Only
J Briegel	110th FG, MICH ANG	Rack/Tray No:
Project No. 27001.01	Sampler (Print) J BRIEGEL	Lab Project #
	Sampler Signature J Briegel U. Fox	

Date Sampled	Time Sampled	Matrix*	Composite	Grab	Sample Identification	No. of Containers	Container Type	Analysis Required/Comments	Sample No.	Filtered Date/Time
11/6	0900	W		X	1GW12	2	1	Highest Priority! VOC		
11/7	1430	Soil		X	1B121517	2	1	PAH, VOC		
11/7	1610	Soil		X	1B8202202	2	1	PAH, VOC		
11/7	1550	Soil		X	1B81517	1	1	VOC		
11/7	1445	Soil		X	1B1220202	2	1	PAH / VOC		
11/7	1210	Soil		X	1B5252702	2	1	PAH, VOC		
11/7	1140	Soil		X	1B5202202	2	1	PAH, VOC		
11/7	1535	Soil		X	1B8101202	2	1	PAH, VOC		
11/7	1110	Soil		X	1B5151702	2	1	PAH, VOC		

Relinquished By:	Date/Time	Received By:	Received to Lab By:	Date/Time	Logged in By:	Date/Time
U. Fox	11/7/94 6:30pm	Don Moran 11/7/94 6:30PM				

* Matrix: Water (WTR), Wastewater (WW), Soil (SOIL), Sludge (SLG), Air, Oil, Waste (WASTE)

0025-CofC

EARTH TECH

5555 Glenwood Hills Pkwy SE • PO Box 874 • Grand Rapids, MI 49588-0874

Chain of Custody Record

Analytical Services

COC No. N2 17?44

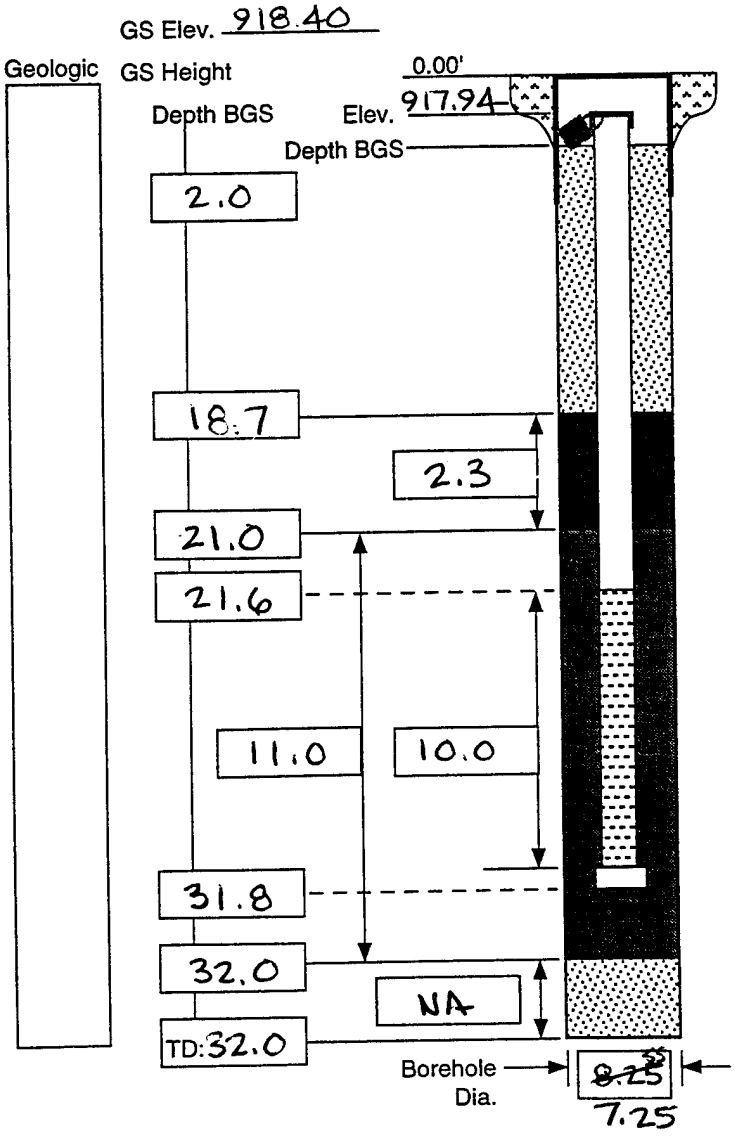
| Project Manager | Project Name | | |

APPENDIX H: MONITORING WELL CONSTRUCTION FORMS

EARTH TECH

Monitoring Well Construction Log - Flush Mount

Project Name: 11CTH FIGHTER GROUP, MIANG	Project Number: 948901	Date: 14 DEC 94
Well Location: SITE 1, FUEL TANK FARM	Well ID: BC1-MW1	Sheet 1 of 1
Driller: MIKE HEFFEARN	Borehole Diameter (in): ~~8.25~~ SS SCH40 PVC 7.25	Total Depth (ft): 32
Drilling Agency: STEARNS	Date Started: 13 DEC 94	Depth to Water (ft): 27.86
Drilling Equipment: CME 550	Date Finished: 14 DEC 94	Elevation and Datum: —
Drilling Method: HOLLOW STEM AUGER	Logged by: S. SMITH	Checked by: JSA
Drilling Fluid: NA	Number of Samples:	Date: 2/9/96



PROTECTIVE CSG
Material / Type:
Diameter:
Depth BGS: Weep Hole (Y /(N))

GUARD POSTS (Y (N))
No.: Type:

SURFACE PAD
Composition and Size:

RISER PIPE
Type: JOHNSON SCH 40 PVC
Diameter: 2.06 IN ID
Total Length (TOC to TOS): 21.71
Ventilated Cap (Y (N))

GROUT
Composition and Proportions: 94 lbs PORTLAND CEMENT + 5 lbs BENTONITE
Tremied (Y /(N))
Interval BGS:

CENTRALIZERS
Depth(s) NA

SEAL 1/4" PELLETED BENTONITE
Type:
Source: GLOBAL DRILLING SUPPLIES
Setup / Hydration Time: 30 MIN Vol. Fluid Added 5GAL
Tremied (Y / N)

FILTER PACK
Type: NO. 7 SILICA SAND
Amt. Used: 275 lbs
Tremied (Y /(N))
Source: GLOBAL DRILLING SUPPLIES
Gr. Size Dist.: 10-20

SCREEN
Type: JOHNSON SCH 40 PVC
Diameter: 2.06 IN ID
Slot Size and Type: 10 SLOT MILLED
Interval BGS:

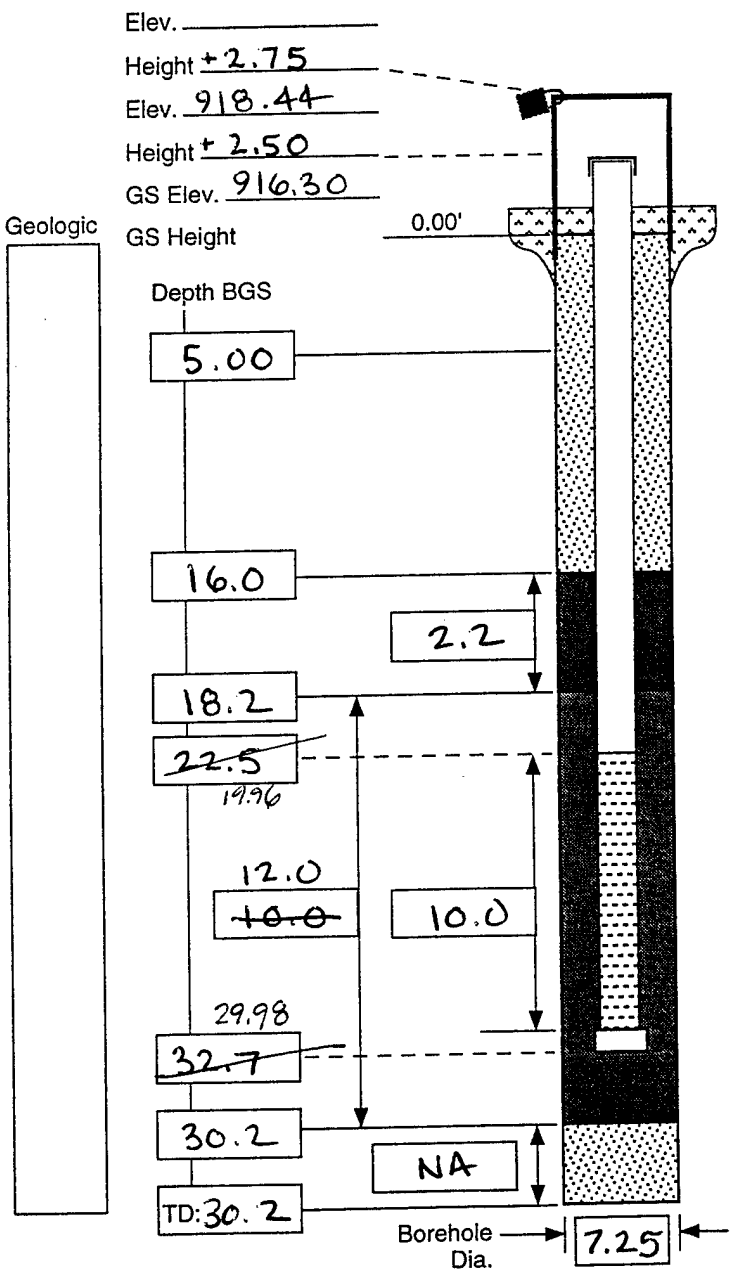
WELL FOOT (Y /(N))
Interval BGS: Length
Bottom Cap ((Y)/ N)

BACKFILL PLUG
Material: NA
Setup / Hydration Time:
Tremied (Y / N)

EARTH TECH

Monitoring Well Construction Log - Above Ground

Project Name: 110TH FIGHTER GROUP, MIANG	Project Number: 94F9C1	Date: 14 DEC 94
Well Location: SITE 1, FUEL TANK FARM	Well ID: BC1-MW2	Sheet 1 of 2
Driller: MIKE HEFFEARN	Borehole Diameter (in): 7.25	Total Depth (ft): 30.2
Drilling Agency: STEARNS	Date Started: 14 DEC 94	Depth to Water (ft): 25.65
Drilling Equipment: HOLLOW STEM AUGER	Date Finished: 14 DEC 94	Elevation and Datum: —
Drilling Method: CME 550	Logged by: S. SMITH	Checked by: JSB
Drilling Fluid: NA	Number of Samples: 4	Date: 2/19/96



PROTECTIVE CSG
Material / Type: STEEL, SQUARE
Diameter: 4 IN x 5 FT
Depth BGS: 2.25 Weep Hole (Y /(N))

GUARD POSTS ((Y) N)
No.: 3 Type: STEEL W/CEMENT

SURFACE PAD
Composition and Size: 3'x3'x6" CONCRETE

RISER PIPE
Type: SCH 40 PVC JOHNSON
Diameter: 2.06 IN I.D.
Total Length (TOC to TOS): 22.46
Ventilated Cap (Y /(N))

GROUT
Composition and Proportions: 94 lbs PORTLAND / 5 lbs BENTONITE / 5 GAL. WATER
Tremied (Y /(N))
Interval BGS: 5.0 FT – 16 FT

CENTRALIZERS
Depth(s) NA

SEAL
Type: ¼" PELLETED BENTONITE
Source: GLOBAL DRILLING SUPPLIES
Setup / Hydration Time: 30 MIN Vol. Fluid Added 5 GAL
Tremied (Y / N)

FILTER PACK
Type: NO. 5 SILICA SAND
Amt. Used: 300 lbs
Tremied (Y /(N))
Source: GLOBAL DRILLING SERVICE
Gr. Size Dist.:

SCREEN
Type: SCH 40 PVC JOHNSON
Diameter: 2.06 IN I.D.
Slot Size and Type: 20 SLOT MILLED
Interval BGS:

WELL FOOT (Y /(N))
Interval BGS: Length
Bottom Cap ((Y) / N)

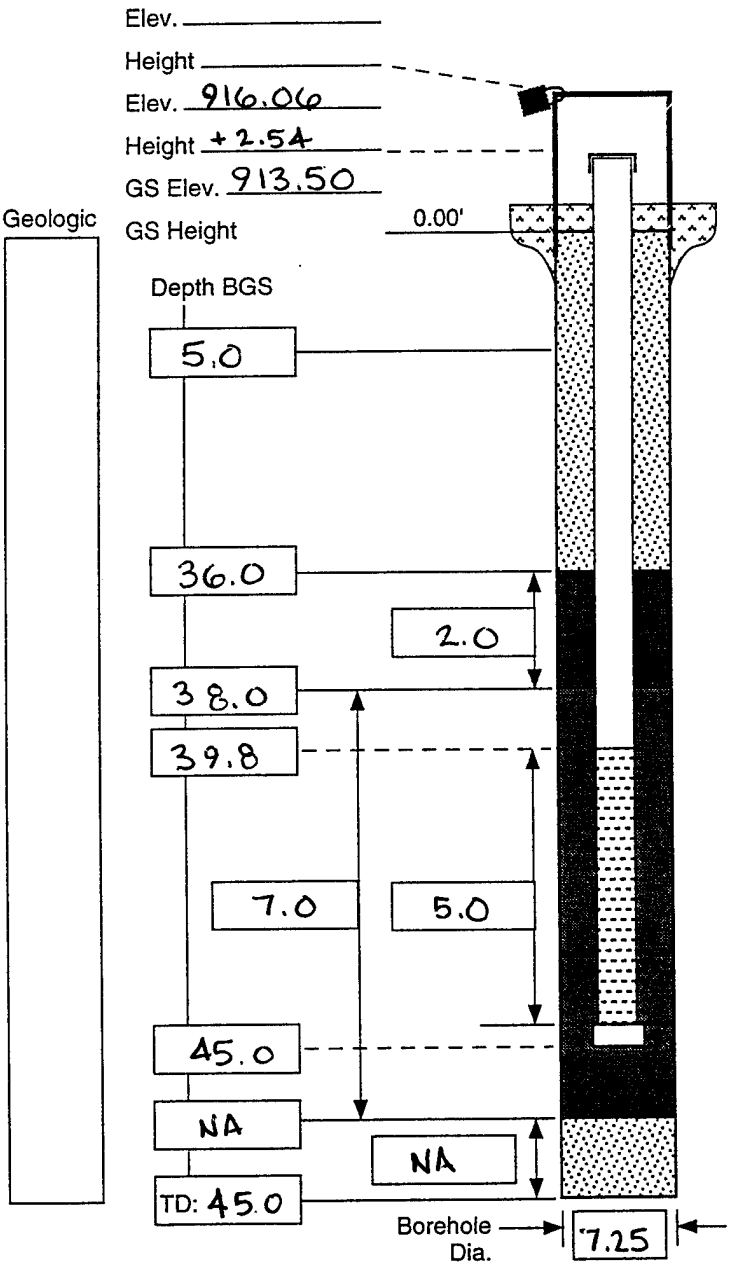
BACKFILL PLUG
Material: NA
Setup / Hydration Time:
Tremied (Y / N)

Form F-1024
9/1/91

EARTH TECH

Monitoring Well Construction Log - Above Ground

Project Name: 110TH FIGHTER GROUP, MIANG	Project Number: 948901	Date: 15 DEC 94
Well Location: SITE 1, FUEL TANK FARM	Well ID: BC1 - MW3	Sheet 1 of 1
Driller: STEARNS	Borehole Diameter (in): 7.25	Total Depth (ft): 45.0
Drilling Agency: CME 550	Date Started: 16 DEC 94	Depth to Water (ft): —
Drilling Equipment: HOLLOW STEM AUGER	Date Finished: 16 DEC 94	Elevation and Datum: —
Drilling Method: MIKE HEFFEARN	Logged by: SAM SMITH	Checked by: JSD
Drilling Fluid: NA	Number of Samples: NA	Date: 2/19/96



PROTECTIVE CSG
Material / Type: STEEL
Diameter: 4" x 5'
Depth BGS: _____ Weep Hole (Y / N)

GUARD POSTS (Y / N)
No.: 3 Type: ROUND STEEL 7'

SURFACE PAD
Composition and Size: 3' x 3' x 6" CONCRETE

RISER PIPE
Type: JOHNSON SCH 40 PVC
Diameter: 2.06 IN ID
Total Length (TOC to TOS): 42.34 FT
Ventilated Cap (Y / N)

GROUT
Composition and Proportions: 94 lbs PORTLAND / 5 lbs BENTONITE / ~5 GAL WATER
Tremied (Y / N)
Interval BGS: ~~36 - 38~~ SS 16/16

CENTRALIZERS
Depth(s) NA

SEAL
Type: 1/4" PELLETED BENTONITE
Source: GLOBAL DRILLING SUPPLIES
Setup / Hydration Time: 30 MIN Vol. Fluid Added: 5 GAL
Tremied (Y / N)

FILTER PACK
Type: NO. 7 SILICA SAND
Amt. Used: 150 lbs
Tremied (Y / N)
Source: GLOBAL DRILLING SUPPLIES
Gr. Size Dist.: 10-20

SCREEN
Type: JOHNSON SCH 40 PVC
Diameter: 2.06 IN ID
Slot Size and Type: 10 SLOT MILLED
Interval BGS: 39.80 FT - 44.80 Ft

WELL FOOT (Y / N)
Interval BGS: _____ Length: _____
Bottom Cap (Y / N)

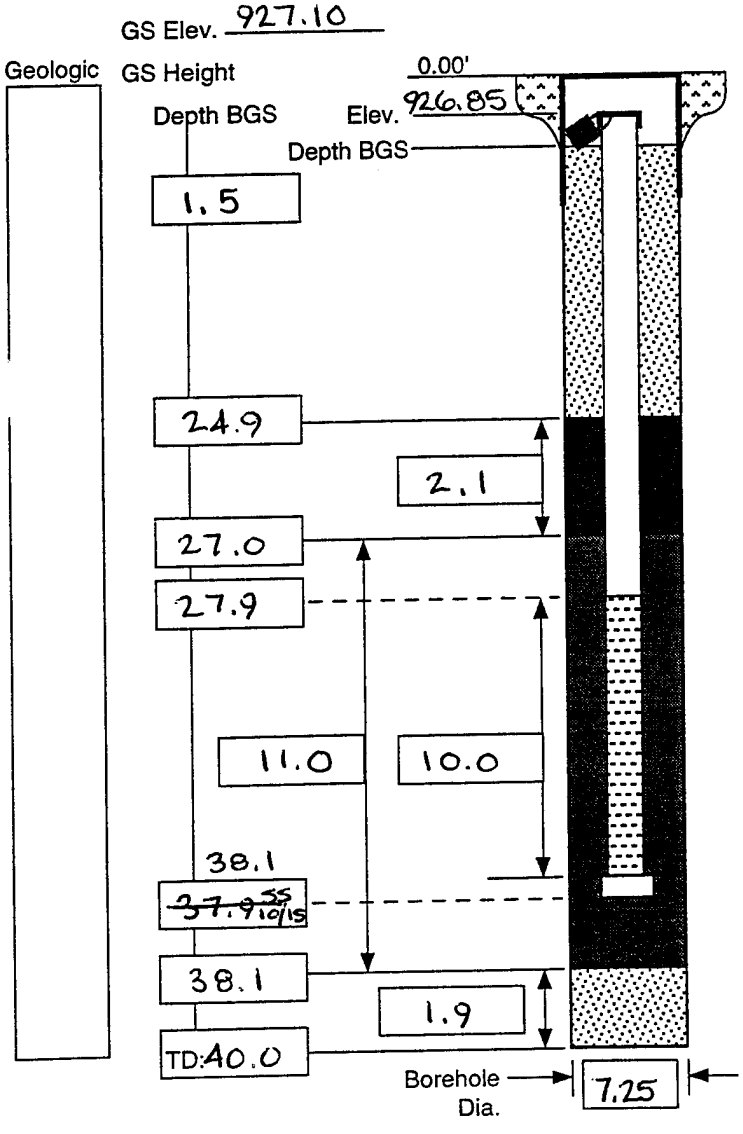
BACKFILL PLUG
Material: NA
Setup / Hydration Time: _____
Tremied (Y / N)

Form F-1024
9/1/91

EARTH TECH

Monitoring Well Construction Log - Flush Mount

Project Name: 110TH FIGHTER GROUP, MIANG	Project Number: 948901	Date: 15 DEC 94
Well Location: PARADE GROUNDS	Well ID: BC-MW16	Sheet 1 of 1
Driller: MIKE HEFFEARN	Borehole Diameter (in): 7.25	Total Depth (ft): 40'
Drilling Agency: STEARNS	Date Started: 15 DEC 94	Depth to Water (ft): 32.90
Drilling Equipment: CME 550	Date Finished: 15 DEC 94	Elevation and Datum: —
Drilling Method: HOLLOW STEM AUGER	Logged by: SAM SMITH	Checked by: JSB
Drilling Fluid: NA	Number of Samples: NA	Date: 2/19/96



PROTECTIVE CSG
Material / Type: LOAD BEARING FLUSH MOUNT
Diameter:
Depth BGS: Weep Hole (Y /(N))

GUARD POSTS (Y /(N))
No.: Type:

SURFACE PAD
Composition and Size:

RISER PIPE
Type: JOHNSON SCH 40 PVC
Diameter: 2.06 IN ID
Total Length (TOC to TOS): 26.66 FT
Ventilated Cap (Y /(N))

GROUT
Composition and Proportions: 94 lbs PORTLAND / 5 lbs BENTONITE / ~5 GAL WATER
Tremied (Y /(N))
Interval BGS:

CENTRALIZERS
Depth(s) NA

SEAL
Type: ¼" PELLETED BENTONITE
Source: GLOBAL DRILLING SUPPLIES
Setup / Hydration Time: 30 MIN Vol. Fluid Added 5GAL
Tremied (Y /(N))

FILTER PACK
Type: NO. 7 SILICA SAND
Amt. Used: 300lbs
Tremied (Y /(N))
Source: GLOBAL DRILLING SUPPLIES
Gr. Size Dist.: 10-20

SCREEN
Type: JOHNSON SCH 40 PVC
Diameter: 2.06 IN I.D.
Slot Size and Type: 10 SLOT MILLED
Interval BGS:

WELL FOOT (Y / N)
Interval BGS: Length
Bottom Cap (Y/ N)

BACKFILL PLUG
Material: HOLEPLUG
Setup / Hydration Time: 30 MIN
Tremied (Y /(N))

APPENDIX I: GROUNDWATER ELEVATION DATA AND GROUNDWATER SAMPLING FORMS

Table I-1 Groundwater Elevation Measurements
110th FG, MIANG, Battle Creek, Michigan

	Elevation (Top of Casing)	May 25, 1994 Depth to Groundwater	May 25, 1994 Elevation of Groundwater	December 19,1994 Depth to Groundwater	December 19,1994 Elevation of Groundwater
BC-MW1	928.3	37.60	890.7	37.39	890.91
BC-MW2	928.37	35.40	892.97	35.17	893.20
BC-MW3	929.03	36.09	892.94	35.91	893.12
BC-MW4	929.13	37.41	891.72	37.26	891.87
BC-MW5	923.60	34.44	889.16	34.24	889.36
BC-MW6	918.52	31.41	887.11	31.12	887.40
BC-MW7	925.71	41.04	884.67	41.21	884.50
BC-MW8	917.16	30.38	886.78	30.61	886.55
BC-MW9	894.38	6.01	888.37	5.97	888.41
BC-MW11	921.09	23.42	897.67	23.27	897.82
BC-MW12	922.32	24.77	897.55	24.62	897.70
BC-MW13	928.40	37.50	890.90	37.46	890.94
BC-MW14	918.89	31.62	887.27	31.42	887.47
BC-MW15	926.68	42.06	884.62	42.21	884.47
BC2-MW1	915.43	26.00	889.43	25.74	889.69
BC3-MW1	923.16	30.86	892.30	30.88	892.28
BC3-MW2	920.73	29.04	891.69	29.10	891.63
BC3-MW3	920.30	29.65	890.65	28.70	891.60
BC3-MW4	920.42	29.34	891.08	29.38	891.04
BC3-MW5	920.28	29.53	890.75	29.58	890.70
BC3-MW6	913.42	23.80	889.62	23.87	889.55
BC4-MW1	917.12	17.42	899.70	17.46	899.66
BC4-MW2	906.39	8.04	898.35	8.69	897.70

Table I-1 Groundwater Elevation Measurements
110th FG, MIANG, Battle Creek, Michigan

	Elevation (Top of Casing)	May 25, 1994 Depth to Groundwater	May 25, 1994 Elevation of Groundwater	December 19,1994 Depth to Groundwater	December 19,1994 Elevation of Groundwater
BC4-MW3	907.02	12.81	894.21	12.90	894.12
BC4-MW4	915.69	22.58	893.11	22.67	893.02
BC5-MW1	901.81	13.17	888.64	13.15	888.66
BC6-MW1	921.89	30.63	891.26	30.58	891.31
BC6-MW2	918.29	27.29	891.00	27.23	891.06
BC6-MW3	919.51	28.25	891.26	28.21	891.30
MW101	901.71	24.56	877.15	Not Measured	–
MW102	901.48	24.48	877.00	Not Measured	–
MW103	901.14	25.92	875.22	Not Measured	–
MW104	891.86	15.92	876.00	Not Measured	–
MW105	891.71	14.87	876.84	Not Measured	–
MW106	894.30	21.26	873.04	Not Measured	–
MW107	894.69	21.42	873.27	Not Measured	–
BC-MW16	926.85	Not Installed	–	32.63	894.22
BC1-MW1	917.94	Not Installed	–	27.22	890.72
BC1-MW2	918.44	Not Installed	–	27.95	890.49
BC1-MW3	916.06	Not Installed	–	26.78	889.28

All numbers are in feet; elevations are in feet above mean sea level.

The Earth Technology Corporation

Groundwater Sampling Record

Project Name 110th FG, MIANG
Project Number 948901-08
Location BATTLE CREEK
Site FUEL TANK FARM
Recorded By
Sample Number BC1MW3
Date 12-18-94
Duplicate Number
Checked By
Date

Aquifer Parameters 1455 → 26.7 ft (water level)

Before Sampling: pH 8.38 EC 700 Temperature 49.6

After Sampling: pH EC Temperature

Sampling Information

Analytical Parameter	Sampling Depth	√ If Field Filtered	Preservation Method	Volume Required	Sample Bottle I.D.s
VOC			HCl/4°C	4 x 40 ml	BC1-MW3-GW5
SVOC			4°C	2 x 1 liter	BC1-MW3-GW5
PP METALS		✓	HNO_3/4°C	1 liter	BC1-MW3-GW5
~~CHLORIDE~~			~~4°C~~	~~1000 ml Plastic~~	~~BC1-MW3-GW5~~
~~SULFATE~~			~~4°C~~		
~~NITRATE~~			~~4°C~~	~~250 ml Plastic~~	~~BC1-MW3-GW5~~

AF 12/18

Form F-1005
9/1/91

The Earth Technology Corporation

Groundwater Sampling Record

Project Name 110th FG, MI ANG
Project Number 948901-08
Location KELLOGG REGIONAL AIRPORT, BATTLE CREEK
Site FUEL TANK FARM
Recorded By
Sample Number BC1MW1GW5
Date 12-18-94
Duplicate Number BC1MW1GW5D
Checked By
Date

Aquifer Parameters 1319 → 27.2 ft. (water level)

Before Sampling: pH 7.62 EC 1214 Temperature 48.2

After Sampling: pH EC Temperature

Sampling Information

Analytical Parameter	Sampling Depth	√ If Field Filtered	Preservation Method	Volume Required	Sample Bottle I.D.s
~~PP metals~~ VOC			HCL/4°C	4 x 40 ml	BC1-MW1-GW5
SVOC			4°C	2 x 1 liter	BC1-MW1-GW5
PP METALS		✓	HNO_3/4°C	1 liter	BC1-MW1-GW5
~~CHLORIDE~~			~~4°C~~	~~1000 ml Plastic~~	~~BC1-MW1-GW5~~
~~SULFATE~~			~~4°C~~		
~~NITRATE~~			~~4°C~~	~~250ml Plastic~~	~~BC1-MW1-GW5~~
VOC			HCl/4°C	8 x 40ml	BC1-MW1-GW5D
SVOC			4°C	4 x 1liter	BC1-MW1-GW5D
PPMETALS		✓	HNO_3/4°C	2 liter	BC1-MW1-GW5D
~~CHLORIDE~~			~~4°C~~	~~2-1000 ml Plastic~~	~~BC1-MW1-GW5D~~
~~SULFATE~~			~~4°C~~		
~~NITRATE~~			~~4°C~~	~~2-250ml Plastic~~	~~BC1-MW1-GW5D~~

Form F-1005
9/1/91

The Earth Technology Corporation

Groundwater Sampling Record

Project Name 110th FG, MIANG
Location BATTLE CREEK
Sample Number BC MW16
Duplicate Number

Project Number 948901-08
Site PARADE GROUNDS
Recorded By
Date 12-18-94
Checked By
Date

Aquifer Parameters 1045 → 32.61' (water level)

Before Sampling: pH 7.71 EC 1079 Temperature 42.5

After Sampling: pH EC Temperature

Sampling Information

Analytical Parameter	Sampling Depth	√ If Field Filtered	Preservation Method	Volume Required	Sample Bottle I.D.s
VOC			HCL / 4°C	4 x 40 ml	BC-MW16-GW5
SVOC			4°C	2 x 1-liter	BC-MW16-GW5
TAL METALS		✓	HNO_3 / 4°C	1 liter	BC-MW16-GW5
CHLORIDE			4°C	1000 ml Plastic	BC-MW16-GW5
SULFATE			4°C		
NITRATE			4°C	250ml Plastic	BC-MW16-GW5

Form F-1005
9/1/91

Tetra Tech Technology Corporation

Well Development/Purge Log

Project Name 110TH FG, MIANG Project No. 948901

PID/FID Readings 0.0 PPM (Ambient) 0.0PPM (Well Mouth)

Static Levels NA (Product) 37.23FT (TOC) (Water)

Pump ☐ /Bail ☒ Rate _____ Total Gal. Extracted _____

Water Column Length 13.27 FT Well Volumes Extracted 3

Disposition of Discharge Water NALGENE HOLDING TANK AT DECON AREA

~~Specific Capacity~~ Well Volume 2.12 GAL (gpm/ft. drawdown) After _____ Hrs.

Well Information

Number BC-MW4

Location NORTH BASE BOUNDARY

Datum TOC

Elev. Datum Point 929.13

Ground Elev. _____

Well Diameter 2.06

Well Depth 50.5 FT (EST) 48.5

Well Material PVC

Equipment Information

Bailer No. DISPOSABLE

Pump No. NA

Interface Probe No. NA

Sounder No. _____

pH Meter No. 9209

Conductivity Meter No. 9209

Thermometer No. 9209

Time (24 hr.)	Flow Rate (gpm)	Water Temp. In C°	pH	Cond. µmhos/cm	~~Turbidity~~ NTU	Settleable Solids (ml)	Gallons Dev./Purge Before Meas.	Water Level (feet)	Remarks (e.g. water clarity)
1156	—	47.3	7.59	858	CLOUDY	—	0.25	—	NO ODORS OR SHEENS
1205	—	46.5	7.49	1230	CLOUDY	—	2.12	—	NO ODORS OR SHEENS
1212	—	47.0	7.44	1168	CLOUDY	—	4.24	—	NO ODORS OR SHEENS
1222	—	46.6	7.66	1275	CLOUDY	—	6.36	37.24	NO ODORS OR SHEENS

Notes: 1 ft length of 4" = 0.087 ft^3 or 0.65 gal

1 ft length of 2" = 0.022 ft 3 or 0.16 gal

Recorded By Sam Sin Date 17 DEC 94

Checked By _____ Date _____

Form F-1003 9/1/91

Tetra Tech Technology Corporation

Well Development/Purge Log

Project Name 110th FE, MIANG Project No. 948901-08
PID/FID Readings 0.0 (Ambient) 5.1 (Well Mouth)
Static Levels NA (Product) 32.6 (Water)
Pump ☐ /Bail ☒ Rate _____ Total Gal. Extracted 15
Water Column Length 4.3 Well Volumes Extracted 21.8
Disposition of Discharge Water _____
1 well volume = 0.688 gallons
Specific Capacity _____ (gpm/ft. drawdown) After _____ Hrs.

Well Information
Number BCMW16
Location Parade Grounds
Datum _____
Elev. Datum Point _____
Ground Elev. _____
Well Diameter 2.06 in
Well Depth 36.9 ft
Well Material PVC

Equipment Information
Bailer No. NA
Pump No. NA
Interface Probe No. NA
Sounder No. 22329
pH Meter No. 9209
Conductivity Meter No. 9209
Thermometer No. 9209

Time (24 hr.)	Flow Rate (gpm)	Water Temp. In C°	pH	Cond. µmhos/cm	Turbidity NTU	Settleable Solids (ml)	Gallons Dev./Purge Before Meas.	Water Level (feet)	Remarks (e.g. water clarity)
1625		43.3	7.50	825	cloudy		0	32.6	No odor
1645		44.7	7.47	856	cloudy		5	32.6	No odor
1655		46.9	7.45	832	cloudy		10	32.6	No odor
1700		45.3	7.48	821	cloudy		15	32.6	No odor

Notes: 1 ft length of 4" = 0.087 ft³ or 0.65 gal
1 ft length of 2" = 0.022 ft 3 or 0.16 gal

Recorded By Q. Fox Date 12-17-94
Checked By ~~EBB~~ SB ~~Date 6/5/95~~ 6/7/95

Form F-1003
9/1/91

Tetra Tech Technology Corporation

Well Development/Purge Log

Project Name 110th FG, MIANG Project No. 948901-08

(PID)/FID Readings 0.0 (Ambient) 1.4 (Well Mouth)

Static Levels N.A (Product) 32.6 (Water)

Pump ☐ /Bail ☒ Rate Total Gal. Extracted

Water Column Length 4.3 Well Volumes Extracted

Disposition of Discharge Water

1 well volume = 0.688 gallons

Specific Capacity (gpm/ft. drawdown) After Hrs.

Well Information

Number BC MW16

Location PARADE GROUNDS

Datum

Elev. Datum Point

Ground Elev.

Well Diameter 2.06 in

Well Depth 36.9

Well Material PVC

Equipment Information

Bailer No. DISPOSABLE

Pump No. NA

Interface Probe No. NA

Sounder No. 22329

pH Meter No. 9209

Conductivity Meter No. 9209

Thermometer No. 9209

Time (24 hr.)	Flow Rate (gpm)	Water Temp. In °C °F	pH	Cond. µmhos/cm	Turbidity NTU	Settleable Solids (ml)	Gallons Dev./Purge Before Meas.	Water Level (feet)	Remarks (e.g. water clarity)
0913		46.1	7.03	1023	cloudy		0		no odor
0918		48.1	7.09	1048	cloudy		1		no odor
0922		48.2	7.12	1033	cloudy		2		no odor
0925		49.4	7.30	1057	cloudy		3		no odor
AF 12/15 ~~0930~~ 0927		49.0	7.36	1031	cloudy		4.5		no odor
0931		49.9	7.32	1066	cloudy		5.5		no odor

Notes: 1 ft length of 4" = 0.087 ft^3 or 0.65 gal

1 ft length of 2" = 0.022 ft 3 or 0.16 gal

Recorded By A. Fox Date 12-18-94

Checked By JSB Date 6/3/95

Form F-1003 9/1/91

Tetra Tech Technology Corporation

Well Development/Purge Log

Project Name 110TH FG, MIANG Project No. 948901

PID/FID Readings 0.0 PPM (Ambient) 0.0 PPM (Well Mouth)

Static Levels NA (Product) 25.64 (Water)

Pump ☐ /Bail ☒ Rate Total Gal. Extracted

Water Column Length 13.59 Well Volumes Extracted

Disposition of Discharge Water

Specific Capacity 2.17 GAL (gpm/ft. drawdown) After Hrs.

Well Information

Number BC2-MW1

Location

Datum

Elev. Datum Point

Ground Elev.

Well Diameter 2 IN

Well Depth 39.23 ~~39.23~~ JSB 6/3/95

Well Material PVC

Equipment Information

Bailer No. DISPOSABLE

Pump No. NA

Interface Probe No. NA

Sounder No.

pH Meter No.

Conductivity Meter No.

Thermometer No.

Time (24 hr.)	Flow Rate (gpm)	Water Temp. In C°	pH	Cond. µmhos/cm	Turbidity NTU	Settleable Solids (ml)	Gallons Dev./Purge Before Meas.	Water Level (feet)	Remarks (e.g. water clarity)
1518	—	45.3	7.64	761	CLOUDY		0.25	—	
1527	—	44.1	7.66	718	CLOUDY		2.17	—	
1546	—	46.2	7.61	795	CLOUDY		4.34	—	
1553	—	45.1	7.63	815	CLOUDY		6.51	—	HYDROCARBON ODOR

Notes: 1 ft length of 4" = 0.087 ft3 or 0.65 gal

1 ft length of 2" = 0.022 ft 3 or 0.16 gal

Recorded By S. Smith Date 6/3/95

Checked By JSB Date 6/3/95

Tetra Tech Technology Corporation

Well Development/Purge Log

Project Name 110th FG, MIANG Project No. 94S901-08
PID/FID Readings 0.0 (Ambient) 0.3 (Well Mouth)
Static Levels NA (Product) 27.2 (Water)
Pump ☐ /Bail ☒ Rate _____ Total Gal. Extracted 15
Water Column Length 4.8 Well Volumes Extracted 19.5
Disposition of Discharge Water cloudy, no odor
1 well volume = 0.77 gallons
Specific Capacity _____ (gpm/ft. drawdown) After _____ Hrs.

Well Information
Number BCIMW1
Location Parking Lot
Datum _____
Elev. Datum Point _____
Ground Elev. _____
Well Diameter 2.00 in
Well Depth 32 ft
Well Material PVC

Equipment Information
Bailer No. NA
Pump No. NA
Interface Probe No. NA
Sounder No. 22329
pH Meter No. 9209
Conductivity Meter No. 9209
Thermometer No. 9209

Time (24 hr.)	Flow Rate (gpm)	Water Temp. In °F	pH	Cond. µmhos/cm	Turbidity NTU	Settleable Solids (ml)	Gallons Dev./Purge Before Meas.	Water Level (feet)	Remarks (e.g. water clarity)
1510		50.3	7.38	1240	cloudy		0	27.2	No odor
1520		48.9	7.29	1171	cloudy		5	27.2	No odor
1525		49.8	7.18	1174	cloudy		10	27.2	No odor
1540		47.7	7.31	1186	cloudy		15	27.2	No odor

Notes: 1 ft length of 4" = 0.087 ft³ or 0.65 gal
1 ft length of 2" = 0.022 ft 3 or 0.16 gal

Recorded By A. Fox Date 12-17-94
Checked By JSB Date 6/3/95

Form F-1003
9/1/91

Tetra Tech Technology Corporation

Well Development/Purge Log

Project Name 110th FG, MIANG Project No. 948901-08
PID/FID Readings 0.0 (Ambient) 0.0 (Well Mouth)
Static Levels NA (Product) 27.2 (Water)
Pump ☐ /Bail ☒ Rate _____ Total Gal. Extracted _____
Water Column Length 4.8 Well Volumes Extracted _____
Disposition of Discharge Water _____
1 well volume = .77
Specific Capacity _____ (gpm/ft. drawdown) After _____ Hrs.

Well Information
Number BC1 MW1
Location FUEL TANK FARM
Datum _____
Elev. Datum Point _____
Ground Elev. _____
Well Diameter 2.06 in
Well Depth 32 ft
Well Material PVC

Equipment Information
Bailer No. DISPOSABLE
Pump No. NA
Interface Probe No. NA
Sounder No. 22329
pH Meter No. 9209
Conductivity Meter No. 9209
Thermometer No. 9209

Time (24 hr.)	Flow Rate (gpm)	Water Temp. In °F	pH	Cond. µmhos/cm	Turbidity NTU	Settleable Solids (ml)	Gallons Dev./Purge Before Meas.	Water Level (feet)	Remarks (e.g. water clarity)
0955		48.4	7.23	1139	cloudy		0		No odor
0957		50.2	7.05	1256	cloudy		1		No odor
0959		50.9	7.11	1289	cloudy		2		No odor
1002		52.0	7.06	1302	cloudy		3		No odor
1004		51.6	7.07	1320	cloudy		4		No odor

Notes: 1 ft length of 4" = 0.087 ft³ or 0.65 gal
1 ft length of 2" = 0.022 ft 3 or 0.16 gal

Recorded By A. Ray Date 12-18-94
Checked By JSB Date 6/3/95

Form F-1003
9/1/91

Tetra Tech Technology Corporation

Well Development/Purge Log

Project Name 110th FG, MIANG Project No. 948901-08
PID/FID Readings 0.0 (Ambient) 0.1 (Well Mouth)
Static Levels NA (Product) 26.7 (Water)
Pump ☐ /Bail ☒ Rate NA Total Gal. Extracted 50
Water Column Length 20.34 Well Volumes Extracted 15.0
Disposition of Discharge Water Cloudy, no odor
1 well volume = 3.33 gallons
Specific Capacity _____ (gpm/ft. drawdown) After _____ Hrs.

Well Information
Number BC1MW3
Location Fuel Tank Farm
Datum _____
Elev. Datum Point _____
Ground Elev. _____
Well Diameter 2.06 in.
Well Depth 47.54 ft.
Well Material PVC

Equipment Information
Bailer No. NA
Pump No. NA
Interface Probe No. NA
Sounder No. 22329
pH Meter No. 9209
Conductivity Meter No. 9209
Thermometer No. 9209

Time (24 hr.)	Flow Rate (gpm)	Water Temp. In °F	pH	Cond. µmhos/cm	Turbidity NTU	Settleable Solids (ml)	Gallons Dev./Purge Before Meas.	Water Level (feet)	Remarks (e.g. water clarity)
1000		49.6	7.25	404	cloudy		~~3.33~~ 0		
1030					cloudy		10	26.8	No odor, Lo Bat
1050		52.4	7.33	402	cloudy		16	26.8	No odor, cloudy
1105		48.2	7.28	397	cloudy		20	26.75	No odor
1130		50.7	7.59	410	cloudy		24	26.75	No odor
1140		49.6	7.58	425	cloudy		30	26.8	No odor
1215		49.1	7.68	421	cloudy		40	26.7	No odor
1245		51.0	7.74	436	cloudy		45	26.75	No odor
1255		51.8	7.69	422	cloudy		50	26.75	No odor

Notes: 1 ft length of 4" = 0.087 ft³ or 0.65 gal
1 ft length of 2" = 0.022 ft 3 or 0.16 gal

Recorded By Q. Fox Date 12-17-94
Checked By JSO Date 6/3/95

Form F-1003 9/1/91

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW1-GW4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/19/94

WELL NO. BC-MW1 LOCATION Base boundary

WEATHER CONDITIONS warm, clear AMBIENT TEMP: 60°

PERSONNEL Carol Frye/Jack Briegel

REVIEWED BY: PH Cay 6/9/94

EQUIPMENT USED: See below

PURGING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? N/A

Which well was previously purged? —

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? N/A

Which well was previously sampled? BC-MW2

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 47' (49' BTOC)

Depth to water surface (ft.) 37.66'

Length of water (ft.) 11.44'

Volume of water (ft3) —

(gal.) 1.8 gal

Amount of sediment at bottom of well (ft.) 1.8 × 4 = purge 7.2 gal

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1005 Finished 1055

Volume purged 7 gal

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 1445

Finish NA

IN-SITU TESTING	Date:	5-19-93	5-19	5-19				
	Time:	1003	1057	1420				
Water Level		37.66	37.5	37.6				
Well Volume Purged (gal.)		0	7	—				
Turbidity		clear	turbid	—				
Odor		—	—	—				
Organic Vapor (ppm)		NA	NA	NA				
pH (units)		7.61	7.76	NA				
Conductivity (μ mhos)		583	545	NA				
Water Temperature (°F)		67.3	77.1	NA				

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW2-GW4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/19/94

WELL NO. BC-MW2 LOCATION Base Boundary

WEATHER CONDITIONS clear AMBIENT TEMP: 60-65°

PERSONNEL Carol Frye / Jack Briegel

REVIEWED BY: PH Lay 6/9/94

EQUIPMENT USED: see below

PURGING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? N/A

Which well was previously purged? none

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOP

How was the line decontaminated? N/A

Which well was previously sampled? none

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 46' (~48' btoc)

Depth to water surface (ft.) 35.42

Length of water (ft.) 12.58'

Volume of water (ft3)

(gal.) 2 gallons

Amount of sediment at bottom of well (ft.) 2 x 4 = purge 8 gallons

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 0855 Finished 0915

Volume purged 8

Comments on Well Recovery

Additional Comments water clear at beginning - became turbid

Samples Collected: Start 1215

Finish N/A

IN-SITU TESTING	Date:	5-19-94	5-19	5-19				
	Time:	0850	0918	1015				
Water Level		35.42	35.4'	36.4				
Well Volume Purged (gal.)		0	8	—				
Turbidity		clear	turbid	—				
Odor		none	none	—				
Organic Vapor (ppm)		—	—	—				
pH (units)		7.62	7.81	NA				
Conductivity (μ mhos)		556	525	NA				
Water Temperature (°F)		58.9	61.6	NA				

Notes: 1 ft. length of 4" = 0.087 ft³ or 0.65 gal. 1 ft. length 2" = 0.022 ft³ or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW3-GW4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/19/94

WELL NO. BC-MW3 LOCATION Base boundary

WEATHER CONDITIONS clear AMBIENT TEMP: 70°

PERSONNEL Carol Frye / Jack Briegel

REVIEWED BY: PALay 6/9/94

EQUIPMENT USED: See below

PURGING DEVICE

Type Device? redi-flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? N/A

Which well was previously purged? BC-MW13

SAMPLING DEVICE

Type Device? Teflon Bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? N/A

Which well was previously sampled? BC-MW13

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 48'

Depth to water surface (ft.) 37.43

Length of water (ft.) 10.57

Volume of water (ft3) —

(gal.) 1.69

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 0740 Finished 0800

Volume purged ~10

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 1045

Finish 1110

IN-SITU TESTING	Date:	5/20/94	5/20/94	5/20/94				
	Time:	0740 0800	—	1045				
Water Level		37.43	—	—				
Well Volume Purged (gal.)		0	~10	—				
Turbidity		clear	—	—				
Odor		none	—	—				
Organic Vapor (ppm)		—	—	—				
pH (units)		4.53	4.40	—				
Conductivity (μ mhos)		863	788	—				
Water Temperature (°C)		54.3	55.1	—				

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW4-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/23/94

WELL NO. BC-MW4 LOCATION Base boundary

WEATHER CONDITIONS pt'ly cloudy AMBIENT TEMP: 60°

PERSONNEL JSB/CMT

REVIEWED BY: PHLang 6/9/94

EQUIPMENT USED: redi flo 2 pump/bailer

PURGING DEVICE

Type Device? redi-flo 2 pump

How was the device decontaminated? see SOP

How was the line decontaminated? see SOP

Which well was previously purged? BC-MW14

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOP

How was the line decontaminated? NA

Which well was previously sampled? BC-MW14

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 49.2

Depth to water surface (ft.) ~~JSB~~ 5/23 37.43

Length of water (ft.) 11.77

Volume of water (ft3) —

(gal.) 7.5 gallons

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 753 Finished 0801

Volume purged ~7.5 gallons

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start —

Finish 0810

IN-SITU TESTING

	Date:	5/23	5/23	5/23				
	Time:	0753	0801	0810				
Water Level		37.43	—	—				
Well Volume Purged (gal.)		0	~7.5	—				
Turbidity		sl. turbid	clear	—				
Odor		none	none	—				
Organic Vapor (ppm)		—	—	—				
pH (units)		6.01	5.63	—				
Conductivity (μ mhos)		1052	1140	—				
Water Temperature (°C)		60.8	57.6	—				

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW5-GW4 (4 JSB 7/29)

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/23/94

WELL NO. BC-MW5 LOCATION Base boundary

WEATHER CONDITIONS clear/ptly cldy AMBIENT TEMP: 70°

PERSONNEL CMF/JSB

REVIEWED BY: PHLay 6/9/94

EQUIPMENT USED: pump/bailer

PURGING DEVICE

Type Device? redi flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? see SOPs

Which well was previously purged? BC-MW4

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? BC-MW4

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) ~45.0

Depth to water surface (ft.) 34.39

Length of water (ft.) 10.71

Volume of water (ft3)

(gal.) 1.71/gallon x 4 = ~7

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.)

PURGING

Time started 1000 Finished 1009

Volume purged 7 gallons

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 1025

Finish

IN-SITU TESTING

	Date:	5/23	5/23	5/23				
	Time:	1000	1009	1025				
Water Level		34.39	—	—				
Well Volume Purged (gal.)		0	JSB 7	—				
Turbidity		sl. turbid	clear	clear				
Odor		—	—	—				
Organic Vapor (ppm)		—	—	—				
pH (units)		6.71	7.57	8.35				
Conductivity (μ mhos)		1036	1024	1082				
Water Temperature (°C)		65.3	60.1	66.3				

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW6-GW4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/22/94

WELL NO. BC-MW6 LOCATION base boundary

WEATHER CONDITIONS clear AMBIENT TEMP: 85°

PERSONNEL JSB / CMF

REVIEWED BY: PHL 6/9/94

EQUIPMENT USED: Teflon bailer / redi-flo 2

PURGING DEVICE

Type Device? redi-flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? See SOPs

Which well was previously purged? BC-MW12

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? BC-MW12

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 43.2

Depth to water surface (ft.) 31.45

Length of water (ft.) 11.75

Volume of water (ft3) —

(gal.) 1.87 gallons

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1415 Finished 1423

Volume purged ~8 gallons

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 1447

Finish

IN-SITU TESTING

	Date:	5/22/94	5/22/94	5/22/94				
	Time:	1415	1423	1447				
Water Level		31.45	—	31.45				
Well Volume Purged (gal.)		0	8	—				
Turbidity		sl. turbid	clear	sl. turbid				
Odor		none	none	none				
Organic Vapor (ppm)		—	—	—				
pH (units)		7.64	6.82	—				
Conductivity (μ mhos)		601	639	—				
Water Temperature (°C)		74.3	62.9	—				

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

Well was resampled
5/24/94

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: 5/20/94

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: BC-MW7-GW4

WELL NO. BC-MW7 LOCATION Battle Creek, Michigan

WEATHER CONDITIONS clear AMBIENT TEMP: 75°

PERSONNEL Mark Christenson / J Briegel

REVIEWED BY: PH Lay 6/9/94

EQUIPMENT USED: Red.Flo 2 pump, bailer

PURGING DEVICE

Type Device? Red.Flo 2 pump

How was the device decontaminated? See SOPs

How was the line decontaminated? See SOPs

Which well was previously purged? —

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? See SOPs

How was the line decontaminated? N/A

Which well was previously sampled? N/A

INITIAL WELL VOLUME

Well diameter (in.) 2'

Stickup (ft.) ~ 2'

Depth to bottom of well (ft.) ~ 52.7'

Depth to water surface (ft.) 41.02

Length of water (ft.) 11.68'

Volume of water (ft3)

(gal.) 1.85 gallons

Amount of sediment at bottom of well (ft.) N/A

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1047 Finished 1056

Volume purged ~ 8 gallons

Comments on Well Recovery

Additional Comments well cleaned up during purging - very silty during sampling

Samples Collected: Start 1405

Finish

IN-SITU TESTING	Date:	5/20/94	5/20/94	5/20/94*	5/20/94			
	Time:	1047	1056	1405	1605			
Water Level		41.02'	—	NA	41.05			
Well Volume Purged (gal.)		0	8	NA	NA			
Turbidity		sl. turbid	clear	NA	opaque			
Odor		none	none	NA	none			
Organic Vapor (ppm)		—	—	NA	—			
pH (units)		6.34	6.05	NA	7.37			
Conductivity (μ mhos)		502	482	NA	461			
Water Temperature (°C)		64.1°	60.6	NA	63.2			

Notes: 1 ft. length of 4" = 0.087 ft³ or 0.65 gal. 1 ft. length 2" = 0.022 ft³ or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC184

* NO_3^{2-} samples collected @ 1405; remaining volumes collected @ 1605 except metals which were finally collected (because of heavy silt load) at 1910

Resampling for BC-MW7

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW7-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/24/94

WELL NO. BC-MW7 LOCATION Base boundary

WEATHER CONDITIONS pt cloudy / light rain AMBIENT TEMP: 65-70

PERSONNEL JSB / CMF / Don Johnson

REVIEWED BY: PHLay 6/9/94

EQUIPMENT USED: Teflon bailer

PURGING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? N/A

Which well was previously purged? BC-MW15

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? N/A

Which well was previously sampled? BC-MW15

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) ~52.7'

Depth to water surface (ft.) 41.05' JSB ~~41.34~~ 6/2/94

Length of water (ft.) 11.65'

Volume of water (ft3)

(gal.) 1.85 gallons x 4 = 7.5 purge

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1010 Finished 1035

Volume purged ~8 gallons

Comments on Well Recovery —

Additional Comments — Resampling

Samples Collected: Start 1050

Finish

IN-SITU TESTING

Date:	5/24/94	5/24/94	5/24/94				
Time:	1010	1035	1050				
Water Level	41.05'	—	—				
Well Volume Purged (gal.)	0	8	—				
Turbidity	turbid	turbid	turbid				
Odor	no odor	no odor	no odor				
Organic Vapor (ppm)	—	—	—				
pH (units)	6.9 ~~6.18~~	6.87	7.22				
Conductivity (μ mhos)	598 ~~513 JSB~~	491	502				
Water Temperature (°C)	56.9 ~~57.9 5/24/94~~	55.8	58.2				

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

well was resampled 5/24/94

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW8-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: ~~5/20/94~~ JSS 5/21/94

WELL NO. BC-MW8 LOCATION Battle Creek, Michigan

WEATHER CONDITIONS clear AMBIENT TEMP: 75°

PERSONNEL Mark Christenson / Jack Bruegel

REVIEWED BY: PALa 6/9/94

EQUIPMENT USED: Redi-flo 2 pump, bailer

PURGING DEVICE

Type Device? redi-flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? see SOPs

Which well was previously purged? BC-MW7

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? N/A

Which well was previously sampled? N/A

INITIAL WELL VOLUME

Well diameter (in.) 2'

Stickup (ft.) ~2'

Depth to bottom of well (ft.) ~44'

Depth to water surface (ft.) 30.38

Length of water (ft.) 13.62'

Volume of water (ft3)

(gal.) 2.2 gallons

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1219 Finished 1230

Volume purged ~9 gallons

Comments on Well Recovery —

Additional Comments slightly turbid at beginning of purge; cleaned up considerably

Samples Collected: Start 1415

Finish 1640

IN-SITU TESTING	Date:	5/20/94	5/20/94	5/20/94 *	5/20/94 *			
	Time:	1219	1230	1415	1640			
Water Level		30.38	—	NA	30.34			
Well Volume Purged (gal.)		0	9	NA	NA			
Turbidity		slight	clear	NA	turbid			
Odor		none	none	NA	none			
Organic Vapor (ppm)		—	—	NA	—			
pH (units)		7.11	7.47	NA	6.96			
Conductivity (μ mhos)		522	529	NA	501			
Water Temperature (°C)		61.6	64.6	NA	64.4			

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC164

* Note: NO_3^{2-} samples were collected @ 1415; remaining samples collected @ 1640

Resampling for BC-MW8

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW8-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/24/94 JSB

WELL NO. BC-MW8 LOCATION Base boundary wells

WEATHER CONDITIONS pHy cloudy AMBIENT TEMP: 70°

PERSONNEL Don Johnson / CMF / JSB

REVIEWED BY: PH Lay 6/9/94

EQUIPMENT USED: Teflon bailer

PURGING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? See SOPs

How was the line decontaminated? NA

Which well was previously purged? BC-MW7

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? BC-MW7

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~ 2'

Depth to bottom of well (ft.) ~ 44

Depth to water surface (ft.) 30.42

Length of water (ft.) 13.58

Volume of water (ft3)

(gal.) 2.2 gallons

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1108 Finished 1120

Volume purged ~ 8 gallons

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 1130

Finish

IN-SITU TESTING

Date:	5/24/94	5/24/94	5/24/94					
Time:	1108	1120	1130					
Water Level	30.42	—	30.82					
Well Volume Purged (gal.)	0	8	—					
Turbidity	clear/sl.turbid	turbid	turbid					
Odor	none	none	none					
Organic Vapor (ppm)	—	—	—					
pH (units)	7.75	7.83	8.06					
Conductivity (μ mhos)	548	549	546					
Water Temperature (°C)	56	56.3	61.2					

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW9-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/23/94

WELL NO. BC-MW9 LOCATION Base Boundary

WEATHER CONDITIONS clear/ptly cloudy AMBIENT TEMP: 80°

PERSONNEL CMF / JSB

REVIEWED BY: PHL 6/9/94

EQUIPMENT USED: Redi flo 2 pump / teflon bailer

PURGING DEVICE

Type Device? Redi flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? see SOPs

Which well was previously purged? BC2-MW1

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? BC2-MW1

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 22'

Depth to water surface (ft.) 5.92'

Length of water (ft.) 16.08'

Volume of water (ft3) —

(gal.) 2.56 x 4 = 10.24

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1533 Finished 1544

Volume purged ~10 gallons

Comments on Well Recovery —

Additional Comments water has a swampy, sulfur of methane odor

Samples Collected: Start 1600

JSB Finish 1615 for duplicate

IN-SITU TESTING

Date:	5/23/94	5/23/94	5/23/94				
Time:	1533	1544	1600				
Water Level	5.92'	—	6.05				
Well Volume Purged (gal.)	0	10	—				
Turbidity	turbid	clear	clear/sl. turbid				
Odor	no hydrocarbon odor	no hydrocarbon odor	no hydrocarbon odor				
Organic Vapor (ppm)	—	—	—				
pH (units)	6.87	6.82	6.96				
Conductivity (μ mhos)	395	459	464				
Water Temperature (°C)	66.3	~~57.2~~ 56.3 JSB 5/25/94	66.3				

Notes: 1 ft. length of 4" = 0.087 ft³ or 0.65 gal. 1 ft. length 2" = 0.022 ft³ or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC184

Note: BC-MW18-GW4 field duplicate collected for this well also extra volume for MS/MSD

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW11-GW4

PROJECT NAME 110th FG, MANG JOB NO: 948901 DATE: 5/22/94

WELL NO. BC-MW11 LOCATION Base boundary

WEATHER CONDITIONS 75° clear AMBIENT TEMP: 75°

PERSONNEL CMF JJS Bruegel

REVIEWED BY: PHL 6/9/94

EQUIPMENT USED: redi-flo 2 pump / teflon bailer

PURGING DEVICE

Type Device? redi-flo 2

How was the device decontaminated? see SOPs

How was the line decontaminated? see SOPs

Which well was previously purged? BC3-MW1

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? NA

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 30.04

Depth to water surface (ft.) 24.65

Length of water (ft.) 5.39'

Volume of water (ft3) —

(gal.) ~1 gallon

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 0923 Finished 0930

Volume purged 5 gallons

Comments on Well Recovery NA

Additional Comments NA

Samples Collected: Start 1040

Finish —

IN-SITU TESTING								
Date:	5/22/94	5/22/94	5/22/94	—	—	—	—	
Time:	0915	0930	1040	—	—	—	—	
Water Level	24.65	—	24.69	—	—	—	—	
Well Volume Purged (gal.)	0	5	—	—	—	—	—	
Turbidity	turbid	clear	sl. turbid	—	—	—	—	
Odor	none	none	none	—	—	—	—	
Organic Vapor (ppm)	—	—	—	—	—	—	—	
pH (units)	7.24	6.27	6.44	—	—	—	—	
Conductivity (μ mhos)	290	324	302	—	—	—	—	
Water Temperature (°C)	59.9	58.3	60.5	—	—	—	—	

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW12-GW4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/22/94

WELL NO. BC-MW12 LOCATION Base boundary

WEATHER CONDITIONS clear AMBIENT TEMP: 80°

PERSONNEL JSB / CMF

REVIEWED BY: PHL ag 6/9/94

EQUIPMENT USED: redi-flo 2 / bailer

PURGING DEVICE

Type Device? Redi-flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? see SOPs

Which well was previously purged? BC-MW11

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? BC-MW11

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 84.70

Depth to water surface (ft.) 24.80

Length of water (ft.) 59.90

Volume of water (ft3) —

(gal.) 9.6 gallons

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1033 Finished 1108

Volume purged ~40 gallons

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 1130

Finish 1145

IN-SITU TESTING

	Date:	5/22/94	5/22	5/22	5/22			
	Time:	1033	1052	1108	1130			
Water Level		24.80	—	—	24.95			
Well Volume Purged (gal.)		0	20	40	—			
Turbidity		clear	—	clear	clear			
Odor		none	—	none	none			
Organic Vapor (ppm)		—	—	—	—			
pH (units)		6.44	6.4	6.52	—			
Conductivity (μ mhos)		302	551	582	—			
Water Temperature (°C)		60.5	58.8	60.9	—			

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW13-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/19/94

WELL NO. BC-MW13 LOCATION Base boundary

WEATHER CONDITIONS warm, 70° AMBIENT TEMP: clear

PERSONNEL JS Bruegel / CM Runge

REVIEWED BY: PH Clay 6/9/94

EQUIPMENT USED: Redi flo 2 pump / teflon bailer

PURGING DEVICE

Type Device? Redi flo 2 pump

How was the device decontaminated? See SOPs

How was the line decontaminated? See SOPs

Which well was previously purged? none

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? New line

Which well was previously sampled? BC-MW1

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) ~96.7'

Depth to water surface (ft.) 37.46' BTOC

Length of water (ft.) 61.23'

Volume of water (ft3)

(gal.) 9.72 gallons

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1648 Finished 1744

Volume purged 40 gallons

Comments on Well Recovery NA

Additional Comments note: large conductivity difference once well was purged ~20 gallons

Samples Collected: Start 0815

Finish 0935

IN-SITU TESTING

Date:	5/19/94	5/19/94	5/19/94	5-20			
Time:				0810			
Water Level	37.46'	NA	NA	37.5			
Well Volume Purged (gal.)	0	20	40	—			
Turbidity	clear	clear	clear	clear			
Odor	none	none	none	none			
Organic Vapor (ppm)	—	—	—	—			
pH (units)	7.82	7.09	7.28	7.72			
Conductivity (μ mhos)	447	716	753	782			
Water Temperature (°C)	64.6°F	60.3°F	60.4°F	56.3			

Notes: 1 ft. length of 4" = 0.087 ft³ or 0.65 gal. 1 ft. length 2" = 0.022 ft³ or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW14-GW4

PROJECT NAME 110TH FG, MIANG JOB NO: 948901 DATE: 5/22/94

WELL NO. BC-MW14 LOCATION base boundary

WEATHER CONDITIONS clear AMBIENT TEMP: 90°

PERSONNEL CMF/JSB

REVIEWED BY: PHL 6/9/94

EQUIPMENT USED: Teflon bailer / Redi-flo 2 pump

PURGING DEVICE

Type Device? Redi-flo 2 pump

How was the device decontaminated? See SOPs

How was the line decontaminated? See SOPs

Which well was previously purged? BC-MW6

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? BC-MW6

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) ~89.6

Depth to water surface (ft.) 31.70

Length of water (ft.) 57.9

Volume of water (ft3) —

(gal.) ~9 gallons

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1530 Finished 1602

Volume purged ~36 gallons

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 1610

Finish 1650

IN-SITU TESTING							
Date:	5/22/94	5/22/94	5/22/94	5/22/94			
Time:	1530	1546	1602	1610			
Water Level	31.70	—	—	32.07			
Well Volume Purged (gal.)	0	~18	36	—			
Turbidity	clear	sl. turbid	sl. turbid	—			
Odor	none	faint	faint	—			
Organic Vapor (ppm)	—	—	—	—			
pH (units)	6.83	6.93	6.93	6.83			
Conductivity (μ mhos)	532	564	564	525			
Water Temperature (°C)	70.3	64.5	64.5	71.7			

153

Notes: 1 ft. length of 4" = 0.087 ft³ or 0.65 gal. 1 ft. length 2" = 0.022 ft³ or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

6.8
559
64.2

Well was resampled 5/24/94

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW15-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/20/94

WELL NO. BC-MW15 LOCATION Battle Creek, Michigan

WEATHER CONDITIONS clear AMBIENT TEMP: 70-75°

PERSONNEL Mark Christenson / Jack Briegel

REVIEWED BY: PHL 6/9/94

EQUIPMENT USED: Redi-flo 2 pump / bailer

PURGING DEVICE

Type Device? Redi-flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? see SOPs

Which well was previously purged? BC-MW3

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? N/A

Which well was previously sampled? N/A

INITIAL WELL VOLUME

Well diameter (in.) 2'

Stickup (ft.) ~2'

Depth to bottom of well (ft.) ~81.45'

Depth to water surface (ft.) 40.04' JSB 11/20/94

Length of water (ft.) 41.41'

Volume of water (ft3) —

(gal.) 6.7

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 0915 Finished 0940

Volume purged ~30 gallons

Comments on Well Recovery —

Additional Comments forgot pH, cond meter collected sample for measurement @ decon area (1025 am)

Samples Collected: Start 1545

Finish N/A

IN-SITU TESTING

	Date:	5/20/94	5/20/94	5/21/94 ⊛				
	Time:	—	1545	1043				
Water Level		41.41	42.01	42.05				
Well Volume Purged (gal.)		0	—	6.6				
Turbidity		clear	clear	—				
Odor		none	none	—				
Organic Vapor (ppm)		—	—	—				
pH (units)		7.63	7.51	8.19				
Conductivity (μ mhos)		.782	468	419				
Water Temperature (°C)		74.3	66.9	66.8				

Notes: 1 ft. length of 4" = 0.087 ft³ or 0.65 gal. 1 ft. length 2" = 0.022 ft³ or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

* NO_3^{2-} sample collected @ 1400 hours; remaining samples collected @ 1545; ⊛ SVOCs resampled 1043 (5/21/94);

Resampling for BC-MW15

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC-MW15-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/24/94

WELL NO. BC-MW15 LOCATION Base boundary wells

WEATHER CONDITIONS ptly cloudy / lt. rain AMBIENT TEMP: 65°-70°

PERSONNEL Don Johnson / JSD / CMF

REVIEWED BY: 6/9/94

EQUIPMENT USED: redi flo 2 / Teflon bailers

PURGING DEVICE

Type Device? redi flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? See SOPs

Which well was previously purged? BC3-MW2

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? N/A

Which well was previously sampled? BC3-MW2

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) ~81.45'

Depth to water surface (ft.) 42.00

Length of water (ft.) 39.55'

Volume of water (ft3)

(gal.) 6.2

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 0950 Finished 1014

Volume purged ~30 gallons

Comments on Well Recovery

Additional Comments Resampling

Samples Collected: Start 1040

Finish

IN-SITU TESTING	Date:	5/24/94	5/24/94	5/24/94				
	Time:	0950	1014					
Water Level		42.00	—	42.6'				
Well Volume Purged (gal.)		0	~30	—				
Turbidity		clear	turbid	clear				
Odor		none	none	none				
Organic Vapor (ppm)		—	—					
pH (units)		6.18	7.56	6.88				
Conductivity (μ mhos)		513	523	500				
Water Temperature (°C)		57.9	56.3	56.5				

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC2-MW1-GW4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/23+24/94 JSG 6/2/94

WELL NO. BC2-MW1 LOCATION Site 2: Drainage Swale

WEATHER CONDITIONS clear/ptly cloudy AMBIENT TEMP: 70°

PERSONNEL Carol Frye / Jack Briegel

REVIEWED BY: PH Lag 6/9/94

EQUIPMENT USED: pump/bailer

PURGING DEVICE

Type Device? redi-flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? N/A

Which well was previously purged? BC-MW5

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? N/A

Which well was previously sampled? —

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 38'

Depth to water surface (ft.) 25.02'

Length of water (ft.) 12.98'

Volume of water (ft3) —

(gal.) 2.07 gallons

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1105 Finished 1117

Volume purged 8 gallons

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 1130

Finish

IN-SITU TESTING

Date:	5/23	5/23	5/23				
Time:	1106	1117	1130				
Water Level	25.02	—	26.00				
Well Volume Purged (gal.)	0	8	—				
Turbidity	turbid	clear	clear				
Odor	none	faint	faint				
Organic Vapor (ppm)	—	—	—				
pH (units)	6.62	6.85	8.12				
Conductivity (μ mhos)	523	545	602				
Water Temperature (°C)	71.7	60.7	69.4°				

Notes: 1 ft. length of 4" = 0.087 ft³ or 0.65 gal. 1 ft. length 2" = 0.022 ft³ or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC3-MW1-GW4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/21/94

WELL NO. BC3-MW1 LOCATION Site 3; Battle Creek Michigan

WEATHER CONDITIONS clear AMBIENT TEMP: 75°

PERSONNEL CMF/MC/JSB

REVIEWED BY: PHLacy 6/9/94

EQUIPMENT USED: Redi Flo 2 pump / Teflon Bailer

PURGING DEVICE

Type Device? Redi Flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? see SOPs

Which well was previously purged? —

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? NA JSB 5/21/94

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 41.6

Depth to water surface (ft.) 30.87

Length of water (ft.) 10.73

Volume of water (ft3) —

(gal.) 1.71 gallons

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1740 (1540) Finished 1750

Volume purged ~7 gallons

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 0740

Finish 0840

IN-SITU TESTING	Date:	5-01	5/21	5/22				
	Time:	1742	1750	0740				
Water Level		30.87	—	30.88				
Well Volume Purged (gal.)		0	7	—				
Turbidity		opaque	sl. turbid	turbid				
Odor		none	none	none				
Organic Vapor (ppm)		—	—	—				
pH (units)		6.98	6.72	6.78				
Conductivity (μ mhos)		537	456	503				
Water Temperature (°C)		25.6	65.2	62.3				

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

JSB
dup (BC3-MW17_GW4) and MS/MSD collected here

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC3-MW2-GW4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/21/94

WELL NO. BC3-MW2 LOCATION Site 3: Battle Creek, Michigan

WEATHER CONDITIONS clear AMBIENT TEMP: 75°

PERSONNEL MC/JSB/CMF

REVIEWED BY: PHLaz 6/9/93

EQUIPMENT USED: RediFlo 2 pump / bailer

PURGING DEVICE

Type Device? RediFlo 2 pump

How was the device decontaminated? See SOPs

How was the line decontaminated? See SOPs

Which well was previously purged? —

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? NA

INITIAL WELL VOLUME

Well diameter (in.) = 2"

Stickup (ft.) ~ 2'

Depth to bottom of well (ft.) 40.5'

Depth to water surface (ft.) 29.04'

Length of water (ft.) ~~40.5'~~ JSB 6/2/94 11.46'

Volume of water (ft3) —

(gal.) 1.83 x 4 = 7.5 gallons

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — * DNAPL (ft.) —

PURGING

Time started 1730 Finished 1742

Volume purged ~ 10 gallons

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 1755

Finish —

IN-SITU TESTING

Date:	5/23/94	5/23/94	5/23/94					
Time:	1730	1742	1755					
Water Level	29.04	—	29.08					
Well Volume Purged (gal.)	0	10	—					
Turbidity	turbid	clear	sl. turbid					
Odor	none	moderate	strong					
Organic Vapor (ppm)	—	—	—					
pH (units)	7.09	6.70	6.82					
Conductivity (μ mhos)	459	554	527					
Water Temperature (°C)	70.12	66.4	66.7					

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

* checked with oil-water interface probe

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC3-MW3-GW4

PROJECT NAME 110th FG - MIANG JOB NO: 948901 DATE: 5/21/94

WELL NO. BC3-MW3 LOCATION Site 3; Battle Creek Michigan

WEATHER CONDITIONS clear AMBIENT TEMP: 75°

PERSONNEL MC / JSB / CMF

REVIEWED BY: DHL 6/9/94

EQUIPMENT USED: Redi Flo 2 / bailer

PURGING DEVICE

Type Device? Redi Flo 2

How was the device decontaminated? see SOPs

How was the line decontaminated? see SOPs

Which well was previously purged? —

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? NA

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 39.13'

Depth to water surface (ft.) 28.58

Length of water (ft.) 10.55

Volume of water (ft3) ~~1.725~~ cm

(gal.) 1.725 gal

Amount of sediment at bottom of well (ft.) purge 2 x 4 = 8gal —

LNAPL (ft.) — DNAPL (ft.) —

PURGING 1210

Time started ~~1210~~ cm Finished 1215

Volume purged 8 gal

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 1418 JSB 1655

Finish 1445 5/21/94

IN-SITU TESTING	Date:	5-21	5-21	5-21-94	5/21/94			
	Time:	~~1210~~ cm	~~1215~~ cm	1445	1655			
Water Level		28.58	—	29.45	28.63			
Well Volume Purged (gal.)		JSB 8.0	— 8	—	—			
Turbidity		clear	clear	~~clear~~	sl. turbid			
Odor		none	none	~~none~~	none			
Organic Vapor (ppm)		—	—		—			
pH (units)		7.67	7.50		7.75			
Conductivity (μ mhos)		740	410	—	367			
Water Temperature (°C)		~~29.5~~	65.4	64.1°	66.5			

Notes: 1 ft. length of 4" = 0.087 ft³ or 0.65 gal. 1 ft. length 2" = 0.022 ft³ or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC3-MW4-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/21/94

WELL NO. BC3-MW4 LOCATION Site 3: Battle Creek Michigan

WEATHER CONDITIONS clear AMBIENT TEMP: 75°

PERSONNEL MC / JSB / CMF

REVIEWED BY: PA Lay 6/9/94

EQUIPMENT USED: Redi-flo 2 pump / bailer

PURGING DEVICE

Type Device? Redi-flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? see SOPs

Which well was previously purged? —

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? NA

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~ 2'

Depth to bottom of well (ft.) 67.3'

Depth to water surface (ft.) 29.32'

Length of water (ft.) 37.98'

Volume of water (ft3) 5

(gal.) 5.95

Amount of sediment at bottom of well (ft.) purge 6 x 3 = 18

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1125 Finished 1140

Volume purged ~17 gallons

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 1418

Finish —

IN-SITU TESTING								
Date:	5-21	5-21	5-21-94					
Time:	1125	1140	1418					
Water Level	29.32	—	29.45					
Well Volume Purged (gal.) JSB 5/21/94	0 X	17	—					
Turbidity	clear	clear	clear					
Odor	none	none	none					
Organic Vapor (ppm)	—	—	—					
pH (units)	8.19	7.88	—					
Conductivity (µ mhos) 4/38	~~8~~	510	—					
Water Temperature (°C) °F	64.8	68.9	64.5					

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC3-MW5-GW4

PROJECT NAME 110th FG, MIANG JOB NO: 948901 DATE: 5/20/94

WELL NO. BC3-MW5 LOCATION Site 3; Battle Creek, Michigan

WEATHER CONDITIONS clear AMBIENT TEMP: 70°

PERSONNEL Carol Frye / Mark Christenson / JSB

REVIEWED BY: PH Lacy 6/9/94

EQUIPMENT USED: Redi-flo 2 pump / bailer

PURGING DEVICE

Type Device? Redi-flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? see SOPs

Which well was previously purged? BC-MW8

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? NA

INITIAL WELL VOLUME

Well diameter (in.) 2'

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 42.0'

Depth to water surface (ft.) 29.59

Length of water (ft.) 12.41

Volume of water (ft3) —

(gal.) 1.98 gallons

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1743 Finished 1752

Volume purged ~8 gallons

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 0740

Finish 0915

IN-SITU TESTING

	Date:	5/20/94	5/20/94	5/21/94				
	Time:	1743 1735 358	1752	0740				
Water Level		29.59	—	29.55				
Well Volume Purged (gal.)		0	8	—				
Turbidity		sl. turbid	clear	—				
Odor		none	none	—				
Organic Vapor (ppm)		—	—	—				
pH (units)		6.16	6.54	7.85				
Conductivity (μ mhos)		573	409	437				
Water Temperature (°C)		75.5	62.9	60.5°				

Notes: 1 ft. length of 4" = 0.087 ft^3 or 0.65 gal. 1 ft. length 2" = 0.022 ft^3 or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BC3-MW6-GW4

PROJECT NAME 110th FG MIANG JOB NO: 948901 DATE: 5/20/94

WELL NO. BC3-MW6 LOCATION Site 3; Battle Creek, Mich

WEATHER CONDITIONS clear AMBIENT TEMP: 70°

PERSONNEL Carol Frye / MC / JSB

REVIEWED BY: PHL 6/9/94

EQUIPMENT USED: Teflon bailer / Redi Flo 2 pump

PURGING DEVICE

Type Device? Redi Flo 2 pump

How was the device decontaminated? see SOPs

How was the line decontaminated? See SOPs

Which well was previously purged? BC3-MW5

SAMPLING DEVICE

Type Device? Teflon bailer

How was the device decontaminated? see SOPs

How was the line decontaminated? NA

Which well was previously sampled? NA

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) ~2'

Depth to bottom of well (ft.) 35'

Depth to water surface (ft.) 23.79

Length of water (ft.) 11.21'

Volume of water (ft3) —

(gal.) 1.78 gallons

Amount of sediment at bottom of well (ft.) —

LNAPL (ft.) — DNAPL (ft.) —

PURGING

Time started 1835 Finished —

Volume purged 7 gallons

Comments on Well Recovery —

Additional Comments —

Samples Collected: Start 0750

Finish

IN-SITU TESTING

	Date:	5/20/94	5/20/94	5/21/94				
	Time:	1835	—	0750				
Water Level		23.79	—	23.81				
Well Volume Purged (gal.)		0	7	—				
Turbidity		turbid	clear/sl. turbid	—				
Odor		none	none	—				
Organic Vapor (ppm)		—	—	—				
pH (units)		6.65 ~~6.87~~ JSB	6.89	7.64				
Conductivity (μ mhos)		466 ~~432~~	432	450				
Water Temperature (°C)		67.6 ~~60.2°~~	60.2	59.6				

Notes: 1 ft. length of 4" = 0.087 ft³ or 0.65 gal. 1 ft. length 2" = 0.022 ft³ or 0.16 gal

Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

The Earth Technology Corporation

GROUNDWATER SAMPLING

Sample ID: BCI-MW2-GW6

PROJECT NAME 110th FG MICHIGAN ANG JOB NO: 948901 DATE: 5/17/95

WELL NO. IMW2 RI LOCATION Site 1: Fuel Tank Farm

WEATHER CONDITIONS cloudy, warm AMBIENT TEMP: 65°

PERSONNEL JSB (EarthTech), Jim Madaj (HAZWRAP

REVIEWED BY: JSB

EQUIPMENT USED: disposable polyethylene bailer, disposable Teflon bailer HYDAC #9305 HAZCO rental; Gelman sciences cartridge filter Lot #52173

PURGING DEVICE

Type Device? disposable poly. bailer

How was the device decontaminated? pre-decned

How was the line decontaminated? N/A - dedicated

Which well was previously purged? N/A

SAMPLING DEVICE

Type Device? disposable Teflon bailer

How was the device decontaminated? pre-decned

How was the line decontaminated? NA - dedicated

Which well was previously sampled? N/A

INITIAL WELL VOLUME

Well diameter (in.) 2"

Stickup (ft.) 2.5'

Depth to bottom of well (ft.) 32.84

Depth to water surface (ft.) 28.03

Length of water (ft.) 4.81

Volume of water (ft3) —

(gal.) 0.7

Amount of sediment at bottom of well (ft.) NA

LNAPL (ft.) not measured DNAPL (ft.) —

PURGING

Time started 0840 Finished 0850

Volume purged 3.5 gallons

Comments on Well Recovery almost instantaneous from previous sampling

Additional Comments broken sheen; strong hydrocarbon odor; filtered samples collected through in-line cartridge filter (0.45 µm) using peristaltic pump

Samples Collected: Start 0920

Finish NA

IN-SITU TESTING							
Date:	5/17	5/17	5/17	—	—	—	—
Time:	0840	0850 JSB 6/3/95	0920	—	—	—	—
Water Level	28.03	2	—	—	—	—	—
Well Volume Purged (gal.)	—	3.5	during after sampling JSB 6/3/95	—	—	—	—
Turbidity	cloudy	turbid	turbid	—	—	—	—
Odor	strong hydrocalon	strong	mod-strong	—	—	—	—
Organic Vapor (ppm)	1.3/1.2	NA	NA	—	—	—	—
pH (units)	5.38	5.67	6.79	—	—	—	—
Conductivity (µ mhos)	974	691	766	—	—	—	—
Water Temperature (°C)	53.1°F	51.9°F	51.5°F	—	—	—	—

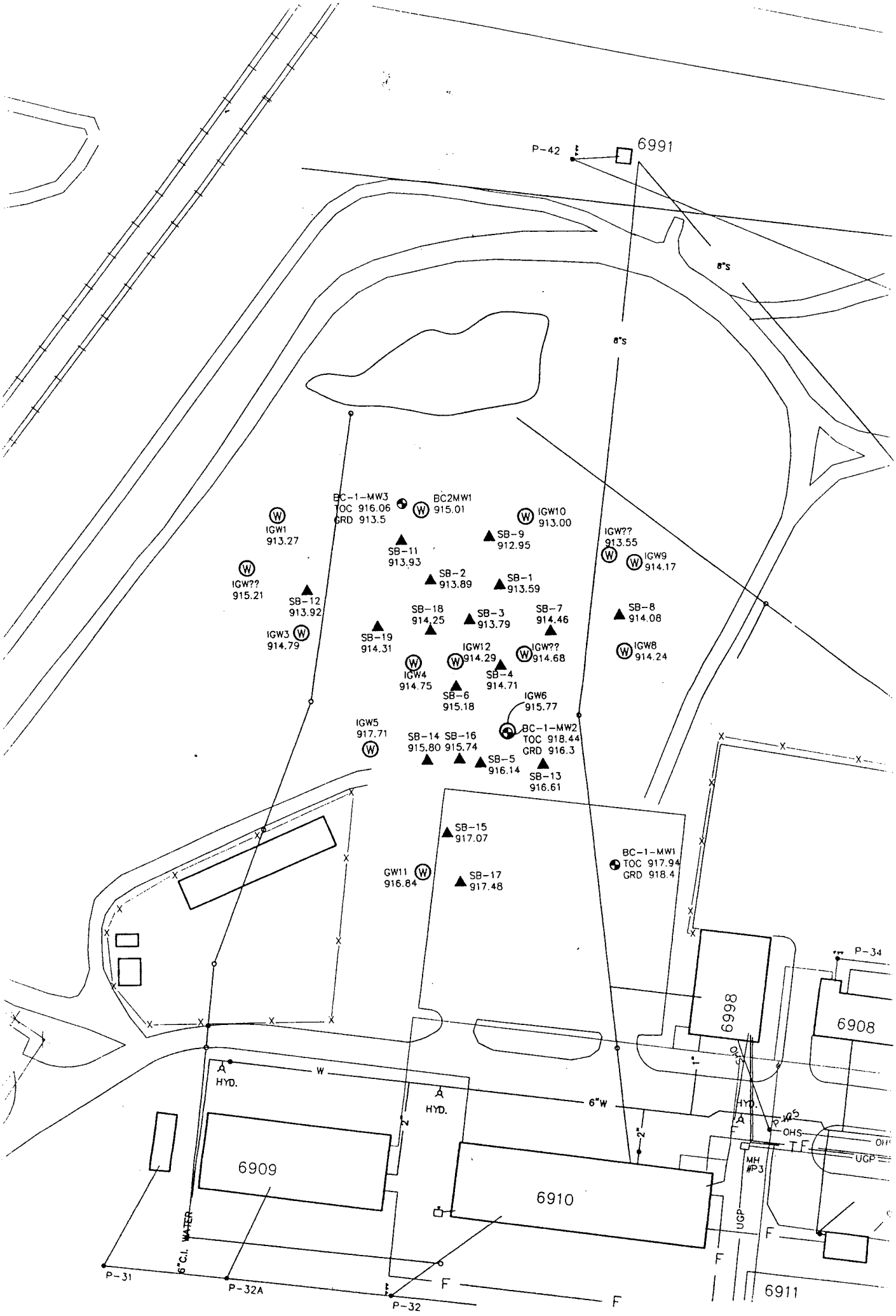
Notes: 1 ft. length of 4" = 0.087 ft³ or 0.65 gal. 1 ft. length 2" = 0.022 ft³ or 0.16 gal

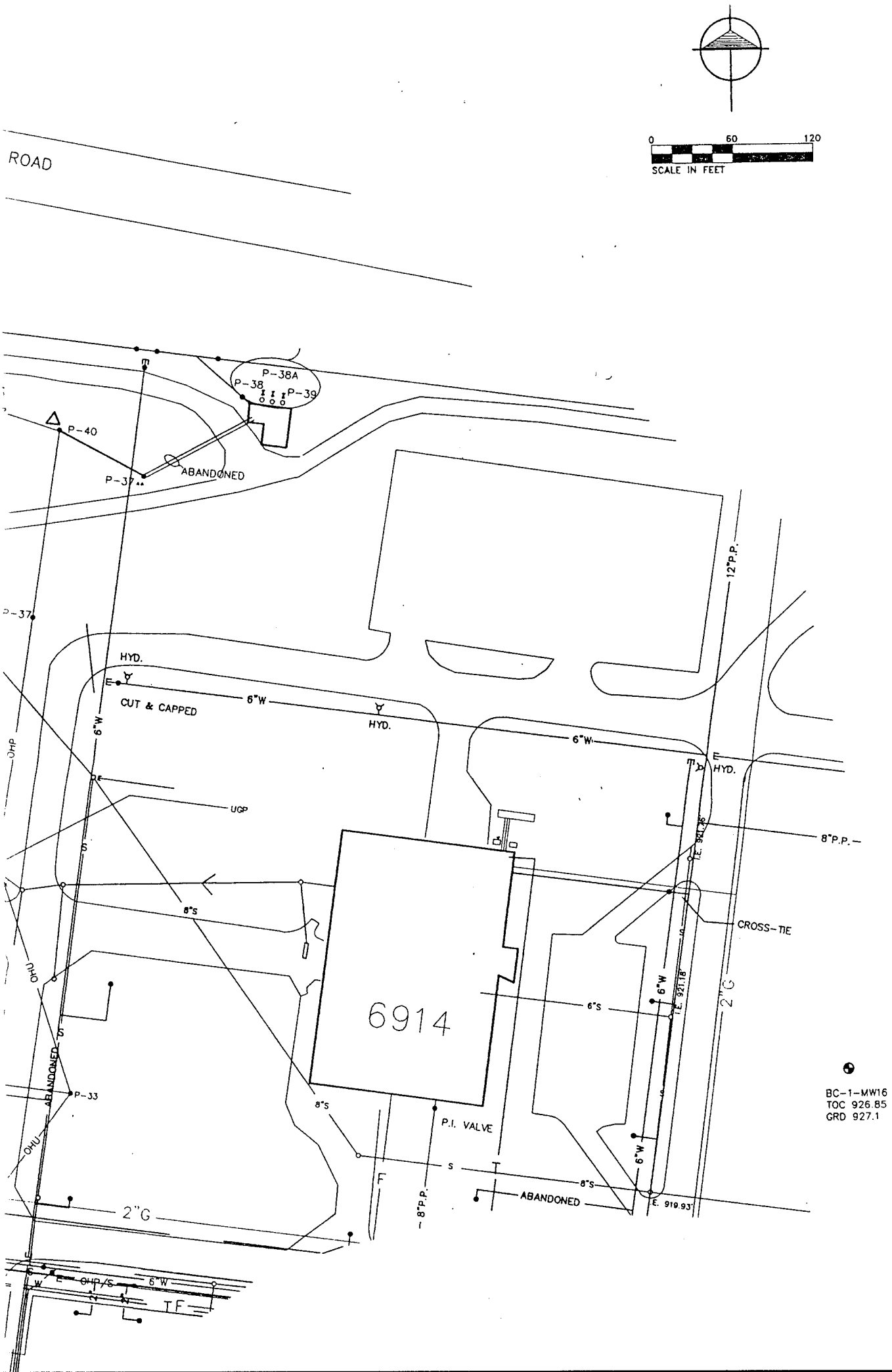
Turbidity choices: clear, turbid, opaque Revision Date: 2-8-91

TETC154

FIGURE 3-2

APPENDIX J: SURVEYING REPORTS


P-42
6991
8"S
8"S
BC-1-MW3
TOC 916.06
GRD 913.5
BC2MW1
915.01
IGW10
913.00
IGW1
913.27
SB-9
912.95
SB-11
913.93
IGW??
913.55
IGW9
914.17
IGW??
915.21
SB-2
913.89
SB-1
913.59
SB-12
913.92
SB-18
914.25
SB-3
913.79
SB-7
914.46
SB-8
914.08
IGW3
914.79
SB-19
914.31
IGW12
914.29
IGW??
914.68
IGW8
914.24
IGW4
914.75
SB-4
914.71
SB-6
915.18
IGW6
915.77
IGW5
917.71
BC-1-MW2
TOC 918.44
GRD 916.3
SB-14
915.80
SB-16
915.74
SB-5
916.14
SB-13
916.61
SB-15
917.07
BC-1-MW1
TOC 917.94
GRD 918.4
GW11
916.84
SB-17
917.48
P-34
6998
6908
HYD.
W
6"W
HYD.
HYD.
2"
2"
6909
6910
6911
OHS
UGP
MH
#P3
UGP
WATER
6"C.I.
P-31
P-32A
P-32
F
F
F
F


0
60
120
SCALE IN FEET
ROAD
P-38A
P-38
P-39
P-40
P-37
ABANDONED
HYD.
CUT & CAPPED
6"W
HYD.
6"W
HYD.
12"P.P.
OHP
UGP
8"P.P.
8"S
CROSS-TIE
6914
6"S
6"W
E. 921.18
2"G
OHU
P-33
ABANDONED
8"S
P.I. VALVE
8"P.P.
8"S
ABANDONED
E. 919.93
2"G
OHP/S
6"W
TF
BC-1-MW16
TOC 926.85
GRD 927.1

APPENDIX K: INVESTIGATION DERIVED WASTE CORRESPONDENCE

683 Emory Valley Road, Oak Ridge, Tennessee 37830

PltwP K-20 6.0

August 23, 1994

Captain Fred Vollmerhausen
Environmental Coordinator
110th Fighter Group, Michigan Air National Guard
3545 Mustang Avenue
Battle Creek, Michigan 49015-5509

Dear Captain Vollmerhausen:

Telephone
615.483.9404
Facsimile
615.481.3834

Field sampling activities at the 110th Fighter Group were ongoing from the middle of May to the middle of July, 1994. Approximately 400 to 450 gallons of wastewater generated by purging monitoring wells and decontaminating sampling equipment was containerized in polyethylene tanks and left on site. A composite sample of this wastewater was collected and analyzed for priority pollutant list volatile and semivolatile organic compounds, pesticides, PCBs, and metals (EPA methods 608, 624, and 625) in the WWES Laboratory, Grand Rapids, Michigan. The final report has been mailed to our office and, once received, will be provided to you in a more official version.

Please contact me if you have any questions or comments regarding these matters.

Sincerely,

EARTH TECH
Government Services Division

Jack S. Briegel
Project Manager

cc: Mr. Dan Wyatt, ANGRC (1 Copy)
Mr. Tom Cady, HAZWRAP (1 Copy)

File copy K-20 (HAZWRAP)

EARTH TECH

ANALYTICAL SERVICE

ANALYTICAL REPORT

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 27-JULY-1994 Sampling

Submittal Number: 32429- 1
Location:
CCS Number .00
CCS Manager: Jack Briegel

	Purge Well	Reporting Limit	Units
Lab Sample No:	93376		
Project Specific Fraction USEPA 624	Enclosed		
Project Specific Fraction * USEPA 625	Enclosed		
Organochlorine Pesticides * USEPA METHOD 608	Enclosed		
Organochlorine Pesticides * USEPA Method 608	Enclosed		
Arsenic, Total	8.6	1.0	ug/l
Cadmium, Total	2.2	0.2	ug/l
Chromium, Total	<50	50	ug/l
Copper, Total	42	10	ug/l
Lead, Total	<1.0	1.0	ug/l
Mercury, Total	<0.2	0.2	ug/l
Nickel, Total	570	10	ug/l
Selenium, Total	<2.0	2.0	ug/l
Silver, Total	<0.2	0.2	ug/l
Zinc, Total	210	20	ug/l
Antimony, Total	<2.0	2.0	ug/l
Thallium, Total	<2.0	2.0	ug/l
Beryllium, Total	<10	10	ug/l
Sampled by:	M.C.		
Date Sampled:	07/27/94		
Time Sampled:	11:00		
Date Received:	07/27/94		
Time Received:	15:40		

* See attached Statement of Data Qualifications.

EARTH TECH ANALYTICAL SERVICES

PROJECT SPECIFIC FRACTION
USEPA 624

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 27-JULY-1994 Sampling
Sample: Purge Well

Submittal Number 32429- 1
Date Sampled: 07/27/94 Time: 11:00
Date Received: 07/27/94 Time: 15:40
Analysis Date: 08/03/94
Lab Sample No: 93376

Parameter	Result ug/l
1,1,1-Trichloroethane	<1.0
1,1,2,2-Tetrachloroethane	<1.0
1,1,2-Trichloroethane	<1.0
1,1-Dichloroethane	<1.0
1,1-Dichloroethylene	<1.0
1,2-Dichloroethylene-(total)	<1.0
1,2-Dichloroethane	<1.0
1,2-Dichloropropane	<10
2-Chloroethyl Vinyl Ether	1.4
Benzene	<1.0
Bromodichloromethane	<1.0
Bromoform	<1.0
Bromomethane	<1.0
Carbon Tetrachloride	1.1
Chlorobenzene	<1.0
Chloroethane	

Parameter	Result ug/l
Chloroform	<1.0
Chloromethane	<1.0
cis-1,3-Dichloropropene	<1.0
Dibromochloromethane	<1.0
Ethylbenzene	1.1
Methylene Chloride	<1.0
Tetrachloroethene	<1.0
Toluene	1.5
trans-1,3-Dichloropropene	<1.0
Vinyl Chloride	<1.0
Xylene, Total	<3.0
Trichloroethene	<1.0
Acrolein	<15
Acrylonitrile	<1.0
Dichlorodifluoromethane	<10
Trichlorofluoromethane	<1.0

PROJECT SPECIFIC FRACTION
USEPA 625

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 27-JULY-1994 Sampling
Sample: Purge Well

Submittal Number 32429- 1
Date Sampled: 07/27/94 Time: 11:00
Date Received: 07/27/94 Time: 15:40
Analysis Date: 08/04/94
Lab Sample No: 93376

Parameter	Result ug/l
1,2,4-Trichlorobenzene	<5.0
2,4,5-Trichlorophenol	<5.0
2,4,6-Trichlorophenol	<5.0
2,4-Dichlorophenol	<5.0
2,4-Dimethylphenol	<5.0
2,4-Dinitrophenol	<20
2,4-Dinitrotoluene	<5.0
2,6-Dinitrotoluene	<5.0
2-Chloronaphthalene	<5.0
2-Chlorophenol	<5.0
2-Methylnaphthalene	<5.0
2-Methylphenol	<5.0
2-Nitrophenol	<5.0
4-Bromophenyl Phenylether	<5.0
4,6-Dinitro-2-Methylphenol	<20
4-Chloro-3-Methylphenol	<5.0
4-Chlorophenylphenyl-Ether	<5.0
4-Methylphenol	<5.0
4-Nitrophenol	<20
Acenaphthene	<5.0
Acenaphthylene	<5.0
Anthracene	<5.0
Benzo (a) Anthracene	<5.0
Benzo (a) Pyrene	<5.0
Benzo (b&k) Fluoranthene	<5.0
Benzo (g,h,i,) Perylene	<5.0
Benzoic Acid	<50
Benzyl Alcohol	<50
Bis (2-Chloroisopropyl)-Ether	<5.0
Bis (2-Chloroethyl) Ether	<5.0
Bis (2-ethylhexyl)-Phthalate	12

Parameter	Result ug/l
Di-n-Butylphthalate	<5.0
Di-n-Octylphthalate	<5.0
Dibenzo (a,h) Anthracene	<5.0
Dimethylphthalate	<5.0
Diethylphthalate	10
Fluoranthene	<5.0
Fluorene	<5.0
Hexachlorobenzene	<5.0
Hexachlorobutadiene	<5.0
Hexachlorocyclopentadiene	<5.0
Hexachloroethane	<5.0
Isophorone	<5.0
Indeno (1,2,3-cd) Pyrene	<5.0
N-Nitrosodi-n-Propylamine	<5.0
N-Nitroso-di-Phenylamine	6.0
Naphthalene	<5.0
Pentachlorophenol	<50
Phenanthrene	<5.0
Phenol	<5.0
Pyrene	<5.0
1,2-Dichlorobenzene	<5.0
1,3-Dichlorobenzene	<5.0
1,4-Dichlorobenzene	<5.0
3,3'-Dichlorobenzidine	<20
4-Chloroaniline	<20
Dibenzofuran	<5.0
2-Nitroaniline	<20
3-Nitroaniline	<20
4-Nitroaniline	<20
Nitrobenzene	<5.0
Benzidine	<50

PROJECT SPECIFIC FRACTION
USEPA 625

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 27-JULY-1994 Sampling
Sample: Purge Well

Submittal Number 32429- 1
Date Sampled: 07/27/94 Time: 11:00
Date Received: 07/27/94 Time: 15:40
Analysis Date: 08/04/94
Lab Sample No: 93376

Parameter	Result ug/l
Bis (2-Chloroethoxy)-Methane	<5.0
Butyl Benzyl Phthalate	<5.0
Chrysene	<5.0
1,2-Diphenylhydrazine	<5.0
N-Nitroso-di-methylamine	<10

ORGANOCHLORINE PESTICIDES
USEPA METHOD 608

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 27-JULY-1994 Sampling
Sample: Purge Well

Submittal Number 32429- 1
Date Sampled: 07/27/94 Time: 11:00
Date Received: 07/27/94 Time: 15:40
Analysis Date: 08/18/94
Lab Sample No: 93376

Parameter	Result ug/l	Parameter	Result ug/l
Aldrin	<1.0	Dieldrin	<1.0
Alpha-BHC	<1.0	Endosulfan I	<1.0
Beta-BHC	<1.0	Endosulfan II	<1.0
Delta-BHC	<1.0	Endosulfan Sulfate	<1.0
Lindane	<1.0	Endrin	<1.0
4,4'-DDD	<1.0	Endrin Aldehyde	<1.0
4,4'-DDE	<1.0	Heptachlor	<1.0
4,4'-DDT	<1.0	Heptachlor Epoxide	<1.0

ORGANOCHLORINE PESTICIDES
USEPA METHOD 608

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 27-JULY-1994 Sampling
Sample: Purge Well

Submittal Number 32429- 1
Date Sampled: 07/27/94 Time: 11:00
Date Received: 07/27/94 Time: 15:40
Analysis Date: 08/02/94
Lab Sample No: 93376

Parameter	Result ug/l	Parameter	Result ug/l
Chlordane (technical)	<1.0	PCB-1242	<1.0
Toxaphene	<1.0	PCB-1248	<1.0
PCB-1016	<1.0	PCB-1254	<1.0
PCB-1221	<1.0	PCB-1260	<1.0
PCB-1232	<1.0		

PHWP K20 6.0

683 Emory Valley Road, Oak Ridge, Tennessee 37830

Telephone
615.483.9404
Facsimile
615.481.3834

March 14, 1995

Captain Fred Vollmerhausen
Environmental Coordinator
110th Fighter Group, Michigan Air National Guard
3545 Mustang Avenue
Battle Creek, Michigan 49015-5509

Dear Captain Vollmerhausen:

Field sampling activities at the 110th Fighter Group were ongoing from the first of November to the middle of December, 1994. Approximately 750 gallons of wastewater generated by purging monitoring wells and decontaminating sampling equipment was containerized in 2 polyethylene tanks and left on site. A composite sample of this wastewater was collected and analyzed for priority pollutant list volatile and semivolatile organic compounds, pesticides, PCBs, and metals (EPA methods 608, 624, and 625) in the Earth Tech Analytical Laboratory, Grand Rapids, Michigan. Per our phone conversation on January 18, 1995, Mr. Greg Reed of the Earth Tech laboratory services group provided you a preliminary copy of these analytical results. The final report was mailed to our office and is being transmitted to you with this letter.

Please contact me if you have any questions or comments regarding these matters.

Sincerely,

EARTH TECH
Government Services Division

Jack S. Briegel
Project Manager

cc: Mr. Paul Wheeler, ANGRC (1 Copy)
Mr. Tom Cady, HAZWRAP (1 Copy)

Attachments

ANALYTICAL REPORT

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 19-December-1994 Sampling

Submittal Number: 32429- 8
Location:
CCS Number .00
CCS Manager: Jack Briegel

	BCWW 121994	Reporting Limit	Units
Lab Sample No:	106548		
Project Specific Fraction USEPA 624	Enclosed		
Project Specific Fraction USEPA 625	Enclosed		
Organochlorine Pesticides * USEPA METHOD 608	Enclosed		
Organochlorine Pesticides * USEPA Method 608	Enclosed		
Arsenic, Total	5.7	1.0	ug/l
Cadmium, Total	1.6	0.2	ug/l
Chromium, Total	110	50	ug/l
Copper, Total	65	10	ug/l
Lead, Total	74	1.0	ug/l
Mercury, Total	<0.2	0.2	ug/l
Nickel, Total	710	10	ug/l
Selenium, Total	<2.0	2.0	ug/l
Silver, Total	<0.2	0.2	ug/l
Zinc, Total	660	20	ug/l
Antimony, Total	<2.0	2.0	ug/l
Thallium, Total	<2.0	2.0	ug/l
Beryllium, Total	<10	10	ug/l
Sampled by:	J.Briegel		
Date Sampled:	12/19/94		
Time Sampled:	12:00		
Date Received:	12/19/94		
Time Received:	14:25		

* See attached Statement of Data Qualifications.

5555 Glenwood Hills Parkway SE, PO Box 874, Grand Rapids, MI 49588-0874, 616/942-9600 Fax 942-6499

PROJECT SPECIFIC FRACTION
USEPA 624

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 19-December-1994 Sampling
Sample: BCWW
121994

Submittal Number 32429- 8
Date Sampled: 12/19/94 Time: 12:00
Date Received: 12/19/94 Time: 14:25
Analysis Date: 12/31/94
Lab Sample No: 106548

Parameter	Result ug/l	Reporting Limit ug/l
1,1,1-Trichloroethane	<1.0	1.0
1,1,2,2-Tetrachloroethane	<1.0	1.0
1,1,2-Trichloroethane	<1.0	1.0
1,1-Dichloroethane	<1.0	1.0
1,1-Dichloroethylene	<1.0	1.0
1,2-Dichloroethylene-(total)	<2.0	2.0
1,2-Dichloroethane	<1.0	1.0
1,2-Dichloropropane	<1.0	1.0
2-Chloroethyl Vinyl Ether	<10	10
Benzene	<1.0	1.0
Bromodichloromethane	<1.0	1.0
Bromoform	<1.0	1.0
Bromomethane	<1.0	1.0
Carbon Tetrachloride	<1.0	1.0
Chlorobenzene	<1.0	1.0
Chloroethane	<1.0	1.0
Chloroform	<1.0	1.0
Chloromethane	<1.0	1.0
cis-1,3-Dichloropropylene	<1.0	1.0
Dibromochloromethane	<1.0	1.0
Ethylbenzene	<1.0	1.0
Methylene Chloride	<1.0	1.0
Tetrachloroethylene	<1.0	1.0
Toluene	<1.0	1.0
trans-1,3-Dichloropropene	<1.0	1.0
Vinyl Chloride	<1.0	1.0
Xylene, Total	<3.0	3.0
Trichloroethylene	<1.0	1.0
Acrolein	*<15	15
Acrylonitrile	<1.0	1.0
Dichlorodifluoromethane	<10	10
Trichlorofluoromethane	<1.0	1.0

* See attached Statement of Data Qualifications.

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PROJECT SPECIFIC FRACTION
USEPA 625

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 19-December-1994 Sampling
Sample: BCWW
121994

Submittal Number 32429- 8
Date Sampled: 12/19/94 Time: 12:00
Date Received: 12/19/94 Time: 14:25
Analysis Date: 12/28/94
Lab Sample No: 106548

Parameter	Result ug/l	Reporting Limit ug/l
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<5.0	5.0
2,4,6-Trichlorophenol	<5.0	5.0
2,4-Dichlorophenol	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
2,4-Dinitrophenol	<20	20
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
2-Methylnaphthalene	**7.0**	5.0
2-Methylphenol	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chlorophenylphenyl-Ether	<5.0	5.0
4-Methylphenol	<5.0	5.0
4-Nitrophenol	<20	20
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Benzoic Acid	<50	50
Benzyl Alcohol	<50	50
Bis (2-Chloroisopropyl)-Ether	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-ethylhexyl)-Phthalate	<5.0	5.0

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PROJECT SPECIFIC FRACTION
USEPA 625

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 19-December-1994 Sampling
Sample: BCWW
121994

Submittal Number 32429- 8
Date Sampled: 12/19/94 Time: 12:00
Date Received: 12/19/94 Time: 14:25
Analysis Date: 12/28/94
Lab Sample No: 106548

Parameter	Result ug/l	Reporting Limit ug/l
Bis (2-Chloroethoxy)-Methane	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dimethylphthalate	<5.0	5.0
Diethylphthalate	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Isophorone	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2-Dichlorobenzene	<5.0	5.0
1,3-Dichlorobenzene	<5.0	5.0
1,4-Dichlorobenzene	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
4-Chloroaniline	<20	20
Dibenzofuran	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
Benzidine	<50	50

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PROJECT SPECIFIC FRACTION
USEPA 625

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 19-December-1994 Sampling
Sample: BCWW
121994

Submittal Number 32429- 8
Date Sampled: 12/19/94 Time: 12:00
Date Received: 12/19/94 Time: 14:25
Analysis Date: 12/28/94
Lab Sample No: 106548

Parameter	Result ug/l	Reporting Limit ug/l
1,2-Diphenylhydrazine	<5.0	5.0
N-Nitroso-di-methylamine	<10	10

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ORGANOCHLORINE PESTICIDES
USEPA METHOD 608

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 19-December-1994 Sampling
Sample: BCWW
121994

Submittal Number 32429- 8
Date Sampled: 12/19/94 Time: 12:00
Date Received: 12/19/94 Time: 14:25
Analysis Date: 01/11/95
Lab Sample No: 106548

Parameter	Result ug/l	Reporting Limit ug/l
Aldrin	<1.0	1.0
Alpha-BHC	<1.0	1.0
Beta-BHC	<1.0	1.0
Delta-BHC	<1.0	1.0
Lindane	<1.0	1.0
4,4'-DDD	<1.0	1.0
4,4'-DDE	<1.0	1.0
4,4'-DDT	<1.0	1.0
Dieldrin	<1.0	1.0
Endosulfan I	<1.0	1.0
Endosulfan II	<1.0	1.0
Endosulfan Sulfate	<1.0	1.0
Endrin	<1.0	1.0
Endrin Aldehyde	<1.0	1.0
Heptachlor	<1.0	1.0
Heptachlor Epoxide	<1.0	1.0

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ORGANOCHLORINE PESTICIDES
USEPA METHOD 608

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 19-December-1994 Sampling
Sample: BCWW
121994

Submittal Number 32429- 8
Date Sampled: 12/19/94 Time: 12:00
Date Received: 12/19/94 Time: 14:25
Analysis Date: 12/30/94
Lab Sample No: 106548

Parameter	Result ug/l	Reporting Limit ug/l
Chlordane (technical)	<1.0	1.0
Toxaphene	<1.0	1.0
PCB-1016	<1.0	1.0
PCB-1221	<1.0	1.0
PCB-1232	<1.0	1.0
PCB-1242	<1.0	1.0
PCB-1248	<1.0	1.0
PCB-1254	<1.0	1.0
PCB-1260	<1.0	1.0

 End of Analytical Report

5555 Glenwood Hills Parkway SE, PO Box 874, Grand Rapids, MI 49588-0874, 616/942-9600 Fax 942-6499

683 Emory Valley Road, Oak Ridge, Tennessee 37830

Telephone
615.483.9404

Facsimile
615.481.3834

March 21, 1995

Captain Fred Vollmerhausen
Environmental Coordinator
110th Fighter Group, Michigan Air National Guard
3545 Mustang Avenue
Battle Creek, Michigan 49015-5509

Dear Captain Vollmerhausen:

A hollow stem auger drilling rig was used to advance five boreholes (four at Site 1 and one east of Building 6914) at the Air National Guard facility during December 1994. The auger cuttings which were removed from these boreholes were either drummed or placed on plastic sheeting next to the boring from which they were removed. The well and cuttings locations are included on Attachment I. All of the soil or groundwater analytical results associated with the boring/wells are presented on Attachment II. Soil samples for laboratory analysis were only collected from one borehole, BC1MW2. Well numbers and locations, samples collected from each boring, and cuttings disposition are included on Attachment III.

On February 22, 1995 I contacted Ms. Lori Aronoff, Environmental Quality Analyst for the Michigan Department of Natural Resources for guidance regarding the disposition of these cuttings. Ms. Aronoff indicated to me that cuttings should not be disposed of by the well or on clean soils if soil samples collected from these borings contain compounds which exceed the Michigan Environmental Response Act 307 Type B direct contact or Type A values. The soil samples collected from well location 1MW2 (10 to 12 and 20 to 22 foot bgs intervals) were analyzed for VOCs, SVOCs, and metals. Only selenium and/or arsenic were detected in concentrations which exceed the cleanup criteria. She did state that it was acceptable practice to combine contaminated soils with other similarly contaminated soils, i.e other sites where similar types of contamination exists. Placing the cuttingns in the Drainage Swale (Site 2) prior to covering this area with the earthen cover would be one option to consider. Data presented in the Site 2 Source Removal Action Plan (Engineering-Science, 1994) shows that sediments at the bottom of the drainage swale contain polynuclear aromatic hydrocarbons and metals above the Type A and B cleanup criteria. These contaminants are the primary contaminants of concern within the Site 1 soils and groundwater.

Please contact me if you have any questions or comments regarding these matters.

Sincerely,

EARTH TECH
Government Services Division

Jack S. Briegel
Project Manager

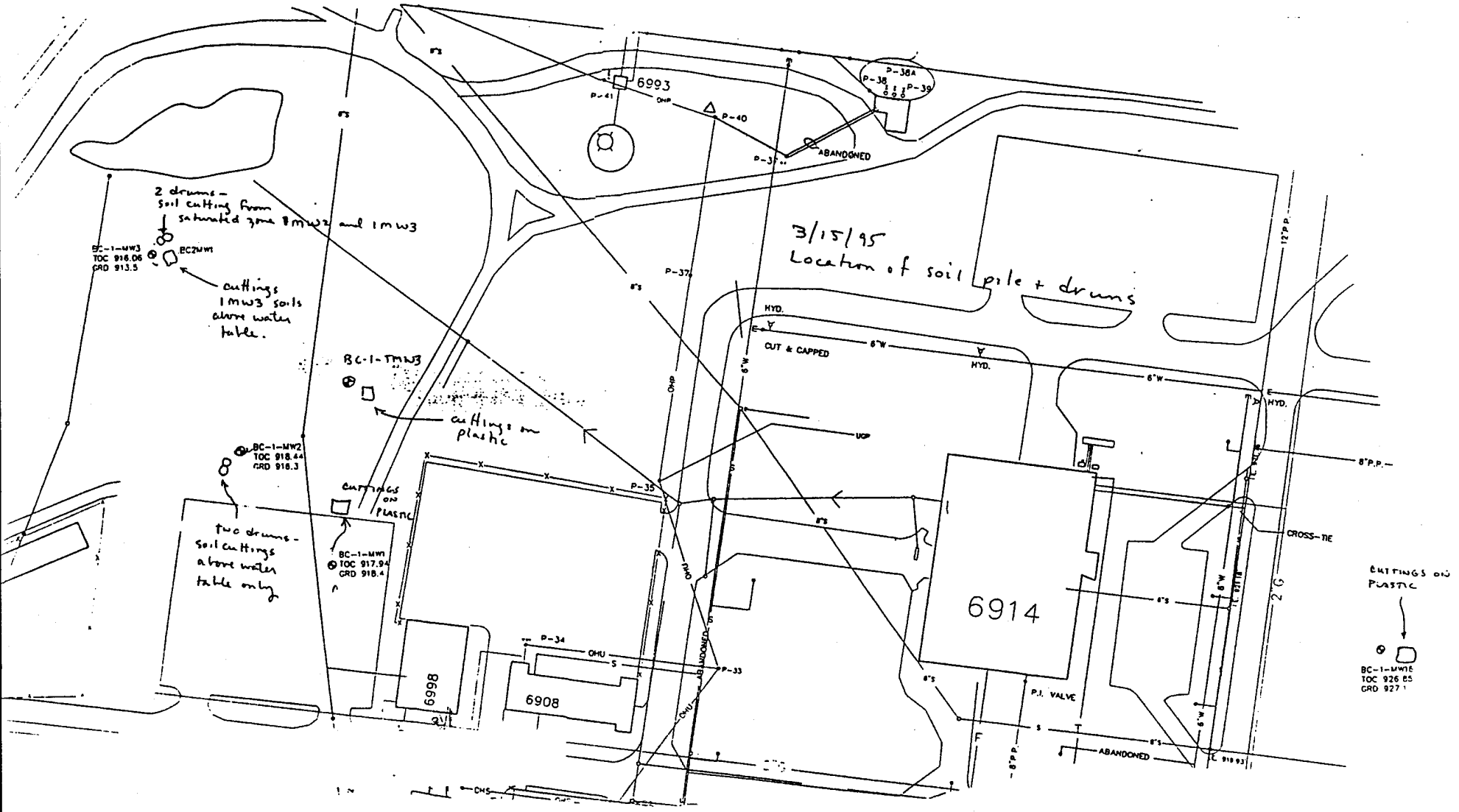
cc: Mr. Paul Wheeler, ANGRC (1 Copy)
Mr. Tom Cady, HAZWRAP (1 Copy)

Attachments

ATTACHMENT I

LOCATION MAP

ATTACHMENT 1



Attachment II

Location	Well #	Samples	Cuttings Location
Site 1(located in parking lot next to AGE shop)	BC1MW1	groundwater only; PID readings during drilling were 0 ppm; located outside of contaminated Site 1 soils	cuttings are located on the northern edge of the parking lot covered in plastic
Site 1	BC1MW2	soil samples 1MW21012 and 1MW22022 were collected from this boring (a); PID readings during drilling (to water table) were 0 ppm	suspected product in well; cuttings from the surface to the water table were drummed and left by the well; cuttings from the water table to total depth were placed in two drums, labelled, and combined with the BC1MW3 saturated cuttings
Site 1 (located on the eastern edge of Site 1)	BC1TMW3	groundwater samples only; PID readings during drilling were 0 ppm; located outside of contaminated Site 1 soils	drilled outside of known contaminated soil plume; cuttings were left on plastic by boring
Site 1 (located next to BC2MW1)	BC1MW3	groundwater samples only; PID readings during drilling were 0 ppm; located outside of contaminated Site 1 soils	located next to BC2MW1; cuttings from surface to water table were left on plastic by the well; cuttings from the water table to total depth were placed in 2 drums, labelled, and combined with the BC1MW2 cuttings
In parade ground	BCMW16	groundwater samples only; PID readings during drilling were 0 ppm; located in an area where soil contamination should not be present	cuttings were covered in plastic and left by the well

ATTACHMENT III

ANALYTICAL RESULTS

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

1MW21012

Lab Name: COMPUCHEM ENV. CORP. Contract: 500639

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00011

Matrix: (soil/water) SOIL Lab Sample ID: 670471

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH070471A52.D

Level: (low/med) LOW Date Received: 12/17/94

% Moisture: not dec. 7 Date Analyzed: 12/28/94

GC Column:DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	5	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	21	B
67-64-1	Acetone	19	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	22	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	11	U
108-10-1	4-Methyl-2-Pentanone	16	U
591-78-6	2-Hexanone	16	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	11	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Xylene (total)	16	U
108-05-4	Vinyl Acetate	11	U

DRAFT

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

1MW21012

Lab Name: COMPUCHEM ENV. CORP. Contract: 500639

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00011

Matrix: (soil/water) SOIL Lab Sample ID: 670471

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH070471A52.D

Level: (low/med) LOW Date Received: 12/17/94

% Moisture: not dec. 7 Date Analyzed: 12/28/94

GC Column:DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U

DRAFT

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1MW21012

Lab Name: COMPUCHEM ENV. CORP. Contract: (3-90)-REVS

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00043

Matrix: (soil/water) SOIL Lab Sample ID: 670463

Sample wt/vol: 30.1 (g/mL) G Lab File ID: GH070463A08.D

Level: (low/med) LOW Date Received: 12/17/94

% Moisture: 7 decanted: (Y/N) N Date Extracted: 12/28/94

Concentrated Extract Volume: 500 (uL) Date Analyzed: 01/23/95

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.3

DRAFT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	350	U
111-44-4	bis(2-Chloroethyl)ether	350	U
95-57-8	2-Chlorophenol	350	U
541-73-1	1,3-Dichlorobenzene	350	U
106-46-7	1,4-Dichlorobenzene	350	U
95-50-1	1,2-Dichlorobenzene	350	U
95-48-7	2-Methylphenol	350	U
108-60-1	2,2'-oxybis(1-Chloropropane)	350	U
106-44-5	4-Methylphenol	350	U
621-64-7	N-Nitroso-di-n-propylamine	350	U
67-72-1	Hexachloroethane	350	U
98-95-3	Nitrobenzene	350	U
78-59-1	Isophorone	350	U
88-75-5	2-Nitrophenol	350	U
105-67-9	2,4-Dimethylphenol	350	U
111-91-1	bis(2-Chloroethoxy)methane	350	U
120-83-2	2,4-Dichlorophenol	350	U
120-82-1	1,2,4-Trichlorobenzene	350	U
91-20-3	Naphthalene	350	U
106-47-8	4-Chloroaniline	350	U
87-68-3	Hexachlorobutadiene	350	U
59-50-7	4-Chloro-3-methylphenol	350	U
91-57-6	2-Methylnaphthalene	350	U
77-47-4	Hexachlorocyclopentadiene	350	U
88-06-2	2,4,6-Trichlorophenol	350	U
95-95-4	2,4,5-Trichlorophenol	860	U
91-58-7	2-Chloronaphthalene	350	U
88-74-4	2-Nitroaniline	860	U
131-11-3	Dimethylphthalate	350	U
208-96-8	Acenaphthylene	350	U
606-20-2	2,6-Dinitrotoluene	350	U
99-09-2	3-Nitroaniline	860	U
83-32-9	Acenaphthene	350	U

29839 00043 SAMPLE DATA SUMMARY

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1MW21012

Lab Name: COMPUCHEM ENV. CORP. Contract: (3-90)-REVS

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00043

Matrix: (soil/water) SOIL Lab Sample ID: 670463

Sample wt/vol: 30.1 (g/mL) G Lab File ID: GH070463A08.D

Level: (low/med) LOW Date Received: 12/17/94

% Moisture: 7 decanted: (Y/N) N Date Extracted: 12/28/94

Concentrated Extract Volume: 500 (uL) Date Analyzed: 01/23/95

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.3

DRAFT

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	860	U
100-02-7	4-Nitrophenol	860	U
132-64-9	Dibenzofuran	350	U
121-14-2	2,4-Dinitrotoluene	350	U
84-66-2	Diethylphthalate	350	U
7005-72-3	4-Chlorophenyl-phenylether	350	U
86-73-7	Fluorene	350	U
100-01-6	4-Nitroaniline	860	U
534-52-1	4,6-Dinitro-2-methylphenol	860	U
86-30-6	N-nitrosodiphenylamine (1)	350	U
101-55-3	4-Bromophenyl-phenylether	350	U
118-74-1	Hexachlorobenzene	350	U
87-86-5	Pentachlorophenol	860	U
85-01-8	Phenanthrene	350	U
120-12-7	Anthracene	350	U
86-74-8	Carbazole	350	U
84-74-2	Di-n-butylphthalate	68	JB
206-44-0	Fluoranthene	350	U
129-00-0	Pyrene	350	U
85-68-7	Butylbenzylphthalate	350	U
91-94-1	3,3'-Dichlorobenzidine	350	U
56-55-3	Benzo(a)anthracene	350	U
218-01-9	Chrysene	350	U
117-81-7	bis(2-Ethylhexyl)phthalate	350	U
117-84-0	Di-n-octylphthalate	350	U
205-99-2	Benzo(b)fluoranthene	350	U
207-08-9	Benzo(k)fluoranthene	350	U
50-32-8	Benzo(a)pyrene	350	U
193-39-5	Indeno(1,2,3-cd)pyrene	350	U
53-70-3	Dibenzo(a,h)anthracene	350	U
191-24-2	Benzo(g,h,i)perylene	350	U
90-12-0	1-Methylnaphthalene	350	U

(1) - Cannot be separated from Diphenylamine

29839 00043 SAMPLE DATA SUMMARY

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

1MW21012

Lab Name: COMPUCHEM_ENV._CORP._____ Contract: SW-846____

Lab Code: COMPU_ Case No.: 50063_ SAS No.: _____ SDG No.: 983913

Matrix (soil/water): SOIL_ Lab Sample ID: 670477

Level (low/med): LOW__ Date Received: 12/17/94

% Solids: _92.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

DRAFT

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	0.20	U	N	P
7440-38-2	Arsenic	3.8			P
7440-39-3	Barium	10.3	B		P
7440-41-7	Beryllium	0.12	B		P
7440-43-9	Cadmium	0.05	U		P
7440-47-3	Chromium	5.2		*	P
7440-50-8	Copper	4.3			P
7439-92-1	Lead	3.8			P
7440-02-0	Nickel	4.8			P
7782-49-2	Selenium	0.65			P
7440-22-4	Silver	0.06	U	N	P
7440-28-0	Thallium	0.57	U		P
7440-66-6	Zinc	15.5			P

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

_____

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

1MW22022

Lab Name: COMPUCHEM ENV. CORP. Contract: 500639

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00011

Matrix: (soil/water) SOIL Lab Sample ID: 670467

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH070467A52.D

Level: (low/med) LOW Date Received: 12/17/94

% Moisture: not dec. 2 Date Analyzed: 12/28/94

GC Column:DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	5	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	22	B
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	20	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	15	U
108-10-1	4-Methyl-2-Pentanone	15	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	15	U
1330-20-7	Xylene (total)	10	U
108-05-4	Vinyl Acetate		

DRAFT

FORM I VOA

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

1MW22022

Lab Name: COMPUCHEM ENV. CORP. Contract: 500639

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00011

Matrix: (soil/water) SOIL Lab Sample ID: 670467

Sample wt/vol: 5.0 (g/mL) G Lab File ID: GH070467A52.D

Level: (low/med) LOW Date Received: 12/17/94

% Moisture: not dec. 2 Date Analyzed: 12/28/94

GC Column:DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U

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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1MW22022

Lab Name: COMPUCHEM ENV. CORP. Contract: (3-90)-REVS

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00043

Matrix: (soil/water) SOIL Lab Sample ID: 670462

Sample wt/vol: 30.1 (g/mL) G Lab File ID: GH070462A08.D

Level: (low/med) LOW Date Received: 12/17/94

% Moisture: 2 decanted: (Y/N) N Date Extracted: 12/28/94

Concentrated Extract Volume: 500(uL) Date Analyzed: 01/23/95

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.3

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	340	U
111-44-4	bis(2-Chloroethyl)ether	340	U
95-57-8	2-Chlorophenol	340	U
541-73-1	1,3-Dichlorobenzene	340	U
106-46-7	1,4-Dichlorobenzene	340	U
95-50-1	1,2-Dichlorobenzene	340	U
95-48-7	2-Methylphenol	340	U
108-60-1	2,2'-oxybis(1-Chloropropane)	340	U
106-44-5	4-Methylphenol	340	U
621-64-7	N-Nitroso-di-n-propylamine	340	U
67-72-1	Hexachloroethane	340	U
98-95-3	Nitrobenzene	340	U
78-59-1	Isophorone	340	U
88-75-5	2-Nitrophenol	340	U
105-67-9	2,4-Dimethylphenol	340	U
111-91-1	bis(2-Chloroethoxy)methane	340	U
120-83-2	2,4-Dichlorophenol	340	U
120-82-1	1,2,4-Trichlorobenzene	340	U
91-20-3	Naphthalene	340	U
106-47-8	4-Chloroaniline	340	U
87-68-3	Hexachlorobutadiene	340	U
59-50-7	4-Chloro-3-methylphenol	340	U
91-57-6	2-Methylnaphthalene	340	U
77-47-4	Hexachlorocyclopentadiene	340	U
88-06-2	2,4,6-Trichlorophenol	340	U
95-95-4	2,4,5-Trichlorophenol	810	U
91-58-7	2-Chloronaphthalene	340	U
88-74-4	2-Nitroaniline	810	U
131-11-3	Dimethylphthalate	340	U
208-96-8	Acenaphthylene	340	U
606-20-2	2,6-Dinitrotoluene	340	U
99-09-2	3-Nitroaniline	810	U
83-32-9	Acenaphthene	340	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1MW22022

Lab Name: COMPUCHEM ENV. CORP. Contract: (3-90)-REVS

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00043

Matrix: (soil/water) SOIL Lab Sample ID: 670462

Sample wt/vol: 30.1 (g/mL) G Lab File ID: GH070462A08.D

Level: (low/med) LOW Date Received: 12/17/94

% Moisture: 2 decanted: (Y/N) N Date Extracted: 12/28/94

Concentrated Extract Volume: 500 (uL) Date Analyzed: 01/23/95

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.3

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CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	810	U
100-02-7	4-Nitrophenol	810	U
132-64-9	Dibenzofuran	340	U
121-14-2	2,4-Dinitrotoluene	340	U
84-66-2	Diethylphthalate	340	U
7005-72-3	4-Chlorophenyl-phenylether	340	U
86-73-7	Fluorene	340	U
100-01-6	4-Nitroaniline	810	U
534-52-1	4,6-Dinitro-2-methylphenol	810	U
86-30-6	N-nitrosodiphenylamine (1)	340	U
101-55-3	4-Bromophenyl-phenylether	340	U
118-74-1	Hexachlorobenzene	340	U
87-86-5	Pentachlorophenol	810	U
85-01-8	Phenanthrene	340	U
120-12-7	Anthracene	340	U
86-74-8	Carbazole	340	U
84-74-2	Di-n-butylphthalate	35	JB
206-44-0	Fluoranthene	340	U
129-00-0	Pyrene	340	U
85-68-7	Butylbenzylphthalate	340	U
91-94-1	3,3'-Dichlorobenzidine	340	U
56-55-3	Benzo(a)anthracene	340	U
218-01-9	Chrysene	340	U
117-81-7	bis(2-Ethylhexyl)phthalate	340	U
117-84-0	Di-n-octylphthalate	340	U
205-99-2	Benzo(b)fluoranthene	340	U
207-08-9	Benzo(k)fluoranthene	340	U
50-32-8	Benzo(a)pyrene	340	U
193-39-5	Indeno(1,2,3-cd)pyrene	340	U
53-70-3	Dibenzo(a,h)anthracene	340	U
191-24-2	Benzo(g,h,i)perylene	340	U
90-12-0	1-Methylnaphthalene	340	U

(1) - Cannot be separated from Diphenylamine

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

1MW22022

Lab Name: COMPUCHEM_ENV._CORP._____ Contract: SW-846____

Lab Code: COMPU_ Case No.: 50063_ SAS No.: _____ SDG No.: 983913

Matrix (soil/water): SOIL_ Lab Sample ID: 670472

Level (low/med): LOW__ Date Received: 12/17/94

% Solids: _97.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	0.19	U	N	P
7440-38-2	Arsenic	13.9			P
7440-39-3	Barium	11.4	B		P
7440-41-7	Beryllium	0.06	B		P
7440-43-9	Cadmium	0.05	U		P
7440-47-3	Chromium	3.4		*	P
7440-50-8	Copper	5.2			P
7439-92-1	Lead	2.3			P
7440-02-0	Nickel	4.8			P
7782-49-2	Selenium	0.73			P
7440-22-4	Silver	0.06	U	N	P
7440-28-0	Thallium	0.55	U		P
7440-66-6	Zinc	8.5			P

DRAFT

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW___ Clarity After: _____ Artifacts: _____

Comments:

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1D

HALOGENATED VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

BC1MW1GW5

Lab Name: COMPUCHEM, RTP Contract:

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00003

Matrix: (soil/water) WATER Lab Sample ID: 671281

Sample wt/vol: 5.0 (g/ml) ML Date Received: 12/20/94

% Moisture: decanted: (Y/N) Date Analyzed: 12/30/94

Dilution Factor: 1 pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	0.50	U
75-01-4	VinylChloride	0.55	U
74-83-9	Bromomethane	0.45	U
75-00-3	Chloroethane	0.50	U
75-35-4	1,1-Dichloroethene	0.35	U
75-09-2	Methylene Chloride	1.2	PB
156-60-5	t-1,2-Dichloroethene	0.30	U
75-34-3	1,1-Dichloroethane	0.35	U
67-66-3	Chloroform	0.35	U
74-97-5	Bromochloromethane	0.25	U
71-55-6	1,1,1-Trichloroethane	0.35	U
56-23-5	Carbon Tetrachloride	0.35	U
107-06-2	1,2-Dichloroethane	0.25	U
79-01-6	Trichloroethene	0.30	U
78-87-5	1,2-Dichloropropane	0.30	U
75-27-4	Bromodichloromethane	0.40	U
74-95-3	Dibromomethane	0.40	U
110-75-8	2-CEVE	0.40	U
10061-01-5	c-1,3-Dichloropropene	0.30	U
10061-02-6	t-1,3-Dichloropropene	0.25	U
79-00-5	1,1,2-Trichloroethane	0.25	U
127-18-4	Tetrachloroethene	0.26	JB
124-48-1	Dibromochloromethane	0.30	U
106-93-4	1,2-Dibromoethane	0.35	U
108-90-7	Chlorobenzene	0.35	U
630-20-6	1,1,1,2-Tetrachloroethane	0.35	U
75-25-2	Bromoform	0.50	U
79-34-5	1,1,2,2-TCA	0.40	U
96-18-4	1,2,3-Trichloropropane	0.35	U
108-86-1	Bromobenzene	0.85	U
95-49-8	2-Chlorotoluene	0.25	U
106-43-4	4-Chlorotoluene	0.35	U
541-73-1	1,3-Dichlorobenzene	0.20	U
106-46-7	1,4-Dichlorobenzene	0.20	U
95-50-1	1,2-Dichlorobenzene	0.30	U

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1D

AROMATIC VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

BC1MW1GW5

Lab Name: COMPUCHEM, RTP Contract:

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00003

Matrix: (soil/water) WATER Lab Sample ID: 671281

Sample wt/vol: 5.0 (g/ml) ML Date Received: 12/20/94

% Moisture: decanted: (Y/N) Date Analyzed: 12/30/94

Dilution Factor: 1 pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Methyl-t-butyl ether	5.0	U
71-43-2	Benzene	0.35	U
108-88-3	Toluene	0.25	U
108-90-7	Chlorobenzene	0.25	U
100-41-4	Ethylbenzene	0.20	U
99-99-9	1,3/1,4-Dimethylbenzene	0.50	U
95-47-6	1,2-Dimethylbenzene	0.20	U
100-42-5	Styrene	0.25	U
541-73-1	1,3-Dichlorobenzene	0.20	U
106-46-7	1,4-Dichlorobenzene	0.23	Z
95-50-1	1,2-Dichlorobenzene	0.15	U

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1LCB

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BC1MW1GW5

Lab Name: COMPUCHEM ENV. CORP. Contract: (10-92)REVS

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00005

Lab Sample ID: 671283 Date Received: 12/20/94

Lab File ID: GH071283A07.D Date Extracted:12/21/94

Sample Volume: 1000 (mL) Date Analyzed: 12/30/94

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1.0(uL) pH:____

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
120-82-1	1,2,4-Trichlorobenzene	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorophenol	20	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	20	U
131-11-3	Dimethylphthalate	5	U
208-96-8	Acenaphthylene	5	U
606-20-2	2,6-Dinitrotoluene	5	U
99-09-2	3-Nitroaniline	20	U
83-32-9	Acenaphthene	5	U

DRAFT

LLCC

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BC1MW1GW5

Lab Name: COMPUCHEM ENV. CORP. Contract: (10-92)REVS

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00005

Lab Sample ID: 671283 Date Received: 12/20/94

Lab File ID: GH071283A07.D Date Extracted:12/21/94

Sample Volume: 1000 (mL) Date Analyzed: 12/30/94

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1.0(uL) pH:____

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
51-28-5	2,4-Dinitrophenol	20	U
100-02-7	4-Nitrophenol	20	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U
84-66-2	Diethylphthalate	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
86-73-7	Fluorene	5	U
100-01-6	4-Nitroaniline	20	U
534-52-1	4,6-Dinitro-2-methylphenol	20	U
86-30-6	N-Nitrosodiphenylamine (1)	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
87-86-5	Pentachlorophenol	20	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
84-74-2	Di-n-butylphthalate	0.5	J
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo(a)anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo(b)fluoranthene	5	U
207-08-9	Benzo(k)fluoranthene	5	U
50-32-8	Benzo(a)pyrene	5	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	U
53-70-3	Dibenzo(a,h)anthracene	5	U
191-24-2	Benzo(g,h,i)perylene	5	U

(1) - Cannot be separated from Diphenylamine

DRAFT

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BC1MW1GW5

Lab Name: COMPUCHEM_ENV._CORP._____ Contract: SW-846____

Lab Code: COMPU_ Case No.: 50063_ SAS No.: _____ SDG No.: 298397

Matrix (soil/water): WATER Lab Sample ID: 671284

Level (low/med): LOW__ Date Received: 12/20/94

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	90.8	B		P
7440-36-0	Antimony	1.9	U		P
7440-38-2	Arsenic	2.2	U		F
7440-39-3	Barium	84.0	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	112000			P
7440-47-3	Chromium	2.2	U		P
7440-48-4	Cobalt	0.50	U		P
7440-50-8	Copper	3.7	B		P
7439-89-6	Iron	27.2	U		P
7439-92-1	Lead	2.3	B		P
7439-95-4	Magnesium	17100			P
7439-96-5	Manganese	89.0			P
7439-97-6	Mercury	0.20	U	N	CV
7440-02-0	Nickel	1.5	U		P
7440-09-7	Potassium	1880	B		P
7782-49-2	Selenium	4.4	U		P
7440-22-4	Silver	4.5	U		P
7440-23-5	Sodium	27100			P
7440-28-0	Thallium	2.7	U	W	F
7440-62-2	Vanadium	0.54	B		P
7440-66-6	Zinc	0.69	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN ILM03.0

1D

HALOGENATED VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

BC1MW3GW5

Lab Name: COMPUCHEM, RTP Contract:

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00003

Matrix: (soil/water) WATER Lab Sample ID: 671271

Sample wt/vol: 5.0 (g/ml) ML Date Received: 12/20/94

% Moisture: decanted: (Y/N) Date Analyzed: 12/30/94

Dilution Factor: 1 pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	0.50	U
75-01-4	VinylChloride	0.55	U
74-83-9	Bromomethane	0.45	U
75-00-3	Chloroethane	0.50	U
75-35-4	1,1-Dichloroethene	0.35	U
75-09-2	Methylene Chloride	1.4	PB
156-60-5	t-1,2-Dichloroethene	0.30	U
75-34-3	1,1-Dichloroethane	0.35	U
67-66-3	Chloroform	0.0040	JPB
74-97-5	Bromochloromethane	0.25	U
71-55-6	1,1,1-Trichloroethane	0.35	U
56-23-5	Carbon Tetrachloride	0.35	U
107-06-2	1,2-Dichloroethane	0.25	U
79-01-6	Trichloroethene	0.30	U
78-87-5	1,2-Dichloropropane	0.30	U
75-27-4	Bromodichloromethane	0.40	U
74-95-3	Dibromomethane	0.40	U
110-75-8	2-CEVE	0.40	U
10061-01-5	c-1,3-Dichloropropene	0.30	U
10061-02-6	t-1,3-Dichloropropene	0.25	U
79-00-5	1,1,2-Trichloroethane	0.25	U
127-18-4	Tetrachloroethene	0.30	U
124-48-1	Dibromochloromethane	0.30	U
106-93-4	1,2-Dibromoethane	0.35	U
108-90-7	Chlorobenzene	0.35	U
630-20-6	1,1,1,2-Tetrachloroethane	0.35	U
75-25-2	Bromoform	0.50	U
79-34-5	1,1,2,2-TCA	0.40	U
96-18-4	1,2,3-Trichloropropane	0.35	U
108-86-1	Bromobenzene	0.85	U
95-49-8	2-Chlorotoluene	0.25	U
106-43-4	4-Chlorotoluene	0.35	U
541-73-1	1,3-Dichlorobenzene	0.20	U
106-46-7	1,4-Dichlorobenzene	0.20	U
95-50-1	1,2-Dichlorobenzene	0.30	U

DRAFT

1D

AROMATIC VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

BC1MW3GW5

Lab Name: COMPUCHEM, RTP Contract:

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00003

Matrix: (soil/water) WATER Lab Sample ID: 671271

Sample wt/vol: 5.0 (g/ml) ML Date Received: 12/20/94

% Moisture: decanted: (Y/N) Date Analyzed: 12/30/94

Dilution Factor: 1 pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Methyl-t-butyl ether	5.0	U
71-43-2	Benzene	0.25	J
108-88-3	Toluene	0.21	J
108-90-7	Chlorobenzene	0.25	U
100-41-4	Ethylbenzene	0.20	U
106-42-3	1,4-Dimethylbenzene	0.13	J
108-38-3	1,3-Dimethylbenzene	0.13	J
95-47-6	1,2-Dimethylbenzene	0.20	U
100-42-5	Styrene	0.25	U
541-73-1	1,3-Dichlorobenzene	0.20	U
106-46-7	1,4-Dichlorobenzene	0.35	Z
95-50-1	1,2-Dichlorobenzene	0.15	U

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FORM I 8020

29839 00036 SAMPLE DATA SUMMARY

LCS

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BC1MW3GW5

Lab Name: COMPUCHEM ENV. CORP. Contract: (10-92)REVS

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00005

Lab Sample ID: 671272 Date Received: 12/20/94

Lab File ID: GH071272A07.D Date Extracted:12/21/94

Sample Volume: 1000 (mL) Date Analyzed: 12/30/94

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1.0(uL) pH:____

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
120-82-1	1,2,4-Trichlorobenzene	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	20	U
95-95-4	2,4,5-Trichlorophenol	5	U
91-58-7	2-Chloronaphthalene	20	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
208-96-8	Acenaphthylene	5	U
606-20-2	2,6-Dinitrotoluene	20	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene		

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LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BC1MW3GW5

Lab Name: COMPUCHEM ENV. CORP. Contract: (10-92)REVS

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00005

Lab Sample ID: 671272 Date Received: 12/20/94

Lab File ID: GH071272A07.D Date Extracted:12/21/94

Sample Volume: 1000 (mL) Date Analyzed: 12/30/94

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1.0(uL) pH:____

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
51-28-5	2,4-Dinitrophenol	20	U
100-02-7	4-Nitrophenol	20	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U
84-66-2	Diethylphthalate	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
86-73-7	Fluorene	5	U
100-01-6	4-Nitroaniline	20	U
534-52-1	4,6-Dinitro-2-methylphenol	20	U
86-30-6	N-Nitrosodiphenylamine (1)	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
87-86-5	Pentachlorophenol	20	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo(a)anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo(b)fluoranthene	5	U
207-08-9	Benzo(k)fluoranthene	5	U
50-32-8	Benzo(a)pyrene	5	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	U
53-70-3	Dibenzo(a,h)anthracene	5	U
191-24-2	Benzo(g,h,i)perylene	5	U

(1) - Cannot be separated from Diphenylamine

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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BC1MW3GW5

Lab Name: COMPUCHEM_ENV._CORP._____ Contract: SW-846____

Lab Code: COMPU_ Case No.: 50063_ SAS No.: _____ SDG No.: 298397

Matrix (soil/water): WATER Lab Sample ID: 671273

Level (low/med): LOW__ Date Received: 12/20/94

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	95.1	B		P
7440-36-0	Antimony	1.9	U		P
7440-38-2	Arsenic	2.2	U		F
7440-39-3	Barium	50.2	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	72400			P
7440-47-3	Chromium	2.2	U		P
7440-48-4	Cobalt	0.50	U		P
7440-50-8	Copper	4.5	B		P
7439-89-6	Iron	1130			P
7439-92-1	Lead	2.8	B		P
7439-95-4	Magnesium	16300			P
7439-96-5	Manganese	114			P
7439-97-6	Mercury	0.20	U	N	CV
7440-02-0	Nickel	1.5	U		P
7440-09-7	Potassium	1650	B		P
7782-49-2	Selenium	4.4	U		P
7440-22-4	Silver	4.5	U		P
7440-23-5	Sodium	6040			P
7440-28-0	Thallium	2.7	U	W	F
7440-62-2	Vanadium	0.50	U		P
7440-66-6	Zinc	2.3	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

_____

_____

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_____

1D

HALOGENATED VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

BCMW16GW5

Lab Name: COMPUCHEM, RTP Contract:

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00003

Matrix: (soil/water) WATER Lab Sample ID: 671277

Sample wt/vol: 5.0 (g/ml) ML Date Received: 12/20/94

% Moisture: decanted: (Y/N) Date Analyzed: 12/30/94

Dilution Factor: 1 pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	0.50	U
75-01-4	VinylChloride	0.55	U
74-83-9	Bromomethane	0.45	U
75-00-3	Chloroethane	0.50	U
75-35-4	1,1-Dichloroethene	0.35	U
75-09-2	Methylene Chloride	0.012	JP
156-60-5	t-1,2-Dichloroethene	0.30	U
75-34-3	1,1-Dichloroethane	0.35	U
67-66-3	Chloroform	0.35	U
74-97-5	Bromochloromethane	0.25	U
71-55-6	1,1,1-Trichloroethane	0.25	JP
56-23-5	Carbon Tetrachloride	0.35	U
107-06-2	1,2-Dichloroethane	0.25	U
79-01-6	Trichloroethene	3.2	
78-87-5	1,2-Dichloropropane	0.30	U
75-27-4	Bromodichloromethane	0.40	U
74-95-3	Dibromomethane	0.40	U
110-75-8	2-CEVE	0.40	U
10061-01-5	c-1,3-Dichloropropene	0.30	U
10061-02-6	t-1,3-Dichloropropene	0.25	U
79-00-5	1,1,2-Trichloroethane	0.25	U
127-18-4	Tetrachloroethene	4.6	
124-48-1	Dibromochloromethane	0.30	U
106-93-4	1,2-Dibromoethane	0.35	U
108-90-7	Chlorobenzene	0.35	U
630-20-6	1,1,1,2-Tetrachloroethane	0.35	U
75-25-2	Bromoform	0.50	U
79-34-5	1,1,2,2-TCA	0.40	U
96-18-4	1,2,3-Trichloropropane	0.35	U
108-86-1	Bromobenzene	0.85	U
95-49-8	2-Chlorotoluene	0.25	U
106-43-4	4-Chlorotoluene	0.35	U
541-73-1	1,3-Dichlorobenzene	0.20	U
106-46-7	1,4-Dichlorobenzene	0.20	U
95-50-1	1,2-Dichlorobenzene	0.30	U

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1D

SAMPLE NO.

AROMATIC VOLATILE ORGANICS ANALYSIS DATA SHEET

BCMW16GW5

Lab Name: COMPUCHEM.RTP Contract:

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00003

Matrix: (soil/water) WATER Lab Sample ID: 671277

Sample wt/vol: 5.0 (g/ml) ML Date Received: 12/20/94

% Moisture: decanted: (Y/N) Date Analyzed: 12/30/94

Dilution Factor: 1 pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Methyl-t-butyl ether	5.0	U
71-43-2	Benzene	0.35	U
108-88-3	Toluene	0.25	U
108-90-7	Chlorobenzene	0.25	U
100-41-4	Ethylbenzene	0.20	U
99-99-9	1,3/1,4-Dimethylbenzene	0.50	U
95-47-6	1,2-Dimethylbenzene	0.20	U
100-42-5	Styrene	0.25	U
541-73-1	1,3-Dichlorobenzene	0.20	U
106-46-7	1,4-Dichlorobenzene	0.15	U
95-50-1	1,2-Dichlorobenzene	0.15	U

FORM I 8020

EPA SAMPLE NO.

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BCMW16GW5

Lab Name: COMPUCHEM ENV. CORP. Contract: (10-92)REVS

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00005

Lab Sample ID: 671278 Date Received: 12/20/94

Lab File ID: G2J71278A07.D Date Extracted:12/21/94

Sample Volume: 1000 (mL) Date Analyzed: 01/13/95

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1.0(uL) pH:____

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
108-95-2	Phenol	5	U
111-44-4	bis(2-Chloroethyl)ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethylphenol	5	U
111-91-1	bis(2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
120-82-1	1,2,4-Trichlorobenzene	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
59-50-7	4-Chloro-3-methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	20	U
95-95-4	2,4,5-Trichlorophenol	5	U
91-58-7	2-Chloronaphthalene	20	U
88-74-4	2-Nitroaniline	5	U
131-11-3	Dimethylphthalate	5	U
208-96-8	Acenaphthylene	5	U
606-20-2	2,6-Dinitrotoluene	20	U
99-09-2	3-Nitroaniline	5	U
83-32-9	Acenaphthene		

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LLCC

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: BCMW16GW5

Lab Name: COMPUCHEM ENV. CORP. Contract: (10-92)REVS

Lab Code: COMPU Case No.: 29839 SAS No.: SDG No.: 00005

Lab Sample ID: 671278 Date Received: 12/20/94

Lab File ID: G2J71278A07.D Date Extracted: 12/21/94

Sample Volume: 1000 (mL) Date Analyzed: 01/13/95

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1.0(uL) pH:____

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
51-28-5	2,4-Dinitrophenol	20	U
100-02-7	4-Nitrophenol	20	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U
84-66-2	Diethylphthalate	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
86-73-7	Fluorene	5	U
100-01-6	4-Nitroaniline	20	U
534-52-1	4,6-Dinitro-2-methylphenol	20	U
86-30-6	N-Nitrosodiphenylamine (1)	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
87-86-5	Pentachlorophenol	20	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo(a)anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo(b)fluoranthene	5	U
207-08-9	Benzo(k)fluoranthene	5	U
50-32-8	Benzo(a)pyrene	5	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	U
53-70-3	Dibenzo(a,h)anthracene	5	U
191-24-2	Benzo(g,h,i)perylene	5	U

(1) - Cannot be separated from Diphenylamine

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U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BCMW16GW5

Lab Name: COMPUCHEM_ENV._CORP. Contract: SW-846

Lab Code: COMPU Case No.: 50063 SAS No.: SDG No.: 298397

Matrix (soil/water): WATER Lab Sample ID: 671279

Level (low/med): LOW Date Received: 12/20/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	91.0	B		P
7440-36-0	Antimony	1.9	U		P
7440-38-2	Arsenic	2.2	U		F
7440-39-3	Barium	39.3	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	93400			P
7440-47-3	Chromium	2.2	U		P
7440-48-4	Cobalt	0.50	U		P
7440-50-8	Copper	3.7	B		P
7439-89-6	Iron	27.2	U		P
7439-92-1	Lead	1.6	U		P
7439-95-4	Magnesium	18600			P
7439-96-5	Manganese	4.8	B		P
7439-97-6	Mercury	0.20	U	N	CV
7440-02-0	Nickel	1.5	U		P
7440-09-7	Potassium	1650	B		P
7782-49-2	Selenium	4.4	U		P
7440-22-4	Silver	4.5	U		P
7440-23-5	Sodium	21600			P
7440-28-0	Thallium	2.7	U	W	F
7440-62-2	Vanadium	0.50	U		P
7440-66-6	Zinc	3.5	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN ILM03.0

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LABORATORY TESTS RESULTS

01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: 1GW14 (106573) → B6ITMW3 40'-42'
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 14:55
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0005
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	1.2	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	5.2	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	5.6	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethylbenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: 1GW14 (106573)
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 14:55
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0005
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
1,2,4-Trimethylbenzene	ND	1.0	ug/l			
s-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
n-butylbenzene	ND	1.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
Hexachlorobutadiene	ND	1.0	ug/l			
Naphthalene	ND	1.0	ug/l			
1,2,3-Tricholorbenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	86-115 %		
1,2-Dichloethane-d4	98	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

12649 Richfield Court
Livonia, MI 48150
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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: BCITMW3 (106570) 25'-32'
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 15:55
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0002
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics in Water		*1		USEPA 8260	12/29/94	RDC
Dichlorodifluoromethane	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Trichlorofluoromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
Methylene chloride	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
2,2-Dichloropropane	ND	1.0	ug/l			
cis-1,2-Dichloroethene	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Bromochloromethane	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
1,1-Dichloropropene	ND	1.0	ug/l			
Benzene	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Dibromomethane	ND	1.0	ug/l			
Toluene	2.6	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Tetrachloroethene	2.4	1.0	ug/l			
1,3-Dichloropropane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,2-Dibromoethane	ND	1.0	ug/l			
1-Chlorohexane	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
1,1,1,2-Tetrachloroethane	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
Styrene	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Isopropylbenzene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Bromobenzene	ND	1.0	ug/l			
1,2,3-Trichloropropane	ND	1.0	ug/l			
N-propylbenzene	ND	1.0	ug/l			
2-Chlorotoluene	ND	1.0	ug/l			
1,3,5-Trimethylbenzene	ND	1.0	ug/l			
4-Chlorotoluene	ND	1.0	ug/l			

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LABORATORY TESTS RESULTS
01/10/95

JOB NUMBER: 114420 CUSTOMER: Earth Tech ATTN: Carol Smith

CLIENT I.D.....: Sample ID: 8CITMW3 (106570)
DATE SAMPLED.....: 12/15/94
TIME SAMPLED.....: 15:55
WORK DESCRIPTION...: Project ID: 110FG, MIANG

LABORATORY I.D...: 114420-0002
DATE RECEIVED....: 12/27/94
TIME RECEIVED....: 15:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
t-butylbenzene	ND	1.0	ug/l			
,2,4-Trimethylbenzene	ND	1.0	ug/l			
-butylbenzene	ND	1.0	ug/l			
p-Isopropyltoluene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
,4-Dichlorobenzene	ND	1.0	ug/l			
-butylbenzene	ND	1.0	ug/l			
,2-Dichlorobenzene	ND	1.0	ug/l			
1,2-Dibromo-3-chloropropane	ND	1.0	ug/l			
1,2,4-Trichlorobenzene	ND	1.0	ug/l			
exachlorobutadiene	ND	1.0	ug/l			
aphthalene	ND	1.0	ug/l			
1,2,3-Tricholorbenzene	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
romofluorobenzene	102	0	%	86-115 %		
,2-Dichloethane-d4	100	0	%	70-121 %		
Toluene-d8	100	0	%	88-110 %		
Date Analyzed:	12/29/94	0	Month/Day/Year			

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: BC1TMW3

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 15:55
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106565

DRAFT

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy)-Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl)-Ether	<5.0	5.0
Bis (2-ethylhexyl)-Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl-Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: BC1TMW3

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 15:55
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106565

Parameter	Result ug/l	Reporting Limit ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
Proj: 110th Fighter Group
MICH A.N.G.
Subm: 15-December-1994 Sampling
Sample: 1GW14

Submittal Number 32429- 9
Date Sampled: 12/15/94 Time: 14:55
Date Received: 12/20/94 Time: 10:30
Analysis Date: 01/06/95
Lab Sample No: 106562

BCITMW3
40-42'

DRAFT

Parameter	Result ug/l	Reporting Limit ug/l
Acenaphthene	<5.0	5.0
Acenaphthylene	<5.0	5.0
Anthracene	<5.0	5.0
Benzo (a) Anthracene	<5.0	5.0
Benzo (a) Pyrene	<5.0	5.0
Benzo (b&k) Fluoranthene	<5.0	5.0
Benzo (g,h,i,) Perylene	<5.0	5.0
Bis (2-Chloroethoxy)-Methane	<5.0	5.0
Bis (2-Chloroethyl) Ether	<5.0	5.0
Bis (2-Chloroisopropyl)-Ether	<5.0	5.0
Bis (2-ethylhexyl)-Phthalate	<5.0	5.0
4-Bromophenyl Phenylether	<5.0	5.0
Butyl Benzyl Phthalate	<5.0	5.0
4-Chloro-3-Methylphenol	<5.0	5.0
4-Chloroaniline	<20	20
2-Chloronaphthalene	<5.0	5.0
2-Chlorophenol	<5.0	5.0
4-Chlorophenylphenyl-Ether	<5.0	5.0
Chrysene	<5.0	5.0
Di-n-Butylphthalate	<5.0	5.0
Di-n-Octylphthalate	<5.0	5.0
Dibenzo (a,h) Anthracene	<5.0	5.0
Dibenzofuran	<5.0	5.0
3,3'-Dichlorobenzidine	<20	20
2,4-Dichlorophenol	<5.0	5.0
Diethylphthalate	<5.0	5.0
Dimethylphthalate	<5.0	5.0
2,4-Dimethylphenol	<5.0	5.0
4,6-Dinitro-2-Methylphenol	<20	20
2,4-Dinitrophenol	<20	20

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PROJECT SPECIFIC FRACTION
USEPA 8270

EARTH TECH - OAK RIDGE
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MICH A.N.G.
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Date Sampled: 12/15/94 Time: 14:55
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Analysis Date: 01/06/95
Lab Sample No: 106562

BCITMW3
40-42'

Parameter	Result ug/l	Reporting Limit ug/l
2,4-Dinitrotoluene	<5.0	5.0
2,6-Dinitrotoluene	<5.0	5.0
Fluoranthene	<5.0	5.0
Fluorene	<5.0	5.0
Hexachlorobenzene	<5.0	5.0
Hexachlorobutadiene	<5.0	5.0
Hexachlorocyclopentadiene	<5.0	5.0
Hexachloroethane	<5.0	5.0
Indeno (1,2,3-cd) Pyrene	<5.0	5.0
Isophorone	<5.0	5.0
2-Methylnaphthalene	<5.0	5.0
2-Methylphenol	<5.0	5.0
4-Methylphenol	<5.0	5.0
N-Nitrosodi-n-Propylamine	<5.0	5.0
N-Nitroso-di-Phenylamine	<5.0	5.0
Naphthalene	<5.0	5.0
2-Nitroaniline	<20	20
3-Nitroaniline	<20	20
4-Nitroaniline	<20	20
Nitrobenzene	<5.0	5.0
2-Nitrophenol	<5.0	5.0
4-Nitrophenol	<20	20
Pentachlorophenol	<20	20
Phenanthrene	<5.0	5.0
Phenol	<5.0	5.0
Pyrene	<5.0	5.0
1,2,4-Trichlorobenzene	<5.0	5.0
2,4,5-Trichlorophenol	<50	50
2,4,6-Trichlorophenol	<5.0	5.0
1-Methylnaphthalene	<5.0	5.0

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APPENDIX L: GUIDANCE DOCUMENTS FROM THE MDNR

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

June 5, 1995

TO: Environmental Response Division Staff

FROM: Alan J. Howard, Chief, Environmental Response Division

SUBJECT: **Interim Environmental Response Division Operational Memorandum #8, Revision 4:** Generic Residential Cleanup Criteria

THIS DRAFT, INTERIM OPERATIONAL MEMORANDUM HAS BEEN PREPARED TO FACILITATE IMPLEMENTATION OF THE 1995 AMENDMENTS TO PART 201 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451 (FORMERLY THE MICHIGAN ENVIRONMENTAL RESPONSE ACT). THIS OPERATIONAL MEMORANDUM WILL TAKE EFFECT *ONLY* WHEN HOUSE BILL 4596 IS SIGNED INTO LAW. INTERNAL REVIEW OF THIS MEMORANDUM IS ON-GOING, AND NO OUTSIDE REVIEW HAS BEEN COMPLETED. THE CONTENT OF THE MEMORANDUM, AND THE ATTACHED CRITERIA, ARE SUBJECT TO CHANGE AND SHOULD BE RELIED UPON ONLY AFTER CONFIRMATION WITH APPROPRIATE ERD STAFF.

Revision 4 of this Operational Memorandum reflects changes made as a result of two major legislative actions: (1) the incorporation of the Michigan Environmental Response Act (MERA), 1982 PA 307, as amended, (2) into the Natural Resources and Environmental Protection Code, 1994 PA 451; and the 1995 amendments to Part 201 contained in [House Bill 4596]. Enactment of the Natural Resources and Environmental Protection Act resulted in new section numbers for all of the former MERA, but did not make any substantive changes in the law. [House Bill 4596] substantially amends Part 201. Those amendments, particularly the changes in cleanup standards, are reflected in this revision of Operational Memorandum #8. Unless otherwise noted, Section references in this memorandum are to Part 201 of Act 451.

The attached table lists generic residential cleanup criteria which have been developed pursuant to Sections 20120A(1)(A) and (3), according to the updated algorithms presented in this memo. This table replaces the previously issued list of Type B criteria dated February 4, 1994. The label of "Type B" has been eliminated and the criteria are now referred to as generic residential criteria. The algorithms as presented in the administrative rules of the Michigan Environmental Response Act, 1982 Public Act 307, as amended, have been replaced by updated algorithms which represent current U.S. Environmental Protection Agency (EPA) guidance and a format consistent with the industrial/commercial equations and those used by the Underground Storage Tank Division (USTD).

The criteria were developed using currently available toxicological data, exposure data, and other data and are subject to change as new data become

available. These criteria are presented in two significant figures; reference doses and slope factors used to generate the criteria were also reported in two significant figures. Cleanup criteria from the attached table should be compared to analytical data presented in two significant figures, as well.

This list presents noncarcinogens and carcinogens together; carcinogens are presented in bold and italics. Chemicals beginning with numbers (such as 1,1,2-trichloroethane) are incorporated alphabetically within the list. Criteria on these lists should be considered draft; final cleanup criteria will be confirmed by Environmental Response Division (ERD) toxicologists and approved as part of a specific remedial action plan (RAP). Staff are reminded that generic residential RAPs must address all elements required by Part 201 and the administrative rules, including those for which specific criteria have not been developed. Additional guidance follows.

Note that in cases where generic residential criteria are less than target method detection limits (MDLs) or background, target MDLs or background levels become the cleanup goal. Generic residential criteria are not relevant in these cases.

The table presents values for the subrules that are most often expected to be the controlling factor in determining soil cleanup criteria. However, a generic residential RAP must include rationale that supports the conclusions drawn from the assessment of pertinent pathways (i.e., some discussion of each pertinent pathway must be included which assesses whether more restrictive criteria are required; See R 299.5711(1) and R 299.5711(6).

HEALTH-BASED AND AESTHETIC DRINKING WATER VALUES

The values in the first column of the table were developed using the residential groundwater algorithms presented later in this memo for carcinogens and noncarcinogens. The values in the second column of the table were established, where sufficient data are available, to protect against adverse aesthetic impacts of hazardous substances on groundwater.

The most restrictive of the values in the first two columns of the table is the cleanup criterion required to satisfy Section 20120A(4) of Part 201. However, where a State Drinking Water Standard has been established, that standard will override the health-based drinking water criteria, as indicated in Sec. 20120A(5) of Part 201. A more restrictive aesthetic criterion will take precedence over the State Drinking Water Standard. Note that Rule 299.5709, referenced in Section 20120A(5), requires that aquifer cleanup criteria take into account adverse aesthetic impacts resulting from one or a combination of hazardous substances. If adverse aesthetic impacts remain when health-based criteria have been achieved, further remedial measures may be required. Consult your Supervisor if you encounter such a case.

IMPACTS OF GROUNDWATER CONTAMINANTS ON SURFACE WATER

The third column in the table lists values based on calculations done by Surface Water Quality Division (SWQD) in accordance with Rule 323.1057 of Part 4 of Part 31 of the Natural Resources and Environmental Protection Act, 1994 PA 451 (formerly known as the Water Resources Commission Act, 1929, PA 245, as amended) or on the National Toxics Rule (NTR; Federal Register, December 22, 1992. Vol. 57(246):60848-60923). For use in ERD programs, the criterion which protects surface water has been termed the groundwater surface water interface (GSI) value. The final GSI value is the more restrictive of the Rule 57 value and the NTR value, where both are available (with the exception of arsenic whose GSI value is the Rule 57 value even though it is greater than the NTR value). Where only one of the two values is available, that number becomes the GSI value.

The GSI values are the criteria used to judge compliance with Rule 299.5713. GSI values are developed for surface water which is not used as a drinking water source and also for surface water which serves as a source of drinking water. GSI values presented in the list are for surface waters not protected as a drinking water source. If the surface water at a site serves as a drinking water source, contact an ERD toxicologist to obtain the correct GSI value. In cases where data are inadequate to calculate a GSI value, the party proposing the remedial action may generate the minimum data necessary to propose a value for Department review and approval.

Prior to passage of the 1995 amendments, a mixing zone was not allowed when assessing the impact of groundwater venting to a surface water. A mixing zone is now allowed for venting groundwater at those sites where an additional load to the receiving stream of site-specific contaminants is allowable and where a mixing zone is appropriate for the receiving stream. If a RAP allows for venting groundwater, the discharge must comply with requirements of Part 31 of Act 451 and the relevant rules promulgated under that Part.

Demonstration of compliance with surface water requirements may be made by assessing groundwater concentrations at the groundwater-surface water interface or through evaluation of mixing zone, whichever is appropriate for a particular site. Predictive modeling and direct monitoring are options to establish compliance with the GSI value at the groundwater-surface water interface. If the groundwater-surface water interface is the compliance point for a particular site, it is not necessary that the GSI value be achieved throughout the aquifer. However, a remedial action plan which proposes to meet the GSI value throughout the aquifer in lieu of monitoring at the interface or modeling will be acceptable.

Note that the sixth column on the table will show 20 times the GSI values. This value is shown for ease of reference in cases where soil is to be remediated to that level as a source control measure. Rule 299.5711 does not require that soil meet the "20 times GSI values", as long as the GSI value is not exceeded at the appropriate compliance point.

SOIL CRITERIA PROTECTIVE OF GROUNDWATER

The "20X" values in the table are provided for convenience and are not mandatory if leachate tests or other methods which better represent in situ conditions support the use of a higher value (refer to Operational Memo #12 for guidance on appropriate leachate methods). For certain chemicals which strongly adsorb to soil and are known not to leach at significant concentrations (i.e., PCBs, carcinogenic polynuclear aromatic hydrocarbons and some chlorinated pesticides), the direct contact value is accepted as the soil cleanup criterion to protect groundwater in addition to the protection against long-term, systemic direct contact hazards. However, there are certain situations (i.e., presence of solvents or collection of unfiltered groundwater samples) which could result in the presence of these types of materials in groundwater. These other conditions should be evaluated before a chemical is considered nonmobile in soil. Consult an ERD toxicologist if you think direct contact values for other contaminants would be protective of groundwater or if you have questions about conditions that could cause the transport of a nonmobile contaminant through soil.

SOIL DIRECT CONTACT CRITERIA

Direct contact criteria only consider long-term, systemic exposure from ingestion of and dermal contact with contaminated soil. Consequently, there

are other potential concerns that may need to be addressed (see discussion of issues not addressed by the direct contact criteria presented below).

Compliance with direct contact criteria are required throughout the affected media in the unlimited residential land use category, but exposure controls and land use restrictions may be employed to prevent exposures to more highly contaminated soils at depth under the limited residential land use category.

Average on-site soil concentrations, represented as a 95% upper confidence level (UCL) on the arithmetic mean, may be used to determine compliance with the soil direct contact value. On-site 95% UCLs should, however, reasonably represent the areas over which exposures are expected to occur. Typically, the exposure area for a residential property is approximately one-quarter acre in size. Refer to EPA guidance on how to appropriately calculate the 95% UCL (EPA, 1992a).

Issues Not Addressed by the Direct Contact Criteria

Inhalation: All RAPs must document that they are protective of the public health, safety and welfare and the environment. As a result, they must contain some discussion of potential inhalation risks, and whether inhalation (i.e. exposure through volatile or particulate contaminant emissions) is a pertinent pathway for human exposure at the site in question. The direct contact criteria do not address and are not applicable for the inhalation pathway because they do not incorporate potential inhalation effects, long-term or acute, of hazardous substances in soil.

Chemical characteristics which are pertinent to this discussion include vapor pressure and/or Henry's Law constant, the potential to cause cancer via the inhalation route, the potential to cause irritation of respiratory tissue and special characteristics which may make a contaminant an inhalation hazard (e.g., friable asbestos). The RAP should indicate whether any materials with these characteristics are present. If such materials are present, it may be necessary to conduct a risk assessment of the inhalation pathway to determine if lower cleanup criteria are required for protection of human health. Consult an ERD toxicologist for guidance. If no significant inhalation risk exists, criteria and/or exposure control measures which are protective for other routes of exposure will be deemed protective for the inhalation pathway and a narrative assessment for the inhalation pathway will be sufficient.

Dermal Toxicity: The direct contact soil equation does not address acute skin toxicity or skin sensitization. These concerns may have to be addressed before chemicals with skin toxicity or sensitization characteristics can be left in place at the direct contact value. Contact an ERD toxicologist for guidance.

Ecological Concerns: RAPs must also address ecological concerns. The RAP should include a description of the physical setting of the site, including any natural resources which could be affected by the release(s) addressed in the plan. In general, potential ecological impacts are defined as adverse impacts on a community or a population of organisms rather than on an individual who is the focus of a human health risk assessment. An ecological risk assessment will be required only if there is a "sensitive environmental resource" present at or near the site, or if there are other special circumstances such as concern for persistent or bioaccumulative hazardous substances, which may adversely effect the food chain, or a physical feature that would attract wildlife to the site (e.g., migratory waterfowl habitat).

Professional judgment must be used to determine whether it is likely that criteria more restrictive than those required to protect public health, or those required pursuant to other applicable regulations (e.g., groundwater/surface water interface criteria), are necessary to protect natural resources at or near the site. If ERD staff believe that there is a need for an ecological assessment, this should be reviewed with your supervisor and other technical experts as appropriate. Ecological risk assessments will be the exception rather than the rule.

TARGET METHOD DETECTION LIMITS

The table also includes the target method detection limits (MDLs) for each hazardous substance, where one has been determined. These target MDLs are taken from Operational Memorandum #6, revision 4 and are provided to allow for convenient comparison between generic residential criteria and target MDLs. Consult Operational Memorandum #6 for a full description of the use of target MDLs and proper methods for analysis.

The use of particular methods and detection limits listed in Operational Memorandum #6 are not mandatory. Other methods or detection limits may be approved as part of a site-specific RAP.

These target MDLs are applicable to environmental investigations and monitoring performed pursuant to Part 201 response activities. These detection limits may not be applicable to environmental monitoring activities performed pursuant to other Parts of Act 451 or environmental statutes. Facilities subject to regulation under other environmental statutes should consult with the appropriate DNR Division for further information regarding appropriate analytical detection limits.

GENERIC RESIDENTIAL ALGORITHMS

RESIDENTIAL GROUNDWATER ALGORITHMS:

CARCINOGENS:

$$C_{dw} = \frac{10^{-5} \times BW \times AT \times CF}{SF \times EF \times ED \times IR_{dw}}$$

where,

C_{dw} (risk-based drinking water concentration)	= in ug/l (ppb)
10^{-5} cancer risk	= acceptable risk
BW (body weight)	= 70 kg
AT (averaging time in days)	= 25,550 days (70 x 365)
CF (conversion factor)	= 1000 ug/mg
SF (cancer slope factor, mg/kg-d^{-1})	= chemical-specific
EF (exposure frequency)	= 350 d/yr
ED (exposure duration)	= 30 yr
IR_{dw} (drinking water ingestion rate)	= 2 liter/day

NONCARCINOGENS:

$$C_{dw} = \frac{HQ \times RfD \times BW \times AT \times RSC \times CF}{EF \times ED \times IR_{dw}}$$

where,		
	C_{dw} (risk-based drinking water concentration)	= in ug/l (ppb)
	HQ (hazard quotient)	= 1
	RfD (oral reference dose, mg/kg/d)	= chemical-specific
	BW (body weight)	= 70 kg
	AT (averaging time)	= 10,950 days (30 x 365)
	RSC (relative source contribution)	= 0.2
	CF (conversion factor)	= 1000 ug/mg
	EF (exposure frequency)	= 350 d/yr
	ED (exposure duration)	= 30 yr
	IR_{dw} (drinking water ingestion rate)	= 2 liter/day

RESIDENTIAL DIRECT CONTACT SOIL CRITERION ALGORITHMS:

CARCINOGENS:

$$C_s = \frac{10^{-5} \times AT \times CF}{SF \times FC \times [(EF_i \times IF \times AE_i) + (EF_d \times DF \times AE_d)]}$$

where,		
	C_s (risk-based soil concentration)	= ug/kg (ppb)
	10^{-5} cancer risk	= acceptable risk
	AT (averaging time)	= 25,550 days (70 x 365)
	CF (conversion factor)	= 1E+9 ug/kg
	SF (cancer slope factor, $mg/kg\text{-}d^{-1}$)	= chemical-specific
	FC (fraction of soil contaminated)	= 1
	EF_i (ingestion exposure frequency)	= 350 d/yr
	EF_d (dermal exposure frequency)	= 245 d/yr
	IF (age-adjusted soil ingestion factor)	= 114 mg-yr/kg-d*
	AE_i (ingestion absorption efficiency)	= (see text)
	DF (age-adjusted soil dermal factor)	= 2442 mg-yr/kg-d**
	AE_d (dermal absorption efficiency)	= (see text)

NONCARCINOGENS:

$$\frac{HQ \times RfD \times AT \times CF}{FC \times [(EF_i \times IF \times AE_i) + (EF_d \times DF \times AE_d)]}$$

where,		
	C_s (risk-based soil concentration)	= ug/kg (ppb)
	HQ (hazard quotient)	= 1
	RfD (oral reference dose, mg/kg/d)	= chemical-specific
	AT (averaging time)	= 10,950 days (30 x 365)
	CF (conversion factor)	= 1E+9 ug/kg
	FC (fraction soil contaminated)	= 1
	EF_i (ingestion exposure frequency)	= 350 d/yr
	EF_d (dermal exposure frequency)	= 245 d/yr
	IF (age-adjusted soil ingestion factor)	= 114 mg-yr/kg-d*
	AE_i (ingestion absorption efficiency)	= (see text)
	DF (age-adjusted soil dermal factor)	= 2442 mg-yr/kg-d**
	AE_d (dermal absorption efficiency)	= (see text)

$$*IF_{soil/age\text{-}adj.} = \frac{IR_{soil/age\ 1\text{-}6} \times ED_{age\ 1\text{-}6}}{BW_{age\ 1\text{-}6}} + \frac{IR_{soil/age\ 7\text{-}31} \times ED_{age\ 7\text{-}31}}{BW_{age\ 7\text{-}31}}$$

where,

$IR_{soil/age\ 1\text{-}6}$ (soil ingestion rate)	= 200 mg/day
$ED_{age\ 1\text{-}6}$ (exposure duration)	= 6 years
$BW_{age\ 1\text{-}6}$ (body weight)	= 15 kg
$IR_{soil/age\ 7\text{-}31}$ (soil ingestion rate)	= 100 mg/d
$ED_{age\ 7\text{-}31}$ (exposure duration)	= 24 yr
$BW_{age\ 7\text{-}31}$ (body weight)	= 70 kg

$$**DF_{soil/age\text{-}adj.} = \frac{SA_{age\ 1\text{-}6} \times AF \times ED_{age\ 1\text{-}6}}{BW_{age\ 1\text{-}6}} + \frac{SA_{age\ 7\text{-}31} \times AF \times ED_{age\ 7\text{-}31}}{BW_{age\ 7\text{-}31}}$$

where,

$SA_{age\ 1\text{-}6}$ (skin surface area)	= 1820 cm^2/day
AF (soil adherence factor)	= 1.0 mg/cm^2
$ED_{age\ 1\text{-}6}$ (exposure duration)	= 6 years
$BW_{age\ 1\text{-}6}$ (body weight)	= 15 kg
$SA_{age\ 7\text{-}31}$ (skin surface area)	= 5000 cm^2/day
AF (soil adherence factor)	= 1.0 mg/cm^2
$ED_{age\ 7\text{-}31}$ (exposure duration)	= 24 yr
$BW_{age\ 7\text{-}31}$ (body weight)	= 70 kg

The residential equations yield values which represent concentrations of contaminants in water in units of micrograms per liter (ug/l) and in soil in units of micrograms per kilogram (ug/kg), or parts per billion (ppb). To convert to units of parts per million or milligrams per liter (mg/l) in water and milligrams per kilogram (mg/kg) in soil, divide by 1,000.

All exposure assumptions represent current EPA guidance. The selection of an appropriate averaging time (AT) is dependent upon the type of toxic effect being evaluated. AT represents the number of days over which the exposure is averaged. When evaluating long-term exposure to noncarcinogenic compounds, exposures are calculated by averaging over the period of exposure (i.e., subchronic or chronic exposures). For carcinogenic compounds, exposures are calculated by prorating the total cumulative dose over a lifetime (also called lifetime average daily dose). The approach for carcinogens is based on the assumption that a high dose of a carcinogen received over a short period of tome is equivalent to a corresponding low dose spread over a lifetime. The averaging time for carcinogens is 25,550 days (70 years x 365 days) and 10,950 days (30 years x 365 days) for noncarcinogens.

The acceptable level of risk for carcinogens has been changed from one in one million (10^{-6}) to one in one hundred thousand (10^{-5}). All criteria for carcinogens have been changed appropriately. The acceptable hazard quotient (HQ) for noncarcinogens has always been 1, although this parameter was not explicitly presented in the previous MERA equations. The HQ is the ratio of a single substance's exposure level over a specified time period to a reference dose for that substance derived from a similar exposure period. An HQ of 1 indicates that an exposure level greater than the reference dose is unacceptable.

The relative source contribution factor (RSC) of 20% remains a parameter within the equations for groundwater criteria for noncarcinogens to maintain consistency with the EPA and State of Michigan in their development of

drinking water standards. The 20% RSC represents a default value to be replaced with a chemical-specific value when data are available. The RSC has been eliminated from the equations for the direct contact soil criteria. (For additional discussion on the RSC, see Operational Memo #14.)

The exposure duration of 30 years represents a national upper-bound time (90th percentile) at one residence (EPA, 1989). The exposure frequency (EF) of 350 represents the number of days per year that a resident is exposed to drinking water at their home; it assumes that people spend approximately 15 days per year away from their homes for vacations or other reasons. Two separate EF values are used for exposure to soil, each specific to the ingestion and dermal routes of exposure.

For ingestion of soil, EPA guidance ("Standard Default Exposure Factors" OSWER Directive: 9285.6-03, March 25, 1991) recommends a daily intake rate of 200 mg/day for children aged 1-6 years and 100 mg/day for all others. These intake values are believed to represent upper-bound estimates of average soil ingestion rates.

The EPA-recommended soil ingestion rates account for ingestion of both outdoor soils and indoor dust. The values are derived primarily from fecal tracer studies which estimate the amount of soil ingested throughout a day's activities. As such, the intake rates are not event-specific (i.e. the rates do not represent the amount of soil ingested during outdoor activities). Data suggest that up to 80% of indoor dust consists of outdoor soils which have been brought into a residence by air deposition and foot traffic. Therefore, it may not be assumed that ingestion of contaminated soil is entirely precluded by climatic conditions such as snow cover.

There is no currently available method for determining the relative contribution of soil vs. dust to the daily total, or the effect of climatic conditions on the rate of soil ingestion. Therefore, a constant year round exposure is assumed and the appropriate EF value for ingestion of soil/dust for the residential soil direct contact criterion is 350 days per year.

The EPA recommends that local weather conditions such as snow cover be considered in determining the appropriate EF for dermal contact with soil. It is assumed that Michigan winters last for 4 months (120 days) making soil unavailable for contact. Therefore, the EF for dermal contact with soil for the residential soil direct contact criterion is 245 days per year (365-120).

Ingestion and dermal contact rates within the direct contact soil criterion equation are adjusted to account for both children and adults. It is assumed that during the 30 year exposure period, 6 years is spent as a child who ingests more soil/day and the remaining 24 years is spent as a child/adult ingesting less soil/day. The age-adjusted approach was previously used in the development of the Type B soil direct contact criteria (although the data and calculations were different) and is recommended by EPA (EPA, 1991).

The skin surface area for child and adult receptors in the age-adjusted dermal factor is equal to 25 percent of the 50th percentile of total skin surface area for the respective age group (EPA, 1992b). Dermal exposure to soil is expected to occur on the hands, arms, legs, neck and head, accounting for approximately 25% of the total skin surface area.

The absorption efficiencies are the same as those used previously. When chemical-specific data are not available, the absorption efficiency applicable

to ingestion (AE_i) shall be either 100% for volatile organic chemicals or 50% for other organic chemicals, polychlorinated biphenyls, pesticides, or inorganic parameters. When chemical-specific data are not available, the absorption efficiency applicable to dermal contact (AE_d) shall be either 10% for a volatile organic chemical or 1% for other organic chemicals, polychlorinated biphenyls, pesticides, or inorganic parameters.

This memo is intended to provide guidance to Division staff to foster consistent application of Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451 and associated Administrative Rules. This document is not intended to convey any rights to any parties nor create any duties or responsibilities under law. This document and matters addressed herein are subject to revision.

Questions about values in the attached table should be directed to one of the ERD toxicologists: Christine Flaga, telephone 517-373-0160, Jeffrey Crum, telephone 517-335-3092, or Linda Larsen, telephone 517-335-3161. Other questions about this memorandum should be directed to District Supervisors.

Attachment
rev. 4

REFERENCES

EPA, 1992a. Supplemental Guidance to RAGS: Calculating the Concentration Term. OSWER Publication 9285.7-081. May, 1992.

EPA, 1992b. Dermal Exposure Assessment: Principles and Applications. Interim Report. EPA/600/8-91/011B. January, 1992.

PART 201 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994
PA 451
GENERIC RESIDENTIAL CLEANUP CRITERIA FOR GROUNDWATER AND SOIL

(Revision 4)

sidential criteria were calculated using currently available toxicological data. These criteria may change as new toxicity data become available. They are not necessarily final cleanup standards. Please read the attached introduction for details. Carcinogenic chemicals are shown in bold italics. All values are expressed in units of parts per billion (ppb); ug/l in water and ug/kg in soil. Scientific notation is represented by E+ or E- a value, for example 2×10^6 is reported as 2E+6. Please refer to Operational Memorandum #6 for additional information concerning analytical methods and method detection limits.

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
Chemical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
Acenaphthene	1,300	NA	3.8	5	26,000	76	7.6E+7	330
Acenaphthylene	26	NA	(B)	5	520	(B)	1.5E+6	330
Acetaldehyde	950	NA	(B)	500	19,000	(B)	1.4E+7	2,500
Acetic acid	4,200	NA	(B)	18,000	84,000	(B)	6.3E+7	9.0E+5
Acetone	730	NA	25,000	100	15,000	5.0E+5	1.1E+7	100
Acetonitrile	140	NA	810	50	2,800	16,000	2.1E+6	100
Acrolein	120	NA	2.5	5	2,400	50	1.8E+6	10
Acrylamide	0.19	NA	9.1	0.5	3.8	180	2,200	5
Acrylic acid	3,900	NA	(B)	NA	78,000	(B)	5.8E+7	NA
rylonitrile	1.6	NA	2.2	1	32	44	4,700	10
Alachlor	2 (C)	NA	48	1	40	960	1.2E+5	20
Aldicarb	3 (C)	NA	(B)	2	60	(B)	4.2E+5	50
Aldicarb sulfoxide	4 (C)	NA	(B)	2	80	(B)	5.5E+5	50
Aldicarb sulfone	2 (C)	NA	(B)	2	40	(B)	4.6E+5	50
Aldrin	0.05	NA	0.0014	0.01	(E)	(E)	580	20
Aluminum	ID	50 (A,F)	(B)	100	1,000	(B)	ID	700
Ammonia	ID (P)	NA	20 (D)	50	ID (P)	400	ID (P)	1,000
Aniline	150	NA	4	20	3,000	80	1.7E+6	1,700
Anthracene	7,300	NA	1.1E+5	5	1.5E+5	2.2E+6	4.2E+8	330
Antimony	6 (A,C)	NA	50 (A)	5	120 (A)	1,000	1.5E+5	500
Arsenic	50 (A,C)	NA	11 (A)	5	1,000 (A)	220 (A)	5,500 (A)	100
Atrazine	3 (C)	NA	7.8	1	60	160	45,000	50
Azobenzene	7.7	NA	(B)	NA	150	(B)	90,000	NA
Barium	2,000 (A,C)	NA	630 (A,D)	200	40,000 (A)	13,000 (A)	3.0E+7	1,000
Benzene	5 (C)	NA	53	5	100	1,100	88,000	10
Benzidine	0.0037	NA	0.0054	50	0.074	0.11	43	1,000
Benzo(a)anthracene (Q)	1.2	NA	0.31	5	(E)	(E)	14,000	330
Benzo(b)fluoranthene (Q)	1.2	NA	0.31	5	(E)	(E)	14,000	330
Benzo(k)fluoranthene (Q)	12	NA	0.31	5	(E)	(E)	1.4E+5	330
nzo(g,h,i)perylene	26	NA	(B)	5	(E)	(E)	1.5E+6	330

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
Chemical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
Benzo(a)pyrene (Q)	0.2 (C)	NA	0.31	5	(E)	(E)	1,400	330
Benzoic acid	32,000	NA	(B)	50	6.4E+5	(B)	1E+9 (G)	3,300
Benzyl alcohol	10,000	NA	22	50	2.0E+5	440	1.6E+8	1,300
Benzyl chloride	5	NA	(B)	0.5	100	(B)	15,000	200
Beryllium	4 (C)	NA	(B)	1	80	(B)	2,300	200
Bis(2-chloroethoxy)ethane	ID	NA	(B)	5	ID	(B)	ID	330
bis(2-Chloroethyl)ether	0.77	NA	4.2	5	15	84	2,300	330
bis(2-Ethylhexyl)phthalate	6 (C)	NA	59	5	(E)	(E)	7.0E+5	330
Boron	440 (A)	NA	(B)	300	8,800 (A)	(B)	2.5E+7	8,000
Bromobenzene	ID	NA	(B)	1	ID	(B)	ID	10
Bromodichloromethane	100 (C,S)	NA	24	1	2,000 (S)	480	41,000	10
Bromoform	100 (C,S)	NA	65	1	2,000 (S)	1,300	3.2E+5	10
Bromomethane	10	NA	11	1	200	220	1.5E+5	10
n-Butanol	950	NA	(B)	800	19,000	(B)	1.4E+7	4,400
2-Butanone (MEK)	13,000	NA	7,200	50	2.6E+5	1.4E+5	2.0E+8	100
n-Butyl acetate	550	NA	40	10	11,000	800	8.3E+6	20
t-Butyl alcohol	3,900	NA	8,300	1,000	78,000	1.7E+5	5.9E+7	4,400
Butyl benzyl phthalate	1,200	NA	(B)	5	24,000	(B)	6.8E+7	330
Cadmium	5 (A,C)	NA	0.64 (A,D)	0.5	100 (A)	13 (A)	2.1E+5	50
Camphene	ID	NA	(B)	NA	ID	(B)	ID	NA
Caprolactam	5,800	NA	(B)	NA	1.2E+5	(B)	3.4E+8	NA
Carbaryl	700	NA	(B)	20	14,000	(B)	4.1E+7	1,000
Carbofuran	40 (C)	NA	1.6	20	800	32	5.5E+5	200
Carbon disulfide (R)	800	NA	(B)	50	16,000	(B)	1.2E+7	100
Carbon tetrachloride	5 (C)	NA	21	1	100	420	20,000	10
Chlordane	2 (C)	NA	0.00053	0.02	(E)	(E)	7,600	10
Chloride	ID	2.5E+5	(B)	10,000	5.0E+5	(B)	ID	2.0E+5
Chlorobenzene	100 (C)	NA	71	1	2,000	1,400	2.1E+6	10
Chloroethane	220	NA	(B)	1	4,400	(B)	6.7E+5	10
2-Chloroethyl vinyl ether	ID	NA	(B)	10	ID	(B)	ID	100
Chloroform	100 (C,S)	NA	80	1	2,000 (S)	1,600	4.2E+5	10
Chloromethane	66	NA	(B)	1	1,300	(B)	2.0E+5	10
4-Chloro-3-methylphenol	150	NA	4.4	5	3,000	88	2.2E+6	330
beta-Chloronaphthalene	1,800	NA	(B)	5	36,000	(B)	2.7E+7	330
2-Chlorophenol	45	NA	10	5	900	200	6.8E+5	330
o-Chlorotoluene	150	NA	(B)	1	3,000	(B)	2.2E+6	10
Chlorpyrifos	22	NA	0.002	0.2	440	0.04	1.3E+6	10
Chromium (III) (I)	100 (A,C,J)	NA	77 (A,D)	50	2,000 (A)	1,500 (A)	6.3E+8	2,500
Chromium (VI) (I)	100 (A,C,J)	NA	7.3 (A)	5	2,000 (A)	150 (A)	2.0E+6	200

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
Chemical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
Chrysene (Q)	120	NA	0.31	5	(E)	(E)	1.4E+6	330
Cobalt	37	NA	(B)	10	740	(B)	2.1E+6	500
Copper	1,400 (A)	1,000	18 (A,D)	25	20,000	360 (A)	1.6E+7	1,000
Cyanazine	1.5	NA	4.7	10	30	94	17,000	500
Cyanide (R)	200 (C)	NA	5.2	20	4,000	100	9.3E+6	500
Cyclohexanone	33,000	NA	(B)	50	6.6E+5	(B)	5.0E+8	100
Dacthal	73	NA	(B)	1	1,500	(B)	4.2E+6	20
Dalapon	200 (C)	NA	(B)	10	4,000	(B)	9.3E+6	100
4-4'-DDD	3.5	NA	0.0084	0.02	(E)	(E)	41,000	20
4-4'-DDE	2.5	NA	0.0059	0.02	(E)	(E)	29,000	20
4-4'-DDT	2.5	NA	0.00023	0.02	(E)	(E)	29,000	20
Decabromodiphenyl ether	73	NA	(B)	10	1,500	(B)	4.2E+6	100
Di-n-butyl phthalate	880	NA	12,000	5	18,000	2.4E+5	5.1E+7	330
Di(2-ethylhexyl) adipate	400 (C)	NA	(B)	5	8,000	(B)	2.1E+6	330
Di-n-octyl phthalate	130	NA	(B)	5	2,600	(B)	7.6E+6	330
Diacetone alcohol	ID	NA	(B)	NA	ID	(B)	ID	NA
Diazinon	1.3	NA	0.002	0.5	26	0.04	76,000	10
Benzo(a,h)anthracene (Q)	0.12	NA	0.31	5	(E)	(E)	1,400	330
Dibenzofuran	ID	NA	(B)	5	ID	(B)	ID	330
Dibromochloromethane	100 (C,S)	NA	29	1	2,000	580	31,000	10
Dibromomethane	80	NA	(B)	5	1,600	(B)	4.6E+6	10
1,2-Dichlorobenzene	600 (C)	NA	7	1	12,000	140	9.4E+6	10
1,3-Dichlorobenzene	600 (C)	NA	180	1	12,000	3,600	9.4E+6	10
1,4-Dichlorobenzene	75 (C)	NA	15	1	1,500	300	1.1E+5	10
3,3'-Dichlorobenzidine	1.9	NA	0.063	20	38	1.3	5,700	2,000
Dichlorodifluoromethane	1,700	NA	(B)	1	34,000	(B)	2.5E+7	10
1,1-Dichloroethane	880	NA	(B)	1	18,000	(B)	1.3E+7	10
1,2-Dichloroethane	5 (C)	NA	560	1	100	11,000	28,000	10
1,1-Dichloroethylene	7 (C)	NA	32	1	140	640	1.1E+5	10
cis-1,2-Dichloroethylene	70 (C)	NA	(B)	1	1,400	(B)	1.2E+6	10
trans-1,2-Dichloroethylene	100 (C)	NA	300	1	2,000	6,000	1.9E+6	10
2,6-Dichloro-4-nitroaniline	2,200	NA	(B)	0.01	44,000	(B)	1.3E+8	0.1
2,4-Dichlorophenol	73	NA	34 (D)	5	1,500	680	4.2E+6	330
2,4-Dichlorophenoxyacetic acid	70 (C)	NA	47	10	1,400	940	4.2E+6	200
1,2-Dichloropropane	5 (C)	NA	64	1	100	1,300	38,000	10
1,3-Dichloropropene (J)	4.7	NA	3	1	96	60	14,000	10
Dichlorovos	2.9	NA	(B)	0.1	58	(B)	34,000	50
Dicyclohexyl phthalate	ID	NA	(B)	5	ID	(B)	ID	330
Dieldrin	0.053	NA	3.2E-5	0.02	(E)	(E)	620	20

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
Chemical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
Diethoxymethane	ID	NA	(B)	10	ID	(B)	ID	100
Diethyl ether	3,700	NA	(B)	50	74,000	(B)	5.5E+7	100
Diethyl phthalate	5,500	NA	1.2E+5	5	1.1E+5	2.4E+6	3.2E+8	330
Diethylene glycol monobutyl ether	88	NA	(B)	NA	1,800	(B)	5.1E+6	NA
Diisopropylamine	5.6	NA	(B)	NA	110	(B)	85,000	NA
Dimethyl phthalate	73,000	NA	2.9E+6	5	1.5E+6	5.8E+7	1E+9 (G)	330
N,N-Dimethylacetamide	180	NA	(B)	NA	3,600	(B)	2.7E+6	NA
N,N-Dimethylaniline	16	NA	(B)	NA	320	(B)	2.4E+5	NA
Dimethylformamide	700	NA	3,800	NA	14,000	76,000	1.1E+7	NA
2,4-Dimethylphenol	370	NA	31	5	7,400	620	2.1E+7	330
2,6-Dimethylphenol	4.4	NA	(B)	5	88	(B)	2.5E+5	330
3,4-Dimethylphenol	10	NA	(B)	5	200	(B)	5.9E+5	330
Dimethylsulfoxide	2.2E+5	NA	(B)	NA	4.4E+6	(B)	1.0E+9 (G)	NA
2,4-Dinitrotoluene	1.3	NA	91	5	26	1,800	15,000	330
Dinoseb	7 (C)	NA	0.5 (D)	1	140	10	4.2E+5	20
1,4-Dioxane	77	NA	2,000	1	1,500	40,000	2.3E+5	10
Diquat	20 (C)	NA	(B)	1	400	(B)	9.3E+5	NA
Endosulfan (J)	1.7	NA	(B)	0.01	(E)	(E)	97,000	3.3
Endothall	100 (C)	NA	(B)	20	2,000	(B)	7.2E+6	NA
Endrin	2 (C)	NA	0.0023	0.02	(E)	(E)	72,000	20
Epichlorohydrin	86	NA	(B)	5	1,700	(B)	2.6E+5	10
Ethanol	2.0E+6	NA	41,000	1,000	4.0E+7	8.2E+5	1.0E+9 (G)	4,400
Ethyl acetate	6,600	NA	1,000	NA	1.3E+5	20,000	9.9E+7	NA
1-Ethyl-2-methylbenzene	ID	NA	(B)	NA	ID	(B)	ID	NA
Ethylbenzene	700 (C)	74	31	1	1,500	620	1.1E+7	10
Ethylene dibromide	0.05 (C)	NA	1.1	1	1	22	39	10
Ethylene glycol	15,000	NA	68,000	5,000	3.0E+5	1.4E+6	8.4E+8	5,000
Ethylene glycol acetate	ID	NA	(B)	NA	ID	(B)	ID	NA
Ethylene glycol monobutyl ether	95	NA	(B)	NA	1,900	(B)	1.4E+6	NA
Fluoranthene	880	NA	370	5	18,000	7,400	5.1E+7	330
Fluorene	880	NA	14,000	5	18,000	2.8E+5	5.1E+7	330
Fluorine	400 (C)	2,000	1,900	NA	8,000	38,000	2.5E+7	NA
Formaldehyde	1,300	NA	170	100	26,000	3,400	2.0E+7	500
Formic acid	10,000	NA	(B)	18,000	2.0E+5	(B)	1.5E+8	9.0E+5
1-Formylpiperidine	80	NA	(B)	NA	1,600	(B)	1.2E+6	NA
Gentian violet	8.5	NA	(B)	NA	170	(B)	99,000	NA
Glyphosate	700 (C)	NA	(B)	100	14,000	(B)	4.2E+7	NA
Heptachlor	0.4 (C)	NA	0.0016	0.01	(E)	(E)	2,200	20
Heptachlor epoxide	0.2 (C)	NA	0.0011	0.01	(E)	(E)	1,100	20

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
Chemical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
n-Heptane	32,000	NA	4	NA	6.4E+5	80	4.8E+8	NA
Hexabromobenzene	20	NA	(B)	(K)	400	(B)	1.2E+6	(K)
Hexachlorobenzene (C-66)	1 (C)	NA	0.0019	(K)	20	0.038	6,200	(K)
Hexachlorobutadiene (C-46)	11	NA	500	(K)	220	10,000	1.3E+5	(K)
alpha-Hexachlorocyclohexane	0.14	NA	0.13	0.01	2.8	2.6	1,600	20
beta-Hexachlorocyclohexane	0.47	NA	0.46	0.01	9.6	9.2	5,500	20
Hexachlorocyclopentadiene (C-56)	50 (C)	NA	0.54	(K)	1,000	11	3.0E+6	(K)
Hexachloroethane	61	NA	13	2	1,200	260	1.8E+5	50
n-Hexane	3,000	NA	(B)	NA	60,000	(B)	4.5E+7	NA
2-Hexanone	1,000	NA	(B)	50	20,000	(B)	1.5E+7	100
Indeno(1,2,3-cd)pyrene (Q)	1.2	NA	0.31	5	(E)	(E)	14,000	330
Iron	ID	300 (A)	(B)	100	6,000 (A)	(B)	ID	2,000
Isobutyl alcohol	2,300	NA	(B)	1,000	48,000	(B)	3.5E+7	4,400
Isophorone	900	NA	860	5	18,000	17,000	2.7E+6	330
Isopropyl alcohol	470	NA	21,000	400	9,400	4.2E+5	7.0E+6	4,400
Lead	4 (A,L)	NA	6.6 (A,D)	3	80 (A)	130 (A)	4.0E+5	1,000
Lindane	0.2 (C)	NA	0.08	0.01	4	1.6	7,600	20
gnesium	4.2E+5	NA	(B)	30	8.4E+6	1.0E+9	1.0E+9 (G)	3,000
Manganese	180 (A)	50 (A)	(B)	20	1,000 (A)	(B)	2.0E+6	2,000
Mercury (Inorganic)	2 (A,C)	NA	0.0013 (A)	0.2	40 (A)	0.026 (A)	1.3E+5	100
Methanol	3,700	NA	41,000	1,000	74,000	8.2E+5	5.5E+7	4,400
Methoxychlor	40 (C)	NA	(B)	0.5	80	(B)	2.1E+6	50
2-Methoxyethanol	29	NA	(B)	NA	580	(B)	4.4E+5	NA
2-Methyl-4-chlorophenoxyacetic acid	7.3	NA	(B)	0.5	150	(B)	4.2E+5	100
2-Methyl-4,6-dinitrophenol	2.6	NA	0.59	20	52	12	1.5E+5	1,700
4-Methyl-2-pentanone (MIBK)	370	NA	(B)	50	7,400	(B)	5.5E+6	100
Methyl-tert-butyl ether (MTBE)	240	NA	380	50	4,800	7,600	3.6E+6	100
N-Methyl-morpholine	20	NA	(B)	NA	400	(B)	3.0E+5	NA
Methylcyclopentane	ID	NA	(B)	50	ID	(B)	ID	500
4,4'-Methylene-bis-2-chloroaniline (M)	0.88	NA	(B)	1	(E)	(E)	10,000	50
Methylene chloride	5 (C)	NA	59	5	100	1,200	3.4E+5	10
2-Methylnaphthalene	ID	NA	(B)	5	ID	(B)	ID	330
2-Methylphenol	370	NA	38	5	7,400	760	5.5E+6	330
3-Methylphenol	370	NA	(B)	5	7,400	(B)	2.1E+7	330
4-Methylphenol	37	NA	6.2	5	740	120	2.1E+6	330
Metolachlor	160	NA	150	10	3,200	3,000	1.9E+6	50
Molybdenum	37 (A)	NA	800 (A)	10	740	16,000 (A)	2.1E+6	100
phthalene	260	NA	29	5	5,200	580	1.5E+7	330
nickel	100 (A,C)	NA	57 (A,D)	50	2,000 (A)	1,100 (A)	3.2E+7	1,000

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
Chemical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
Nitrate (P)	10,000 (C,P)	NA	(B)	100	2.0E+5 (P)	(B)	ID	NA
Nitrite (P)	1,000 (C,P)	NA	(B)	100	20,000 (P)	(B)	ID	NA
Nitrobenzene	3.4	NA	1,900	5	68	38,000	51,000	330
2-Nitrophenol	20	NA	(B)	5	400	(B)	1.2E+6	330
n-Nitroso-di-n-propylamine	0.12	NA	(B)	5	2.4	(B)	370	330
N-Nitrosodiphenylamine	170	NA	160	5	3,400	3,200	5.2E+5	330
Oxamyl	200 (C)	NA	(B)	NA	4,000	(B)	1.6E+7	NA
Oxo-hexyl acetate	73	NA	(B)	NA	1,500	(B)	1.1E+6	NA
Pendimethalin	880	NA	0.62	0.1	18,000	12	5.1E+7	20
Pentachlorobenzene	6.1	NA	(B)	2	120	(B)	3.5E+5	50
Pentachloronitrobenzene	55	NA	(B)	2	1,100	(B)	3.2E+6	50
Pentachlorophenol	1 (C)	NA	0.8 (D)	20	20	16	82,000	3,400
Pentane	ID	NA	(B)	100	ID	(B)	ID	1,000
2-Pentene	ID	NA	(B)	NA	ID	(B)	ID	NA
Phenanthrene	28	NA	(B)	5	520	(B)	1.5E+6	330
Phenol	4,400	NA	1,100	5	88,000	22,000	6.6E+7	330
Picloram	500 (C)	NA	(B)	10	10,000	(B)	3.0E+7	100
Piperidine	3.2	NA	(B)	NA	64	(B)	48,000	NA
Polybrominated biphenyls (J)	0.098	NA	(B)	NA	(E)	(E)	1,100	NA
Polychlorinated biphenyls (PCBs) (J,T)	0.5 (C)	NA	2.0E-5	0.2	(E)	(E)	2,300	330
Prometon	160	NA	(B)	0.5	3,200	(B)	9.3E+6	20
Propachlor	95	NA	(B)	1	1,900	(B)	5.5E+6	20
Propazine	200	NA	(B)	0.5	4,000	(B)	1.1E+7	20
Propionic acid	12,000	NA	(B)	100	2.4E+5	(B)	1.9E+8	6,700
Propyl alcohol	1,400	NA	15,000	NA	28,000	3.0E+5	2.1E+7	NA
Propylene glycol	1.5E+5	NA	1.9E+5	5,000	3.0E+6	3.8E+6	1.0E+9 (G)	5,000
Pyrene	550	NA	11,000	5	11,000	2.2E+5	3.2E+7	330
Pyridine	7.3	NA	20	20	150	400	1.1E+5	330
Selenium	50 (A,C)	NA	5 (A)	5	1,000 (A)	100 (A)	2.1E+6	500
Silver	34 (A)	100	0.1 (A)	0.5	680 (A)	2 (A)	2.0E+6	500
Simazine	4 (C)	NA	3.4	10	80	68	2.2E+6	40
Sodium	1.6E+5	NA	(B)	NA	3.2E+6	(B)	1.0E+9 (G)	NA
Styrene	100 (C)	NA	19	1	2,000	380	85,000	10
Sulfate	ID	2.5E+5	(B)	NA	5.0E+6	(B)	ID	NA
Tebuthiuron	510	NA	(B)	NA	10,000	(B)	3.0E+7	NA
2,3,7,8-Tetrabromodibenzo-p-dioxin (O)	(O)	NA	(O)	0.0001	(E)	(E)	(O)	0.01
1,2,4,5-Tetrachlorobenzene	2,500	NA	0.4	0.1	50,000	8	1.4E+6	20
2,3,7,8-Tetrachlorodibenzo-p-dioxin (O)	3E-5 (C)	NA	1.4E-6	1.0E-5	(E)	(E)	0.09	0.001
1,1,1,2-Tetrachloroethane	33	NA	(B)	1	660	(B)	99,000	10

	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
Chemical	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	20X Drinking Water Value	20X GSI Value	Direct Contact Value	Target Method Detection Limit in Soil
1,1,2,2-Tetrachloroethane	4.3	NA	32	1	86	640	13,000	10
Tetrachloroethylene	5 (C)	NA	22	1	100	440	50,000	10
Tetrahydrofuran	240	NA	3,300	1,000	4,800	66,000	3.6E+6	10,000
Thallium	2 (A,C)	NA	5.4 (A)	2	40 (A)	110 (A)	28,000	500
Toluene	1,000 (C)	790	110	1	16,000	2,200	2.4E+7	10
p-Toluidine	4.5	NA	(B)	NA	90	(B)	52,000	NA
Toxaphene	3 (C)	NA	0.0002	1	60	0.004	2,300	170
Triallate	95	NA	(B)	1	1,900	(B)	5.5E+6	20
Tributylamine	10	NA	(B)	NA	200	(B)	1.5E+5	NA
1,2,4-Trichlorobenzene	70 (C)	NA	22	5	1,400	440	6.3E+6	330
1,1,1-Trichloroethane	200 (C)	NA	120	1	4,000	2,400	3.1E+6	10
1,1,2-Trichloroethane	5 (C)	NA	65	1	100	1,300	45,000	10
Trichloroethylene	5 (C)	NA	94	1	100	1,900	1.6E+5	10
Trichlorofluoromethane	2,600	NA	580	1	52,000	12,000	3.8E+7	10
2,4,5-Trichlorophenol	730	NA	25	50	15,000	500	4.2E+7	1,700
2,4,6-Trichlorophenol	77	NA	27 (D)	5	1,500	540	9.0E+5	330
2(2,4,5-Trichlorophenoxy)propionic acid (N)	50 (C)	NA	21	1	1,000	420	3.2E+6	50
,3-Trichloropropane	42	NA	(B)	1	840	(B)	2.4E+6	10
1,1,2-Trichloro-1,2,2-trifluoroethane	2.0E+5	NA	33	NA	4.0E+6	660	1.0E+9 (G)	NA
Triethanolamine	3,700	NA	(B)	NA	74,000	(B)	5.5E+7	NA
3-Trifluoromethyl-4-nitrophenol	4,500	NA	32 (D)	NA	90,000	640	2.6E+8	NA
Trifluralin	110	NA	(B)	1	2,200	(B)	1.3E+6	50
2,2,4-Trimethyl pentane	ID	NA	(B)	50	ID	(B)	ID	500
2,2,4-Trimethyl-2-pentene	ID	NA	(B)	NA	ID	(B)	ID	NA
1,2,4-Trimethylbenzene	30	NA	22	1	600	440	4.5E+5	10
1,3,5-Trimethylbenzene	23	NA	26	1	460	520	3.4E+5	10
tris(2,3-Dibromopropyl)phosphate	0.47	NA	(B)	NA	9.4	(B)	5,500	NA
Urea	ID (P)	NA	(B)	400	ID (P)	(B)	ID (P)	20,000
Vanadium	64 (A)	NA	8 (A)	20	1,300 (A)	160 (A)	3.7E+6	1,000
Vinyl acetate	640	NA	(B)	50	13,000	(B)	9.7E+6	100
Vinyl chloride	2 (C)	NA	3.1	1	40	62	1,200	10
White phosphorus (R)	0.11	NA	(B)	NA	2.2	(B)	6,300	NA
Xylenes	10,000 (C)	280	59	3	5,600	1,200	2.0E+8	30
Zinc	2,400 (A)	5,000 (A)	81 (A,D)	20	48,000 (A)	1,600 (A)	1.4E+6	1,000

Footnotes

{A} Background, as defined in Rule 701(c), may be substituted if higher than the cleanup criteria.

{B} Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value. Contact an ERD toxicologist for assistance.

{C} State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976 used as the default.

{D} GSI value is pH, temperature, or water hardness dependent. Contact an ERD toxicologist for details.

{E} Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions.

{F} Professional judgment used to determine that 50 ppb of aluminum in drinking water is protective of human health.

{G} Criteria exceeds 100% in soil, hence it is reduced to 100%.

{H} Criteria is based on agricultural impacts (phytotoxicity), not 20X groundwater criterion.

{I} Valence-specific chromium data (Cr III and Cr VI) must be compared to the same valence-specific cleanup criteria. If analytical data are provided for "total" chromium only, then values for chromium VI must be applied as the cleanup criteria. Chromium III cleanup criteria can only be used at sites where groundwater is prevented from being used as a public water supply, currently or in the future.

{J} Chemical may be present in several isomer forms. Isomer specific concentrations must be combined for comparison to criteria. Contact an ERD toxicologist for further explanation.

{K} Two different analytical methods and target method detection limits are available for this chemical. Refer to Operational Memorandum #6 for details.

{L} Criteria developed using the U.S. EPA Integrated Uptake Biokinetic Model for children. No risk assessment method(s) is currently available to evaluate lead toxicity in adults. Higher level may be acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties. Contact an ERD toxicologist for further explanation.

{M} Also known as MBOCA.

{N} Also known as Silvex.

{O} Use 2,3,7,8-TCDD "toxicity equivalence factors" (TEFs) for other chlorinated and /or brominated dibenzo-p-dioxins and chlorinated and/or brominated dibenzofurans for comparison to cleanup criteria. Contact an ERD toxicologist for details.

{P} All potential sources of nitrogen-nitrate must be combined and compared to nitrate criteria. Contact an ERD toxicologist for details.

{Q} Criteria for carcinogenic polynuclear aromatic hydrocarbons (PAHs) were developed using "relative potential potencies" (RPPs) to benzo(a)pyrene.

{R} Chemical may be reactive in soil.

{S} Concentrations of trihalomethanes in groundwater must be combined to determine compliance with the health-based drinking water value of 100 ppb.

{T} Toxic Substances Control Act, Subpart G - PCB Spill Cleanup Policy standards may be more restrictive.

ID = Inadequate data to develop criterion; NA = Not available.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

June 6, 1995

TO: Environmental Response Division Staff

FROM: Alan J. Howard, Chief, Environmental Response Division

SUBJECT: **Environmental Response Division Operational Memorandum #14 Revision 2:** Remedial Action Plans Using Generic Industrial or Generic Commercial Cleanup Criteria and Other Requirements

THIS DRAFT, INTERIM OPERATIONAL MEMORANDUM HAS BEEN PREPARED TO FACILITATE IMPLEMENTATION OF THE 1995 AMENDMENTS TO PART 201 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451 (FORMERLY THE MICHIGAN ENVIRONMENTAL RESPONSE ACT). THIS OPERATIONAL MEMORANDUM WILL TAKE EFFECT *ONLY* WHEN HOUSE BILL 4596 IS SIGNED INTO LAW. INTERNAL REVIEW OF THIS MEMORANDUM IS ON-GOING, AND NO OUTSIDE REVIEW HAS BEEN COMPLETED. THE CONTENT OF THE MEMORANDUM, AND THE ATTACHED CRITERIA, ARE SUBJECT TO CHANGE AND SHOULD BE RELIED UPON ONLY AFTER CONFIRMATION WITH APPROPRIATE ERD STAFF.

Revision 2 of this Operational Memorandum reflects changes made as a result of two major legislative actions: (1) the incorporation of the Michigan Environmental Response Act (MERA), 1982 PA 307, as amended, (2) into the Natural Resources and Environmental Protection Code, 1994 PA 451; and the 1995 amendments to Part 201 contained in [House Bill 4596]. Enactment of the Natural Resources and Environmental Protection Act resulted in new section numbers for all of the former MERA, but did not make any substantive changes in the law. [House Bill 4596] substantially amends Part 201. Those amendments, particularly the changes in cleanup standards, are reflected in this revision of Operational Memorandum #14. Unless otherwise noted, Section references in this memorandum are to Part 201 of Act 451.

This memorandum provides direction in the preparation and review of generic industrial and commercial land use remedial action plans (RAPs) to comply with Section 20120A(1)(B) and (D). The following information highlights some important aspects of generic land use cleanups:

- The preparation, review and approval of RAPs based on the generic industrial/commercial approach is anticipated to require less effort than a site-specific RAP for most sites. In general, it will not be necessary to develop site-specific cleanup criteria for those sites which can be appropriately and completely addressed with these generic criteria.

- Site-specific RAPs are also an option under Section 20120A(2). Site-specific RAPs require the development of exposure assumptions that are representative of the activities of human receptors at the site. Site-

specific direct contact cleanup criteria may be developed by appropriately adjusting the exposure assumptions in the generic algorithms. Justification must be provided for the site-specific exposure assumptions identified.

- If a RAP relies on the attached generic risk assessment algorithms and criteria, the RAP must include a statement confirming that the generic exposure assumptions are representative of, or exceed, the expected exposure of workers at the site.

- In identifying which generic cleanup criteria are appropriate for a site, primary consideration should be given to the human receptors and the kinds of activities in which they engage. Land-use specific criteria can be used for a site not typically categorized under that specific land use, as long as the exposures do not exceed those identified in the algorithm used to derive the criteria.

- These generic industrial and commercial criteria apply only to the assessment of human health risks for workers at these sites. The need for assessment of off-site human health risks will be determined based on an evaluation of exposure potential for off-site receptors.

The direction provided in this memo is intended to facilitate the preparation of RAPs by setting forth the Environmental Response Division's (ERD) expectations for the human health risk assessment assumptions which are used to generate acceptable cleanup criteria for specific land uses. Additional information about the applicability of this approach and the criteria listed in the attached tables follows.

The attached sections on the land use-specific categories explain the basis for the exposure assumptions used in the generic approaches. In general, the exposure assumptions were established to be protective for a "reasonable maximum exposure" (RME) of a worker under the scenarios established. The RME is defined as the highest exposure that is reasonably expected to occur at a site. These exposure assumptions would also be protective of other workers at the facility who are outdoors less often. If the workers at a commercial or industrial property have a greater exposure potential (e.g., the exposure duration or exposure frequency is greater than that assumed in the generic algorithms), a site-specific RAP which reflects the exposure potential at the site should be submitted. This can be done by adjusting the exposure assumptions within the generic equation.

The criteria in the attached tables have been calculated by ERD toxicologists for the convenience of parties preparing generic industrial or commercial RAPs. The criteria are not maximum allowable criteria; they are concentrations that may be allowable for exposure in certain industrial or commercial settings. Higher concentrations may be approved as part of a limited industrial/commercial RAP if exposure barriers or engineering controls prevent or limit exposure. The criteria in the tables can be used as a screening tool to determine which areas of a site may be addressed by land use restrictions alone, and which require additional remediation or control.

The values in the table are useful in determining acceptable concentrations protective of human health through exposure pathways characterized by standardized assumptions. The text of the attachment describing the

algorithms includes discussions of other human exposure pathways which may require additional consideration in exceptional circumstances (e.g., inhalation pathway if a hazardous substance present in shallow soils is a carcinogen via inhalation but not ingestion or risks from contaminated subsurface materials to construction workers). When these special circumstances exist, contact an ERD toxicologist for guidance.

Generic Industrial and Commercial Cleanup Criteria
Groundwater and Soil Direct Contact

The attached tables list the generic industrial and commercial site criteria in a format similar to the table of residential criteria in Operational Memorandum #8. The applicability of values from the generic commercial and industrial tables may vary depending, for example, on site characteristics, reasonably foreseeable groundwater use, and the nature of the remedy being proposed. Additional guidance on the applicability of values from the chart follows.

HEALTH-BASED AND AESTHETIC DRINKING WATER CRITERIA

These criteria apply to groundwater in an aquifer. The RAP should identify whether each saturated zone underlying the site is an aquifer. Any formation which serves or may serve as a drinking water source meets the definition of "aquifer" in R 299.5101(c). Cleanup criteria for groundwater not in an aquifer must be determined by consideration of potential public health and environmental impacts associated with contamination of that groundwater (see discussion of Groundwater/Surface Water Interface Values below).

The health-based values in the attached table were calculated using the generic land use algorithms which are designed to protect workers whose drinking water is from an on-site groundwater source. If groundwater is the source of drinking water at the property, and the values in the table are exceeded, a remedial action to address groundwater will be necessary. If a state drinking water standard is available for an on-site contaminant, the drinking water standard overrides the health-based criterion and becomes the cleanup goal. In addition, if the affected groundwater is the source of drinking water at the industrial/commercial site, the aesthetic criterion (as defined by R 299.5709(2)(c) or (d)) must be met if that criterion is more restrictive than the health-based criterion unless an assessment is presented that justifies an alternative criterion. The state drinking water standard would not, however, override a more restrictive aesthetic criterion. This assures that the groundwater will not be unusable because of aesthetic impacts. If groundwater is not the source of drinking water at the property, but it is or may be the source for off-site drinking water, then the need for remedial action to address the groundwater would be determined by other rules (e.g., R 299.5709). Groundwater beyond the property boundary would need to be addressed either by remediation or exposure controls.

Consider this example: A RAP using the generic criteria is proposed for an industrial site where groundwater is used as the source of drinking water for that facility and for private wells off-site. The groundwater concentrations on site (current and expected concentrations, based on information about migration potential developed during the Remedial Investigation and explained in the RAP) do not exceed the applicable drinking water criteria in the attached table. Remedial actions to address on-site groundwater would be

determined by the requirements of R 299.5705(5) and (6) (unless the Department makes a finding pursuant to Section 20118(5) and (6) that compliance with those subrules is not required) and/or compliance with GSI criteria. However, if hazardous substance concentrations in groundwater exceed the generic residential criteria at the industrial site boundary, groundwater remediation or exposure controls, or both, may be required to address potential off-site risks.

GROUNDWATER SURFACE WATER INTERFACE (GSI) CRITERIA

The GSI values included in the attached table are the same GSI values as presented in Op Memo #8. See Op Memo #8 for a complete explanation of GSI values. The GSI values are included here because they define the maximum allowable hazardous substance concentration at the groundwater surface water interface or at the edge of the mixing zone, whichever is applicable for a specific site, in industrial/commercial situations as well as residential situations. This is a function of applicable requirements of Part 31 of Act 451. Judgments about the applicability of GSI values and the compliance point for GSI criteria are the same for residential and commercial/industrial situations.

Prior to passage of the 1995 amendments, a mixing zone was not allowed when assessing the impact of groundwater venting to a surface water. A mixing zone is now allowed for venting groundwater at those sites where an additional load to the receiving stream of site-specific contaminants is allowable and where a mixing zone is appropriate for the receiving stream. If a RAP allows for venting groundwater, the discharge must comply with requirements of Part 31 of Act 451 and the relevant rules promulgated under that Part.

TARGET METHOD DETECTION LIMITS IN WATER AND SOIL

The values in these columns are identical to those in Operational Memorandum #8 and Operational Memorandum #6. See Op Memo #6 for a complete explanation of "target method detection limits" and analytical methodology.

SOIL CRITERIA PROTECTIVE OF GROUNDWATER

The determination of a soil concentration protective of groundwater in an aquifer can be more complex at industrial/commercial sites than for some residential sites, consequently, these values are not presented on the list. If groundwater contamination is confined (and will remain) on-site, and the groundwater at the site is used as a source of drinking water, then the soil cleanup criteria protective of groundwater can be determined in one of the following ways: 1) through the use of leachate test (see Operational Memorandum #12), comparing the leachate results to the industrial/commercial health-based drinking water value or aesthetic value, whichever is more restrictive, or if available, the state drinking water standard (unless the aesthetic criterion is more restrictive); 2) by comparing the concentration in soil (i.e., measured as a total, not leachable concentration) to 20 times the appropriate groundwater criterion; or 3) by the use of other methods, such as fate and transport modeling or perched in-situ groundwater evaluation, that demonstrate that hazardous substances in soil will not result in relevant groundwater criteria being exceeded. However, if off-site groundwater is or may be used as a source of drinking water, the groundwater must meet residential criteria at the property boundary or exposure controls must be provided. In that case, on-site soils may need to be cleaned up to a level more restrictive than that described above in order to assure that residential

criteria will be met at the appropriate location, unless groundwater remediation is being used to achieve the residential groundwater criteria off-site. It is possible that acceptable soil criteria protective of groundwater may vary across the site.

For certain chemicals which strongly adsorb to soil and are known not to leach at significant concentrations (i.e., PCBs, carcinogenic polynuclear aromatic hydrocarbons and some chlorinated pesticides), the direct contact value is accepted as the soil cleanup criterion to protect groundwater in addition to the protection against long-term, systemic, direct contact hazards. However, there are certain situations (i.e., presence of solvents or collection of unfiltered groundwater samples) which could result in the presence of these types of materials in groundwater. These other conditions should be evaluated before a chemical is considered nonmobile in soil. Consult an ERD toxicologist if you think direct contact values for other contaminants would be protective of groundwater or if you have questions about conditions that could cause the transport of a nonmobile contaminant through soil.

SOIL CRITERIA PROTECTIVE OF SURFACE WATER

The default values are shown in Op Memo #8 as 20 times the GSI value. If the GSI value is the controlling factor for groundwater and/or aquifers at an industrial/commercial site, the 20 times GSI value would be applied here in the same way it would be at a residential site. See Operational Memorandum #8 for a full discussion of this issue. Since the GSI value applies only at the groundwater surface water interface it is not necessary that soil concentrations throughout the site be less than or equal to 20 times the GSI number. However, in some cases, it may be simplest to make this comparison in judging the need for soil remediation to protect surface water. Generic industrial/commercial soil cleanup criteria protective of surface water can be developed using the same approaches that apply to the soil criteria protective of drinking water (i.e., leachate tests, 20 times water concentrations, comparison of perched water quality to GSI values or fate and transport modeling). This accounts only for leaching of hazardous substances from soil into groundwater and the subsequent impact of that groundwater on surface water. If there is significant potential for runoff to carry contaminated soil into surface water (i.e., this pathway is pertinent in the risk assessment), the impact of that runoff should be characterized in the risk assessment using fate and transport modeling. This type of analysis may be necessary in cases where the hazardous substances present at the site are highly persistent and/or bioaccumulative, since transport of substances with these properties may result in unacceptable impact on surface water sediments or in the food chain.

DIRECT CONTACT CRITERIA

These values protect workers at the site against long-term, systemic health effects from ingestion and dermal absorption of hazardous substances in soil. The exposure assumptions used in the algorithms are discussed in the generic industrial and commercial sections. The generic land-use direct contact criteria are applied like the residential direct contact values, except that the requirement that direct contact concentrations be met throughout the affected media will not always apply to industrial/commercial cleanups. It is possible for a generic industrial/commercial RAP to combine the application of these values for shallow soils and land use restrictions to protect against exposure to higher concentrations in deeper soils to provide for a remedy that is, when considered in total, protective of public health. In general,

surface soils are considered to be the top 0-6 inches, unless activities at a site indicate that a greater depth is more appropriate. However, unless use restriction are in place for contaminated subsurface materials, contaminant concentrations cannot exceed the appropriate soil concentration to protect public health.

Average on-site soil concentrations, represented as a 95% upper confidence level (UCL) on the arithmetic mean, may be used to determine compliance with the soil direct contact value. On-site 95% UCLs should, however, reasonably represent the areas over which exposures are expected to occur. Refer to EPA Guidance (EPA, 1992b) on appropriate methodology for calculating the 95% UCL.

ISSUES NOT ADDRESSED BY THE DIRECT CONTACT CRITERIA

Inhalation: Since all RAPs must document that they are protective of the public health, safety and welfare and the environment, they must contain some discussion of potential inhalation risks, and whether inhalation is a pertinent pathway for human exposure at the site in question. The direct contact criteria do not address and are not applicable for the inhalation pathway because they do not incorporate the potential inhalation effects, long-term or acute, of hazardous substances in soil.

In many cases, the inhalation pathway will be addressed by a simple description of the physical characteristics of the site such as pavement, vegetative cover, depth to contamination, or characteristics of on-site contaminants, which would allow for its elimination as a pertinent pathway. Characteristics of the contaminants that should be considered are vapor pressure and/or Henry's Law constant, the potential to cause cancer via the inhalation route, the potential to cause irritation of respiratory tissue and special characteristics which may make a contaminant an inhalation hazard (e.g., friable asbestos). The RAP should indicate whether any materials with these characteristics are present. If such materials are present, it may be necessary to conduct a risk assessment of the inhalation pathway, pursuant to Rules 299.5717(3)(a) and (f) in general, and to include criteria or exposure controls which are protective under the inhalation scenario. If not, criteria and/or exposure control measures which are protective for other routes of exposure will be deemed protective for the inhalation pathway and a narrative assessment for the inhalation pathway will be sufficient. EPA guidance should be followed when evaluating the inhalation pathway (EPA, 1991).

Dermal Toxicity: The direct contact soil equations do not address acute skin toxicity or skin sensitization. These concerns may have to be addressed before chemicals with these characteristics can be left in place at the direct contact concentration.

Ecological Concerns: Industrial/commercial RAPs also must address ecological concerns. The RAP should include a description of the physical setting of the site, including any natural resources which could be affected by the release(s) addressed in the plan. In general, potential ecological impacts are defined as adverse impacts on a community or a population of organisms rather than on an individual who is the focus of a human health risk assessment. An ecological risk assessment will be required only if there is a "sensitive environmental resource" (See Rule 299.5803(j)) present at or near the site, or if there are other special circumstances such as concern for persistent or bioaccumulative hazardous substances which may adversely effect the food chain, or a physical feature that would attract wildlife to the site

(e.g., migratory waterfowl habitat). Professional judgment must be used to determine whether it is likely that criteria more restrictive than those required to protect public health, or those required pursuant to other applicable regulations (e.g., groundwater/surface water interface criteria), are necessary to protect natural resources at or near the site. If ERD staff believe that there is a need for an ecological assessment, this should be reviewed with your supervisor and other technical experts as appropriate. Ecological risk assessments will be the exception rather than the rule.

Other Requirements for Industrial and Commercial RAPs

The generic industrial and commercial cleanup criteria will simplify the human health risk assessment component of the RAP when they are applicable. If the site meets the criteria for application of the generic approach, the human health risk assessment can consist of a comparison to the generic criteria when they are proposed for use at the site. If other criteria are proposed, they must be justified as protective of public health, safety, welfare and the environment. Regardless of whether generic or site-specific criteria are proposed, the RAP must also contain a demonstration that it satisfies all other requirements of Part 201 and the administrative rules, including applicable or relevant and appropriate requirements (ARARs) from other environmental laws. You should review Rules 299.5717, 299.5719 which contain requirements applicable specifically to industrial/commercial (formerly "Type C") cleanups. Also review Rules 299.5601 and 299.5603 which describe the factors the Department must consider in deciding whether to approve a RAP. Parties preparing industrial/commercial RAPs should directly and succinctly address how the RAP is responsive to all requirements of Rules 299.5601, 299.5603, 299.5717, and 299.5719 (or explain why the requirement is not applicable to the site).

Important components of an industrial/commercial RAP, in addition to the risk assessment, include:

- a thorough description of the proposed exposure controls (including a proposed restrictive covenant which addresses the factors called for in Rule 299.5719(3)). Exposure controls can be as simple as a commitment, through the restrictive covenant, that the land use of the site will remain consistent with the industrial or commercial risk assessment assumptions. More complex controls will be required if, for example, an engineered containment structure is part of the remedy.

- an explanation of how the proposed controls will be reliable, effective and satisfy other requirements of law.

- an operation and maintenance plan (see Rule 299.5517) and a monitoring plan (see Rule 299.5519), or both, if necessary. These plans may be conceptual (e.g., they need not specify manufacturers for equipment to be used, but must describe the function of the equipment). However, the plans must be presented in sufficient detail to allow us to judge their adequacy. The plans must also include cost estimates for implementation of the operation and maintenance and/or monitoring work. The cost estimates, which will be used, in part, to determine the amount of financial assurances required pursuant to Rule 299.5719(2), should be

based on work being done by contractor personnel rather than by employees of the party responsible for implementation of the RAP. This allows us to be confident that financial assurances would cover necessary costs if the state must take over these activities.

This memo is intended to provide guidance to Division staff to foster consistent application of Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451 and associated Administrative Rules. This document is not intended to convey any rights to any parties nor create any duties or responsibilities under law. This document and matters addressed herein are subject to revision.

Questions about the generic industrial and commercial algorithms and criteria should be directed to ERD toxicologists (Chris Flaga, at 517-373-0160; Jeff Crum, at 517-335-3092; or Linda Larsen at 517-335-3161). Questions about other aspects of generic industrial and commercial RAPs should be directed to District Supervisors.

GENERIC INDUSTRIAL LAND USE CATEGORY

A generic industrial site will include sites with the following characteristics:

- The primary activity at the site is industrial in nature (e.g., manufacturing; utilities; industrial research and development; petroleum bulk storage) and access to the site is reliably restricted consistent with its use (e.g., by fences or security personnel or both). The term industrial site does not include farms, gasoline service stations or other commercial establishments where children may commonly be present. Inactive or abandoned sites are included if the property use was industrial, as described above.

- The current zoning of the property is industrial, the zoning is anticipated to be industrial (see below), or the RAP includes documentation that the current industrial use is a legal non-conforming use. This may include different zoning designations, depending on the community, such as "light industrial" or "heavy industrial". Documentation of zoning must be provided in the form of a map or current property record card which shows the zoning status of the site and all adjacent properties. If the RAP is based on anticipated zoning changes, discussion of this issue must indicate how and when the zoning changes are to be accomplished. The RAP must identify (preferably on a map) the nearest current residential land uses and nearest parcels which are zoned for residential use. Any non-conforming land uses in the vicinity of the site must be identified in the RAP (e.g., residential use on a parcel zoned "transitional industrial").

Generic Industrial Cleanup Criteria Algorithms

The following equations represent a reasonable and conservative approach for deriving generic cleanup criteria for an industrial facility. Assumptions are conservative to include a reasonable maximum exposure. The population protected are those industrial workers who spend a significant percentage of

their work time outdoors. Algorithms are presented for both the ingestion of groundwater and for direct contact with soil.

The generic industrial equations follow.

Generic Groundwater Algorithms:

CARCINOGENS:

$$\frac{10^{-5} \times BW \times AT \times CF}{SF \times EF \times ED \times IR_{dw}}$$

where,		
	10^{-5} cancer risk	= acceptable risk
	BW (body weight)	= 70 kg
	AT (averaging time in days)	= 25,550 (70 x 365)
	CF (conversion factor)	= 1000 ug/mg
	SF (cancer slope factor, mg/kg-d^{-1})	= chemical-specific
	EF (exposure frequency)	= 245 d/yr
	ED (exposure duration)	= 21 yr
	IR_{dw} (drinking water ingestion rate)	= 1 liter/day

NONCARCINOGENS:

$$\frac{HQ \times RfD \times BW \times AT \times RSC \times CF}{EF \times ED \times IR_{dw}}$$

where,		
	HQ (hazard quotient)	= 1
	RfD (oral reference dose, mg/kg/d)	= chemical-specific
	BW (body weight)	= 70 kg
	AT (averaging time)	= 7,665 days (21 x 365)
	CF (conversion factor)	= 1000 ug/mg
	RSC (relative source contribution)	= 0.2
	EF (exposure frequency)	= 245 d/yr
	ED (exposure duration)	= 21 yr
	IR_{dw} (drinking water ingestion rate)	= 1 liter/day
	ED (exposure duration)	= 21 yr
	IR_{dw} (drinking water ingestion rate)	= 1 liter/day

These equations yield values which represent concentrations of contaminants in water in units of parts per billion (ppb) or micrograms per liter (ug/l). To convert to units of parts per million (ppm) or milligrams per liter (mg/l) in water, divide by 1,000.

The selection of an appropriate averaging time (AT) is dependent upon the type of toxic effect being evaluated. EPA guidance is followed on this issue (USEPA, 1989; USEPA, 1991). AT represents the number of days over which the exposure is averaged. When evaluating long-term exposure to noncarcinogenic compounds, exposures are calculated by averaging over the period of exposure (i.e., subchronic or chronic exposures). For carcinogenic compounds, exposures are calculated by prorating the total cumulative dose over a lifetime (also called lifetime average daily dose). The approach for carcinogens is based on the assumption that a high dose of a carcinogen received over a short period of time is equivalent to a corresponding low dose spread over a lifetime. The averaging time for carcinogens is 25,550 days (70 years x 365 days) and 7,665 days (21 years x 365 days) for noncarcinogens.

MDNR's recommendation of 21 years as the exposure duration (ED) for a worker is based on 1991 statistics from the U.S. Dept. of Labor. However, since the Dept. of Labor statistics did not detail the distribution for employees

working greater than 19 years at one location, the EPA 95th percentile estimate of 25 years was assumed. The 90th percentile was estimated to be 21 years. Although an ED of 21 years differs from EPA's recommendation of 25 years, our value represents more recent data. In addition, we follow general EPA guidance which recommends using a combination of exposure assumptions which represent 50th, 90th and 95th percentiles.

The exposure frequency (EF) for the drinking water scenario is derived assuming 260 work days per year minus 3 work weeks (15 days) of vacation and sick time. The assumed amount of water ingested at work (1 liter/day) is based on EPA's recommendation (USEPA, 1991). It is pointed out, however, that workers engaged in hard, physical labor could ingest a greater volume of water and this should be considered before finalizing the criteria to be used at a specific site.

The RSC of 0.2 (20%) assumes that a worker gets 80% of his/her exposure to on-site contaminants from other sources. The RSC represents a default value, and if chemical-specific data are available, they should be used in place of the default. Use of the RSC is consistent with the algorithms for the residential cleanup criteria. Justification for use of a RSC follows. There are many chemicals to which people are exposed through a variety of media and activities. For example, solvents, which are common industrial contaminants, are also commonly found in products routinely used by the general consumer. Ignoring exposures from other sources could underestimate the risk posed by that type of chemical. However, other chemicals may not occur at significant levels, or may not occur at all, outside of the work place. In light of the fact that chemical-specific data pertaining to this issue is extremely limited and significant exposures to certain chemicals do occur outside of the work place, it is necessary to identify a conservative default for this generic approach. As data suggesting something other than 20% becomes available, they will be incorporated into the chemical-specific criteria calculations.

An RSC is only used for groundwater criteria; it has been eliminated from the direct contact soil equations. It's use for the industrial/commercial scenario is consistent with the residential equations. A 20% RSC for groundwater criteria is consistent with the approach taken by U.S. EPA for establishing Maximum Contaminant Level goals (MCLg) for noncarcinogens (previously known as RMCLs). Twenty percent is used by EPA "as a reasonable approximation of the actual exposure and recognizes that this value may somewhat either overestimate or underestimate the actual drinking water contribution. EPA does not believe that it is appropriate to set the RMCL at 100 percent of the ADI, as drinking water is not the sole contributor to total exposure, and using 100 percent of the ADI would underestimate the other sources of exposure" (U.S. EPA, 1985). An RSC has also been incorporated into the Great Lakes Initiative risk assessment process and has been informally used by the Waste Management Division in establishing groundwater permit limits for noncarcinogens.

In those cases where a State Drinking Water Standard is available, it will replace the health-based drinking water criterion, unless a more conservative aesthetic criterion is available.

Generic Industrial Direct Contact Soil Criterion Algorithms

CARCINOGENS:

$$\frac{10^{-5} \times BW \times AT \times CF}{SF \times (EF \times FD) \times ED \times FC \times [(IR_s \times AE_i) + (SA \times AF \times AE_d)]}$$

where,

10^{-5} cancer risk	= acceptable risk
BW (body weight)	= 70 kg
AT (averaging time)	= 25,550 days
CF (conversion factor)	= 1E+9 ug/kg
SF (cancer slope factor, mg/kg-d^{-1})	= chemical-specific
EF (exposure frequency)	= 112 d/yr
ED (exposure duration)	= 21 yr
FC (fraction of soil contaminated)	= 1
IR_s (soil ingestion rate)	= 50 mg/day
AE_i (ingestion absorp. efficiency)	= (see text)
SA (skin surface area)	= 2570 cm^2/day
AF (soil adherence factor)	= 1.0 mg/cm^2
AE_d (dermal absorption efficiency)	= (see text)

NONCARCINOGENS:

$$\frac{HQ \times RfD \times BW \times AT \times CF}{EF \times ED \times FC \times [(IR_s \times AE_i) + (SA \times AF \times AE_d)]}$$

where,

HQ (hazard quotient)	= 1
RfD (oral ref. dose, mg/kg/day)	= chemical-specific
BW (body weight)	= 70 kg
AT (averaging time)	= 7,665 days
CF (conversion factor)	= 1E+9 ug/kg
EF (exposure frequency)	= 112 d/yr
ED (exposure duration)	= 21 yr
FC (fraction soil contam'd)	= 1
Ir_s (soil ingestion rate)	= 50 mg/day
Ae_i (ingestion absorp. efficiency)	= (see text)
SA (skin surface area)	= 2570 cm^2/day
AF (soil adherence factor)	= 1.0 mg/cm^2
AE_d (dermal absorption efficiency)	= (see text)

These equations yield values representative of concentrations of contaminants in soil in units of ppb or micrograms/kilogram (ug/kg). To convert to units of ppm or milligrams/kilogram (mg/kg) in soil, divide by 1,000.

The exposure frequency (EF) for the direct contact scenario was derived considering climatic factors (e.g., snow cover, frozen soil) and inclement weather conditions (e.g., rain) as well as variation in daily activities in which industrial workers participate. It is assumed that Michigan winters last for 4 months (120 days) making soil unavailable for contact. Allowing three weeks off for vacations and sick leave, and adjusting for a standard five day work week yields a maximum number of 160 days per year of industrial outdoor exposure in Michigan. The assumptions represent high-end values within a range of potential exposures.

$$365 - 120 - 21 \times 5/7 = 160$$

Data from the Air Quality Division indicate that, on average, precipitation exceeds 0.25 inch one day per week during the months of March through October. These data represent average values from a 30 year period, 1951 through 1980. It is assumed that rainfall which exceeds 0.25 inches makes working outdoors difficult. Incorporating this factor also assumes that this significant rainfall occurs during the work week and during the eight hour work shift, which may not always be the case. However, this assumption may be balanced or "corrected" by a few low temperature days or snow days in March or October which could prevent a worker from working outdoors. This factor results in the number of days per week which a worker comes into contact with soil to be reduced from 5 to 4.

Activity patterns of a reasonable maximum exposed worker are not likely to bring the individual into contact with bare soil each and every day, since many different duties may be performed at any given facility. As a conservative estimate, it is assumed that one half day per week is spent performing some activity which does not bring the worker into contact with bare site soil. The incorporation of this factor results in a reasonable maximum EF value of 3.5 days per week or 112 days per year.

$$160 \times 3.5/5 = 112$$

The soil ingestion rate recommended by MDNR is 50 mg/day, which follows EPA's recommendation for industrial/commercial workers.

The oral absorption efficiency default is assumed to be 100% for volatiles and 50% for semi- and nonvolatile chemicals. When chemical-specific data are available, they will be used in place of the defaults. This policy is consistent with the Type B algorithms.

The skin surface area was estimated in the following manner:

skin surface area (cm^2) =	u SA forearms	= 1140
	u SA face (1/2 head)	= 590
	u SA hands	= 840
		2570

The amount of exposed skin surface area identified represents an average scenario, realizing that at times a worker could have more or less skin exposed. For example, there may be times when a worker is working without a shirt and times when a worker may be working in a long-sleeved shirt and/or a coat. The average scenario assumes that a worker is working in a short-sleeved shirt and long pants with hair or a hat covering part of his/her head. This scenario estimates a skin surface area value of 2,570 cm^2/day. In addition to the above discussion, surface area is strongly correlated with body weight. Since the assumed body weight represents an average value, surface area should be represented by an average value as well.

The attenuation factor of 1.0 mg/cm^2 is the value recommended by EPA (EPA, 1991). After evaluating the available soil adherence studies, EPA concludes that all of the studies considered have uncertainties thereby making a recommendation difficult. The studies provide a possible range from 0.2 to 1.5 mg/cm^2. A conservative central value of 1.0 mg/cm^2 is recommended until better data are available.

The dermal absorption efficiency is assumed to be 10% for volatiles and 1% for semi- and nonvolatiles as assumed in the Type B algorithm. All absorption values represent defaults which will be replaced if chemical-specific data are or become available.

As indicated earlier, EPA provides general guidance on how to characterize exposures and risks when conducting risk assessments. For Superfund exposure assessments, intake and exposure values should be selected so that the combination of all variables results in an estimate of the reasonable maximum exposure (RME) for that pathway. The RME is the maximum exposure that is reasonably expected to occur at a site. Under this approach, some intake variables may not be at their individual maximum values, but when in combination with other variables, will result in estimates of the RME (USEPA, 1989). More recent EPA guidance (USEPA, 1992), recommends estimating the high end exposure by "...identifying the most sensitive parameters and using maximum or near-maximum values for one or a few of these variables, leaving others at their mean values". This guidance applies when only limited information on the distribution of the exposure or dose factors is available. The basis for this recommendation is that maximizing all variables will result in an estimate that is above the range of actual values seen in the population. The algorithms presented in this document follow EPA guidance by combining exposure assumptions which represent a mix of high-end and mid-range values. For example, when evaluating the direct contact equation, a 70 year life span, body weight and surface area all represent a 50th percentile, while the exposure duration of 21 years and the soil ingestion rate represent the 90th percentile.

Since no distributions exist for frequency of exposure to soil, it's difficult to estimate a value and its associated percentile. However, it's reasonable to assume that the value chosen (112 days) is representative of the higher end of the range of possible exposures. Data supporting the dermal contact rate is also lacking, making it difficult to estimate the percentile that it represents. Although we are using average skin surface area values as presented by EPA (USEPA, 1990), estimation of those areas which are exposed to soil is strictly based upon best professional judgment. Although a significant amount of uncertainty surrounds the estimated exposure frequency and the dermal contact rate, the exposure assumptions selected are reasonable and conservative for the purpose of developing state-wide, generic cleanup criteria for industrial facilities.

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GENERIC COMMERCIAL LAND USE CATEGORY

The commercial land use category is extremely varied and broad, encompassing everything from day care centers and schools to gas stations and warehouse operations. The physical setting of commercial properties and the activities which workers and the general public engage in at these sites are also extremely variable. Given the breadth of the commercial land use category, it is impossible to assign a single set of "typical" or generic exposure assumptions to characterize the activities of all potentially exposed populations.

In order to facilitate the development of generic commercial criteria, the universe of commercial land uses has been divided into four subcategories based on factors which are critical to the assessment of potential risk. These factors include the potentially exposed populations (workers or general public) and the nature, duration, and frequency of the exposures likely to occur when people occupy, work at, visit, or patronize the site. The division of the commercial land use category into subcategories allows for some useful generalizations to be made.

A substantial degree of variability remains even within the subcategories of commercial land use. It will be the responsibility of the party proposing a remedy to demonstrate that the site and exposure setting is consistent with the characteristics of the subcategory closely enough to warrant use of the criteria. Similarly, the party proposing the remedy will have to describe in the RAP those measures that will be put in place (institutional controls, restrictive covenants, access restrictions, etc.) to assure that the exposure setting of the site is maintained consistent with the exposure characteristics of the subcategory. This will serve to guarantee that uses of the site which might yield unacceptable exposures will be precluded in the future. Conversely, land uses consistent with a subcategory may not possess exposures that are similar to those used to define the category. Proper characterization of those site-specific activities or exposures may warrant the use of generic criteria from another subcategory or category.

In the following sections, exposure assumptions protective for the set of site and exposure characteristics described below for subcategory III and IV sites have been developed. Some commercial subcategory III and IV sites may be located in or near residential areas and, therefore, may be used by other populations for purposes other than the intended commercial use (e.g. recreational). It may be inappropriate to apply the generic criteria developed for a given subcategory of commercial land use, if anticipated exposure from unintended uses exceeds the exposures assumed under that subcategory. Adjustments can be made to the exposure assumptions to represent these other uses or criteria for a more representative category can be used. Alternatively, the RAP may denote measures designed to preclude unintended uses.

For the purpose of determining if the generic commercial criteria presented in this memorandum are applicable, the party proposing a remedy must first determine that the site falls within the definition of commercial land use or that the site-related exposures are similar to those assumed for this category. The definition of commercial land use includes the following two elements:

- The primary activity at the site is commercial in nature (e.g., retail; warehouse; office/business space, etc.). This could include abandoned or inactive commercial facilities as long as they fit both the definition of a commercial facility and one of the subcategory definitions described below.

- The current zoning of the property is commercial, future zoning is anticipated to be commercial, or the RAP includes documentation that the current commercial use is a legal non-conforming use. This may include different zoning designations, depending on the community, such as "community commercial", "regional commercial", "retail", or "office-business". Documentation of zoning must be provided in the form of a map or current property record card which shows the zoning status of the site and all adjacent properties. If the RAP is based on anticipated zoning changes, discussion of this issue must indicate how and when the zoning changes are to be accomplished. The RAP must identify (preferably on a map) the nearest current residential land uses and nearest parcels which are zoned for residential use. Any non-conforming land uses in the vicinity of the site must be identified in the RAP (e.g., residential use on a parcel zoned "transitional commercial").

Caution should be used when categorizing sites on the basis of facility or business type. We expect that activities may vary considerably even among facilities of the same type. Activities and exposures should be the primary considerations when determining a land use category for a specific site.

If the site meets the definition of commercial land use, the party proposing the remedy must determine which of the four subcategories of commercial land use defined below is most representative of the exposure setting of the subject site. The subcategories and the features which define them are described below:

Subcategory I: This commercial land use subcategory is characterized by any use which is intended to house, educate, or provide care for children, the elderly, the infirm, or other sensitive subpopulations. The activities engaged in by these populations at the site are characterized by exposures of relatively significant duration and/or frequency approximating the magnitude of exposures used to develop the residential criteria. The site setting may include unpaved or landscaped areas containing contaminated surficial soils which may be frequented by potentially exposed populations (e.g. play areas). Any soil contaminants present may therefore be readily accessible to the resident populations. If relied on for drinking water, exposure to groundwater would also be significant. In addition, this subcategory of commercial land use is usually, but not always, located in or near residential areas and, therefore, may be used by other populations for purposes other than the intended commercial use (e.g. recreational). This subcategory could include, but is not limited to, the following uses:

- day care centers
- any form of educational facility
- hospitals, elder care facilities, and nursing homes.

Although a site-specific risk assessment may be conducted on sites within this category, no generic commercial cleanup criteria will be developed because in

most cases, the site setting and uses will warrant the application of residential criteria. There are forms of subcategory I commercial land uses that do not possess the exposure characteristics of the residential exposure setting, for example, long-term or convalescent care facilities where patients are not expected to come into contact with soils on a frequent basis. In such cases, site-specific cleanup criteria or criteria from another subcategory can be utilized with proper justification.

Subcategory II: This commercial land use subcategory is characterized by the following features. Access to the public is reliably restricted, consistent with its use, by fences, security, or both. Affected surficial soils are located in unpaved or landscaped areas that are frequently contacted by worker populations such as groundskeepers, maintenance workers, or other employees whose primary duties are performed outdoors. If site groundwater is relied on for drinking water, worker populations would receive half of their total exposure from on site drinking water.

This subcategory could include, but is not limited to, the following uses:

- large-scale commercial warehouse operations
- wholesale lumber yards
- building supply warehouses

The degree of exposure for such employees under Subcategory II property is assumed to be equivalent to the exposures used to model outdoor activities in the development of the generic industrial criteria. As a result, a unique set of generic criteria has not been defined for this subcategory of commercial land use. Sites which fall into this subcategory should be addressed through the application of the generic industrial criteria or through a site-specific risk assessment.

Subcategory III: A subcategory III commercial site is characterized by the following features. Access to the public is unrestricted, however, the general public's occupancy of the site is expected to be intermittent and significantly less in frequency and duration relative to the population working at the site. Although some of the activities for both worker populations and the general public at a subcategory III commercial site are conducted indoors, a significant component of their activity will likely be outdoors. Affected surficial soils are located in unpaved or landscaped areas that may be contacted frequently, primarily by the worker populations (as may be the cases at gas stations, auto dealerships or building supply warehouses with unpaved or landscaped areas). If site groundwater is relied on for drinking water, worker populations would receive about half of their total exposure from the site.

This subcategory could include, but is not limited to, the following uses:

- Retail gas stations
- Auto service stations
- Auto dealerships
- Retail warehouses selling the majority of their merchandise indoors but including some limited storage or stockpiling of materials in a rear yard (building supply, retail flower and garden shops not involving on site plant horticulture and excluding open air nurseries, tree farms and sod farms which would fall into an agricultural land use).

- Repair and service establishments including but not limited to, lawn mower, boat, snowmobile, or small appliance repair shops that have small outdoor yards.
- Small warehouse operations

Subcategory IV: A subcategory IV commercial site is characterized by the following features. Access to the public is unrestricted, however, the general public's occupancy of the site is intermittent in frequency and of short duration relative to the worker populations resident at the site (i.e. the frequency and duration of general public occupancy at the site is typified by the time necessary to transact business at a retail establishment or to receive personal services). The predominant activities performed by both workers and the general public at this type of commercial property are conducted indoors. Affected surficial soils are located in unpaved or landscaped areas that are contacted by worker populations on an occasional basis, such as outdoor break or eating areas. General public contact with these areas is anticipated to be significantly less than the worker's contact, both in terms of frequency and duration. If site groundwater is relied on for drinking water, worker populations would receive one-half of their total exposure at the site.

This subcategory could include, but is not limited to, the following uses:

- Professional offices (lawyers, architects, engineers, real estate, insurance, etc.)
- Medical/dental offices and clinics (not including hospitals)
- Banks, credit unions, savings and loan institutions, etc.
- Publicly owned office buildings
- Any retail business whose principal activity is the sale of food or merchandise within an enclosed building
- Personal service establishments which perform services indoors (health clubs, barber/beauty salons, mortuaries, photographic studios, etc.).

Generic Commercial Cleanup Criteria Algorithms

The following section provides justification for the exposure assumptions used under the generic commercial subcategories III and IV. The methods used to establish the generic commercial cleanup criteria for commercial subcategories III and IV are briefly summarized below.

Groundwater: The worker population was used to establish exposure parameters for the generic commercial groundwater criteria. Because workers are expected to spend the most time on site, their exposures are assumed to be greater than exposures to the general public. Protection of the more highly exposed population assures protection of the general public.

Unlike soil exposures, the exposure assumptions which serve as the basis for the generic groundwater criteria were not varied between subcategories (except for subcategory I which assumes the ingestion of 2 liters of water/day). No meaningful distinctions could be made between commercial land use subcategories and water ingestion rates. The exposure assumptions and the resulting groundwater criteria do not differ from those developed for the generic industrial scenario. Please refer to the narrative on groundwater

exposure assumptions in the generic industrial section for details. When available, State Drinking Water Standards serve as the ultimate drinking water criterion, unless a more restrictive aesthetic cleanup criterion is available.

Soil: The exposure assumptions used in the direct contact algorithms are protective for a "reasonable maximum exposure". The focus was the worker population within each subcategory that spends the largest amount of time outdoors engaged in activities that permit contact with affected soils. The worker population in both commercial subcategory III and subcategory IV represents the segment of the population within the subcategory with the highest potential exposures. Protection of less significantly exposed populations, like customers or workers who spend less time outdoors, is thereby assured.

Generic Commercial Direct Contact Soil Algorithm

The direct contact soil algorithm for the commercial scenario is the same as the industrial direct contact soil algorithm with the exception of different values for two exposure parameters, specifically, exposure frequency (EF) and the skin surface area (SA), and incorporation of an exposure time parameter. Please refer to the generic industrial section for details on the exposure assumptions that have not changed.

CARCINOGENS:

$$\frac{10^{-5} \times BW \times AT \times CF}{SF \times (EF \times FD) \times ED \times FC \times [(IR_s \times AE_i) + (SA \times AF \times AE_d)]}$$

where,

10^{-5} cancer risk	= acceptable risk
BW (body weight)	= 70 kg
AT (averaging time)	= 25,550 days
CF (conversion factor)	= 1E+9 ug/kg
SF (cancer slope factor, mg/kg-d^{-1})	= chemical-specific
EF (exposure frequency)	= (see text)
FD (fraction of work day)	= (see text)
ED (exposure duration)	= 21 yr
FC (fraction of soil contaminated)	= 1
IR_s (soil ingestion rate)	= 50 mg/day
AE_i (ingest. absorption efficiency)	= (see text)
SA (skin surface area)	= (see text)
AF (soil adherence factor)	= 1.0 mg/cm^2
AE_d (dermal absorption efficiency)	= (see text)

NONCARCINOGENS:

$$\frac{HQ \times RfD \times BW \times AT \times CF}{(EF \times FD) \times ED \times FC \times [(IR_s \times AE_i) + (SA \times AF \times AE_d)]}$$

where,

HQ (hazard quotient)	= 1
RfD(oral reference dose, mg/kg day)	= chemical specific
BW	= 70 kg
AT	= 7,665 days
CF	= 1E+9 ug/kg
EF	= (see text)
ED	= 21 yr
FD	= (see text)
FC (fraction soil contam'd)	= 1

Ir_s	= 50 mg/day
AE_i	= (see text)
SA	= (see text)
AF	= 1.0 mg/cm^2
AE_d	= (see text)

These equations yield values which represent concentrations of contaminants in soil in units of ppm or mg/kg. To convert to units of ppb or micrograms/kilogram in soil (ug/kg), multiply by 1,000.

Commercial Subcategory III

A typical receptor in this subcategory is a gas station attendant who must perform a combination of indoor and outdoor activities. The EF of 160 days/year was derived assuming that four months of winter would preclude an individual from coming into contact with soil. Rain and other inclement weather factors were not considered because it is assumed that this type of worker must still perform his/her outdoor duties. Allowing for three weeks off per year for vacations and sick leave and adjusting for a standard five day work week yields a maximum number of 160 days per year of potential exposure (i.e., 365 - 120 - 21 x 5/7 = 160). Having both indoor and outdoor responsibilities, this type of commercial worker is conservatively expected to spend four out of eight hours per work day outdoors. The FD parameter is equal to 0.5 (4/8 hours).

The area of skin exposed is assumed to be the same as for the generic industrial worker, 2570 cm^2/day. This assumes that the face, hands and forearms of the receptor are available for exposure, typified by a worker wearing a short-sleeved shirt and long pants.

Commercial Subcategory IV

The typical worker in this subcategory may be represented by an office worker who eats lunch and takes breaks outdoors. The EF was derived assuming that four months of winter would preclude an individual from coming into contact with soil. Allowing three weeks off for vacations and sick leave and adjusting for a standard five day work week yields 160 days/year. As in the generic industrial scenario, it is also assumed that it rains one day out of the week. This results in a value of 128 days/year. Since this type of receptor is outdoors only a small portion of the work day, reasonably 1.5 hours/day, a fraction of day parameter (FD) (1.5 hours out of 8) is incorporated into the algorithm. FD is equal to 0.19 (1.5/8).

This type of receptor is assumed to be a person with face, hands, forearms and lower legs exposed. This represents an individual wearing a short-sleeved shirt and a dress or skirt. The total skin surface area for these exposed areas is 4575 cm^2/day.

The assumed EF, FD, and SA values for the two commercial subcategories are summarized as follows:

	Exposure Frequency	Fraction of Day	Surface Area
Commercial Subcat. III	160	0.50	2570
Commercial Subcat. IV	128	0.19	4575

Attached as a table is a matrix presenting all commercial category and subcategory definitions and exposure assumptions. Use this table when trying to determine the most appropriate commercial land use subcategory for the site in question.

Table 1. Definitions of industrial and commercial categories and commercial subcategories and associated exposure assumptions.

LAND USE CATEGORIES AND SUBCATEGORIES	EXPOSURE ASSUMPTIONS				
	Exposure Frequency (d/year)	Fraction of Day (unitless)	Exposure Duration (years)	Soil Ingestion Rate (mg/day)	Skin Surface Area (cm^2/day)
INDUSTRIAL primary activity is industrial; property has landscaped and/or unpaved areas maintained by employees on a regular basis or employees are present whose primary duties are performed outdoors; access to general public is restricted; zoning is industrial	≤112	≤1	≤21	≤50	≤2570
COMMERCIAL primary activity is commercial; access is unrestricted; zoning is commercial; see subcategories					
SUBCATEGORY I a property where children, the elderly, the infirm or other sensitive subpopulations are housed, educated or otherwise cared for, e.g., schools, nursing homes, day cares; residential cleanup required	≤365	≤1	≤70	≤90	varies for different age grps.
SUBCATEGORY II activities similar to those characterized in industrial category; industrial cleanup required	≤112	≤1	≤21	≤50	≤2570
SUBCATEGORY III property has landscaped or unpaved areas in which some employees will spend approximately half of their work time, e.g., gas station attendants	≤160	≤0.5	≤21	≤50	≤2570
SUBCATEGORY IV a property with unpaved or landscaped areas that will be frequented by employees on an occasional basis, e.g., outdoor eating areas	≤128	≤0.19	≤21	≤50	≤4575

PART 201 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994
PA 451
GENERIC INDUSTRIAL AND COMMERCIAL CLEANUP CRITERIA
FOR GROUNDWATER AND SOIL

(REVISION 2)

These criteria were calculated using currently available toxicological data. Criteria may change as new toxcity data become available. They are not necessarily final cleanup standards. The determination of a soil concentration protective of surface water and/or groundwater in an aquifer is more complex than for residential sites, consequently, there are no values shown on the list. PLEASE READ THE ATTACHED OPERATIONAL MEMORANDUM FOR DETAILS. Carcinogenic chemicals are shown in bold italics. All values are expressed in units of parts per billion (ppb); ug/l in water and ug/kg in soil. (Values are converted from units of parts per million (ppm) as generated by algorithms). Scientific notation is represented by E+ or E- a value, for example 2×10^6 is reported as 2E+6. Please refer to Operational Memorandum #6 and #8 for information concerning method detection limits and residential cleanup criteria, respectively.

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
Acenaphthene	3,800	NA	3.8	5	8.1E+8	1.0E+9 (G)	1.0E+9 (G)	330
Acenaphthylene	75	NA	(B)	5	1.6E+7	2.3E+7	5.4E+7	330
Acetaldehyde	2,700	NA	(B)	500	9.7E+7	1.4E+8	2.7E+8	2,500
Acetic acid	12,000	NA	(B)	18,000	4.2E+8	5.9E+8	1.0E+9 (G)	9.0E+5
Acetone	2,100	NA	25,000	100	7.4E+7	1.0E+8	2.1E+8	100
Acetonitrile	400	NA	810	50	1.4E+7	2.0E+7	3.9E+7	100
Acrolein	330	NA	2.5	5	1.2E+7	1.7E+7	3.3E+7	10
Acrylamide	0.78	NA	9.1	0.5	33,000	47,000	1.1E+5	5
Acrylic acid	11,000	NA	(B)	NA	3.9E+8	5.5E+8	1.0E+9 (G)	NA
Acrylonitrile	6.4	NA	2.2	1	46,000	64,000	1.3E+5	10
Alachlor	2 (C)	NA	48	1	1.9E+6	2.6E+6	6.2E+6	20
Aldicarb	3 (C)	NA	(B)	2	4.5E+6	6.3E+6	1.5E+7	50
Aldicarb sulfoxide	4 (C)	NA	(B)	2	5.9E+6	8.2E+6	1.9E+7	50
Aldicarb sulfone	2 (C)	NA	(B)	2	5.0E+6	7.0E+6	1.6E+7	50
Aldrin	0.2	NA	0.0014	0.01	8,800	12,000	29,000	20
Aluminum	ID	50 (A,F)	(B)	100	ID	ID	ID	700
Ammonia	ID (P)	NA	20 (D)	50	ID (P)	ID (P)	ID (P)	1,000
Aniline	610	NA	4	20	2.6E+7	3.7E+7	8.7E+7	1,700
Anthracene	21,000	NA	1.1E+5	5	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	330
Antimony	6 (A,C)	NA	50 (A)	5	1.6E+6	2.2E+6	5.2E+6	500
Arsenic	50 (A,C)	NA	11 (A)	5	83,000	1.2E+5	2.8E+5	100
Atrazine	3 (C)	NA	7.8	1	6.8E+5	9.5E+5	2.3E+6	50
Azobenzene	32	NA	(B)	NA	1.4E+6	1.9E+6	4.5E+6	NA
Barium	2,000 (A,C)	NA	630 (A,D)	200	3.2E+8	4.4E+8	1.0E+9 (G)	1,000
Benzene	5 (C)	NA	53	5	8.5E+5	1.2E+6	2.4E+6	10

GENERIC INDUSTRIAL AND COMMERCIAL CLEANUP CRITERIA

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
					Direct Contact Value			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Industrial	Commercial Subcategory III	Commercial Subcategory IV	Target Method Detection Limit in Soil
Benzidine	0.015	NA	0.0054	50	650	910	2,200	1,000
Benzo(a)anthracene (Q)	4.8	NA	0.31	5	2.1E+5	2.9E+5	6.8E+5	330
Benzo(b)fluoranthene (Q)	4.8	NA	0.31	5	2.1E+5	2.9E+5	6.8E+5	330
Benzo(k)fluoranthene (Q)	48	NA	0.31	5	2.1E+6	2.9E+6	6.8E+6	330
Benzo(g,h,i)perylene	75	NA	(B)	5	1.6E+7	2.3E+7	5.4E+7	330
Benzo(a)pyrene (Q)	0.2 (C)	NA	0.31	5	21,000	29,000	68,000	330
Benzoic acid	92,000	NA	(B)	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	3,300
Benzyl alcohol	29,000	NA	22	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	1,300
Benzyl chloride	20	NA	(B)	0.5	1.5E+5	2.0E+5	4.1E+5	200
Beryllium	4 (C)	NA	(B)	1	35,000	49,000	1.2E+5	200
Bis(2-chloroethoxy)ethane	ID	NA	(B)	5	ID	ID	ID	330
bis(2-Chloroethyl)ether	3.2	NA	4.2	5	23,000	32,000	63,000	330
bis(2-Ethylhexyl)phthalate	6 (C)	NA	59	5	1.1E+7	1.5E+7	3.5E+7	330
Boron	1,300 (A)	NA	(B)	300	2.7E+8	3.8E+8	8.9E+8	8,000
Bromobenzene	ID	NA	(B)	1	ID	ID	ID	10
Bromodichloromethane	100 (C,S)	NA	24	1	4.0E+5	5.6E+5	1.1E+6	10
Bromoform	100 (C,S)	NA	65	1	3.1E+6	4.4E+6	8.7E+6	10
Bromomethane	29	NA	11	1	1.0E+6	1.5E+6	2.9E+6	10
n-Butanol	2,700	NA	(B)	800	9.7E+7	1.4E+8	2.7E+8	4,400
2-Butanone (MEK)	38,000	NA	7,200	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	100
n-Butyl acetate	1,600	NA	40	10	5.7E+7	7.9E+7	1.6E+8	20
t-Butyl alcohol	11,000	NA	8,300	1,000	4.0E+8	5.6E+8	1.0E+9 (G)	4,400
Butyl benzyl phthalate	3,300	NA	(B)	5	7.2E+8	1.0E+9 (G)	1.0E+9 (G)	330
Cadmium	5 (A,C)	NA	0.64 (A,D)	0.5	2.3E+6	3.2E+6	7.4E+6	50
Camphene	ID	NA	(B)	NA	ID	ID	ID	NA
Caprolactam	17,000	NA	(B)	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
Carbaryl	2,000	NA	(B)	20	4.3E+8	6.1E+8	1.0E+9 (G)	1,000
Carbofuran	40 (C)	NA	1.6	20	3.7E+6	5.2E+6	1.0E+7	200
Carbon disulfide (R)	2,300	NA	(B)	50	8.2E+7	1.1E+8	2.3E+8	100
Carbon tetrachloride	5 (C)	NA	21	1	1.9E+5	2.7E+5	5.3E+5	10
Chlordane	2 (C)	NA	0.00053	0.02	1.2E+5	1.6E+5	3.8E+5	10
Chloride	ID	2.5E+5	(B)	10,000	ID	ID	ID	2.0E+5
Chlorobenzene	100 (C)	NA	71	1	1.4E+7	2.0E+7	3.9E+7	10
Chloroethane	910	NA	(B)	1	6.5E+6	9.1E+6	1.8E+7	10
2-Chloroethyl vinyl ether	ID	NA	(B)	10	ID	ID	ID	100
Chloroform	100 (C,S)	NA	80	1	4.1E+6	5.7E+6	1.1E+7	10
Chloromethane	270	NA	(B)	1	1.9E+6	2.7E+6	5.3E+6	10
4-Chloro-3-methylphenol	420	NA	4.4	5	1.5E+7	2.1E+7	4.1E+7	330
beta-Chloronaphthalene	5,200	NA	(B)	5	1.9E+8	2.6E+8	5.2E+8	330

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
2-Chlorophenol	130	NA	10	5	4.6E+6	6.5E+6	1.3E+7	330
o-Chlorotoluene	420	NA	(B)	1	1.5E+7	2.1E+7	4.1E+7	10
Chlorpyrifos	63	NA	0.002	0.2	1.4E+7	1.9E+7	4.5E+7	10
Chromium (III) (I)	100 (A,C,J)	NA	77 (A,D)	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	2,500
Chromium (VI) (I)	100 (A,C,J)	NA	7.3 (A)	5	2.2E+7	3.0E+7	7.1E+7	200
Chrysene (Q)	480	NA	0.31	5	2.1E+7	2.9E+7	6.8E+7	330
Cobalt	100	NA	(B)	10	2.3E+7	3.2E+7	7.4E+7	500
Copper	4,000 (A)	1,000	18 (A,D)	25	1.7E+8	2.4E+8	5.6E+8	1,000
Cyanazine	6	NA	4.7	10	2.6E+5	3.6E+5	8.5E+5	500
Cyanide (R)	200 (C)	NA	5.2	20	9.9E+7	1.4E+8	3.3E+8	500
Cyclohexanone	94,000	NA	(B)	50	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	100
Dacthal	210	NA	(B)	1	4.5E+7	6.3E+7	1.5E+8	20
Dalapon	200 (C)	NA	(B)	10	6.3E+7	8.8E+7	1.8E+8	100
4-4'-DDD	14	NA	0.0084	0.02	6.3E+5	8.8E+5	2.1E+6	20
4-4'-DDE	10	NA	0.0059	0.02	4.4E+5	6.2E+5	1.5E+6	20
4-4'-DDT	10	NA	0.00023	0.02	4.4E+5	6.2E+5	1.5E+6	20
Decabromodiphenyl ether	200	NA	(B)	10	4.5E+7	6.3E+7	1.5E+8	100
Di-n-butyl phthalate	2,500	NA	12,000	5	5.4E+8	7.6E+8	1.0E+9 (G)	330
Di(2-ethylhexyl) adipate	400 (C)	NA	(B)	5	2.1E+7	2.9E+7	5.8E+7	330
Di-n-octyl phthalate	380	NA	(B)	5	8.1E+7	1.1E+8	2.7E+8	330
Diacetone alcohol	ID	NA	(B)	NA	ID	ID	ID	NA
Diazinon	3.8	NA	0.002	0.5	8.1E+5	1.1E+6	2.7E+6	10
Dibenzo(a,h)anthracene (Q)	0.48	NA	0.31	5	21,000	29,000	68,000	330
Dibenzofuran	ID	NA	(B)	5	ID	ID	ID	330
Dibromochloromethane	100 (C,S)	NA	29	1	3.0E+5	4.1E+5	8.2E+5	10
Dibromomethane	230	NA	(B)	5	5.0E+7	6.9E+7	1.6E+8	10
1,2-Dichlorobenzene	600 (C)	NA	7	1	6.4E+7	9.0E+7	1.8E+8	10
1,3-Dichlorobenzene	600 (C)	NA	180	1	6.4E+7	9.0E+7	1.8E+8	10
1,4-Dichlorobenzene	75 (C)	NA	15	1	1.0E+6	1.4E+6	2.9E+6	10
3,3'-Dichlorobenzidine	7.7	NA	0.063	20	55,000	77,000	1.5E+5	2,000
Dichlorodifluoromethane	4,800	NA	(B)	1	1.7E+8	2.4E+8	4.8E+8	10
1,1-Dichloroethane	2,500	NA	(B)	1	8.9E+7	1.3E+8	2.5E+8	10
1,2-Dichloroethane	5 (C)	NA	560	1	2.7E+5	3.8E+5	7.6E+5	10
1,1-Dichloroethylene	7 (C)	NA	32	1	7.4E+5	1.0E+6	2.1E+6	10
cis-1,2-Dichloroethylene	70 (C)	NA	(B)	1	8.2E+6	1.1E+7	2.3E+7	10
trans-1,2-Dichloroethylene	100 (C)	NA	300	1	1.3E+7	1.8E+7	3.5E+7	10
2,6-Dichloro-4-nitroaniline	6,300	NA	(B)	0.01	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	0.1
2,4-Dichlorophenol	210	NA	34 (D)	5	4.5E+7	6.3E+7	1.5E+8	330
2,4-Dichlorophenoxyacetic acid	70 (C)	NA	47	10	4.5E+7	6.3E+7	1.5E+8	200

GENERIC INDUSTRIAL AND COMMERCIAL CLEANUP CRITERIA

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
					Direct Contact Value			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Industrial	Commercial Subcategory III	Commercial Subcategory IV	Target Method Detect Limit in Soil
1,2-Dichloropropane	5 (C)	NA	64	1	3.6E+5	5.1E+5	1.0E+6	10
1,3-Dichloropropene (J)	19	NA	3	1	1.4E+5	1.9E+5	3.8E+5	10
Dichlorovos	12	NA	(B)	0.1	5.2E+5	7.2E+5	1.7E+6	50
Dicyclohexyl phthalate	ID	NA	(B)	5	ID	ID	ID	330
Dieldrin	0.22	NA	3.2E-5	0.02	9,400	13,000	31,000	20
Diethoxymethane	ID	NA	(B)	10	ID	ID	ID	100
Diethyl ether	10,000	NA	(B)	50	3.7E+8	5.2E+8	1.0E+9 (G)	100
Diethyl phthalate	16,000	NA	1.2E+5	5	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	330
Diethylene glycol monobutyl ether	250	NA	(B)	NA	5.4E+7	7.6E+7	1.8E+8	NA
Diisopropylamine	16	NA	(B)	NA	5.7E+5	8.0E+5	1.6E+6	NA
Dimethyl phthalate	2.1E+5	NA	2.9E+6	5	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	330
N,N-Dimethylacetamide	520	NA	(B)	NA	1.9E+7	2.6E+7	5.2E+7	NA
N,N-Dimethylaniline	46	NA	(B)	NA	1.6E+6	2.3E+6	4.6E+6	NA
Dimethylformamide	2,000	NA	3,800	NA	7.1E+7	1.0E+8	2.0E+8	NA
2,4-Dimethylphenol	1,000	NA	31	5	2.3E+8	3.2E+8	7.4E+8	330
2,6-Dimethylphenol	13	NA	(B)	5	2.7E+6	3.8E+6	8.9E+6	330
3,4-Dimethylphenol	29	NA	(B)	5	6.3E+6	8.8E+6	2.1E+7	330
Dimethylsulfoxide	6.3E+5	NA	(B)	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
2,4-Dinitrotoluene	5.1	NA	91	5	2.2E+5	3.1E+5	7.3E+5	330
Dinoseb	7 (C)	NA	0.5 (D)	1	4.5E+6	6.3E+6	1.5E+7	20
1,4-Dioxane	320	NA	2,000	1	2.3E+6	3.2E+6	6.3E+6	10
Diquat	20 (C)	NA	(B)	1	9.9E+6	1.4E+7	3.3E+7	NA
Endosulfan (J)	4.6	NA	(B)	0.01	1.0E+6	1.5E+6	3.4E+6	3.3
Endothall	100 (C)	NA	(B)	20	7.7E+7	1.1E+8	2.5E+8	NA
Endrin	2 (C)	NA	0.0023	0.02	7.7E+5	1.1E+6	2.5E+6	20
Epichlorohydrin	350	NA	(B)	5	2.5E+6	3.5E+6	7.0E+6	10
Ethanol	5.6E+6	NA	41,000	1,000	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	4,400
Ethyl acetate	19,000	NA	1,000	NA	6.7E+8	9.4E+8	1.0E+9 (G)	NA
1-Ethyl-2-methylbenzene	ID	NA	(B)	NA	ID	ID	ID	NA
Ethylbenzene	700 (C)	74	31	1	7.2E+7	1.0E+8	2.0E+8	10
Ethylene dibromide	0.05 (C)	NA	1.1	1	290	410	810	10
Ethylene glycol	42,000	NA	68,000	5,000	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	5,000
Ethylene glycol acetate	ID	NA	(B)	NA	ID	ID	ID	NA
Ethylene glycol monobutyl ether	270	NA	(B)	NA	9.7E+6	1.4E+7	2.7E+7	NA
Fluoranthene	2,500	NA	370	5	5.4E+8	7.6E+8	1.0E+9 (G)	330
Fluorene	2,500	NA	14,000	5	5.4E+8	7.6E+8	1.0E+9 (G)	330
Fluorine	400 (C)	2,000	1,900	NA	2.7E+8	3.8E+8	8.9E+8	NA
Formaldehyde	3,800	NA	170	100	1.3E+8	1.9E+8	3.7E+8	500
Formic acid	29,000	NA	(B)	18,000	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	9.0E+5

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
					Direct Contact Value			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Industrial	Commercial Subcategory III	Commercial Subcategory IV	Target Method Detection Limit in Soil
1-Formylpiperidine	230	NA	(B)	NA	8.2E+6	1.1E+7	2.3E+7	NA
Gentian violet	35	NA	(B)	NA	1.5E+6	2.1E+6	5.0E+6	NA
Glyphosate	700 (C)	NA	(B)	100	4.5E+8	6.3E+8	1.0E+9 (G)	NA
Heptachlor	0.4 (C)	NA	0.0016	0.01	33,000	47,000	1.1E+5	20
Heptachlor epoxide	0.2 (C)	NA	0.0011	0.01	16,000	23,000	54,000	20
n-Heptane	92,000	NA	4	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
Hexabromobenzene	58	NA	(B)	(K)	1.3E+7	1.8E+7	4.2E+7	(K)
Hexachlorobenzene (C-66)	1(C)	NA	0.0019	(K)	94,000	1.3E+5	3.1E+5	(K)
Hexachlorobutadiene (C-46)	45	NA	500	(K)	1.9E+6	2.7E+6	6.4E+6	(K)
alpha-Hexachlorocyclohexane	0.55	NA	0.13	0.01	24,000	33,000	79,000	20
beta-Hexachlorocyclohexane	1.9	NA	0.46	0.01	83,000	1.2E+5	2.8E+5	20
Hexachlorocyclopentadiene (C-56)	50 (C)	NA	0.54	(K)	3.2E+7	4.5E+7	1.1E+8	(K)
Hexachloroethane	250	NA	13	2	1.8E+6	2.5E+6	4.9E+6	50
n-Hexane	8,600	NA	(B)	NA	3.1E+8	4.3E+8	8.5E+8	NA
2-Hexanone	2,900	NA	(B)	50	1.0E+8	1.5E+8	2.9E+8	100
Indeno(1,2,3-cd)pyrene (Q)	4.8	NA	0.31	5	2.1E+5	2.9E+5	6.8E+5	330
Iron	ID	300 (A)	(B)	100	ID	ID	ID	2,000
Isobutyl alcohol	6,700	NA	(B)	1,000	2.4E+8	3.3E+8	6.6E+8	4,400
Isophorone	3,700	NA	860	5	2.6E+7	3.7E+7	7.3E+7	330
Isopropyl alcohol	1,300	NA	21,000	400	4.8E+7	6.7E+7	1.3E+8	4,400
Lead	4 (A,L)	NA	6.6 (A,D)	3	4.0E+5 (L)	4.0E+5 (L)	4.0E+5 (L)	1,000
Lindane	0.2 (C)	NA	0.08	0.01	1.2E+5	1.6E+5	3.8E+5	20
Magnesium	1.2E+6	NA	(B)	30	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	3,000
Manganese	500 (A)	50 (A)	(B)	20	2.2E+7	3.0E+7	7.1E+7	2,000
Mercury (inorganic)	2 (A,C)	NA	0.0013 (A)	0.2	1.4E+6	1.9E+6	4.5E+6	100
Methanol	10,000	NA	41,000	1,000	3.7E+8	5.2E+8	1.0E+9 (G)	4,400
Methoxychlor	40 (C)	NA	(B)	0.5	2.3E+7	3.2E+7	7.4E+7	50
2-Methoxyethanol	83	NA	(B)	NA	3.0E+6	4.2E+6	8.3E+6	NA
2-Methyl-4-chlorophenoxyacetic acid	21	NA	(B)	0.5	4.5E+6	6.3E+6	1.5E+7	100
2-Methyl-4,6-dinitrophenol	7.3	NA	0.59	20	1.6E+6	2.2E+6	5.2E+6	1,700
4-Methyl-2-pentanone (MIBK)	1,000	NA	(B)	50	3.7E+7	5.2E+7	1.0E+8	100
Methyl-tert-butyl ether (MTBE)	690	NA	380	50	2.5E+7	3.4E+7	6.8E+7	100
N-Methyl-morpholine	56	NA	(B)	NA	2.0E+6	2.8E+6	5.6E+6	NA
Methylcyclopentane	ID	NA	(B)	50	ID	ID	ID	500
4,4'-Methylene-bis-2-chloroaniline (M)	3.6	NA	(B)	1	1.6E+5	2.2E+5	5.1E+5	50
Methylene chloride	5 (C)	NA	59	5	3.3E+6	4.6E+6	9.2E+6	10
2-Methylnaphthalene	ID	NA	(B)	5	ID	ID	ID	330
2-Methylphenol	1,000	NA	38	5	3.7E+7	5.2E+7	1.0E+8	330
3-Methylphenol	1,000	NA	(B)	5	2.3E+8	3.2E+8	7.4E+8	330

GENERIC INDUSTRIAL AND COMMERCIAL CLEANUP CRITERIA

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
					Direct Contact Value			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Industrial	Commercial Subcategory III	Commercial Subcategory IV	Target Method Detec Limit in Soil
4-Methylphenol	100	NA	6.2	5	2.3E+7	3.2E+7	7.4E+7	330
Metolachlor	670	NA	150	10	2.9E+7	4.0E+7	9.5E+7	50
Molybdenum	100 (A)	NA	800 (A)	10	2.3E+7	3.2E+7	7.4E+7	100
Naphthalene	750	NA	29	5	1.6E+8	2.3E+8	5.4E+8	330
Nickel	100 (A,C)	NA	57 (A,D)	50	3.4E+8	4.8E+8	1.0E+9 (G)	1,000
Nitrate (P)	10,000 (C,P)	NA	(B)	100	ID	ID	ID	NA
Nitrite (P)	1,000 (C,P)	NA	(B)	100	ID	ID	ID	NA
Nitrobenzene	9.6	NA	1,900	5	3.4E+5	4.8E+5	9.5E+5	330
2-Nitrophenol	58	NA	(B)	5	1.3E+7	1.8E+7	4.2E+7	330
n-Nitroso-di-n-propylamine	0.5	NA	(B)	5	3,500	5,000	9,900	330
N-Nitrosodiphenylamine	710	NA	160	5	5.1E+6	7.1E+6	1.4E+7	330
Oxamyl	200 (C)	NA	(B)	NA	1.7E+8	2.4E+8	5.6E+8	NA
Oxo-hexyl acetate	210	NA	(B)	NA	7.4E+6	1.0E+7	2.1E+7	NA
Pendimethalin	2,500	NA	0.62	0.1	5.4E+8	7.6E+8	1.0E+9 (G)	20
Pentachlorobenzene	17	NA	(B)	2	3.7E+6	5.2E+6	1.2E+7	50
Pentachloronitrobenzene	160	NA	(B)	2	3.4E+7	4.7E+7	1.1E+8	50
Pentachlorophenol	1 (C)	NA	0.8 (D)	20	1.3E+6	1.8E+6	4.1E+6	3,400
Pentane	ID	NA	(B)	100	ID	ID	ID	1,000
2-Pentene	ID	NA	(B)	NA	ID	ID	ID	NA
Phenanthrene	75	NA	(B)	5	1.6E+7	2.3E+7	5.4E+7	330
Phenol	13,000	NA	1,100	5	4.5E+8	6.2E+8	1.0E+9 (G)	330
Picloram	500 (C)	NA	(B)	10	3.2E+8	4.4E+8	1.0E+9 (G)	100
Piperidine	9.2	NA	(B)	NA	3.3E+5	4.6E+5	9.1E+5	NA
Polybrominated biphenyls (J)	0.39	NA	(B)	NA	17,000	24,000	56,000	NA
Polychlorinated biphenyls (PCBs) (J,T)	0.5 (C)	NA	2.0E-5	0.2	21,000	30,000	58,000	330
Prometon	460	NA	(B)	0.5	9.9E+7	1.4E+8	3.3E+8	20
Propachlor	270	NA	(B)	1	5.9E+7	8.2E+7	1.9E+8	20
Propazine	560	NA	(B)	0.5	1.2E+8	1.7E+8	4.0E+8	20
Propionic acid	35,000	NA	(B)	100	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	6,700
Propyl alcohol	4,000	NA	15,000	NA	1.4E+8	2.0E+8	3.9E+8	NA
Propylene glycol	4.2E+5	NA	1.9E+5	5,000	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	5,000
Pyrene	1,600	NA	11,000	5	3.4E+8	4.7E+8	1.0E+9 (G)	330
Pyridine	21	NA	20	20	7.4E+5	1.0E+6	2.1E+6	330
Selenium	50 (A,C)	NA	5 (A)	5	2.3E+7	3.2E+7	7.4E+7	500
Silver	98 (A)	100	0.1 (A)	0.5	2.1E+7	3.0E+7	7.0E+7	500
Simazine	4 (C)	NA	3.4	10	2.3E+7	3.3E+7	7.7E+7	40
Sodium	4.5E+5	NA	(B)	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
Styrene	100 (C)	NA	19	1	8.3E+5	1.2E+6	2.3E+6	10
Sulfate	ID	2.5E+5	(B)	NA	ID	ID	ID	NA

Chemical	GROUNDWATER (ppb:ug/l)				SOIL (ppb:ug/kg)			
	Health-Based Drinking Water Value	Aesthetic Drinking Water Value	GSI Value	Target Method Detection Limit in Water	Direct Contact Value			Target Method Detection Limit in Soil
					Industrial	Commercial Subcategory III	Commercial Subcategory IV	
Tebuthiuron	1,500	NA	(B)	NA	3.2E+8	4.4E+8	1.0E+9 (G)	NA
2,3,7,8-Tetrabromodibenzo-p-dioxin (O)	(O)	NA	(O)	0.0001	(O)	(O)	(O)	0.01
1,2,4,5-Tetrachlorobenzene	7,100	NA	0.4	0.1	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	20
2,3,7,8-Tetrachlorodibenzo-p-dioxin (O)	3.0E-5 (C)	NA	1.4E-8	1.0E-5	0.99	1.4	2.9	0.001
1,1,1,2-Tetrachloroethane	130	NA	(B)	1	9.5E+5	1.3E+6	2.7E+6	10
1,1,2,2-Tetrachloroethane	17	NA	32	1	1.2E+5	1.7E+5	3.5E+5	10
Tetrachloroethylene	5 (C)	NA	22	1	4.9E+5	6.8E+5	1.4E+6	10
Tetrahydrofuran	690	NA	3,300	1,000	2.5E+7	3.4E+7	6.8E+7	10,000
Thallium	2 (A,C)	NA	5.4 (A)	2	3.0E+5	4.2E+5	1.0E+6	500
Toluene	1,000 (C)	790	110	1	1.6E+8	2.3E+8	4.6E+8	10
p-Toluidine	18	NA	(B)	NA	7.9E+5	1.1E+6	2.6E+6	NA
Toxaphene	3 (C)	NA	0.0002	1	23,000	32,000	63,000	170
Triallate	270	NA	(B)	1	5.9E+7	8.2E+7	1.9E+8	20
Tributylamine	29	NA	(B)	NA	1.0E+6	1.5E+6	2.9E+6	NA
1,2,4-Trichlorobenzene	70 (C)	NA	22	5	6.8E+7	9.5E+7	2.2E+8	330
1,1,1-Trichloroethane	200 (C)	NA	120	1	2.1E+7	2.9E+7	5.8E+7	10
1,1,2-Trichloroethane	5 (C)	NA	65	1	4.4E+5	6.1E+5	1.2E+6	10
Trichloroethylene	5 (C)	NA	94	1	1.6E+6	2.2E+6	4.3E+6	10
Trichlorofluoromethane	7,300	NA	580	1	2.6E+8	3.6E+8	7.3E+8	10
2,4,5-Trichlorophenol	2,100	NA	25	50	4.5E+8	6.3E+8	1.0E+9 (G)	1,700
2,4,6-Trichlorophenol	320	NA	27 (D)	5	1.4E+7	1.9E+7	4.5E+7	330
2(2,4,5-Trichlorophenoxy)propionic acid (N)	50 (C)	NA	21	1	3.4E+7	4.7E+7	1.1E+8	50
1,2,3-Trichloropropane	120	NA	(B)	1	2.6E+7	3.6E+7	8.5E+7	10
1,1,2-Trichloro-1,2,2-trifluoroethane	5.6E+5	NA	33	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
Triethanolamine	10,000	NA	(B)	NA	3.7E+8	5.2E+8	1.0E+9 (G)	NA
3-Trifluoromethyl-4-nitrophenol	13,000	NA	32 (D)	NA	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	NA
Trifluralin	450	NA	(B)	1	2.0E+7	2.7E+7	6.4E+7	50
2,2,4-Trimethyl pentane	ID	NA	(B)	50	ID	ID	ID	500
2,2,4-Trimethyl-2-pentene	ID	NA	(B)	NA	ID	ID	ID	NA
1,2,4-Trimethylbenzene	86	NA	22	1	3.1E+6	4.3E+6	8.5E+6	10
1,3,5-Trimethylbenzene	65	NA	28	1	2.3E+6	3.2E+6	6.4E+6	10
tris(2,3-Dibromopropyl)phosphate	1.9	NA	(B)	NA	83,000	1.2E+5	2.8E+5	NA
Urea	ID (P)	NA	(B)	400	ID (P)	ID (P)	ID (P)	20,000
Vanadium	180 (A)	NA	8 (A)	20	3.9E+7	5.5E+7	1.3E+8	1,000
Vinyl acetate	1,800	NA	(B)	50	6.5E+7	9.2E+7	1.8E+8	100
Vinyl chloride	2 (C)	NA	3.1	1	11,000	16,000	31,000	10
White phosphorus (R)	0.31	NA	(B)	NA	68,000.	95,000.	2.2E+5.	NA
Xylenes	10,000 (C)	280	59	3	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	30
Zinc	6,900 (A)	5,000 (A)	81 (A,D)	20	1.0E+9 (G)	1.0E+9 (G)	1.0E+9 (G)	1,000

Footnotes

{A} Background, as defined in Rule 701(c), may be substituted if higher than the cleanup criteria.

{B} Chemical has either not been evaluated or an inadequate data base precludes the development of a GSI value Contact an ERD toxicologist for assistance.

{C} State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Ac No. 399 of the Public Acts of 1976 used as the default.

{D} GSI value is pH, temperature, or water hardness dependent. Contact an ERD toxicologist for details.

{E} Chemical, due to its physicochemical properties, is not expected to leach through soils to groundwater under most conditions.

{F} Professional judgment used to determine that 50 ppb of aluminum in drinking water is protective of human health.

{G} Criteria exceeds 100% in soil, hence it is reduced to 100%.

{H} Criteria is based on agricultural impacts (phytotoxicity), not 20X groundwater criterion.

{I} Valence-specific chromium data (Cr III and Cr VI) must be compared to the same valence-specific cleanup criteria. If analytical data are provided for "total" chromium only, then values for chromium VI must be applied as the cleanup criteria. Chromium III cleanup criteria can only be used at sites where groundwater is prevented from being used as a public water supply, currently or in the future.

{J} Chemical may be present in several isomer forms. Isomer specific concentrations must be combined for comparison to criteria. Contact an ERD toxicologist for further explanation.

{K} Two different analytical methods and target method detection limits are available for this chemical. Refer to Operational Memorandum #6 for details.

{L} Criteria developed using the U.S. EPA Integrated Uptake Biokinetic Model for children. No risk assessment method(s) is currently available to evaluate lead toxicity in adults. Higher level may be acceptable if soil concentration is less than 400 ppm and groundwater migrating off-site will not impact adjacent properties. Contact an ERD toxicologist for further explanation.

{M} Also known as MBOCA.

{N} Also known as Silvex.

{O} Use 2,3,7,8-TCDD "toxicity equivalence factors" (TEFs) for other chlorinated and /or brominated dibenzo-p-dioxins and chlorinated and/or brominated dibenzofurans for comparison to cleanup criteria. Contact an ERD toxicologist for details.

{P} All potential sources of nitrogen-nitrate must be combined and compared to nitrate criteria. Contact an ERD toxicologist for details.

{Q} Criteria for carcinogenic polynuclear aromatic hydrocarbons (PAHs) were developed using "relative potential potencies" (RPPs) to benzo(a)pyrene.

{R} Chemical may be reactive in soil.

{S} Concentrations of trihalomethanes in groundwater must be combined to determine compliance with the health-based drinking water value of 100 ppb.

{T} Toxic Substances Control Act, Subpart G - PCB Spill Cleanup Policy standards may be more restrictive.

ID = Inadequate data to develop criterion; NA = Not available.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

Marquette District
ERD

September 30, 1993

TO: Environmental Response Division Staff

FROM: Alan J. Howard, Chief, Environmental Response Division

SUBJECT: MERA Operational Memorandum #15: Default Type A Cleanup Criteria

In order to facilitate cleanup decisions at sites at which naturally occurring metals may be of concern, the following acceptable default Type A soil cleanup criteria have been established. These values are based on analysis of the database for the Michigan Background Soil Survey (April 1991) which is maintained by Waste Management Division (WMD). They represent the mean plus one standard deviation for WMD data from combined clay, topsoil and sand categories. The values are presented in two significant figures. Data should be rounded to two significant figures for comparison.

Table 1: ACCEPTABLE DEFAULT VALUES TYPE A SOIL CLEANUP CRITERIA

Type B	Substance	Acceptable Concentration (mg/kg)	Substance	Acceptable Concentration (mg/kg)	Type PP
1.0	Aluminum	6900	Iron	12000	6.0 C
C	Arsenic	5.8	Mercury	0.13	0.042 C
48, C	Barium	75	Lithium	9.8	—
0.07, C	Cadmium	1.2	Manganese	440	1.0 C
—	Cobalt	6.8	Nickel	20	11.0 C
2.4 C	Chromium (total)	18	Lead	21	C
20 C	Copper	32	Selenium	0.41	0.7 C
3.0 C	Cyanide	0.39	Silver	1.0	0.66 C
			Zinc	47	46 C

The default values apply as follows:

1. If measured concentrations at a site do not exceed the values listed in Table 1, site specific samples to establish background are not required.

2. The values apply to all soil types, statewide.

3. It is acceptable to establish a site-specific background concentration higher than the default values. Such sampling should be conducted according to requirements in existence before the issuance of this memorandum. Comparison of site values is made against the mean plus three standard deviations calculated from background samples as provided for in existing ERD guidance regarding verification of soil remediation.

4. Staff also may approve Type A cleanups based on a regionally proximate background value higher than the default values. Comparison should be made as in #3, above.

This memorandum is intended to provide guidance to Division staff to foster consistent application of the Michigan Environmental Response Act (1982 PA 307, as amended) and the Administrative Rules promulgated thereunder. This document is not intended to convey any rights to any parties nor create any duties or responsibilities under law. This document and matters addressed herein are subject to revision.

Any questions about this memorandum should be directed to Bill Iversen at 517-373-0907.

rev. 0
cc: Dennis Drake, Air Quality Division
Bob Miller, Surface Water Quality Division
Tom Segall, Geological Survey Division
Jim Sygo, Waste Management Division

APPENDIX M: RISK ASSESSMENT

TABLE M-1 CANCER/HAZARD ESTIMATE - SOIL INGESTION
FUTURE LAND USE SCENARIO - CONSTRUCTION WORKER

Record#	ANALYTE	CONC	UNITS	CDI CANCER	CANCER RISK	CDI NON-CANCER	NON-CANCER RISK
1	2-Methylnaphthalene	0.2221	MG/KG	.3725468269E-8	0.000000	.1043131115E-5	0.000003
2	Acenaphthene	0.2355	MG/KG	.3950237629E-8	0.000000	.1106066536E-5	0.000002
3	Acenaphthylene	0.2187	MG/KG	.3668437237E-8	0.000000	.1027162426E-5	0.000000
4	Acetone	0.0142	MG/KG	.2381884260E-9	0.000000	.6669275929E-7	.6669275929E-7
5	Anthracene	0.2077	MG/KG	.3483925076E-8	0.000000	.9754990215E-6	.3251663405E-6
6	Antimony	1.1000	MG/KG	.1845121610E-7	0.000000	.5166340508E-5	0.012916
7	Arsenic	7.7200	MG/KG	.1294939893E-6	.2330891807E-6	.3625831702E-4	0.120861
8	Benzo(a)anthracene	0.3636	MG/KG	.6098965613E-8	.4452244897E-8	.1707710371E-5	0.000006
9	Benzo(a)pyrene	0.3632	MG/KG	.6092256080E-8	.4447346938E-7	.1705831702E-5	0.000006
10	Benzo(b)fluoranthene	0.5579	MG/KG	.9358121330E-8	.6831428570E-8	.2620273972E-5	0.000009
11	Benzo(g,h,i)perylene	0.2627	MG/KG	.4406485882E-8	.3216734693E-8	.1233816046E-5	0.000004
12	Benzo(k)fluoranthene	0.6273	MG/KG	.1052222532E-7	.7681224483E-7	.2946223091E-5	0.000010
13	Beryllium	0.2200	MG/KG	.3690243220E-8	.1586804584E-7	.1033268101E-5	0.000207
14	Carbazole	0.2157	MG/KG	.3618115739E-8	.2641224489E-7	.1013072407E-5	0.000000
15	Chrysene	0.3968	MG/KG	.6655856863E-8	.931819960E-10	.1863639921E-5	0.000006
16	Di-n-butyl phthalate	0.1738	MG/KG	.2915292144E-8	0.000000	.8162818003E-6	0.000001
17	Dibenzo(a,h)anthracene	0.2167	MG/KG	.3634889572E-8	.2653469387E-7	.1017769080E-5	0.000003
18	Dibenzofuran	0.2295	MG/KG	.3849594632E-8	.2810204081E-7	.1077886497E-5	0.000000
19	Fluoranthene	0.4712	MG/KG	.7903830025E-8	0.000000	.2213072407E-5	0.000006
20	Fluorene	0.2199	MG/KG	.3688565837E-8	0.000000	.1032798434E-5	0.000003
21	Indeno(1,2,3-cd)pyrene	0.2745	MG/KG	.4604417109E-8	.1979899356E-7	.1289236790E-5	0.000004
22	Naphthalene	0.2251	MG/KG	.3775789767E-8	0.000000	.1057221135E-5	0.000004
23	Phenanthrene	0.2882	MG/KG	.4834218618E-8	.2465451495E-9	.1353581213E-5	0.000005
24	Phenol	0.2286	MG/KG	.3834498182E-8	0.000000	.1073659491E-5	0.000004
25	Pyrene	0.4337	MG/KG	.7274811294E-8	0.000000	.2036947162E-5	0.000007
26	Tetrachloroethene	0.0038	MG/KG	.637405647E-10	.325076879E-11	.1784735812E-7	.1784735812E-6
27	bis(2-Ethylhexyl)phthalate	0.2349	MG/KG	.3940173329E-8	.2876326530E-9	.1103248532E-5	0.000055

TABLE M-2 CANCER/HAZARD ESTIMATE - DERMAL CONTACT WITH SOIL
FUTURE LAND USE SCANARIO - CONSTRUCTION

Record#	ANALYTE	CONC	UNITS	CDI CANCER	CANCER RISK	CDI NON-CANCER	NON-CANCER RISK
1	2-Methylnaphthalene	0.2221	MG/KG	.4986694506E-8	0.000000	.1396274461E-5	0.000027
2	Acenaphthene	0.2355	MG/KG	.5287557660E-8	0.000000	.1480516144E-5	0.000015
3	Acenaphthylene	0.2187	MG/KG	.4910356094E-8	0.000000	.1374899706E-5	0.000000
4	Acetone	0.0142	MG/KG	.3188251327E-9	0.000000	.8927103718E-7	.1130013128E-6
5	Anthracene	0.2077	MG/KG	.4663378878E-8	0.000000	.1305746086E-5	0.000003
6	Antimony	1.1000	MG/KG	.9879088621E-9	0.000000	.2766144814E-6	0.013831
7	Arsenic	7.7200	MG/KG	.6933324014E-8	.1313682444E-7	.1941330724E-5	0.006812
8	Benzo(a)anthracene	0.3636	MG/KG	.8163719597E-8	.3505597238E-7	.2285841487E-5	0.000045
9	Benzo(a)pyrene	0.3632	MG/KG	.8154738607E-8	.3501740695E-6	.2283326810E-5	0.000045
10	Benzo(b)fluoranthene	0.5579	MG/KG	.1252623532E-7	.5378912813E-7	.3507345890E-5	0.000069
11	Benzo(g,h,i)perylene	0.2627	MG/KG	.5898264956E-8	.2532784363E-7	.1651514187E-5	0.000032
12	Benzo(k)fluoranthene	0.6273	MG/KG	.1408443702E-7	0.000001	.3943642367E-5	0.000077
13	Beryllium	0.2200	MG/KG	.1975817724E-9	.8496016213E-7	.5532289628E-7	0.001106
14	Carbazole	0.2157	MG/KG	.4842998672E-8	.2079640606E-6	.1356039628E-5	0.000000
15	Chrysene	0.3968	MG/KG	.8909141738E-8	.1861611706E-9	.2494559686E-5	0.000012
16	Di-n-butyl phthalate	0.1738	MG/KG	.3902240005E-8	0.000000	.1092627201E-5	0.000001
17	Dibenzo(a,h)anthracene	0.2167	MG/KG	.4865451146E-8	.2089281962E-6	.1362326320E-5	0.000027
18	Dibenzofuran	0.2295	MG/KG	.5152842815E-8	.2212691326E-6	.1442795988E-5	0.000000
19	Fluoranthene	0.4712	MG/KG	.1057960581E-7	0.000000	.2962289628E-5	0.000044
20	Fluorene	0.2199	MG/KG	.4937299063E-8	0.000000	.1382443737E-5	0.000020
21	Indeno(1,2,3-cd)pyrene	0.2745	MG/KG	.6163204151E-8	.1558928108E-6	.1725697162E-5	0.000034
22	Naphthalene	0.2251	MG/KG	.5054051928E-8	0.000000	.1415134540E-5	0.000028
23	Phenanthrene	0.2882	MG/KG	.6470803047E-8	.1941240914E-8	.1811824853E-5	0.000036
24	Phenol	0.2286	MG/KG	.5132635588E-8	0.000000	.1437137964E-5	0.000005
25	Pyrene	0.4337	MG/KG	.9737638034E-8	0.000000	.2726538649E-5	0.000040
26	Tetrachloroethene	0.0038	MG/KG	.853194017E-10	.435128948E-11	.2388943248E-7	.2388943248E-6
27	bis(2-Ethylhexyl)phthalate	0.2349	MG/KG	.5274086175E-8	.2264754651E-8	.1476744129E-5	0.000434

TABLE M-3 CANCER/HAZARD ESTIMATE - SOIL INHALATION
FUTURE LAND USE SCENARIO - EXCAVATION WORKER

Record#	ANALYTE	CONC	UNITS	CDI CANCER	CANCER RISK	CDI NON-CANCER	NON-CANCER RISK
1	2-Methylnaphthalene	0.2221	MG/KG	.8436616742E-8	0.000000	.2362252687E-5	0.000008
2	Acenaphthene	0.2355	MG/KG	.8945624686E-8	0.000000	.2504774912E-5	0.006262
3	Acenaphthylene	0.2187	MG/KG	.8307465473E-8	0.000000	.2326090332E-5	0.007754
4	Acetone	0.0142	MG/KG	.5393964779E-9	0.000000	.1510310138E-6	0.000265
5	Anthracene	0.2077	MG/KG	.7889623131E-8	0.000000	.2209094476E-5	0.000007
6	Antimony	1.1000	MG/KG	.4178423420E-7	0.000000	.1169958557E-4	0.000039
7	Arsenic	7.7200	MG/KG	.2932493527E-6	0.000004	0.0001	0.000333
8	Benzo(a)anthracene	0.3636	MG/KG	.1381158868E-7	.1008245973E-6	.3867244832E-5	0.000013
9	Benzo(a)pyrene	0.3632	MG/KG	.1379639442E-7	.1007136792E-6	.3862990437E-5	0.007726
10	Benzo(b)fluoranthene	0.5579	MG/KG	.2119220387E-7	.1547030882E-6	.5933817085E-5	0.000424
11	Benzo(g,h,i)perylene	0.2627	MG/KG	.9978834841E-8	0.000000	.2794073755E-5	0.000009
12	Benzo(k)fluoranthene	0.6273	MG/KG	.2382840919E-7	.1739473870E-6	.6671954575E-5	0.000022
13	Beryllium	0.2200	MG/KG	.8356846840E-8	.7019751345E-7	.2339917115E-5	0.000468
14	Carbazole	0.2157	MG/KG	.8193508470E-8	.1638701694E-9	.2294182371E-5	0.000008
15	Chrysene	0.3968	MG/KG	.1507271284E-7	.1100308037E-6	.4220359597E-5	0.000000
16	Di-n-butyl phthalate	0.1738	MG/KG	.6601909004E-8	0.000000	.1848534521E-5	0.000002
17	Dibenzo(a,h)anthracene	0.2167	MG/KG	.8231494138E-8	.6008990720E-7	.2304818358E-5	0.000008
18	Dibenzofuran	0.2295	MG/KG	.8717710681E-8	0.000000	.2440958990E-5	0.000000
19	Fluoranthene	0.4712	MG/KG	.1789884650E-7	0.000000	.5011677021E-5	0.008792
20	Fluorene	0.2199	MG/KG	.8353048274E-8	0.000000	.2338853516E-5	0.004103
21	Indeno(1,2,3-cd)pyrene	0.2745	MG/KG	.1042706571E-7	.7611757968E-7	.2919578400E-5	0.000010
22	Naphthalene	0.2251	MG/KG	.8550573744E-8	0.000000	.2394160648E-5	0.003990
23	Phenanthrene	0.2882	MG/KG	.1094746936E-7	0.000000	.3065291421E-5	0.005474
24	Phenol	0.2286	MG/KG	.8683523581E-8	0.000000	.2431386602E-5	0.000004
25	Pyrene	0.4337	MG/KG	.1647438397E-7	0.000000	.4612827513E-5	0.008093
26	Tetrachloroethene	0.0038	MG/KG	.1443455363E-9	.259821965E-12	.4041675017E-7	.4041675017E-6
27	bis(2-Ethylhexyl)phthalate	0.2349	MG/KG	.8922833286E-8	.1249196660E-9	.2498393320E-5	0.004383

TABLE M-4 SLOPE AND RFD VALUES

Record#	CHEMICAL	OCRFD	OSRFD	ICRFD	ISRFD	OSF	ISF	ABS
1	2-METHYLNAPHTHALENE	N/A	0.3	N/A	0.3	N/A	N/A	0.17
2	ACENAPHTHENE	0.06	0.6	0.06	0.0004	N/A	N/A	0.17
3	ACENAPHTHYLENE	0.04	N/A	0.0006	0.0003	N/A	N/A	0.17
4	ACETONE	0.1	1	0.1	0.00057	N/A	N/A	0.79
5	ANTHRACENE	0.3	3	0.3	0.3	N/A	N/A	0.17
6	ANTIMONY	0.0004	0.0004	0.0004	0.3	N/A	N/A	0.05
7	ARSENIC	0.0003	0.0003	0.0003	0.3	1.8	15	0.95
8	BENZO(A)ANTHRACENE	0.04	0.3	0.04	0.3	0.73	7.3	0.17
9	BENZO(A)PYRENE	0.04	0.3	0.04	0.0005	7.3	7.3	0.17
10	BENZO(B)FLUORANTHENE	0.04	0.3	0.04	0.014	0.73	7.3	0.17
11	BENZO(G,H,I)PERYLENE	N/A	0.3	N/A	0.3	0.73	N/A	0.17
12	BENZO(K)FLUORANTHENE		0.3		0.3	7.3	7.3	0.17
13	BERYLLIUM	0.005	0.005	0.005	0.005	4.3	8.4	0.01
14	BIS(2-ETHYLHEXYL)PHTHALATE	0.02	0.02	0.02	0.00057	0.073	0.014	0.17
15	CARBAZOLE		N/A		0.3	7.3	0.02	0.17
16	CHRYSENE		0.3			0.014	7.3	0.67
17	DI-N-BUTYL PHTHALATE	0.1	1.0		1	N/A	N/A	0.8
18	DIBENZO(A,H)ANTHRACENE	0.03	0.3	0.03	0.3	7.3	7.3	0.17
19	DIBENZOFURAN	0.004	N/A	0.004	ND	7.3	N/A	0.17
20	FLUORANTHENE	0.04	0.4	0.04	0.00057	N/A	N/A	0.17
21	FLUORENE	0.04	0.4	0.04	0.00057	N/A	N/A	0.17
22	INDENO(1,2,3-CD)PYRENE	0.04	0.3	0.04	0.3	4.3	7.3	0.17
23	NAPHTHALENE	0.04	0.3	0.04	0.0006	N/A	N/A	0.17
24	PHENANTHRENE	0.03	0.3	0.03	0.00056	0.051	N/A	0.17
25	PHENOL	0.6	0.3	0.6	0.6	N/A	N/A	0.9
26	PYRENE	0.03	0.3	0.03	0.00057	N/A	N/A	0.23
27	TETRACHLOROETHENE	0.01	0.1	0.01	0.1	0.051	0.0018	1