

**PHASE I INITIAL SITE INVESTIGATION  
REPORT**

**VOLUME 2  
APPENDICES H AND I**

**Mill Street Property  
Brookfield, Massachusetts**

**Release Tracking Numbers (RTNs) 2-14601  
and 2-10354**

**January 7, 2004**

**Prepared for:  
Town of Brookfield, Massachusetts**

**Prepared by:**

**M&E**  
**Metcalf & Eddy**

**APPENDIX H**

**LABORATORY ANALYTICAL RESULTS**



701 Edgewater Drive  
Wakefield, MA 01880

Tel: 781-246-5200  
Fax: 781-245-6293  
www.m-e.com

036200100.0006.00115

October 29, 2003

Ms. Christine Clark  
USEPA - New England  
OEME - QA Unit  
11 Technology Drive  
North Chelmsford, Massachusetts 01863-2431

Re: Work Assignment No. 106-SIBZ-0100  
Case No. 32006, SDG No. MA1357  
Liberty Analytical Corp., Cary, North Carolina  
Targeted Brownfields Site Assessment: Mill Street, Brookfield, Massachusetts  
Modified Tier II Inorganic Data Validation

Metals: 9/Soil/MA1357, MA1358, MA1359, MA1360, MA1361, MA1362,  
MA1363, MA1364, MA1365  
(Field Duplicates/MA1363 and MA1365)

Dear Ms. Clark:

A modified Tier II data validation was performed by Metcalf & Eddy, Inc. (M&E) on the inorganic analytical data for nine soil samples collected from the Mill Street Targeted Brownfields Assessment (TBA) site, located in Brookfield, Massachusetts by M&E field personnel on August 5, 2003. The samples were analyzed for metals under the Contract Laboratory Program Routine Analytical Services (RAS) using the EPA *Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, ILM04.1*. M&E evaluated the data using the *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, February 1989 criteria, and incorporated new organic data validation guidance from *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses*, December 1996 criteria, as deemed appropriate. All samples were received by the laboratory on August 6, 2003. The data package was received in the M&E office on September 4, 2003.

M&E reviewed the data in accordance with the EPA-approved Final Field Task Work Plan for the site, and the guidance received from EPA Work Assignment Manager, Mr. James Byrne, in a September 17, 1999 letter to former M&E Work Assignment Manager, Barb Wyskowski. The format of the validation memoranda underwent modification as of July 2001 at the request of the EPA Project Chemist, Alan Peterson, with the approval of Mr. Byrne. The data review included the following:

J:\ne\brwnflds\MillstreetBrookfield\data\MA1357

- \* • Data Completeness
  - \* • Preservation and Technical Holding Times
  - Initial and Continuing Calibrations
  - Blank Analysis Results
  - Inductively Coupled Plasma (ICP) Interference Check Sample Results
  - Matrix Spike (MS) Recoveries
  - Laboratory Duplicate Sample Results
  - \* • Field Duplicate Sample Results
  - \* • Laboratory Control Sample (LCS) Results
  - \* • Furnace Atomic Absorption Results
  - ICP Serial Dilution Results
  - \* • Instrument Detection Limits (IDL)
  - Sample Quantitation Results
  - NA • Performance Evaluation Sample
- \* = All criteria met for this parameter  
NA = Not applicable and/or no information was provided by the laboratory

Note: Worksheets are not included for parameters that have met criteria or for criteria that are not applicable to the method and/or to Tier II data validation.

### Initial and Continuing Calibrations

The following table summarizes the CRDL standard recoveries that did not meet acceptable percent recovery criteria of 80-120%:

Analyte	Percent Recovery	Action
thallium	129.8%	Estimate (J) the positive result <3xCRDL (6 mg/kg) in sample MA1357.
arsenic	120.6%	Estimate (J) the positive results <3x CRDL (6 mg/kg) in samples MA1357, MA1358, MA1359, MA1360, MA1361, MA1362, MA1364, and MA1365.

The positive thallium result in sample MA1357 and the positive arsenic results in samples MA1357, MA1358, MA1359, and MA1364 were qualified as nondetect (U) due to blank contamination. Therefore, these results are further qualified as estimated, nondetect (UJ) due to blank contamination and high CRDL standard recovery.

### Blank Analysis Results

A review of laboratory blank analysis results indicates the presence of laboratory contamination for the analytes listed below. If a contaminant was detected in more than one blank, the highest concentration was used to qualify associated sample results. Positive sample results reported with concentrations less than the blank action level (BAL) for that compound are considered to be false positive results.

Analyte	Max. Conc. Contaminant (µg/L)	BAL* (mg/kg)	Affected Samples/Action
arsenic	2.8	2.8	Qualify the reported value as nondetect (U) in samples MA1357, MA1358, MA1359, and MA1364.
barium	4.4	4.4	None. All sample results >BAL.
beryllium	0.1	0.1	None. All sample results >BAL.
potassium	208.0	208.0	None. All sample results >BAL.
thallium	5.1	5.1	Qualify the reported value as nondetect (U) in sample MA1357.
vanadium	-0.7	0.7	None. All sample results >BAL.

\* The sample-specific preparation factors and percent solids were taken into account when evaluating blank contamination.

For positive blank contamination, sample results were qualified as follows:

- \* concentration  $\leq$  BAL; report value on summary table as U.
- \* concentration  $>$  BAL; report value unqualified.

For negative blank contamination, sample results were qualified as follows:

- \* concentration  $\leq$  negative BAL; report value on summary table as UJ
- \* concentration  $>$  negative BAL; report value unqualified.

### ICP Interference Check Sample Results

The following sample results have been affected by spectral interference from iron as indicated by interference check solution (ICS) A exceedances:

Sample	Interferent/Conc. (µg/L)	Analyte	% Estimated Interference	Action
MA1363	Iron 141473	arsenic	19.6	Estimate (J) positive result in this sample due to positive spectral interference. Interference is >10% but <90% of the sample concentration. Therefore, the positive result may be biased high due to the high concentration of iron.
		barium	0.09	No action since the estimated interference is <10% of sample result.
		cobalt	13.2	Estimate (J) positive result in this sample due to negative spectral interference. Interference is >10% but <90% of the sample concentration. Therefore, the positive result may be biased low due to the high concentration of iron.
		potassium	4.7	No action since the estimated interference is <10% of sample result.
		manganese	0.07	No action since the estimated interference is <10% of sample result.
		selenium	not calculable	Estimate (UJ) the nondetect result in this sample due to negative spectral interference. Therefore, the nondetect result may be biased low due to high iron concentration.
		vanadium	1.6	No action since the estimated interference is <10% of sample result.
MA1365	Iron 107702	arsenic	21.1	Estimate (J) positive result in this sample due to positive spectral interference. Interference is >10% but <90% of the sample concentration. Therefore, the positive result may be biased high due to the high concentration of iron.
		barium	0.06	No action since the estimated interference is <10% of sample result.

Sample	Interferent/Conc. (µg/L)	Analyte	% Estimated Interference	Action
MA1365	Iron 107702	cobalt	14.6	Estimate (J) positive result in this sample due to negative spectral interference. Interference is >10% but <90% of the sample concentration. Therefore, the positive result may be biased low due to the high concentration of iron.
		potassium	4.3	No action since the estimated interference is <10% of sample result.
		manganese	1.5	No action since the estimated interference is <10% of sample result.
		selenium	not calculable	Estimate (UJ) the nondetect result in this sample due to negative spectral interference. Therefore, the nondetect result may be biased low due to high iron concentration.
		vanadium	0.06	No action since the estimated interference is <10% of sample result.

The positive arsenic result in sample MA1365 was previously qualified as estimated (J) due to low CRDL standard recovery. Therefore, no further action is taken due to interference from a high iron concentration.

#### Matrix Spike Recoveries

The matrix spike recoveries for soil sample MA1362 that did not meet acceptance criteria of 75-125 percent recovery (%R), indicating possible matrix interference, are summarized below:

Analyte	Spiked Sample Result (mg/kg)	Sample Result (mg/kg)	Matrix Spike %R	Affected Samples/Action
antimony	51.0527	0.6452 U	44.3	Estimate (J) positive results in samples MA1363 and MA1365. Estimate (UJ) nondetect results in samples MA1357, MA1358, MA1359, MA1360, MA1361, MA1362, and MA1364. Samples results may be biased low.
copper	97.1811	56.7061	70.3	Estimate (J) positive results in all samples. Sample results may be biased low.
mercury	0.7419	0.3522	67.2	Estimate (J) positive results in samples MA1360, MA1361, MA1362, MA1363, MA1364, and MA1365. Estimate (UJ) the nondetect results in samples MA1357, MA1358, and MA1359. Sample results may be biased low.
zinc	212.2284	204.0819	7.1	Estimate (J) positive results in all samples. Samples results may be biased low.

**Laboratory Duplicate Sample Results**

The analytes that did not meet acceptance criterion of relative percent difference (%RPD) < 35% in soil sample MA1362 are summarized in the following table:

Analyte	Sample Result (mg/kg)	Duplicate Sample Result (mg/kg)	%RPD	Affected Samples/Action
barium	235.9466	155.47	41.1	Estimate (J) positive results in all samples. A bias could not be determined.
iron	19108.4492	41533.6445	74.0	Estimate (J) positive results in all samples. A bias could not be determined.
lead	250.0751	164.7310	41.1	Estimate (J) positive results in all samples. A bias could not be determined.

### ICP Serial Dilution Results

The analyte that did not meet acceptance criterion for percent difference (%D) of  $\leq 15\%$  in the serially diluted sample MA1362 is summarized in the following table :

Analyte	Sample Result (mg/kg)	Duplicate Sample Result (mg/kg)	%RPD	Affected Samples/Action
copper	246.10	301.29	22.4	Estimate (J) positive results in all samples. Sample results may be biased low.

The positive copper results in all samples were previously qualified as estimated (J) due to low matrix spike recovery. Therefore, no further action is taken due to poor serial dilution results.

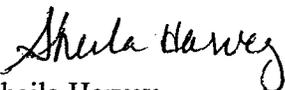
### Sample Quantitation Results

The following table summarizes the positive sample results and the blank-qualified nondetect sample results that are less than two times the instrument detection limit (IDL) and were not previously qualified as estimated (J) due to quality control parameters discussed above. The listed results are qualified as estimated (J) due to uncertainty in the quantitation near the IDL:

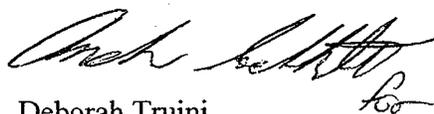
Analyte	Affected Samples
sodium	MA1357, MA1359, MA1360, MA1362, MA1363, MA1365
cadmium	MA1364

Please contact Constance Lapite at (781) 224-6628 or [constance.lapite@m-e.com](mailto:constance.lapite@m-e.com) if you have any questions regarding this information.

Very truly yours,



Sheila Harvey  
Initial Data Validator



Deborah Truini  
Senior Reviewer



Constance Lapite  
RAC Lead Chemist

cc: Barbara Weir, Project Manager (memo only)  
Denise Laferte, Project Chemist (entire package)  
S. Harvey, Data Validator (entire package)  
TBA Mill Street Project File (WA No. 106-SIBZ-0100)

Attachments: IRDA Form  
Chain-of-Custody Forms  
Validated Sample Result Summary Sheets (Form Is)  
Data Validation Worksheets  
Copies of Telephone Logs/Communication Forms (not applicable)  
CSF Audit (DC-2 Form)  
DQO Summary Form

Attachment I

IRDA Form

Region I

**INORGANIC REGIONAL DATA ASSESSMENT**

Targeted Brownsfield Site Assessment

CASE NO. 32006 SITE Hill Street, Brookfield, MA  
 LABORATORY Liberty Analytical Corp. NO OF SAMPLES/MATRIX 9/soil  
 SDG # MA1357 REVIEWER(IFNOT ESD) M+E, Inc.  
 SOW # ILM04.1 REVIEWER'S NAME B. Harvey  
 DPO:ACTION FYI X COMPLETION DATE 9/9/03

DATA ASSESSMENT SUMMARY

	ICP	AA	HG	CYANIDE		
1. HOLDING TIMES	O	NA	O	NA		
2. CALIBRATIONS	O <sup>1</sup>		O			
3. BLANKS	O <sup>2</sup>		O			
4. ICS	O <sup>3</sup>		O			
5. LCS	O		O			
6. DUPLICATE ANALYSIS	O <sup>4</sup>		O			
7. MATRIX SPIKE	O <sup>5</sup>		O			
8. MSA	NA		NA			
9. SERIAL DILUTION	O <sup>6</sup>		O			
10. SAMPLE VERIFICATION	O		O			
11. OTHER QC	O <sup>7</sup>		O			
12. OVERALL ASSESSMENT	O		↓		O	↓

O = Data had no problems, or qualified due to minor problems.  
 M = Data qualified due to major problems.  
 Z = Data unacceptable.  
 X = Problems, but do not affect data.

ACTION ITEMS: O<sup>1</sup> several As and Tl results were qualified as estimated (E) due to T.C.R.I.C. stripping recovery  
O<sup>2</sup> several As results were considered to be unreliable (u) due to sulfate contamination

AREAS OF CONCERN: O<sup>3</sup> Several As, Co, Se results were qualified (E) as estimated due to spectral interference from high concentrations of iron  
O<sup>4</sup> all Bi, Fe, Pb results were estimated (E) due to low recovery  
O<sup>5</sup> all Sb, Cu, Hg, Zn results were qualified as estimated (E) due to low recovery  
O<sup>6</sup> all Cu results were qualified as estimated (E) due to serial dilution  
O<sup>7</sup> 10% excess iron

NOTABLE PERFORMANCE: O<sup>1</sup> Several Na and Cd results were qualified as estimated (E) due to qualitative yield the 10%.

Attachment II  
Chain-of-Custody



# Metcalf and Eddy DAS Chain of Custody Form Inorganic Traffic Report & Chain of Custody Record

Case No: 32006

DAS No:

R

Region: 1	Date Shipped: 8/5/03	Chain of Custody Record	Signature:
Project Code: 036200100.0006.00115	Carrier Name: FedEx	Relinquished By:	Received By:
CERCLIS ID:	Airbill: 838301929482	1	(Date / Time)
Spill ID:	Shipped to: Liberty Analytical Corporation	2	
Site Name/State: Mill Street, Brookfield 2003/MA	501 Madison Avenue	3	
Project Leader: Bill Abrahams-DeMatte	Cary NC 27513	4	
Action: Brownfields Site	(919) 379-4100		
Sampling Co: Metcalf & Eddy, Inc.			

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	PRESERVATIVE/ Bottles	TAG No./	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MA1357	SOIL/ Bill Abrahams-DeM atte	L/G	RAS Metals (21)	195135 (Ice Only) (1)		SB-1-D	12:10		
MA1358	SOIL/ Bill Abrahams-DeM atte	L/G	RAS Metals (21)	195136 (Ice Only) (1)		SB-1-S	12:00		
MA1359	SOIL/ Bill Abrahams-DeM atte	L/G	RAS Metals (21)	195137 (Ice Only) (1)		SB-2-D	12:30		
MA1360	SOIL/ Bill Abrahams-DeM atte	L/G	RAS Metals (21)	195138 (Ice Only) (1)		SB-2-S	12:20		
MA1361	SOIL/ Bill Abrahams-DeM atte	L/G	RAS Metals (21)	195139 (Ice Only) (1)		SB-3-D	12:40		
MA1362	SOIL/ Bill Abrahams-DeM atte	L/G	RAS Metals (21)	195140 (Ice Only), 195141 (Ice Only) (2)		SB-3-S	12:35		
MA1363	SOIL/ Bill Abrahams-DeM atte	L/G	RAS Metals (21)	195142 (Ice Only) (1)		SB-4-D	12:55		FD 1

Shipment to Complete?	Sample(s) to be used for laboratory QC: MA1362	Additional Sampler Signature(s): 	Chain of Custody Seal Number:
Analysis Key: RAS Metals = RAS Metals	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced? _____

TR Number: 1-502446878-080503-0001

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

REGION COPY



# Metcalfe and Eddy DAS Chain of Custody Form Inorganic Traffic Report & Chain of Custody Record

Case No: 32006  
DAS No:

R

Region: Project Code: Account Code: GERCLIS ID: Spill ID: Site Name/State: Project Leader: Action: Sampling Co:	1 036200100.0006.00115 Mill Street, Brookfield 2003/MA Bill Abrahams-DeMatte Brownfields Site Metcalfe & Eddy, Inc.	Date Shipped: 8/5/03 Carrier Name: FedEx Airbill: 838301928482 Shipped to: Liberty Analytical Corporation 501 Madison Avenue Cary NC 27513 (919) 379-4100	Chain of Custody Record	Sampler Signature:
			Relinquished By:	Received By:
			2	(Date / Time) 8/5/03
			3	(Date / Time) 8/5/03
			4	(Date / Time)

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	PRESERVATIVE/ Bottles	TAG No./	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
MA1364	SOIL/ Bill Abrahams-DeM	L/G	RAS Metals (21)	195143 (Ice Only) (1)		SB-4-S	S: 8/5/03 12:50		
MA1365	SOIL/ Bill Abrahams-DeM	L/G	RAS Metals (21)	195144 (Ice Only) (1)		SBK-4-D	S: 8/5/03 13:00		FD 1

Shipment for Case Complete? <input checked="" type="checkbox"/> (PKO) 8/5/03	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysis Key: RAS Metals = RAS Metals	Type/Designate: Composite F. C. Grab = G	Shipment Iced? <input type="checkbox"/>
Samples(s) to be used for laboratory QC: MA1362		
Concentration: L = Low, M = Low/Medium, H = High		

TR Number: 1-502446878-080503-0001

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA, 20191-3400 Phone 703/264-9348 Fax 703/264-9222

REGION COPY

Attachment III

Validated Sample Result Summary Sheets

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1357

Lab Name: COMPUCHEM

Contract: 68W00082

Lab Code: LIBRTY

Case No.: 32006

SAS No.: \_\_\_\_\_

SDG No.: MA1357

Matrix (soil/water): SOIL

Lab Sample ID: 40601

Level (low/med): LOW

Date Received: 08/06/03

Solids: 89.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

*8/16 10/20/03*

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11000			P
7440-36-0	Antimony	0.60	UJ	X	P
7440-38-2	Arsenic	2.7	UJ		P
7440-39-3	Barium	106	J	X	P
7440-41-7	Beryllium	0.34	X		P
7440-43-9	Cadmium	0.11	U		P
7440-70-2	Calcium	1780		X	P
7440-47-3	Chromium	21.3			P
7440-48-4	Cobalt	3.4	B		P
7440-50-8	Copper	17.6	J	NAD	P
7439-89-6	Iron	15100	J	X	P
7439-92-1	Lead	13.2	J	X	P
7439-95-4	Magnesium	3140			P
7439-96-5	Manganese	228		X	P
7439-97-6	Mercury	0.049	UJ	X	CV
7440-02-0	Nickel	8.1	B		P
7440-09-7	Potassium	2640			P
7782-49-2	Selenium	0.68	U		P
7440-22-4	Silver	0.28	U		P
7440-23-5	Sodium	121	AJ		P
7440-28-0	Thallium	0.73	X	UJ	P
7440-62-2	Vanadium	27.6			P
7440-66-6	Zinc	38.1	J	X	P

Color Before: BROWN

Clarity Before: \_\_\_\_\_

Texture: COARSE

Color After: YELLOW

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_

0000011

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1358

Lab Name: COMPUCHEM

Contract: 68W00082

Lab Code: LIBRTY

Case No.: 32006

SAS No.: \_\_\_\_\_

SDG No.: MA1357

Matrix (soil/water): SOIL

Lab Sample ID: 40602

Level (low/med): LOW

Date Received: 08/06/03

Solids: 94.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

*(Signature)* 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4170			P
7440-36-0	Antimony	0.57	UJ	X	P
7440-38-2	Arsenic	1.0	B	UJ	P
7440-39-3	Barium	13.8	B	J	P
7440-41-7	Beryllium	0.11	B		P
7440-43-9	Cadmium	0.10	U		P
7440-70-2	Calcium	277	B	/	P
7440-47-3	Chromium	3.3			P
7440-48-4	Cobalt	1.3	B		P
7440-50-8	Copper	3.0	AJ	NZ	P
7439-89-6	Iron	4200	J	+	P
7439-92-1	Lead	3.5	J	←	P
7439-95-4	Magnesium	270	B		P
7439-96-5	Manganese	30.9		←	P
7439-97-6	Mercury	0.042	UJ	NZ	CV
7440-02-0	Nickel	2.3	B		P
7440-09-7	Potassium	217	B		P
7782-49-2	Selenium	0.65	U		P
7440-22-4	Silver	0.26	U		P
7440-23-5	Sodium	69.2	U		P
7440-28-0	Thallium	0.70	U		P
7440-62-2	Vanadium	6.3	B		P
7440-66-6	Zinc	6.8	J	X	P

Color Before: BROWN

Clarity Before: \_\_\_\_\_

Texture: COARSE

Color After: YELLOW

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_

0000012

## INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1359

Lab Name: COMPUCHEMContract: 68W00082Lab Code: LIBRTYCase No.: 32006

SAS No.: \_\_\_\_\_

SDG No.: MA1357Matrix (soil/water): SOILLab Sample ID: 40603Level (low/med): LOWDate Received: 08/06/03Solids: 87.4Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10800			P
7440-36-0	Antimony	0.59	UJ	X	P
7440-38-2	Arsenic	2.8	UJ		P
7440-39-3	Barium	132	J	X	P
7440-41-7	Beryllium	0.34	J		P
7440-43-9	Cadmium	0.10	U		P
7440-70-2	Calcium	1090		X	P
7440-47-3	Chromium	17.1			P
7440-48-4	Cobalt	3.7	J		P
7440-50-8	Copper	21.7	J	NE	P
7439-89-6	Iron	19100	J	X	P
7439-92-1	Lead	7.8	J	X	P
7439-95-4	Magnesium	2920			P
7439-96-5	Manganese	282		X	P
7439-97-6	Mercury	0.048	UJ	NE	CV
7440-02-0	Nickel	7.4	J		P
7440-09-7	Potassium	2670			P
7782-49-2	Selenium	0.67	U		P
7440-22-4	Silver	0.27	U		P
7440-23-5	Sodium	134	J		P
7440-28-0	Thallium	0.71	U		P
7440-62-2	Vanadium	27.8			P
7440-66-6	Zinc	39.4	J	X	P

8d 10/20/03

Color Before: BROWN

Clarity Before: \_\_\_\_\_

Texture: COARSEColor After: YELLOW

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_

0000013

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1360

Lab Name: COMPUCHEM Contract: 68W00082  
 Lab Code: LIBERTY Case No.: 32006 SAS No.: \_\_\_\_\_ SDG No.: MA1357  
 Matrix (soil/water): SOIL Lab Sample ID: 40604  
 Level (low/med): LOW Date Received: 08/06/03  
 Solids: 86.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9970			P
7440-36-0	Antimony	0.64	UJ	X	P
7440-38-2	Arsenic	5.4	J		P
7440-39-3	Barium	166	J	/	P
7440-41-7	Beryllium	0.34	/		P
7440-43-9	Cadmium	0.11	U		P
7440-70-2	Calcium	3900		/	P
7440-47-3	Chromium	18.3			P
7440-48-4	Cobalt	3.2	/		P
7440-50-8	Copper	38.7	J	ME	P
7439-89-6	Iron	17300	J	+	P
7439-92-1	Lead	84.6	J	+	P
7439-95-4	Magnesium	2400			P
7439-96-5	Manganese	152		/	P
7439-97-6	Mercury	0.084	J	ME	CV
7440-02-0	Nickel	8.1	/		P
7440-09-7	Potassium	1800			P
7782-49-2	Selenium	0.73	U		P
7440-22-4	Silver	0.30	U		P
7440-23-5	Sodium	78.6	J	J	P
7440-28-0	Thallium	0.77	U		P
7440-62-2	Vanadium	26.4			P
7440-66-6	Zinc	148	J	X	P

JH 10/24/03

Color Before: BROWN Clarity Before: \_\_\_\_\_ Texture: COARSE  
 Color After: YELLOW Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

0000014

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1361

Lab Name: COMPUCHEM

Contract: 68W00082

Lab Code: LIBRTY

Case No.: 32006

SAS No.: \_\_\_\_\_

SDG No.: MA1357

Matrix (soil/water): SOIL

Lab Sample ID: 40605

Level (low/med): LOW

Date Received: 08/06/03

Solids: 86.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12200			P
7440-36-0	Antimony	0.60	UJ	*	P
7440-38-2	Arsenic	4.1	J		P
7440-39-3	Barium	141	J	*	P
7440-41-7	Beryllium	0.40	B		P
7440-43-9	Cadmium	0.11	U		P
7440-70-2	Calcium	3290		/	P
7440-47-3	Chromium	19.6			P
7440-48-4	Cobalt	4.8	B		P
7440-50-8	Copper	42.8	J	NE	P
7439-89-6	Iron	18900	B	*	P
7439-92-1	Lead	141	J	*	P
7439-95-4	Magnesium	3030			P
7439-96-5	Manganese	308		/	P
7439-97-6	Mercury	2.2	J	*	CV
7440-02-0	Nickel	8.1	B		P
7440-09-7	Potassium	2650			P
7782-49-2	Selenium	0.68	U		P
7440-22-4	Silver	0.28	U		P
7440-23-5	Sodium	223	B		P
7440-28-0	Thallium	0.72	U		P
7440-62-2	Vanadium	30.8			P
7440-66-6	Zinc	66.3	J	*	P

SH 10/20/03

Color Before: BROWN

Clarity Before: \_\_\_\_\_

Texture: COARSE

Color After: YELLOW

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_

0000015

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1362

Lab Name: COMPUCHEM

Contract: 68W00082

Lab Code: LIBRTY

Case No.: 32006

SAS No.: \_\_\_\_\_

SDG No.: MA1357

Matrix (soil/water): SOIL

Lab Sample ID: 40606

Level (low/med): LOW

Date Received: 08/06/03

Solids: 86.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

SH 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11700			P
7440-36-0	Antimony	0.64	U	*	P
7440-38-2	Arsenic	4.5	J		P
7440-39-3	Barium	236	J	*	P
7440-41-7	Beryllium	0.39	B		P
7440-43-9	Cadmium	0.45	B		P
7440-70-2	Calcium	6290		*	P
7440-47-3	Chromium	21.3			P
7440-48-4	Cobalt	3.0	B		P
7440-50-8	Copper	56.7	J	NTE	P
7439-89-6	Iron	19100	J	*	P
7439-92-1	Lead	250	J	*	P
7439-95-4	Magnesium	2690			P
7439-96-5	Manganese	191		*	P
7439-97-6	Mercury	0.35	J	*	CV
7440-02-0	Nickel	8.1	B		P
7440-09-7	Potassium	1800			P
7782-49-2	Selenium	0.74	U		P
7440-22-4	Silver	0.96	B		P
7440-23-5	Sodium	78.8	B	J	P
7440-28-0	Thallium	0.78	U		P
7440-62-2	Vanadium	28.4			P
7440-66-6	Zinc	204	J	*	P

Color Before: BROWN

Clarity Before: \_\_\_\_\_

Texture: COARSE

Color After: YELLOW

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_

0000016

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1363

Lab Name: COMPUCHEM Contract: 68W00082  
 Lab Code: LIBRTY Case No.: 32006 SAS No.: \_\_\_\_\_ SDG No.: MA1357  
 Matrix (soil/water): SOIL Lab Sample ID: 40607  
 Level (low/med): LOW Date Received: 08/06/03  
 Solids: 77.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

*St 10/20/03*

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8530			P
7440-36-0	Antimony	1.8	<i>J</i>	<i>X</i>	P
7440-38-2	Arsenic	8.0	<i>J</i>		P
7440-39-3	Barium	1140	<i>J</i>	<i>✓</i>	P
7440-41-7	Beryllium	0.29	<i>B</i>		P
7440-43-9	Cadmium	0.53	<i>B</i>		P
7440-70-2	Calcium	9740		<i>✓</i>	P
7440-47-3	Chromium	17.0			P
7440-48-4	Cobalt	5.3	<i>B</i>	<i>J</i>	P
7440-50-8	Copper	1210	<i>J</i>	<i>NE</i>	P
7439-89-6	Iron	34600	<i>J</i>	<i>✓</i>	P
7439-92-1	Lead	468	<i>J</i>	<i>✓</i>	P
7439-95-4	Magnesium	1980			P
7439-96-5	Manganese	256		<i>✓</i>	P
7439-97-6	Mercury	0.15	<i>J</i>	<i>X</i>	CV
7440-02-0	Nickel	18.4			P
7440-09-7	Potassium	1120	<i>B</i>		P
7782-49-2	Selenium	0.78	<i>UJ</i>		P
7440-22-4	Silver	0.32	<i>U</i>		P
7440-23-5	Sodium	141	<i>B</i>	<i>J</i>	P
7440-28-0	Thallium	0.83	<i>U</i>		P
7440-62-2	Vanadium	21.8			P
7440-66-6	Zinc	670	<i>J</i>	<i>X</i>	P

Color Before: BLACK Clarity Before: \_\_\_\_\_ Texture: COARSE

Color After: YELLOW Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

0000017

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1364

Lab Name: COMPUCHEM

Contract: 68W00082

Lab Code: LIBRTY

Case No.: 32006

SAS No.: \_\_\_\_\_

SDG No.: MA1357

Matrix (soil/water): SOIL

Lab Sample ID: 40608

Level (low/med): LOW

Date Received: 08/06/03

Solids: 81.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

SA 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9070			P
7440-36-0	Antimony	0.68	UJ	X	P
7440-38-2	Arsenic	2.4	X	UJ	P
7440-39-3	Barium	766	J	/	P
7440-41-7	Beryllium	0.28	X		P
7440-43-9	Cadmium	0.21	X	J	P
7440-70-2	Calcium	29900		/	P
7440-47-3	Chromium	16.5			P
7440-48-4	Cobalt	2.5	X		P
7440-50-8	Copper	247	J	N+E	P
7439-89-6	Iron	17700	J	/	P
7439-92-1	Lead	524	J	/	P
7439-95-4	Magnesium	3450			P
7439-96-5	Manganese	205		/	P
7439-97-6	Mercury	0.15	J	X	CV
7440-02-0	Nickel	10.0			P
7440-09-7	Potassium	2570			P
7782-49-2	Selenium	0.77	U		P
7440-22-4	Silver	0.31	U		P
7440-23-5	Sodium	264	X		P
7440-28-0	Thallium	0.82	U		P
7440-62-2	Vanadium	23.0			P
7440-66-6	Zinc	420	J	X	P

Color Before: BLACK

Clarity Before: \_\_\_\_\_

Texture: COARSE

Color After: YELLOW

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_

0000018

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MA1365

Lab Name: COMPUCHEM

Contract: 68W00082

Lab Code: LIBRTY

Case No.: 32006

SAS No.: \_\_\_\_\_

SDG No.: MA1357

Matrix (soil/water): SOIL

Lab Sample ID: 40609

Level (low/med): LOW

Date Received: 08/06/03

Solids: 77.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

*SPH*  
*10/20/03*

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8340			P
7440-36-0	Antimony	2.8	<del>B</del> J*		P
7440-38-2	Arsenic	5.4	J		P
7440-39-3	Barium	1220	J	X	P
7440-41-7	Beryllium	0.23	<del>B</del>		P
7440-43-9	Cadmium	1.0	<del>B</del>		P
7440-70-2	Calcium	10100		/	P
7440-47-3	Chromium	16.4			P
7440-48-4	Cobalt	3.5	<del>B</del> J		P
7440-50-8	Copper	1260	J	<del>NE</del>	P
7439-89-6	Iron	25400	J	+	P
7439-92-1	Lead	686	J	X	P
7439-95-4	Magnesium	1760			P
7439-96-5	Manganese	214		X	P
7439-97-6	Mercury	0.32	J	<del>NE</del>	CV
7440-02-0	Nickel	14.1			P
7440-09-7	Potassium	902	<del>B</del>		P
7782-49-2	Selenium	0.76	UJ		P
7440-22-4	Silver	2.6			P
7440-23-5	Sodium	126	<del>B</del> J		P
7440-28-0	Thallium	0.80	U		P
7440-62-2	Vanadium	16.8			P
7440-66-6	Zinc	782	J	*	P

Color Before: BLACK

Clarity Before: \_\_\_\_\_

Texture: COARSE

Color After: YELLOW

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_

0000019

Attachment IV  
Data Validation Worksheets

**REGION I REVIEW OF INORGANIC  
CONTRACT LABORATORY DATA PACKAGE**

The hardcopied (laboratory name) Liberty Corp, NC data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. 32006 / SAS No. \_\_\_\_\_ Sampling Date (s) 8/5/03  
SDG No. MA1357 / Matrix Soil Shipping Date (s) 8/5/03  
No. of Samples 9 / Date(s) rec'd by lab 8/6/03

Traffic Report Numbers MA1357, MA1358, MA1359, MA1360, MA1361,  
MA1362, MA1363, MA1364, MA1365

Trip Blank No.: \_\_\_\_\_  
Equipment Blank Number: \_\_\_\_\_  
Field Duplicate Numbers: MA1363/MA1365

SOW No. 12M04.1 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- Data Completeness
- Holding Times
- Calibrations
- Blanks
- ICP Interference Check Results
- Matrix Spike Recoveries
- Laboratory Duplicates
- Field Duplicates
- Lab Control Sample Results
- Furnace AA results
- ICP Serial Dilution Results
- Detection Limit Results
- Sample Quantitation

Overall Comments: \_\_\_\_\_ Cooler temp 3.2°C

- Definitions and Qualifiers:
- A - Acceptable data
  - J - Approximate data due to quality control criteria
  - R - Reject data due to quality control criteria
  - U - Analyte not detected

Reviewer: Sheila Plaxey Date: 9/5/03



**IV A. BLANK ANALYSIS RESULTS** (Sections 1-3)

List the blank contamination in sections 1 and 2 below. A separate worksheet should be used for soil and water blanks.

**1. Laboratory Blanks**

Matrix: Soil

DATE:	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS
	CCB #7		As	2.8 µg/L
	ICB/CCB1-3	✓	Ba	4.3 µg/L, 4.3 µg/L, 4.3 µg/L, 4.4 µg/L
	CCB 4-7		↓	0.869 mg/kg
	CCB 8-11		↓	4.4 µg/L, 4.2 µg/L, 4.3 µg/L, 4.4 µg/L;
	CCB 4+10		Be	4.2 µg/L, 4.4 µg/L, 4.4 µg/L, 4.4 µg/L
	CCB 5, 6, 7, 9		↓	0.1 µg/L, 0.1 µg/L
	CCB 10, 11		↓	189.2 µg/L, 144.0 µg/L, 140.3 µg/L, 193.9 µg/L
				208.0 µg/L, 145.1 µg/L

**2. Equipment/Trip Blanks** None

DATE:	EQUIP BL #	ANALYTE	CONC./UNITS

**3. Frequency Requirements**

- A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? Yes or No
- B. Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? Yes or No

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**IV A. BLANK ANALYSIS RESULTS** (Sections 1-3)

List the blank contamination in sections 1 and 2 below. A separate worksheet should be used for soil and water blanks.

**1. Laboratory Blanks**

Matrix: Soil

<u>DATE:</u>	<u>ICB/CCB#</u>	<u>PREP BL</u>	<u>ANALYTE</u>	<u>CONC./UNITS</u>
	CCB 1,2,4,7		TL	3.9 µg/L; 5.1 µg/L; 4.8 µg/L; 5.0 µg/L
		✓	TL	0.760 mg/kg
	CCB 10,11		TL	5.0 µg/L; 5.0 µg/L

**2. Equipment/Trip Blanks**

<u>DATE:</u>	<u>EQUIP BL #</u>	<u>ANALYTE</u>	<u>CONC./UNITS</u>

**3. Frequency Requirements**

- A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? Yes or No
- B. Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? Yes or No

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**IV B. BLANK ANALYSIS RESULTS (Section 4)**

**4. Blank Actions**

The Action Level for any analyte is equal to 5X the highest concentration of that analyte found in any blank. (Use 5X the absolute value for any negative blank results). The Action Level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL) for that analyte. Specific actions are as follows:

1. When the concentration is greater than the IDL, but less than the Action Level, report the sample concentration detected with a U.
2. When the sample concentration is greater than the Action Level, report the sample concentration unqualified.

Matrix: <u>Soil</u>			Matrix: _____		
<u>ELEMENT</u>	<u>MAX. CONC.</u> <u>/UNITS</u>	<u>AL</u> <u>/UNITS</u> <i>ug/L</i>	<u>ELEMENT</u>	<u>MAX. CONC.</u> <u>UNITS</u>	<u>AL</u> <u>UNIT</u>
<u>As</u>	<u>2.8 ug/L</u> ✓	<u>14.0</u>			
<u>Ba</u>	<u>4.4 ug/L</u> ✓	<u>22.0</u>			
<u>Be</u>	<u>0.1 ug/L</u> ✓	<u>0.5</u>			
<u>K</u>	<u>208.0 ug/L</u> ✓	<u>1040</u>			
<u>Tl</u>	<u>5.1 ug/L</u> ✓	<u>25.5</u>			
<u>V</u>	<u>-0.7 ug/L</u>				

NOTE: Blanks analyzed during a soil case must be converted to mg/kg in order to compare them with the sample results.

$$\text{conc. in ug/l} \times \frac{\text{Volume diluted to (200ml)}}{\text{Weight digested (1gram)}} \times \frac{1\text{L}}{1000\text{ml}} \times \frac{1000\text{g}}{1\text{kg}} \times \frac{1\text{mg}}{1000\text{ug}} = \text{mg/kg}$$

Multiplying this result by 5 to arrive at the Action Level gives a final result in mg/kg which can then be compared to sample results

As: "u" (+) result in samples MA1357, MA1358, MA1359, MA1364  
 Ba: none  
 Be: none  
 K: none  
 Tl: "u" (+) result as nondetected in sample MA1357

**V.B. ICP INTERFERENCE CHECK SAMPLE (Section 3)**

3. Report the concentration of any elements detected in the ICS A solution > 2X IDL that should not be present.

IDL	ELEMENT	highest	lowest			
		CONC. DETECTED IN THE ICS <sup>initial or final</sup> µg/L	AL	CA	FE	MG
2.2	As	9			199101	
6.0	Ba	6				
0.7	Co	-4				
128.9	K	306				
0.4	Vn	-2				
0.4	Mn	-1				
3.2	Se	-7				

Estimate the concentration produced by the interfering element in all affected samples. See the guidelines for examples. List the samples affected by the interferences below:

see attached

SAMPLE AFFECTED	ELEMENT AFFECTED	SAMPLE CONC. (µg/L)	SAMPLE INTERFERENT CONC. (µg/L)				ESTIMATED INTERF (µg/L)
			AL	CA	FE	MG	
MA1363 + MA1365							

**ACTIONS:**

- In general, the sample data can be accepted without qualification if the sample concentrations of Al, Ca, Fe, and Mg are less than 50% of their respective levels in the ICS solution.
- Estimate (J) positive results for affected elements for samples with levels of interferents 50% or more of that in the ICS solution.
- Reject (R) positive results if the reported concentration is due entirely to the interfering element.
- Estimate (UJ) non-detected results for which false negatives are suspect.

Give an explanation for any actions taken below:

---



---



---

Sample ID: MA1363

Analyte	Average Fe In ICSA (ug/L)	Fe In sample (ug/L)	Highest Conc. of analyte in ICSA (ug/L)	Conc. of analyte in sample (ug/L)	Conc. Attributable to Interference	% Estimated Interference	Actions
Arsenic	199101.0	141473.0	9	32.6	6.40	19.62%	J ✓
Barium	199101.0	141473.0	6	4678	4.26	0.09%	No Action ✓
Cobalt	199101.0	141473.0	-4	21.6	-2.84	-13.16%	J ✓
Potassium	199101.0	141473.0	306	4603	217.43	4.72%	No Action ✓
Vanadium	199101.0	141473.0	-2	89	-1.42	-1.60%	No Action ✓
Manganese	199101.0	141473.0	-1	1046	-0.71	-0.07%	No Action ✓
Se			-7	1.14	#DIV/0!	#DIV/0!	uJ
					#DIV/0!	#DIV/0!	

Sample ID: MA1365

Analyte	Average Fe In ICSA (ug/L)	Fe In sample (ug/L)	Highest Conc. of analyte in ICSA (ug/L)	Conc. of analyte in sample (ug/L)	Conc. Attributable to Interference	% Estimated Interference	Actions
Arsenic	199101.0	107702.0	9	23.1	4.87	21.08%	J ✓
Barium	199101.0	107702.0	6	5153.7	3.25	0.06%	No Action ✓
Cobalt	199101.0	107702.0	-4	14.8	-2.16	-14.62%	J ✓
Potassium	199101.0	107702.0	306	3820	165.53	4.33%	No Action ✓
Vanadium	199101.0	107702.0	-2	71.1	-1.08	-1.52%	No Action ✓
Manganese	199101.0	107702.0	-1	904.5	-0.54	-0.06%	No Action ✓
Se	199101	107702	-7	1.25	#DIV/0!	#DIV/0!	uJ
					#DIV/0!	#DIV/0!	
					#DIV/0!	#DIV/0!	

VI. MATRIX SPIKE

TR # MA1362

Matrix: Soil

1. Recovery Criteria

List the percent recoveries for analytes which did not meet the required criteria.

- S - amount of spike added
- SSR - spiked sample result
- SR - sample result

ANALYTE	SSR	SR	S	%R	ACTION
Sb	51.0527	0.24524	115.21	44.3 ✓	J(+) / UJ(ND)
Cu	97.1811	56.7001	57.60	70.3 ✓	J(+) / UJ(ND)
Pb	0.7419	0.3522	0.58	67.2 ✓	J(+) / UJ(ND)
Zn	212.2284	204.0817	115.21	7.1	J(+) / R(ND)

Matrix Spike Actions apply to all samples of the same matrix.

ACTIONS:

1. If the sample concentration exceed the spike concentration by a factor of 4 or more, no action is taken.
2. If any analyte does not meet the %R criteria, follow the actions stated below:

PERCENT RECOVERY

	<u>&lt; 30%</u>	<u>30%-74%</u>	<u>&gt;125%</u>
Positive Sample Results	J	J	J
Non-detected Results	R	UJ	A

2. Frequency Criteria

- A. Was a matrix spike prepared at the required frequency?  Yes or No
- B. Was a post digestion spike analyzed for elements that did not meet the required criteria for matrix spike recovery?  Yes or No

A separate worksheet should be filled out for each matrix spike pair.

Sb = 93.8%  
Cu = 106.8  
Zn = 93

**VII. LABORATORY DUPLICATES**

List the concentrations of any analyte not meeting the criteria for duplicate precision. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume, and percent solids data for the sample. Indicate what criteria was used to evaluate precision by circling either the RPD or CRDL for each element.

Matrix: Soil

ELEMENT	CRDL		SAMPLE # <u>MA362</u>	DUPLICATE # <u>MA362D</u>	RPD	ACTION
	WATER ug/L	SOIL mg/kg				
Aluminum	200		<u>235.9466</u>	<u>185.47</u> (80)	41.1 /	
Antimony	60					
Arsenic	10					
Barium	200		235.9466	185.47	41.1 /	JLH all samples
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100		19108.4492	41533.6445	74.0 /	JLH all samples
Lead	5		250.0751	164.7310	41.1 /	" "
Magnesium	5000					
Manganese	15					
Mercury	0.2	0.1 mg/kg	0.3522	0.1688	70.4	JLH all samples
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10					

DAT 10/10/03

OK 12 CRDL

Laboratory duplicate actions should be applied to all other samples of the same matrix type.

**ACTION:**

1. Estimate (J) positive results for elements which have an RPD > 20% for waters and > 35% for soils.
2. If sample results are less than 5X the CRDL, estimate (J) positive results for elements whose absolute difference is > CRDL (2X CRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

**XI. INDUCTIVELY COUPLED PLASMA (ICP) SERIAL DILUTION ANALYSIS**

Serial dilutions were performed for each matrix and results of the diluted sample analysis agreed within  $\pm 10\%$  of the original undiluted analysis.

Serial dilution was not performed for the following:

Serial dilutions were performed, but analytical results did not agree within  $\pm 10\%$  for analyte concentrations greater than 50X the IDL before dilution.

Report all results below that do not meet the required laboratory criteria for ICP serial dilution analysis.

Matrix: Soil

MA1362

ELEMENT	IDL	50X IDL	SAMPLE RESULT	SERIAL DILUTION	% D	ACTION
Aluminum						
Antimony						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper			246.10	301.29	224	J(+)
Iron						
Lead						
Magnesium						
Manganese						
Nickel						
Potassium						
Silver						
Sodium						
Vanadium						
Zinc						

Actions apply to all samples of the same matrix

**ACTIONS:**

1. Estimate (J) all positive results and (UJ) all nondetects if the % D > 15%.



Attachment V

Copies of Telephone Logs/Communications Forms  
(NOT APPLICABLE)

Attachment VI

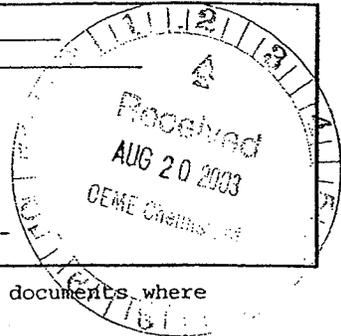
CSF Completeness Evidence Audit (DC-2)

DG/ESAT  
8/20/03

FULL INORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET

0308004-IA  
M&E/RI

LABORATORY NAME Liberty  
 CITY/STATE Cary, NC  
 CASE NO. 32006 SDG NO. MA1357  
 SDG NOS. TO FOLLOW \_\_\_\_\_  
 SAS NO. \_\_\_\_\_  
 CONTRACT NO. 68W00082  
 SOW NO. ILM0421



All documents delivered in the Complete SDG File must be original documents where possible. (Reference Exhibit B, Section II F and Section III U.)

	PAGE NOS.		(Please Check:)	
	FROM	TO	LAB	REGION
1. Inventory Sheet (DC-2) (Do not number)			<input checked="" type="checkbox"/>	8/9/03
2. Cover Page	1	3	<input checked="" type="checkbox"/>	
3. SDG Narrative	4	8	<input checked="" type="checkbox"/>	
4. Inorganic Analysis Data Sheet (Form I-IN)	9	19	<input checked="" type="checkbox"/>	
5. Initial & Continuing Calibration Verification (Form IIA-IN)	20	31	<input checked="" type="checkbox"/>	
6. CRDL Standards For AA and ICP (Form IIB-IN)	32	39	<input checked="" type="checkbox"/>	
7. Blanks (Form III-IN)	40	47	<input checked="" type="checkbox"/>	
8. ICP Interference Check Sample (Form IV-IN)	48	55	<input checked="" type="checkbox"/>	
9. Spike Sample Recovery (Form VA-IN)	56	56	<input checked="" type="checkbox"/>	
10. Post Digest Spike Sample Recovery (Form VB-IN)	57	57	<input checked="" type="checkbox"/>	
11. Duplicates (Form VI-IN)	58	58	<input checked="" type="checkbox"/>	
12. Laboratory Control Sample (Form VII-IN)	59	59	<input checked="" type="checkbox"/>	
13. Standard Addition Results (Form VIII-IN)	N/A	N/A	<input checked="" type="checkbox"/>	
14. ICP Serial Dilutions (Form IX-IN)	60	60	<input checked="" type="checkbox"/>	
15. Instrument Detection Limits (Form X-IN)	76	78	<input checked="" type="checkbox"/>	
16. ICP Interelement Correction Factors (Form XIA-IN)	79	79	<input checked="" type="checkbox"/>	
17. ICP Interelement Correction Factors (Form XIB-IN)	80	83	<input checked="" type="checkbox"/>	
18. ICP Linear Ranges (Form XII-IN)	84	84	<input checked="" type="checkbox"/>	
19. Preparation Log (Form XIII-IN)	61	62	<input checked="" type="checkbox"/>	
20. Analysis Run Log (Form XIV-IN)	63	75	<input checked="" type="checkbox"/>	
21. ICP Raw Data	85	431	<input checked="" type="checkbox"/>	
22. Furnace AA Raw Data	N/A	N/A	<input checked="" type="checkbox"/>	
23. Mercury Raw Data	432	445	<input checked="" type="checkbox"/>	
24. Cyanide Raw Data	N/A	N/A	<input checked="" type="checkbox"/>	
25. Preparation Logs Raw Data	445	446	<input checked="" type="checkbox"/>	
26. Percent Solids Determination Log	447	447	<input checked="" type="checkbox"/>	
27. Traffic Report	448	451	<input checked="" type="checkbox"/>	
28. EPA Shipping/Receiving Documents	N/A	N/A	<input checked="" type="checkbox"/>	
Airbill (No. of Shipments)	452	452	<input checked="" type="checkbox"/>	
Chain-of-Custody Records	453	454	<input checked="" type="checkbox"/>	
Sample Tags	455	455	<input checked="" type="checkbox"/>	
Sample Log-In Sheet (Lab & DCI)	456	459	<input checked="" type="checkbox"/>	
SDG Cover Sheet	460	460	<input checked="" type="checkbox"/>	
29. Misc. Shipping/Receiving Records (list all individual records)				
Telephone Logs	N/A	N/A	<input checked="" type="checkbox"/>	
30. Internal Lab Sample Transfer Records & Tracking Sheets (describe or list)	461	463	<input checked="" type="checkbox"/>	
<u>Internal</u>				

FROM

TO

LAB

REGION

~~NA~~

~~NA~~

~~NA~~

9/15/03

31. Internal Original Sample Prep & Analysis Records (describe or list)

Prep Records \_\_\_\_\_  
Analysis Records \_\_\_\_\_  
Description \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

32. Other Records (describe or list)

Telephone Communications Log  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

33. Comments:

Completed by (CLP Lab):

*Joan Pardee*

Joan Pardee

8/18/03

(Signature)

(Print Name & Title)

(Date)

Audited by (EPA):

*Sheila Harvey*

Metcalfe & Eddy, Inc. Sheila Harvey / Chemist

9/15/03

(Signature)

(Print Name & Title)

(Date)

~~NA~~ Contract #

Attachment VII  
DQO Summary Form

A separate Form should be completed for each sampling event. Refer to Attachment A for instructions on completing this form, Attachment B for a complete list of the parameter codes and Attachment C for an example of a completed form.

1. EPA Program: <del>TSCA CERCLA RCRA DW NPDES CAA</del> Other: <u>Targeted Brownfields Assessment (TBA)</u> Projected Date(s) of Sampling: <u>4-8 August 2003</u> EPA Site Manager: <u>Jim Byrne / James Chow</u> EPA Case Team Members: _____	Site Name: <u>54-67 Mill Street</u> Site Location: <u>Brookfield, MA</u> Assigned Site Latitude/Longitude: <u>Unknown</u> CERCLA Site/Spill Identifier No. 01 _____ (Include Operable Unit) Phase: <del>ERA SA/SI pre-RI RI (phase I, etc.) FS RD RA post-RA</del> (circle one) Other: <u>TBA</u>
---	--

2. QAPJP Title and Revision Date: Generic Sampling and Analysis Plan for Brownfield Targeted Site Assessments (M&E, June 1999) and Amended Field Task Work Plan for 54-67 Mill Street, Brookfield, MA (M&E, June 2003)  
 Approved by: Jim Byrne / James Chow Date of Approval: July 14, 2003  
 Title of Approving Official: EPA Work Assignment Manager Organization\*: EPA Region I  
 \*If other than EPA, record date approval authority was delegated: \_\_\_\_\_

EPA Oversight Project (circle one)     N    Type of EPA Oversight (circle one) PRP or FF Other: \_\_\_\_\_  
 Confirmatory Analysis for Field Screening     N    If EPA Oversight or Confirmatory: % splits \_\_\_\_\_  
 Are comparability criteria documented?     N

3. a.	Matrix Code <sup>1</sup>	SO	SO		
b.	Parameter Code <sup>2</sup>	13126010	ILM04.1MT		
c.	Preservation Code <sup>3</sup>	5	5		
d.	Analytical Services Mechanism	Sub.*	RAS		
e.	No. of Sample Locations	8	8		
Field QC:					
f.	Field Duplicate Pairs	1	1		
g.	Equipment Blanks	0	0		
h.	VOA Trip Blanks	0	0		
i.	Cooler Temperature Blanks	1 per cooler	1 per cooler		
j.	Bottle Blanks	0	0		
k.	Other: _____				
l.	PES sent to Laboratory	0	0		
Laboratory QC:					
m.	Reagent Blank	1	1		
n.	Duplicate	0	0		
o.	Matrix Spike	1	1		
p.	Matrix Spike Duplicate	1	1		
q.	Other: _____				

4. Site Information  
 Site Dimensions: Unknown  
 List all potentially contaminated matrices SO  
 Range of Depth to Groundwater 5-10 feet below ground surface    Soil Types: Surface and Subsurface  
 Sediment Types: Stream Pond Estuary Wetland - Other: \_\_\_\_\_    Other: \_\_\_\_\_  
 Expected Soil/Sediment Moisture Content: High    Low

When multiple matrices will be sampled during a sampling event, complete Sections 5-10 for each matrix.    Matrix Code<sup>1</sup> SO

5. Data Use (circle all that apply)    Site Investigation/Assessment    PRP Determination    Removal Actions  
Nature and Extent of Contamination    Human and/or Ecological Risk Assessment    Remediation Alternatives  
Engineering Design    Remedial Action  
Post-Remedial Action (quarterly monitoring)    Other: TBA

6. Summarize DQOs: To provide data for characterizing and assessing current environmental and site conditions as needed to support a preliminary evaluation of risks and remedial alternatives.  
 Complete Table if applicable

COCs	Action Levels	Analytical Method-Quantitation Limits
Refer to Amended Field Task Work Plan for 54-67 Mill Street, Brookfield, MA (TBA), M&E, June 2003	Refer to Amended Field Task Work Plan for 54-67 Mill Street, Brookfield, MA (TBA), M&E, June 2003	Subcontract Methods - per SOP with approved TBA laboratories (Mitekem, Amro, or Woods Hole Group)

7. Sampling Method (circle technique) ~~Bailer~~ Low flow pump (Region I method: Yes No) ~~Peristaltic Pump~~  
~~Positive Displacement Pump~~ ~~Faucet or Spigot~~  
Split Spoon ~~Dredge~~ Trowel Other: \_\_\_\_\_  
 Sampling Procedures (SOP name, No., Rev. #, and date) \_\_\_\_\_  
 List Background Sample Locations \_\_\_\_\_  
 Circle: Grab or ~~Composite~~  
 "Hot spots" sampled: Yes ~~No~~

8. Field Data (circle) ~~ORP~~ pH ~~Specific Conductance~~ ~~Dissolved O<sub>2</sub>~~ ~~Temperature~~ ~~Turbidity~~  
 Other: \_\_\_\_\_

9. Analytical Methods and Parameters

Method title/SOP name	Method/SOP Identification number	Revision Date	Target Parameters (VOA, SV, Pest/PCB, Metals, etc.)
See Section 3			

10. Validation Criteria (circle one) 1. Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, Part II, III or IV  
 2. Other Approved Validation Criteria: Approved Validation Criteria: Tier II-like validation memorandum  
 Validation Tier (circle one) I II III Partial Tier III Modified Tier II  
 Company/Organization Performing Data Validation: Metcalf & Eddy, Inc. Prime or Subcontractor (circle one)

11. Company Name: Metcalf & Eddy, Inc. Contract Number: 68-W6-0042  
 Contract Name (e.g. START, RAC, etc.): RAC Work Assignment No. 106-SISI-01ZZ  
 Person Completing Form/Title: Denise Laferte, Project Chemist Date of DQO Summary Form Completion: June 9, 2003

Matrix Codes<sup>1</sup> - Refer to Attachment B, Part I  
 Parameter Codes<sup>2</sup> - Refer to Attachment B, Part II

Preservation Codes<sup>3</sup>

- |                                   |  |
|-----------------------------------|--|
| 1. HCl to pH ≤ 2                  | 7. K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> |
| 2. HNO <sub>3</sub>               | 8. Freeze  |
| 3. NaHSO <sub>4</sub>             | 9. Room Temperature (avoid excessive heat)       |
| 4. H <sub>2</sub> SO <sub>4</sub> | 10. Other (Specify)                              |
| 5. Cool @ 4°C (± 2°)              | N. Not preserved                                 |
| 6. NaOH                           |  |

\* - To supplement Matrix Codes and/or Parameter Codes contact the QA Unit

**Notes:**

\* SUB = Directly Subcontracted Laboratory.

ILM04.1 = RAS Total Metals/Hg.

13116010 = SPLP Metals.



## Memorandum

**PROJECT NO:** 036200100.0006.00115  
**TO:** Mill Street Site File (BTSA)  
**FROM:** S. Harvey *SH*  
**REVIEWED BY:** D. Truini *DT*  
**CC:** B. Weir, N. Thurber, D. Laferte (memo only)

**DATE:** October 27, 2003  
**OFFICE:** Wakefield  
**COMPANY:** Metcalf & Eddy, Inc.

**SUBJECT:** Limited QC Review/Modified Tier II-Like Review  
SPLP Metals Analytical Results  
Mitekem Corporation, Warwick, Rhode Island  
Project No. B1264

On August 5, 2003, nine soil samples were collected at the Mill Street Brownfields Targeted Site Assessment (BTSA) site, located in Brookfield, Massachusetts by Metcalf & Eddy, Inc. (M&E) field personnel. The sampling was performed as part of the BTSA Response Action Contract (RAC) Work Assignment (WA) #106-SIBZ-01ZZ. The samples were submitted to Mitekem Corporation, located in Warwick, Rhode Island for the analysis of Synthetic Precipitation Leaching Procedure (SPLP) Metals using SW-846 Method 1312. All samples were received by the laboratory on August 6, 2003. The data package was received in the M&E office on August 27, 2003.

M&E reviewed the data in accordance with the EPA-approved Final Field Task Work Plan for the site, and the guidance received from EPA Work Assignment Manager, Mr. James Byrne, in a September 17, 1999 letter to former M&E Work Assignment Manager, Barb Wyskowski. The data review included:

- \* • Data Completeness
- \* • Preservation and Technical Holding Times
- \* • Initial and Continuing Calibrations
- Blank Analysis Results
- \* • Inductively Coupled Plasma (ICP) Interference Check Sample
- \* • Matrix Spike (MS) Recoveries
- \* • Laboratory Duplicate Sample Results
- \* • Field Duplicate Sample Results
- \* • Laboratory Control Sample (LCS) Results
- \* • ICP Serial Dilution Analysis Results
- Compound Quantitation and Reported Quantitation Limits
- NA • Performance Evaluation (PE) Sample Results

\* = All criteria met for this parameter  
NA = Not applicable and/or no information was provided by the laboratory

Note: Worksheets are not included for parameters that have met criteria or for criteria that are not applicable to the method and/or to the modified Tier II-like review.

Included in Attachment I is a copy of the chain-of-custody (COC) record. Included in Attachment II are the result summary sheets, annotated with qualifiers, if necessary, as detailed in this memorandum. Included in Attachment III are the data validation worksheets.

### Data Competeness

Copper was inadvertently not reported by the laboratory in the original submission of the data package. M&E requested that copper results be reported for all SPLP samples on October 2, 2003. A resubmittal response was received at M&E on October 17, 2003.

### Blanks

The following table summarizes the SPLP metals detected in the laboratory blanks and the resulting actions:

Analyte	Max. Concentration ( $\mu\text{g/L}$ )	BAL ( $\mu\text{g/L}$ )	Affected Samples
silver	6.630	33.2	Qualify the reported results as nondetect (U) in samples SB-1-D, SB-1-S, SB-2-D, and SB-2-S. All other sample results are nondetect.

The blank contamination validation actions include:

- \* concentration  $\leq$  blank action level; qualify the value as nondetect (U) at the reported value.
- \* concentration  $>$  blank action level; report the value unqualified.

### Compound Quantitation and Reported Quantitation Limits

The following table summarizes the positive and blank-qualified nondetect sample results which are estimated (and UJ, respectively) due to reported concentrations being less than two times the instrument detection limits (IDL). There is uncertainty in the quantitation near the IDL:

Analyte	Affected Sample
arsenic	SB-1-S, SB-2-S, SBK-4-D
antimony	SB-4-D
chromium	SB-1-D, SB-2-S
copper	SB-3-S
lead	SB-2-S, SB-3-D
nickel	SB-4-D
silver	SB-1-D, SB-1-S, SB-2-D, SB-2-S
vanadium	SB-1-D
zinc	SB-1-D, SB-1-S, SB-2-D

The positive results for silver in the above listed samples were previously reported "U" due to blank contamination and are further qualified as estimated (UJ) detection limits.

Attachment I  
Chain-of-Custody



# Metcalf and Eddy DAS Chain of Custody Form

## Generic Chain of Custody

Reference Case: 32006

Client No:

R

Region: 1	Date Shipped: 8/6/03	Carrier Name: Courier - Mitkem	Shipped to: Mitekem Corporation 175 Metro Center Blvd. Warwick RI 02886 (401) 732-3400
Project Code: 036200100.0006.00115	Airbill:		
CERCLIS ID:			
Spill ID:			
Site Name/State: Mill Street, Brookfield 2003/MA			
Project Leader: Bill Abrahams-DeMatte			
Action: Brownfields Site			
Sampling Co: Metcalf & Eddy, Inc.			

Chain of Custody Record	
Relinquished By	Received By (Date / Time)
1 <i>[Signature]</i>	8/6/03 12:00
2	
3	
4	

SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	QC Type
SB-1-D	SOIL/ Bill	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-1-D	S: 8/5/03 12:10	--
	Abrahams-DeM atte						
SB-1-S	SOIL/ Bill	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-1-S	S: 8/5/03 12:00	--
	Abrahams-DeM atte						
SB-2-D	SOIL/ Bill	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-2-D	S: 8/5/03 12:30	--
	Abrahams-DeM atte						
SB-2-S	SOIL/ Bill	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-2-S	S: 8/5/03 12:20	--
	Abrahams-DeM atte						
SB-3-D	SOIL/ Bill	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-3-D	S: 8/5/03 12:40	--
	Abrahams-DeM atte						
SB-3-S	SOIL/ Bill	L/G	SPLP Metal (21)	(Ice Only) (2)	SB-3-S	S: 8/5/03 12:35	--
	Abrahams-DeM atte						
SB-4-D	SOIL/ Bill	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-4-D	S: 8/5/03 12:55	FD 1
	Abrahams-DeM atte						

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC: SB-3-S	Additional Sampler Signature(s): <i>[Signature]</i>	Chain of Custody Seal Number:
Analysis Key: SPLP Metal = SPLP Metals	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Iced? _____

IR Number: 1-502446878-080503-0002

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

REGION COPY



# Metcalfe and Eddy DAS Chain of Custody Form Generic Chain of Custody

Reference Case: 32006  
Client No. *[Signature]*

**R**

Region: Project Code: Account Code: CERCLIS ID: Spill ID: Site Name/State: Project Leader: Action: Sampling Co:	1 036200100.0006.00115  Mill Street, Brookfield 2003/MA Bill Abrahams-DeMatte Brownfields Site Metcalfe & Eddy, Inc.	Date Shipped: 8/6/03 Carrier Name: Courier - Mitkem Airbill: Shipped to: Mitkem Corporation 175 Metro Center Blvd. Warwick RI 02886 (401) 732-3400	Chain of Custody Record	Sampler Signature: Received By (Date / Time) (Date / Time)
			Reinquished By <i>[Signature]</i> 8/6/03 12:00	
			3	
			4	

SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	QC Type
SB-4-S	SOIL/ Bill Abrahams-DeM atte	L/G	SPLP Metal (21)	(Ice Only) (1)	SB-4-S	S: 8/5/03 12:50	
SBK-4-D	SOIL/ Bill Abrahams-DeM atte	L/G	SPLP Metal (21)	(Ice Only) (1)	SBK-4-D	S: 8/5/03 13:00	FD 1

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC: SB-3-S	Additional Sampler Signature(s): <i>[Signature]</i>	Chain of Custody Seal Number:
Analysis Key: SPLP Metal = SPLP Metals	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C / Grab = G	Shipment iced? _____

TR Number: 1-502446878-080503-0002

PR provides preliminary results. Requests for preliminary results will increase analytical costs.  
Send Copy to: Sample Management Office, 2000 Edmund Halley Dr., Reston, VA. 20191-3400 Phone 703/264-9348 Fax 703/264-9222

**REGION COPY**

Attachment II

Sample Result Summary Sheets

U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-1-D

Client Name: MITKEM CORPORATION \_\_\_\_\_ Contract: \_\_\_\_\_

Client Code: MITKEM Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_

SDG No.: B1264\_\_

Matrix (soil/water): WATER \_\_\_\_\_ Lab Sample ID: B1264-01A \_\_\_\_\_

Level (low/med): MED \_\_\_\_\_ Date Received: 08/06/03 \_\_\_\_\_

Solids: \_\_\_\_\_

Concentration Units (ug/L or mg/kg dry weight):

UG/L

*SD*  
10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	134	<del>U</del>		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	0.83	<del>U</del> J		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron				NR
7439-92-1	Lead	4.0	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.14	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	3.9	<del>U</del> UJ		P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	1.3	<del>U</del> J		P
7440-66-6	Zinc	8.7	<del>U</del> J		P
	Cyanide				NR

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

000412

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-1-S

Company Name: MITKEM CORPORATION \_\_\_\_\_ Contract: \_\_\_\_\_

Company Code: MITKEM Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_

SDG No.: B1264\_\_

Matrix (soil/water): WATER \_\_\_\_\_ Lab Sample ID: B1264-02A \_\_\_\_\_

Level (low/med): MED \_\_\_\_\_ Date Received: 08/06/03 \_\_\_\_\_

Solids: \_\_\_\_\_

Concentration Units (ug/L or mg/kg dry weight):

UG/L

SA 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.6	B	J	P
7440-39-3	Barium	124	B		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	1.4	B		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	15.3	B		P
7439-89-6	Iron				NR
7439-92-1	Lead	29.1			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.14	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	3.4	B	UJ	P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	2.8	B		P
7440-66-6	Zinc	12.7	B	J	P
	Cyanide				NR

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

0005 R

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-2-D

Client Name: MITKEM CORPORATION \_\_\_\_\_ Contract: \_\_\_\_\_

Client Code: MITKEM Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_

SDG No.: B1264\_\_

Matrix (soil/water): WATER \_\_\_\_\_ Lab Sample ID: B1264-03A \_\_\_\_\_

Level (low/med): MED \_\_\_\_\_ Date Received: 08/06/03 \_\_\_\_\_

Solids: \_\_\_\_\_

Concentration Units (ug/L or mg/kg dry weight):

UG/L

SA 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	136	B		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron				NR
7439-92-1	Lead	4.0	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.14	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.9	B	UJ	P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	7.8	B	J	P
	Cyanide				NR

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

0006 R

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-2-S

Site Name: MITKEM CORPORATION Contract: \_\_\_\_\_

Site Code: MITKEM Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_

SDG No.: B1264

Matrix (soil/water): WATER Lab Sample ID: B1264-04A

Level (low/med): MED Date Received: 08/06/03

Solids: \_\_\_\_\_

Concentration Units (ug/L or mg/kg dry weight):

UG/L

8/10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.0	<del>B</del> J		P
7440-39-3	Barium	168	<del>B</del>		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	1.0	<del>B</del> J		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron				NR
7439-92-1	Lead	4.8	<del>B</del> J		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.4	<del>B</del> UJ		P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	1.5	<del>B</del>		P
7440-66-6	Zinc	21.7	<del>B</del>		P
	Cyanide				NR

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

I  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-3-D

Client Name: MITKEM CORPORATION \_\_\_\_\_ Contract: \_\_\_\_\_

Client Code: MITKEM Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_

SDG No.: B1264\_\_

Matrix (soil/water): WATER \_\_\_\_\_ Lab Sample ID: B1264-05A \_\_\_\_\_

Level (low/med): MED \_\_\_\_\_ Date Received: 08/06/03 \_\_\_\_\_

Solids: \_\_\_\_\_

Concentration Units (ug/L or mg/kg dry weight):

UG/L

8/10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	141	B		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron				NR
7439-92-1	Lead	5.1	B	J	P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.14	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	7.0	U		P
	Cyanide				NR

Color Before: \_\_\_\_\_

Clarity Before: \_\_\_\_\_

Texture: \_\_\_\_\_

Color After: \_\_\_\_\_

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

0008R

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-3-S

Company Name: MITKEM CORPORATION Contract: \_\_\_\_\_

Company Code: MITKEM Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_

SDG No.: B1264

Matrix (soil/water): WATER Lab Sample ID: B1264-06A

Level (low/med): MED Date Received: 08/06/03

Solids: \_\_\_\_\_

Concentration Units (ug/L or mg/kg dry weight):

UG/L

SA 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	101	<del>B</del>		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	1.3	<del>B</del>		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.8	<del>B</del> J		P
7439-89-6	Iron				NR
7439-92-1	Lead	8.3	<del>B</del>		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.15	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	2.0	<del>B</del>		P
7440-66-6	Zinc	18.6	<del>B</del>		P
	Cyanide				NR

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

0009R

U.S. EPA - CLP

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-4-D

Site Name: MITKEM\_CORPORATION Contract: \_\_\_\_\_

Site Code: MITKEM Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_

SDG No.: B1264

Matrix (soil/water): WATER Lab Sample ID: B1264-07A

Level (low/med): MED Date Received: 08/06/03

Solids: \_\_\_\_\_

Concentration Units (ug/L or mg/kg dry weight):

UG/L

8/10/2003

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.1	<del>B</del>	J	P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	175	<del>B</del>		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	17.2	<del>B</del>		P
7439-89-6	Iron				NR
7439-92-1	Lead	9.4	<del>B</del>		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.15	U		CV
7440-02-0	Nickel	1.1	<del>B</del>	J	P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	24.2	<del>B</del>		P
	Cyanide				NR

Color Before: \_\_\_\_\_

Clarity Before: \_\_\_\_\_

Texture: \_\_\_\_\_

Color After: \_\_\_\_\_

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB-4-S

Sample Name: MITKEM\_CORPORATION Contract: \_\_\_\_\_

Sample Code: MITKEM Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_

SDG No.: B1264

Matrix (soil/water): WATER Lab Sample ID: B1264-08A

Level (low/med): MED Date Received: 08/06/03

Solids: \_\_\_\_\_

Concentration Units (ug/L or mg/kg dry weight):

UG/L

SH 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.0	U		P
7440-39-3	Barium	62.0	<del>U</del>		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	1.2	<del>U</del>		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.0	U		P
7439-89-6	Iron				NR
7439-92-1	Lead	4.0	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.15	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	3.9	<del>U</del>		P
7440-66-6	Zinc	7.0	U		P
	Cyanide				NR

Color Before: \_\_\_\_\_ Clarity Before: \_\_\_\_\_ Texture: \_\_\_\_\_

Color After: \_\_\_\_\_ Clarity After: \_\_\_\_\_ Artifacts: \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

0011R

1  
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBK-4-D

Lab Name: MITKEM CORPORATION \_\_\_\_\_ Contract: \_\_\_\_\_

Lab Code: MITKEM Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_

SDG No.: B1264\_\_

Matrix (soil/water): WATER \_\_\_\_\_ Lab Sample ID: B1264-09A\_\_\_\_\_

Level (low/med): MED \_\_\_\_\_ Date Received: 08/06/03\_\_\_\_\_

Solids: \_\_\_\_\_

Concentration Units (ug/L or mg/kg dry weight):

UG/L

SM 10/20/03

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	3.2	<del>B</del> J		P
7440-39-3	Barium	178	<del>B</del>		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	0.70	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.1	<del>B</del>		P
7439-89-6	Iron				NR
7439-92-1	Lead	18.6			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.16	U		CV
7440-02-0	Nickel	0.80	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium	9.0	U		P
7440-22-4	Silver	2.0	U		P
7440-23-5	Sodium				NR
7440-28-0	Thallium	3.0	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	20.1	<del>B</del>		P
	Cyanide				NR

Color Before: \_\_\_\_\_

Clarity Before: \_\_\_\_\_

Texture: \_\_\_\_\_

Color After: \_\_\_\_\_

Clarity After: \_\_\_\_\_

Artifacts: \_\_\_\_\_

Comments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

0012R

Attachment III

Data Validation Worksheets

Region I  
Data Review Worksheet

TBSA Site  
Site Name: Mill Street Brookfield, MA  
Reference Number: 200100, 0006, 00115

**REGION I REVIEW OF INORGANIC  
CONTRACT LABORATORY DATA PACKAGE**

The hardcopied (laboratory name) Mitkem Corp. data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. \_\_\_\_\_ SAS No. \_\_\_\_\_ Sampling Date (s) 8/5/03  
SDG No. B1214 Matrix \_\_\_\_\_ Shipping Date (s) 8/6/03  
No. of Samples 9 / soils Date(s) rec'd by lab 8/6/03

Traffic Report Numbers SB-1-D, SB-1-S, SB-2-D, SB-2-S, SB-3-D, SB-3-S,  
SB-4-D, SB-4-S, SBK-4-D

Trip Blank No.: \_\_\_\_\_  
Equipment Blank Number: \_\_\_\_\_  
Field Duplicate Numbers: SB-4-D / SBK-4-D

SOW No. Spl Metals SW 1312, 6010B, 1747A requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> -Data Completeness              | <input checked="" type="checkbox"/> -Field Duplicates            |
| <input checked="" type="checkbox"/> -Holding Times                  | <input checked="" type="checkbox"/> -Lab Control Sample Results  |
| <input checked="" type="checkbox"/> -Calibrations                   | <input checked="" type="checkbox"/> -Furnace AA results          |
| <input checked="" type="checkbox"/> -Blanks                         | <input checked="" type="checkbox"/> -ICP Serial Dilution Results |
| <input checked="" type="checkbox"/> -ICP Interference Check Results | <input checked="" type="checkbox"/> -Detection Limit Results     |
| <input checked="" type="checkbox"/> -Matrix Spike Recoveries        | <input checked="" type="checkbox"/> -Sample Quantitation         |
| <input checked="" type="checkbox"/> -Laboratory Duplicates          |  |

Overall Comments: Cooler temp 3°C

Definitions and Qualifiers:

- A - Acceptable data
- J - Approximate data due to quality control criteria
- R - Reject data due to quality control criteria
- U - Analyte not detected

Reviewer: Shala Harvey

Date: 9/3/03

**IV A. BLANK ANALYSIS RESULTS** (Sections 1-3)

List the blank contamination in sections 1 and 2 below. A separate worksheet should be used for soil and water blanks.

**1. Laboratory Blanks**

SPLP  
Matrix: Soil

DATE:	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS <i>ug/L</i>
	ICB		As	4.5
		✓	As	6.630

**2. Equipment/Trip Blanks** *None*

DATE:	EQUIP BL #	ANALYTE	CONC./UNITS

**3. Frequency Requirements**

- A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? Yes or No
- B. Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? Yes or No

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

---



---



---

**IV B. BLANK ANALYSIS RESULTS** (Section 4)

**4. Blank Actions**

The Action Level for any analyte is equal to 5X the highest concentration of that analyte found in any blank. (Use 5X the absolute value for any negative blank results). The Action Level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL) for that analyte. Specific actions are as follows:

1. When the concentration is greater than the IDL, but less than the Action Level, report the sample concentration detected with a U.
2. When the sample concentration is greater than the Action Level, report the sample concentration unqualified.

Matrix: Soil - TCLP

<u>ELEMENT</u>	<u>MAX. CONC.</u> <u>/UNITS</u> $\mu\text{g/L}$	<u>AL</u> <u>/UNITS</u> $\mu\text{g/L}$	Matrix: _____	<u>ELEMENT</u>	<u>MAX. CONC.</u> <u>UNITS</u>	<u>AL</u> <u>UNIT</u>
<u>Ag</u>	<u>6.63</u>	<u>33.15</u>	<u>33.2</u>			

NOTE: Blanks analyzed during a soil case must be converted to mg/kg in order to compare them with the sample results.

$$\text{conc. in } \mu\text{g/l} \times \frac{\text{Volume diluted to (200ml)}}{\text{Weight digested (1gram)}} \times \frac{1\text{L}}{1000\text{ml}} \times \frac{1000\text{g}}{1\text{kg}} \times \frac{1\text{mg}}{1000\mu\text{g}} = \text{mg/kg}$$

Multiplying this result by 5 to arrive at the Action Level gives a final result in mg/kg which can then be compared to sample results

Ag: "U" positive results in samples: SB-1-D, SB-1-S, SB-2-D, SB-2-S;  
all others ND

**XIII. SAMPLE QUANTITATION (continued)**

List the positive sample results that were reported at concentrations less than 2xIDL and have not already been qualified. The positive results have been estimated (J) due to uncertainty in the quantitation near the IDL.

<u>Analyte</u>	<u>Samples Affected</u>
Cr	SB-1-D, SB-2-S
As*	SB-1-D, SB-1-S, SB-2-D, SB-2-S
Vn	SB-1-D,
Zn	SB-1-D, SB-1-S, SB-2-D,
As	SB-1-S, SB-2-S, SBK-4-D
Pb	SB-2-S, SB-3-D
Sb** DAT 10/1/03	SB-4-D
Ni	SB-4-D
Cu	SB-3-S

\* results "u" due to blank contamination. Therefore, UJ.

\*\* result previously "J" due to CV %R > 110%. No further action taken.  
DAT 10/1/03



## Memorandum

**PROJECT NO:** 0362001-0006-00115  
**TO:** Mill Street Site File (BTSA)  
**FROM:** S. Harvey  
**REVIEWED BY:** L. Krowitz  
**CC:** B. Weir, N. Thurber, D. Laferte (memo only)

**DATE:** July 23, 2002  
**OFFICE:** Wakefield  
**COMPANY:** Metcalf & Eddy, Inc.

**SUBJECT:** Limited QC Review/Modified Tier II-Like Review  
VPH, EPH, PCB, and TCLP Metals Analytical Results  
Woods Hole Group, Raynham, Massachusetts  
ETR No. 0206065

On June 10, 11, and 12, 2002, thirteen soil samples were collected at the Mill Street Brownfields Targeted Site Assessment (BTSA) site, located in Brookfield, Massachusetts by Metcalf & Eddy, Inc. (M&E) field personnel. The sampling was performed as part of the BTSA Response Action Contract (RAC) Work Assignment (WA) #106-SIBZ-01ZZ. The samples were submitted to Woods Hole Group, located in Raynham, Massachusetts for the analysis of Volatile Petroleum Hydrocarbons (VPH) using the Massachusetts Department of Environmental Protection (MADEP) *Method for Determination of Volatile Petroleum Hydrocarbons (VPH) (January 1998)*; Extractable Petroleum Hydrocarbons (EPH) using the Massachusetts Department of Environmental Protection (MADEP) *Method for the Determination of Extractable Petroleum Hydrocarbons (EPH), January 1998*; Polychlorinated Biphenyls (PCB) using EPA SW-846 Methods 8082; and Toxicity Characteristic Leaching Procedure (TCLP) Metals using SW-846 Methods 1311, 6020A. All samples were received by the laboratory on June 13, 2002. The data package was received in the M&E office on July 3, 2002.

M&E reviewed the data in accordance with the EPA-approved Final Field Task Work Plan for the site, and the guidance received from EPA Work Assignment Manager, Mr. James Byrne, in a September 17, 1999 letter to former M&E Work Assignment Manager, Barb Wyskowski. The data review included:

- Data Completeness
- \* • Preservation and Technical Holding Times
- NA • GC/MS and GC/ECD Instrument Performance Check
- Initial and Continuing Calibrations
- Blank Analysis Results
- \* • Inductively Coupled Plasma (ICP) Interference Check Sample Results
- Surrogate Compounds
- \* • Internal Standards
- Matrix Spike (MS) Recoveries

*	•	Laboratory Duplicate Sample Results
*	•	Field Duplicate Sample Results
*	•	Laboratory Control Sample (LCS) Results
NA	•	Furnace Atomic Absorption Results
	•	ICP Serial Dilution Analysis Results
	•	Compound Quantitation and Reported Quantitation Limits
NA	•	Semivolatile and Pesticide/PCB Cleanup
NA	•	Performance Evaluation (PE) Sample Results
*	=	All criteria met for this parameter
NA	=	Not applicable and/or no information was provided by the laboratory

Note: Worksheets are not included for parameters that have met criteria or for criteria that are not applicable to the method and/or to the modified Tier II-like review.

Included in Attachment I is a copy of the chain-of-custody (COC) record. Included in Attachment II are the result summary sheets, annotated with qualifiers, if necessary, as detailed in this memorandum. Included in Attachment III are the data validation worksheets.

### **Data Completeness**

#### PCBs

The laboratory was contacted on July 16, 2002, to request a summary form detailing the PCB analytical sequence as well as to verbally confirm the Case Narrative statement that all PCB results were reported from the primary column. The laboratory submitted the requested information on July 17, 2002.

### **Initial and Continuing Calibrations**

#### VPH

The following table summarizes the continuing calibration (CC) analysis results that failed to meet the CC criterion of percent difference (%D)  $\leq 25$ :

Instrument	HP PID
Calibration	CC 6/25/02
Compound	%D
n-nonane	-32%
Associated Samples:	All VPH samples.

%D ≥ 25%: Estimate (J) positive and nondetect (UJ) C<sub>9</sub>-C<sub>10</sub> aromatic results. A bias cannot be determined.

EPH

The following table summarizes the initial calibration (IC) and CC EPH analysis results that failed to meet the IC criterion of correlation coefficient ( $r^2$ ) ≥ 0.995 and the CC criterion of %D ≤ 25%:

Instrument	HP TPH	
Calibration	IC 5/28/02	CC 6/24/02
Compound	$r^2$	%D
benzo(k)fluoranthene	0.990	-
n-hexatriacontane (C <sub>36</sub> )	-	27.3
Associated Samples:	All EPH samples.	None, because no field samples associated with this standard.

$r^2$  < 0.995: Estimate nondetect (UJ) results. A bias cannot be determined.

%D ≥ 25%: Estimate (J) positive and nondetect (UJ) results. A bias cannot be determined.

PCBs

The following table summarizes the CC PCB analysis results that failed to meet the CC criteria of percent difference (%D) ≤ 15:

Instrument/Column	CLP II/Col. II	RTX-5/Col. I	CLP II/Col. II	CLP II/Col. II	CLP II/Col. II
Calibration	CC 6/17/02 C2061701	CC 6/17/02 C2061702	CC 6/17/02 C2061702	CC 6/18/02 C2061802	CC 6/18/02 C2061803
Compound	%D	%D	%D	%D	%D
peak #1 A1260	16.0	15.3	29.9	22.3	24.1
peak #2 A1260	15.5	15.3	31.7	23.8	25.0
peak #3 A1260	16.1	-	29.4	22.2	28.3
peak #4 A1260	-	16.0	30.5	21.1	25.0
peak #5 A1260	-	-	33.5		37.4
peak #1 A1016	-	-	20.8	-	15.6
peak #2 A1016	-	-	21.3	-	22.1
peak #3 A1016	-	-	19.8	-	-
peak #4 A1016	-	-	15.2	19.7	19.4
peak #5 A1016	-	-	-	16.9	19.4
tetrachlorometa-xylene (surrogate)	-	-	18.5	-	20.0
decachlorobiphenyl (surrogate)	-	-	22.4	19.5	24.7
Associated Samples:	None, because no field samples associated with this calibration.	None, because no field samples associated with this calibration.	None, because no field samples associated with this calibration.	None, because sample results not reported from this column.	None, because sample results not reported from this column.

%D >15: Estimate positive (J) results and nondetect (UJ) results. A bias cannot be determined.

TCLP Metals

The following table summarizes the initial calibration (IC) TCLP metals analysis results that failed to meet the IC criterion of percent recovery (%R) 90-110%:

Analyte	%R	Action/Affected Samples
Calibration		IC 6/24/02
silver	112.0	No qualification since silver was not detected in any of the field samples.

## Blank Analysis Results

### TCLP Metals

A review of laboratory blank analysis results indicates the presence of contamination for the metals analytes in the samples listed below. Positive sample results reported with concentrations less than the blank action level (BAL) for that analyte are considered to be false positive results.

Analyte	Max. Conc. ( $\mu\text{g/L}$ )	Blank Action Level (BAL) ( $\mu\text{g/L}$ )*	Affected Samples/Action
barium	80	400	None. Sample results $\geq$ BAL.
chromium	13	65	Qualify the reported value as nondetect "U" in TCLP metals samples TP-1-A, TP-2-A, TP-2-B, KTP-2-B, TP-3-A, TP-3-B, and TP-4-B.

\* Dilution factors were taken into account when evaluating blank contamination.

The blank contamination validation actions include:

- \* concentration  $\leq$  blank action level; qualify the reported value as nondetect (U)
- \* concentration  $\geq$  blank action level; report the value unqualified.

The positive chromium results in samples TP-1-A, TP-2-A, TP-3-A, and TP-3-B were qualified as estimated, nondetect (UJ) due to positive results reported being less than the reporting limit (RL) but greater than the method detection limit (MDL).

## Surrogate Compounds

### VPH

The VPH surrogate compounds that did not meet the acceptance criterion of percent recovery (%R) of 70-130% for 1,4-difluorobenzene are summarized in the following table:

Sample ID	FID	PID	Action
TP-2-B	49	49	Estimate (UJ) the nondetect aliphatic and aromatic VPH results in sample TP-2-B. The results may be biased low.
KTP-2-B	47	46	Estimate (UJ) the nondetect aliphatic and aromatic VPH results in sample KTP-2-B. The results may be biased low.
TP-3-A	-	69	Estimate (UJ) the nondetect aromatic VPH results in sample TP-3-A. The results may be biased low.
TP-4-B	23	20	Estimate the positive (J) and nondetect (UJ) aliphatic and aromatic VPH results in sample TP-4-B. The results may be biased low.

“-“ indicates acceptable recovery

The nondetect C<sub>9</sub>-C<sub>10</sub> aromatic hydrocarbon range in all the samples listed above were previously qualified as estimated (UJ) due to instrument variability. Therefore, no further action is taken on these results due to poor surrogate recovery.

PCBs

The PCB surrogate compounds that did not meet the acceptance criterion of percent recovery (%R) of 30-150% for tetrachloro-meta-xylene (TMX) and/or decachlorobiphenyl (DCB) are summarized in the following table:

Sample ID	TMX Column II	DCB Column II	Action
TP-2-B	-	182	No action. Results reported from Column I.
KTP-2-B	-	156	No action. Results reported from Column I.
TP-3-A	-	192	No action. Results reported from Column I.

“-“ indicates acceptable recovery

### Matrix Spike Recoveries

#### VPH

The VPH compounds that did not meet acceptance criteria of 70-130 percent recovery (%R) in matrix spike sample TP-3-A, indicating possible matrix interference, are summarized in the table below:

Compound	Spiked Sample Result (µg/kg)	Sample Result (µg/kg)	Matrix Spike %R	Affected Samples/Action
n-nonane	11,000	460 U	175	No action. Sample result is nondetect.

### ICP Serial Dilution Analysis Results

#### TCLP Metals

The following table summarizes the TCLP analyte that did not meet the percent difference (%D) acceptance criterion of <15% for the serially diluted sample TP-3-A:

Analyte	%D	Affected Samples/Action
cadmium	16	Estimate (J) positive results in all samples.

### Compound Quantitation and Reported Quantitation Limits

#### EPH

The laboratory performed a laboratory duplicate analysis on soil sample TP-3-A. The laboratory duplicate sample results were detected at higher concentrations for all but two EPH compounds than those concentrations detected in the original analysis of sample TP-3-A. As a conservative measure, the data validator chose to report the laboratory duplicate sample results instead of the original analysis results of sample TP-3-A.

TCLP Metals

The following table summarizes the TCLP metal results that are less than the sample-specific report limit (RL) but greater than the method detection limit (MDL) and were not previously qualified as estimated (J) due to quality control parameters discussed above. The listed results are qualified as estimated (J) due to uncertainty in the quantitation near the RL:

Analyte	Affected Samples/Action
arsenic	TP-2-A, TP-2-B, KTP-2-B, TP-3-A, TP-3-B, and TP-4-B.
chromium	TP-1-A, TP-2-A, TP-3-A, and TP-3-B

The positive chromium results in all the samples listed above were previously qualified as nondetect (U) due to blank contamination. The results are further qualified as estimated, nondetect (UJ) due to blank contamination and uncertainty in quantitation.

Attachment I  
Chain-of-Custody



# CHAIN OF CUSTODY FORM

Job/Project Name: Mill Street Property

Samplers: (Signatures) *DK Odgers*

Job/Project Location: Brookfield, MA

Job/Project Number: 200100.0006.00114

Lab (Samples Sent To): Woods Hole Group, Raynham, MA

Recorder: (Signature) *DK Odgers*

Date: 6/12/02

SAMPLING	SAMPLE NUMBER	SAMPLE LOCATION	MATRIX		ANALYSIS REQUESTED							COMMENTS	
			Water	Soil	COMPOSITE/GRAB	PRESERVATIVE (Y/N)	VPH	TPP METALS	PCBS	% SOLIDS	Total # Bottles		
6/11/02	1130	ME-1A-D-4	X		C	X	X	X	X	X		3	VPH Samples
6/12/02	1010	ME-4A-O-4	X		C	X	X	X	X	X		3	preserved in
6/11/02	1230	ME-1B-4-12	X		C	X	X	X	X	X		3	Methanol
6/11/02	1600	ME-2B-4-12	X		C	X	X	X	X	X		3	
6/12/02	1400	ME-3B-4-12	X		C	X	X	X	X	X		3	
6/12/02	1045	ME-4B-4-14	X		C	X	X	X	X	X		3	field dup of
6/10/02	1305	KTP-2-B	X		C	X	X	X	X	X		3	
6/12/02	1830	TP-01		X		X	X	X	X	X		1	M&S/MSB (PK)
6/10/02	1005	TP-1-A	X		C	X	X	X	X	X		3	
6/10/02	1140	TP-2-A	X		C	X	X	X	X	X		3	
6/10/02	1220	TP-2-B	X		C	X	X	X	X	X		3	
6/10/02	1550	TP-4-B	X		C	X	X	X	X	X		3	

Relinquished By: (Signature) <i>DK Odgers</i>	Date: 6/12/02	Time: 1700	Received By: (Signature)	Date:	Time:
Relinquished By: (Signature)	Date:	Time:	Received By: (Signature)	Date:	Time:
Relinquished By: (Signature)	Date:	Time:	Received By: (Signature)	Date:	Time:

Comments: Mail results attn:  
Denise Laferte  
M+E, Wakefield MA  
Follow Brownfields requirements  
per work order.



**CHAIN OF CUSTODY FORM**

Job/Project Name: <b>Mill Street Property</b>		Job/Project Location: <b>Brookfield, MA</b>		Job/Project Number: <b>200100.0006.00114</b>									
Samplers: (Signatures) <i>[Signature]</i>		Recorder: (Signature) <i>[Signature]</i>		Date: <b>6/12/02</b>									
Lab (Samples Sent To): <b>Woods Hole, Raynham, MA</b>		MATRIX		ANALYSIS REQUESTED									
SAMPLING	SAMPLE NUMBER	SAMPLE LOCATION	Water	Soil	COMPOSITE/GRAB	PRESERVATIVE (Y/N)	VPH	EPH	TCP Metals	PCBS	% Solids	Total # Bottles	COMMENTS
6/10/02	1345	TP-3-A	X		0		X	X	X	X	X	6	MS/MSD Samples on Ice.
6/10/02	1415	TP-3-B	X		0		X	X	X	X	X	3	
6/11/02	1500	EPA REQUIRED TEMP BLANK INCLUDED											
6/11/02	1500	ME-2A-3	X		0		X		X			2	
Relinquished By: (Signature) <i>[Signature]</i>		Date: <b>6/11/02</b>		Time: <b>1700</b>		Received By: (Signature) <i>[Signature]</i>		Date:		Time:		Received By: (Signature)	
Relinquished By: (Signature) <i>[Signature]</i>		Date:		Time:		Relinquished By: (Signature) <i>[Signature]</i>		Date:		Time:		Received By: (Signature)	
Relinquished By: (Signature) <i>[Signature]</i>		Date:		Time:		Received for Lab By: (Signature)		Date:		Time:		Comments: <b>Main Result Attn: Denise Laferte M+E Wakefield, MA</b>	
Method of Shipment:													

PK

Follow Brownfields Requirements  
 den. 10/20/02

Attachment II

Sample Result Summary Sheets



# Form I Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A SDG: N/A  
 Client ID: **ME-1A-0-4**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-01**  
 Associated Blank: **VS0626B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/11/02	06/13/02	06/26/02	88.3	26	26.11	0.1	5	1	MLR

### Petroleum Range Data

	Result
C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	20000 U
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	5600 U
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	11000 U
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	20000 U
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	5600 U

SA  
7/26/02

### Target Analytes

Target Analytes	Elution Range	Result
Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	280 U
Benzene	C <sub>5</sub> - C <sub>8</sub>	280 U
Toluene	C <sub>5</sub> - C <sub>8</sub>	850 U
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	280 U
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1100 U
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	560 U
Naphthalene	N/A	560 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	88	106	70-130

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable

06/27/02 11:57



# Form I

## Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A      SDG: N/A  
 Client ID: **ME-1B-4-12**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-03**  
 Associated Blank: **VS0626B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/11/02	06/13/02	06/26/02	83.9	26	26.12	0.1	5	1	MLR

Petroleum Range Data	Result
C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	21000 U
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	5900 U
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	12000 U <i>5</i>
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	21000 U
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	5900 U

*SH  
7/22/02*

Target Analytes	Elution Range	Result
Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	300 U
Benzene	C <sub>5</sub> - C <sub>8</sub>	300 U
Toluene	C <sub>5</sub> - C <sub>8</sub>	890 U
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	300 U
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1200 U
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	590 U
Naphthalene	N/A	590 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	90	109	70-130

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable

06/27/02 11:57



# Form I

## Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A SDG: N/A  
 Client ID: **ME-2A-3**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-15**  
 Associated Blank: **VS0625B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/11/02	06/13/02	06/26/02	77.8	26	24.52	0.1	5	1	MLR

### Petroleum Range Data

	Result
C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	24000 U
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	6800 U
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	14000 U <sub>3</sub>
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	24000 U
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	6800 U

SH  
7/22/02

### Target Analytes

Target Analytes	Elution Range	Result
Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	340 U
Benzene	C <sub>5</sub> - C <sub>8</sub>	340 U
Toluene	C <sub>5</sub> - C <sub>8</sub>	1000 U
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	340 U
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1400 U
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	680 U
Naphthalene	N/A	680 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	86	83	70-130

U - The analyte was analyzed for but not detected at the sample specific level reported.  
 N/A - Not Applicable

06/28/02 10:02



# Form I

## Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A SDG: N/A  
 Client ID: **ME-2B-4-12**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-04**  
 Associated Blank: **VS0625B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/11/02	06/13/02	06/26/02	87.3	26	25.73	0.1	5	1	MLR

### Petroleum Range Data

	Result
C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	20000 U
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	5800 U
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	12000 U <i>3</i>
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	20000 U
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	5800 U

*SK 7/2/02*

### Target Analytes

Target Analytes	Elution Range	Result
Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	290 U
Benzene	C <sub>5</sub> - C <sub>8</sub>	290 U
Toluene	C <sub>5</sub> - C <sub>8</sub>	870 U
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	290 U
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1200 U
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	580 U
Naphthalene	N/A	580 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	99	96	70-130

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable

06/27/02 11:54



# Form I

## Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A      SDG: N/A  
 Client ID: **ME-3B-4-12**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-05**  
 Associated Blank: **VS0625B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/12/02	06/13/02	06/26/02	87.0	26	24.20	0.1	5	1	MLR

### Petroleum Range Data

### Result

C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	22000 U
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	6200 U
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	12000 U <i>5</i>
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	22000 U
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	6200 U

*SA  
7/22/02*

### Target Analytes

### Elution Range

### Result

Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	310 U
Benzene	C <sub>5</sub> - C <sub>8</sub>	310 U
Toluene	C <sub>5</sub> - C <sub>8</sub>	930 U
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	310 U
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1200 U
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	620 U
Naphthalene	N/A	620 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	101	98	70-130

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable

06/27/02 11:54



# Form I

## Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A      SDG: N/A  
 Client ID: **ME-4A-0-4**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-02**  
 Associated Blank: **VS0626B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/12/02	06/13/02	06/26/02	90.0	26	24.16	0.1	5	1	MLR

### Petroleum Range Data

### Result

C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	21000 U
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	6000 U
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	12000 U ✓
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	21000 U
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	6000 U

*824  
7/22/02*

### Target Analytes

### Elution Range

### Result

Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	300 U
Benzene	C <sub>5</sub> - C <sub>8</sub>	300 U
Toluene	C <sub>5</sub> - C <sub>8</sub>	900 U
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	300 U
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1200 U
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	600 U
Naphthalene	N/A	600 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	92	111	70-130

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable

06/27/02 11:57



# Form I

## Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A      SDG: N/A  
 Client ID: **ME-4B-4-14**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-06**  
 Associated Blank: **VS0625B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/12/02	06/13/02	06/26/02	84.2	26	24.50	0.1	5	1	MLR

### Petroleum Range Data

	Result
C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	22000 U
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	6300 U
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	13000 U <i>J</i>
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	22000 U
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	6300 U

*SA  
7/22/02*

### Target Analytes

Target Analytes	Elution Range	Result
Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	320 U
Benzene	C <sub>5</sub> - C <sub>8</sub>	320 U
Toluene	C <sub>5</sub> - C <sub>8</sub>	950 U
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	320 U
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1300 U
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	630 U
Naphthalene	N/A	630 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	105	102	70-130

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable

06/27/02 11:54



# Form I Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A      SDG: N/A  
 Client ID: **TP-1-A**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-09**  
 Associated Blank: **VS0625B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/10/02	06/13/02	06/26/02	89.4	26	26.51	0.1	5	1	MLR

### Petroleum Range Data

	Result
C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	19000 U
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	5500 U
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	11000 U ✓
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	19000 U
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	5500 U

*SA  
7/22/02*

### Target Analytes

Target Analytes	Elution Range	Result
Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	270 U
Benzene	C <sub>5</sub> - C <sub>8</sub>	270 U
Toluene	C <sub>5</sub> - C <sub>8</sub>	820 U
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	270 U
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1100 U
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	550 U
Naphthalene	N/A	550 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	97	95	70-130

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable

06/27/02 11:55



# Form I

## Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A      SDG: N/A  
 Client ID: **TP-2-A**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-10**  
 Associated Blank: **VS0625B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/10/02	06/13/02	06/26/02	87.2	26	23.62	0.1	5	1	MLR

### Petroleum Range Data

### Result

C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	22000 U
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	6300 U
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	13000 U <i>J</i>
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	22000 U
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	6300 U

*82A  
7/22/02*

### Target Analytes

### Elution Range

### Result

Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	320 U
Benzene	C <sub>5</sub> - C <sub>8</sub>	320 U
Toluene	C <sub>5</sub> - C <sub>8</sub>	950 U
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	320 U
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1300 U
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	630 U
Naphthalene	N/A	630 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	98	93	70-130

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable

06/27/02 11:55



# Form I Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A      SDG: N/A  
 Client ID: **TP-2-B**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-11**  
 Associated Blank: **VS0625B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/10/02	06/13/02	06/26/02	78.0	26	25.64	0.1	5	1	MLR

**Petroleum Range Data**

	Result
C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	23000 UJ
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	6500 UJ
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	13000 UJ
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	23000 UJ
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	6500 UJ

*SL*  
*7/22/02*

**Target Analytes**

Target Analytes	Elution Range	Result
Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	320 UJ
Benzene	C <sub>5</sub> - C <sub>8</sub>	320 UJ
Toluene	C <sub>5</sub> - C <sub>8</sub>	980 UJ
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	320 UJ
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1300 UJ
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	650 UJ
Naphthalene	N/A	650 UJ

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	49	§ 49	§ 70-130

§ - Surrogate value outside of acceptable range.

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable



# Form I

## Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: **N/A**      SDG: **N/A**  
 Client ID: **KTP-2-B**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-07**  
 Associated Blank: **VS0625B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/10/02	06/13/02	06/26/02	79.2	26	24.25	0.1	5	1	MLR

### Petroleum Range Data

### Result

C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	24000	U J
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	6800	U J
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	14000	U J
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	24000	U J
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	6800	U J

81  
7/22/02

### Target Analytes

### Elution Range      Result

Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	340	U J
Benzene	C <sub>5</sub> - C <sub>8</sub>	340	U J
Toluene	C <sub>5</sub> - C <sub>8</sub>	1000	U J
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	340	U J
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1400	U J
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	680	U J
Naphthalene	N/A	680	U J

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

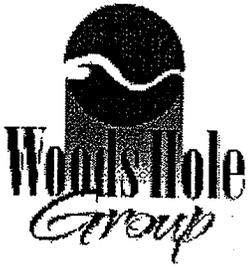
Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	47	§ 46	§ 70-130

§ - Surrogate value outside of acceptable range.

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable

06/27/02 11:54



# Form I Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: **N/A**      SDG: **N/A**  
 Client ID: **TP-3-A**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-13**  
 Associated Blank: **VS0625B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/10/02	06/13/02	06/26/02	87.0	26	32.72	0.1	5	1	MLR

**Petroleum Range Data**

**Result**

C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	16000 U
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	4600 U
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	9100 U <i>J</i>
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	16000 U
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	4600 U

*8/2/02*

**Target Analytes**

**Elution Range**

**Result**

Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	230 U <i>J</i>
Benzene	C <sub>5</sub> - C <sub>8</sub>	230 U <i>J</i>
Toluene	C <sub>5</sub> - C <sub>8</sub>	680 U <i>J</i>
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	230 U <i>J</i>
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	910 U <i>J</i>
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	460 U <i>J</i>
Naphthalene	N/A	460 U <i>J</i>

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	103	100	70-130

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable

06/27/02 11:56



# Form I

## Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: **N/A**      SDG: **N/A**  
 Client ID: **TP-3-B**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-14**  
 Associated Blank: **VS0625B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/10/02	06/13/02	06/26/02	85.6	26	25.27	0.1	5	1	MLR

### Petroleum Range Data

### Result

C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	21000 U
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	6000 U
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	12000 U <i>3</i>
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	21000 U
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	6000 U

*8/12/02*

### Target Analytes

### Elution Range

### Result

Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	300 U
Benzene	C <sub>5</sub> - C <sub>8</sub>	300 U
Toluene	C <sub>5</sub> - C <sub>8</sub>	900 U
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	300 U
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1200 U
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	600 U
Naphthalene	N/A	600 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	97	93	70-130

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable

06/27/02 11:56



# Form I Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A      SDG: N/A  
 Client ID: **TP-4-B**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-12**  
 Associated Blank: **VS0625B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/10/02	06/13/02	06/26/02	63.5	26	26.12	0.1	5	1	MLR

Petroleum Range Data	Result
C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	27000 U J
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	12000 J
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	16000 U J
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	27000 U J
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	12000 J

SA  
7/2/02

Target Analytes	Elution Range	Result
Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	390 U J
Benzene	C <sub>5</sub> - C <sub>8</sub>	390 U J
Toluene	C <sub>5</sub> - C <sub>8</sub>	1200 U J
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	390 U J
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1600 U J
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	780 U J
Naphthalene	N/A	780 U J

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	23	§ 20	§ 70-130

§ - Surrogate value outside of acceptable range.

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable



# Form I

## Volatile Petroleum Hydrocarbons by GC - PID/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A      SDG: N/A  
 Client ID: **TB-01**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-08**  
 Associated Blank: **VS0625B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Analyzed	Percent Solid	Methanol Volume (ml)	Sample Amount (g)	Extract Volume (ml)	Final Volume (ml)	Dilution Factor	Analyst
06/12/02	06/13/02	06/25/02	100	26	25.00	0.1	5	1	MLR

**Petroleum Range Data**

**Result**

C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1,2</sup>	18000 U
C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1,3</sup>	5200 U
C <sub>9</sub> -C <sub>10</sub> Aromatic Hydrocarbons <sup>1</sup>	10000 U <i>J</i>
Unadjusted C <sub>5</sub> -C <sub>8</sub> Aliphatic Hydrocarbons <sup>1</sup>	18000 U
Unadjusted C <sub>9</sub> -C <sub>12</sub> Aliphatic Hydrocarbons <sup>1</sup>	5200 U

*SMA 7/2/02*

**Target Analytes**

**Elution Range**

**Result**

Methyl tert-butyl ether (MTBE)	C <sub>5</sub> - C <sub>8</sub>	260 U
Benzene	C <sub>5</sub> - C <sub>8</sub>	260 U
Toluene	C <sub>5</sub> - C <sub>8</sub>	780 U
Ethylbenzene	C <sub>9</sub> - C <sub>12</sub>	260 U
p/m-Xylene	C <sub>9</sub> - C <sub>12</sub>	1000 U
o-Xylene	C <sub>9</sub> - C <sub>12</sub>	520 U
Naphthalene	N/A	520 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = Range concentration excludes the concentration of target analytes eluting in that range.

<sup>3</sup> = Range concentration excludes the concentration of target analytes eluting in that range and the concentration of the aromatic hydrocarbon range.

Surrogate	% Recovery		Acceptance Range (%)
	FID	PID	
1,4-Difluorobenzene	110	109	70-130

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable

06/27/02 11:53



# Form I

## Extractable Petroleum Hydrocarbons by GC/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A SDG: N/A  
 Client ID: **ME-1A-0-4**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-01**  
 Associated Blank: **ES0614B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Extracted	Percent Solid	Sample Amount (g)	Fraction	Date Analyzed	Final Volume (ml)	Dilution Factor	Analyst
06/11/02	06/13/02	06/14/02	88.3	10.25	Aromatic	06/21/02	1	1	MLB
					Aliphatic	06/21/02	1	1	MLB

### Extractable Petroleum Hydrocarbons (EPH) Result

C <sub>9</sub> -C <sub>18</sub> Aliphatics <sup>1</sup>	4300
C <sub>19</sub> -C <sub>36</sub> Aliphatics <sup>1</sup>	65000
C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1,2</sup>	9400 U
Unadjusted C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1</sup>	9400 U

*80  
7/22/02*

### Target PAH Analytes Result

Naphthalene	550 U
2-Methylnaphthalene	550 U
Acenaphthylene	550 U
Acenaphthene	550 U
Fluorene	550 U
Phenanthrene	550 U
Anthracene	550 U
Fluoranthene	550 U
Pyrene	550 U
Benzo(a)anthracene	550 U
Chrysene	550 U
Benzo(b)fluoranthene	550 U
Benzo(k)fluoranthene	550 U <i>J</i>
Benzo(a)pyrene	550 U
Indeno(1,2,3-cd)pyrene <sup>3</sup>	550 U
Dibenzo(a,h)anthracene <sup>3</sup>	550 U
Benzo(g,h,i)perylene	550 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.  
<sup>2</sup> = C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.  
<sup>3</sup> = Values reported reflect their sum.

Extraction Surrogate	% Recovery	Acceptance Range (%)
5-alpha Androstane	115	40-140
ortho-Terphenyl	66	40-140
Fractionation Surrogate		
Biphenyl	85	40-140
2-Fluorobiphenyl	81	40-140

U - The analyte was analyzed for but not detected at the sample specific level reported.  
 N/A - Not Applicable



# Form I

## Extractable Petroleum Hydrocarbons by GC/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A SDG: N/A  
 Client ID: **ME-1B-4-12**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-03**  
 Associated Blank: **ES0614B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Extracted	Percent Solid	Sample Amount (g)	Fraction	Date Analyzed	Final Volume (ml)	Dilution Factor	Analyst
06/11/02	06/13/02	06/14/02	83.9	10.34	Aromatic	06/21/02	1	1	MLB
					Aliphatic	06/21/02	1	1	MLB

### Extractable Petroleum Hydrocarbons (EPH) Result

C <sub>9</sub> -C <sub>18</sub> Aliphatics <sup>1</sup>	3500 U
C <sub>19</sub> -C <sub>36</sub> Aliphatics <sup>1</sup>	4600 U
C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1,2</sup>	9800 U
Unadjusted C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1</sup>	9800 U

*SA  
7/2/02*

### Target PAH Analytes Result

Naphthalene	580 U
2-Methylnaphthalene	580 U
Acenaphthylene	580 U
Acenaphthene	580 U
Fluorene	580 U
Phenanthrene	580 U
Anthracene	580 U
Fluoranthene	580 U
Pyrene	580 U
Benzo(a)anthracene	580 U
Chrysene	580 U
Benzo(b)fluoranthene	580 U
Benzo(k)fluoranthene	580 U <i>J</i>
Benzo(a)pyrene	580 U
Indeno(1,2,3-cd)pyrene <sup>3</sup>	580 U
Dibenzo(a,h)anthracene <sup>3</sup>	580 U
Benzo(g,h,i)perylene	580 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.

<sup>3</sup> = Values reported reflect their sum.

Extraction Surrogate	% Recovery	Acceptance Range (%)
5-alpha Androstane	105	40-140
ortho-Terphenyl	70	40-140
Fractionation Surrogate		
Biphenyl	84	40-140
2-Fluorobiphenyl	80	40-140

U - The analyte was analyzed for but not detected at the sample specific level reported.  
 N/A - Not Applicable

06/25/02 21:56



# Form I

## Extractable Petroleum Hydrocarbons by GC/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: **N/A**      SDG: **N/A**  
 Client ID: **ME-2B-4-12**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-04**  
 Associated Blank: **ES0614B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Extracted	Percent Solid	Sample Amount (g)	Fraction	Date Analyzed	Final Volume (ml)	Dilution Factor	Analyst
06/11/02	06/13/02	06/14/02	87.3	10.13	Aromatic	06/21/02	1	1	MLB
					Aliphatic	06/21/02	1	1	MLB

### Extractable Petroleum Hydrocarbons (EPH) Result

C <sub>9</sub> -C <sub>18</sub> Aliphatics <sup>1</sup>	3400 U
C <sub>19</sub> -C <sub>36</sub> Aliphatics <sup>1</sup>	4500 U
C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1,2</sup>	9600 U
Unadjusted C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1</sup>	9600 U

*SA  
7/2/02*

### Target PAH Analytes Result

Naphthalene	570 U
2-Methylnaphthalene	570 U
Acenaphthylene	570 U
Acenaphthene	570 U
Fluorene	570 U
Phenanthrene	570 U
Anthracene	570 U
Fluoranthene	570 U
Pyrene	570 U
Benzo(a)anthracene	570 U
Chrysene	570 U
Benzo(b)fluoranthene	570 U
Benzo(k)fluoranthene	570 U ✓
Benzo(a)pyrene	570 U
Indeno(1,2,3-cd)pyrene <sup>3</sup>	570 U
Dibenzo(a,h)anthracene <sup>3</sup>	570 U
Benzo(g,h,i)perylene	570 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.

<sup>3</sup> = Values reported reflect their sum.

Extraction Surrogate	% Recovery	Acceptance Range (%)
5-alpha Androstane	101	40-140
ortho-Terphenyl	68	40-140
Fractionation Surrogate		
Biphenyl	83	40-140
2-Fluorobiphenyl	79	40-140

U - The analyte was analyzed for but not detected at the sample specific level reported.

N/A - Not Applicable



# Form I

## Extractable Petroleum Hydrocarbons by GC/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: **N/A**      SDG: **N/A**  
 Client ID: **ME-3B-4-12**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-05**  
 Associated Blank: **ES0614B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Extracted	Percent Solid	Sample Amount (g)	Fraction	Date Analyzed	Final Volume (ml)	Dilution Factor	Analyst
06/12/02	06/13/02	06/14/02	87.0	10.36	Aromatic	06/21/02	1	1	MLB
					Aliphatic	06/21/02	1	1	MLB

### Extractable Petroleum Hydrocarbons (EPH) Result

C <sub>9</sub> -C <sub>18</sub> Aliphatics <sup>1</sup>	3300 U
C <sub>19</sub> -C <sub>36</sub> Aliphatics <sup>1</sup>	4400 U
C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1,2</sup>	9400 U
Unadjusted C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1</sup>	9400 U

SU  
7/22/02

### Target PAH Analytes Result

Naphthalene	550 U
2-Methylnaphthalene	550 U
Acenaphthylene	550 U
Acenaphthene	550 U
Fluorene	550 U
Phenanthrene	550 U
Anthracene	550 U
Fluoranthene	550 U
Pyrene	550 U
Benzo(a)anthracene	550 U
Chrysene	550 U
Benzo(b)fluoranthene	550 U
Benzo(k)fluoranthene	550 U ✓
Benzo(a)pyrene	550 U
Indeno(1,2,3-cd)pyrene <sup>3</sup>	550 U
Dibenzo(a,h)anthracene <sup>3</sup>	550 U
Benzo(g,h,i)perylene	550 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.

<sup>3</sup> = Values reported reflect their sum.

Extraction Surrogate	% Recovery	Acceptance Range (%)
5-alpha Androstane	105	40-140
ortho-Terphenyl	70	40-140
Fractionation Surrogate		
Biphenyl	84	40-140
2-Fluorobiphenyl	80	40-140

U - The analyte was analyzed for but not detected at the sample specific level reported.  
 N/A - Not Applicable

06/25/02 21:56



# Form I

## Extractable Petroleum Hydrocarbons by GC/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A      SDG: N/A  
 Client ID: **ME-4A-0-4**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-02**  
 Associated Blank: **ES0614B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Extracted	Percent Solid	Sample Amount (g)	Fraction	Date Analyzed	Final Volume (ml)	Dilution Factor	Analyst
06/12/02	06/13/02	06/14/02	90.0	10.32	Aromatic	06/21/02	1	1	MLB
					Aliphatic	06/21/02	1	1	MLB

Extractable Petroleum Hydrocarbons (EPH)	Result
C <sub>9</sub> -C <sub>18</sub> Aliphatics <sup>1</sup>	3200 U
C <sub>19</sub> -C <sub>36</sub> Aliphatics <sup>1</sup>	12000
C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1,2</sup>	9200 U
Unadjusted C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1</sup>	9200 U

*SA*  
*7/22/02*

Target PAH Analytes	Result
Naphthalene	540 U
2-Methylnaphthalene	540 U
Acenaphthylene	540 U
Acenaphthene	540 U
Fluorene	540 U
Phenanthrene	540 U
Anthracene	540 U
Fluoranthene	540 U
Pyrene	540 U
Benzo(a)anthracene	540 U
Chrysene	540 U
Benzo(b)fluoranthene	540 U
Benzo(k)fluoranthene	540 U <i>J</i>
Benzo(a)pyrene	540 U
Indeno(1,2,3-cd)pyrene <sup>3</sup>	540 U
Dibenzo(a,h)anthracene <sup>3</sup>	540 U
Benzo(g,h,i)perylene	540 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.  
<sup>2</sup> = C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.  
<sup>3</sup> = Values reported reflect their sum.

Extraction Surrogate	% Recovery	Acceptance Range (%)
5-alpha Androstane	102	40-140
ortho-Terphenyl	67	40-140
Fractionation Surrogate		
Biphenyl	82	40-140
2-Fluorobiphenyl	78	40-140

U - The analyte was analyzed for but not detected at the sample specific level reported.  
 N/A - Not Applicable



# Form I

## Extractable Petroleum Hydrocarbons by GC/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: **N/A**      SDG: **N/A**  
 Client ID: **ME-4B-4-14**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-06**  
 Associated Blank: **ES0614B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Extracted	Percent Solid	Sample Amount (g)	Fraction	Date Analyzed	Final Volume (ml)	Dilution Factor	Analyst
06/12/02	06/13/02	06/14/02	84.2	10.13	Aromatic	06/21/02	1	1	MLB
					Aliphatic	06/21/02	1	1	MLB

### Extractable Petroleum Hydrocarbons (EPH)      Result

C <sub>9</sub> -C <sub>18</sub> Aliphatics <sup>1</sup>	3500 U
C <sub>19</sub> -C <sub>36</sub> Aliphatics <sup>1</sup>	4700 U
C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1,2</sup>	10000 U
Unadjusted C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1</sup>	10000 U

*SA  
7/2/02*

### Target PAH Analytes      Result

Naphthalene	590 U
2-Methylnaphthalene	590 U
Acenaphthylene	590 U
Acenaphthene	590 U
Fluorene	590 U
Phenanthrene	590 U
Anthracene	590 U
Fluoranthene	590 U
Pyrene	590 U
Benzo(a)anthracene	590 U
Chrysene	590 U
Benzo(b)fluoranthene	590 U
Benzo(k)fluoranthene	590 U <i>J</i>
Benzo(a)pyrene	590 U
Indeno(1,2,3-cd)pyrene <sup>3</sup>	590 U
Dibenzo(a,h)anthracene <sup>3</sup>	590 U
Benzo(g,h,i)perylene	590 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.

<sup>2</sup> = C<sub>11</sub>-C<sub>22</sub> Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.

<sup>3</sup> = Values reported reflect their sum.

Extraction Surrogate	% Recovery	Acceptance Range (%)
5-alpha Androstane	135	40-140
ortho-Terphenyl	72	40-140
Fractionation Surrogate		
Biphenyl	84	40-140
2-Fluorobiphenyl	80	40-140

U - The analyte was analyzed for but not detected at the sample specific level reported.  
 N/A - Not Applicable

06/25/02 21:57



# Form I

## Extractable Petroleum Hydrocarbons by GC/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: **N/A**      SDG: **N/A**  
 Client ID: **TP-1-A**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-09**  
 Associated Blank: **ES0614B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Extracted	Percent Solid	Sample Amount (g)	Fraction	Date Analyzed	Final Volume (ml)	Dilution Factor	Analyst
06/10/02	06/13/02	06/14/02	89.4	10.30	Aromatic	06/21/02	1	1	MLB
					Aliphatic	06/21/02	1	1	MLB

Extractable Petroleum Hydrocarbons (EPH)	Result
C <sub>9</sub> -C <sub>18</sub> Aliphatics <sup>1</sup>	3300 U
C <sub>19</sub> -C <sub>36</sub> Aliphatics <sup>1</sup>	<b>47000</b>
C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1,2</sup>	9200 U
Unadjusted C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1</sup>	9200 U

*87A  
7/21/02*

Target PAH Analytes	Result
Naphthalene	540 U
2-Methylnaphthalene	540 U
Acenaphthylene	540 U
Acenaphthene	540 U
Fluorene	540 U
Phenanthrene	540 U
Anthracene	540 U
Fluoranthene	540 U
Pyrene	540 U
Benzo(a)anthracene	540 U
Chrysene	540 U
Benzo(b)fluoranthene	540 U
Benzo(k)fluoranthene	540 U <i>J</i>
Benzo(a)pyrene	540 U
Indeno(1,2,3-cd)pyrene <sup>3</sup>	540 U
Dibenzo(a,h)anthracene <sup>3</sup>	540 U
Benzo(g,h,i)perylene	540 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.  
<sup>2</sup> = C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.  
<sup>3</sup> = Values reported reflect their sum.

Extraction Surrogate	% Recovery	Acceptance Range (%)
5-alpha Androstane	115	40-140
ortho-Terphenyl	76	40-140
Fractionation Surrogate		
Biphenyl	87	40-140
2-Fluorobiphenyl	83	40-140

U - The analyte was analyzed for but not detected at the sample specific level reported.  
 N/A - Not Applicable



# Form I

## Extractable Petroleum Hydrocarbons by GC/FID

Client: **Metcalf & Eddy**  
 Project: **Mill Street - Brookfield**  
 Case: N/A SDG: N/A  
 Client ID: **TP-2-A**  
 Matrix: **Soil**

Lab Code: **M-MA030**  
 ETR: **0206065**  
 Lab ID: **0206065-10**  
 Associated Blank: **ES0614B1**  
 Concentration Units: **µg/Kg**

Date Collected	Date Received	Date Extracted	Percent Solid	Sample Amount (g)	Fraction	Date Analyzed	Final Volume (ml)	Dilution Factor	Analyst
06/10/02	06/13/02	06/14/02	87.2	10.09	Aromatic	06/21/02	1	1	MLB
					Aliphatic	06/21/02	1	1	MLB

Extractable Petroleum Hydrocarbons (EPH)	Result
C <sub>9</sub> -C <sub>18</sub> Aliphatics <sup>1</sup>	4200
C <sub>19</sub> -C <sub>36</sub> Aliphatics <sup>1</sup>	98000
C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1,2</sup>	25000
Unadjusted C <sub>11</sub> -C <sub>22</sub> Aromatics <sup>1</sup>	28000

*SLA  
7/22/02*

Target PAH Analytes	Result
Naphthalene	570 U
2-Methylnaphthalene	570 U
Acenaphthylene	570 U
Acenaphthene	570 U
Fluorene	570 U
Phenanthrene	570 U
Anthracene	570 U
Fluoranthene	590
Pyrene	650
Benzo(a)anthracene	570 U
Chrysene	570 U
Benzo(b)fluoranthene	920
Benzo(k)fluoranthene	570 U <i>J</i>
Benzo(a)pyrene	570 U
Indeno(1,2,3-cd)pyrene <sup>3</sup>	600
Dibenzo(a,h)anthracene <sup>3</sup>	600
Benzo(g,h,i)perylene	570 U

<sup>1</sup> = Range concentration excludes the concentration of any surrogate(s) and/or internal standards eluting in that range.  
<sup>2</sup> = C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.  
<sup>3</sup> = Values reported reflect their sum.

Extraction Surrogate	% Recovery	Acceptance Range (%)
5-alpha Androstane	106	40-140
ortho-Terphenyl	72	40-140
Fractionation Surrogate		
Biphenyl	84	40-140
2-Fluorobiphenyl	80	40-140

U - The analyte was analyzed for but not detected at the sample specific level reported.  
 N/A - Not Applicable

