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MEMORANDUM

PROJECT NO: 036800269.00115
TO: TBA: Mill Street, Brookfield, Massachusetts
FROM: K. Rutherford *K. Rutherford*
REVIEWED BY: R. Purdy *R. Purdy*
CC: B. Weir *B. Weir*
 N. Thurber
 D. Laferte (memo only)

DATE: April 3, 2006
OFFICE: Wakefield
COMPANY: Metcalf & Eddy, Inc.

SUBJECT: Limited QC Review/Modified Tier II-Like Review
 Metals Analytical Results
 Mitkem Corporation, Warwick, Rhode Island
 Lab Project No. E0173

On February 15, 2006, six groundwater samples (including one field duplicate pair) were collected by Metcalf & Eddy, Inc. (M&E) from the Targeted Brownfields Assessment (TBA) Mill Street Site, located in Brookfield, Massachusetts. The sampling was performed as part of the TBA Response Action Contract Work Assignment #155-SIBZ-0100. The samples were submitted to Mitkem Corporation (Warwick, Rhode Island) for the analysis of mercury according to *SW-846 Method 7470A, Mercury in Liquid Waste (Manual Cold Vapor Technique)* (August 2004) and for the analysis of metals according to *SW-846 Method 6010B, Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)* (May 2004). The samples were received by the laboratory on February 16, 2006. The data package was received in the M&E office on March 11, 2006.

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
- Inductively Coupled Plasma (ICP) Interference Check Samples
- ICP Serial Dilution Analysis
- * • Matrix Spike/Matrix Spike Duplicate
- * • Lab Duplicate Samples
- * • Field Duplicate Samples
- * • Laboratory Control Sample/ Laboratory Control Duplicate Sample
- Analyte Quantitation and Reported Quantitation Limits
- NA • Performance Evaluation Samples
- * = All criteria met for this sample
- 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.

Initial and Continuing Calibrations

All criteria met for initial and continuing calibrations. No low level calibration check standard was performed for the metals analysis. However, the low calibration point was at or below the reporting limit for all analytes. No validation actions were taken.

Blanks

The following table summarizes the level of blank contamination detected in the laboratory blanks associated with the groundwater samples. If a contaminant was detected in more than one blank, the highest concentration was used to qualify associated sample results.

Analyte	Maximum Concentration (µg/L)	Nominal BAL (µg/L)	Samples Affected/Actions
antimony	-14.8	-74	Qualify the results as estimated non-detect (UJ) at the RL in all samples.
barium	2.416	12.1	All sample results were non-detect; no action required.
cadmium	0.1	0.5	All sample results were non-detect; no action required.
selenium	-3.516	-17.6	Qualify the results as estimated non-detect (UJ) at the RL in all samples.
silver	-7.7	-38.5	Qualify the results as estimated non-detect (UJ) at the RL in all samples.
zinc	2.5	12.5	Qualify the non-detect results in samples MEW-4, MEW-4CS, MEW-7, MEW-9, and P-3 as estimated non-detect (UJ) at the $ -BAL $. The result in sample MEW-3 was $> -BAL $; no action required.
	-13.1	-65.5	

BAL – Blank Action Limit

Inductively Coupled Plasma (ICP) Interference Check Samples

All recovery criteria (80%-120%) were met for all analytes in Interference Check Sample AB.

Due to the limited nature of this review (lack of raw data), an in-depth review of the ICSA solution exceedances was not possible. The validator reviewed the ICSA results to determine whether there were any gross exceedances (unspiked analytes at concentrations $>$ reporting limit). Lead was detected in the ICSA solution at an absolute value greater than the reporting limit of 10 µg/L (13 µg/L) in association with

the groundwater analytical sequences. However, no actions were taken since the significance of this interference could not be evaluated for the groundwater samples due to lack of raw data.

ICP Serial Dilution Analysis Results

ICP Serial Dilution Analysis was performed on sample MEW-3. Analytes that did not meet difference criteria (%D<15) are summarized in the following table:

Analyte	MDL (µg/L)	50xMDL (µg/L)	Sample Result (µg/L)	Serial Dilution (µg/L)	%D	Samples Affected/Actions
arsenic	1.6	80	2.25	ND	NC	The concentration in the undiluted sample was <50xMDL; no actions required.
cadmium	0.10	5.0	1.48	1.85	25	The concentration in the undiluted sample was <50xMDL; no actions required.
chromium	0.38	19	0.47	ND	NC	The concentration in the undiluted sample was <50xMDL; no actions required.
copper	6.3	315	13.22	ND	NC	The concentration in the undiluted sample was <50xMDL; no actions required.
lead	0.46	23	1.63	ND	NC	The concentration in the undiluted sample was <50xMDL; no actions required.
nickel	0.59	29.5	2.68	3.25	21.3	The concentration in the undiluted sample was <50xMDL; no actions required.
zinc	2.3	115	143.58	114.83	20.0	Qualify as estimated (J/UJ) the positive and non-detect results in all samples.

ND – non-detect
NC – not calculated

Analyte Quantitation and Reported Quantitation Limits

The results for zinc in samples MEW-4, MEW-4CS, MEW-7, MEW-9, and P-3 were qualified as estimated non-detect (UJ) at the negative blank action limit due to negative instrument drift.

Performance Evaluation Samples/Accuracy Check

No Performance Evaluation Sample was submitted for metals analysis.

Attachment I
Chain-of-Custody

Attachment II
Sample Result Summary Sheets

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

MEW-3

Lab Name: Mitkem Corporation

Contract: WO-2823,

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0173

Matrix (soil/water): WATER

Lab Sample ID: E0173-01

Level (low/med): MED

Date Received: 02/16/06

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	20	U	J	P
7440-38-2	Arsenic	20	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	20	U		P
7440-50-8	Copper	30	U		P
7439-92-1	Lead	10	U		P
7440-02-0	Nickel	50	U		P
7782-49-2	Selenium	30	U	J	P
7440-22-4	Silver	30	U	J	P
7440-28-0	Thallium	20	U		P
7440-62-2	Vanadium	50	U		P
7440-66-6	Zinc	144	U	J	P
7439-97-6	Mercury	0.28	U		CV

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

MEW-4

Lab Name: Mitkem Corporation

Contract: WO-2823,

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0173

Matrix (soil/water): WATER

Lab Sample ID: E0173-04

Level (low/med): MED

Date Received: 02/16/06

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	20	U	J	P
7440-38-2	Arsenic	20	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	20	U		P
7440-50-8	Copper	30	U		P
7439-92-1	Lead	10	U		P
7440-02-0	Nickel	50	U		P
7782-49-2	Selenium	30	U	J	P
7440-22-4	Silver	30	U	J	P
7440-28-0	Thallium	20	U		P
7440-62-2	Vanadium	50	U		P
7440-66-6	Zinc	66 50	U	E W J	P
7439-97-6	Mercury	0.26	U		CV

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

MEW-4CS

Lab Name: Mitkem Corporation

Contract: WO-2823,

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0173

Matrix (soil/water): WATER

Lab Sample ID: E0173-05

Level (low/med): MED

Date Received: 02/16/06

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	20	U	J	P
7440-38-2	Arsenic	20	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	20	U		P
7440-50-8	Copper	30	U		P
7439-92-1	Lead	10	U		P
7440-02-0	Nickel	50	U		P
7782-49-2	Selenium	30	U	J	P
7440-22-4	Silver	30	U	J	P
7440-28-0	Thallium	20	U		P
7440-62-2	Vanadium	50	U		P
7440-66-6	Zinc	66 50	U	E U	P
7439-97-6	Mercury	0.26	U		CV

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

MEW-7

Lab Name: Mitkem Corporation

Contract: WO-2823,

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0173

Matrix (soil/water): WATER

Lab Sample ID: E0173-02

Level (low/med): MED

Date Received: 02/16/06

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	20	U	J	P
7440-38-2	Arsenic	20	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	20	U		P
7440-50-8	Copper	30	U		P
7439-92-1	Lead	10	U		P
7440-02-0	Nickel	50	U		P
7782-49-2	Selenium	30	U	J	P
7440-22-4	Silver	30	U	J	P
7440-28-0	Thallium	20	U		P
7440-62-2	Vanadium	50	U		P
7440-66-6	Zinc	66 50	U	BU	P
7439-97-6	Mercury	0.28	U		CV

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

MEW-9

Lab Name: Mitkem Corporation

Contract: WO-2823,

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0173

Matrix (soil/water): WATER

Lab Sample ID: E0173-03

Level (low/med): MED

Date Received: 02/16/06

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	20	U	J	P
7440-38-2	Arsenic	20	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	20	U		P
7440-50-8	Copper	30	U		P
7439-92-1	Lead	10	U		P
7440-02-0	Nickel	50	U		P
7782-49-2	Selenium	30	U	J	P
7440-22-4	Silver	30	U	J	P
7440-28-0	Thallium	20	U		P
7440-62-2	Vanadium	50	U		P
7440-66-6	Zinc	66 50	U	E U J	P
7439-97-6	Mercury	0.28	U		CV

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

P-3

Lab Name: Mitkem Corporation

Contract: WO-2823,

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0173

Matrix (soil/water): WATER

Lab Sample ID: E0173-06

Level (low/med): MED

Date Received: 02/16/06

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	20	U	J	P
7440-38-2	Arsenic	20	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	20	U		P
7440-50-8	Copper	30	U		P
7439-92-1	Lead	10	U		P
7440-02-0	Nickel	50	U		P
7782-49-2	Selenium	30	U	J	P
7440-22-4	Silver	30	U	J	P
7440-28-0	Thallium	20	U		P
7440-62-2	Vanadium	50	U		P
7440-66-6	Zinc	66 50	U	E UJ	P
7439-97-6	Mercury	0.26	U		CV

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Attachment III
Data Validation Worksheets

REGION I

Data Review Worksheets

Data Validation Worksheet Cover Page - Page 2

Check if all criteria are met and no hardcopy worksheet provided. Indicate NA if worksheet is not applicable to analytical method. Note: there is no standard worksheet for System Performance, however, the validator must document all system performance issues in the Data Validation Memorandum.

Inorganics Worksheets

- I. DATA COMPLETENESS
- II. HOLDING TIMES
- III A. INSTRUMENT CALIBRATION (Section 1)
- III B. INSTRUMENT CALIBRATION (Section 2)
- III C. INSTRUMENT CALIBRATION (Section 3)
- IV A. BLANK ANALYSIS RESULTS (Section 1-3)
- IV B. BLANK ANALYSIS RESULTS (Section 4)
- V A. ICP INTERFERENCE CHECK SAMPLE (Sections 1 & 2)
- V B. ICP INTERFERENCE CHECK SAMPLE (Section 3)
- VI. MATRIX SPIKE
- VII. LABORATORY DUPLICATES
- VIII. FIELD DUPLICATES
- IX. LABORATORY CONTROL SAMPLE
- NA_X A. FURNACE ATOMIC ABSORPTION ANALYSIS
- XI. INDUCTIVELY COUPLED PLASMA (ICP) SERIAL DILUTION ANALYSIS
- XII. DETECTION LIMIT ANALYSIS
- XIII. SAMPLE QUANTITATION
- NA XIV. ACCURACY CHECK (Performance Evaluation Sample)

I certify that all criteria were met for the worksheets checked above.

Signature: KRutherford

Name: Kristin Rutherford

Date: 3/21/06

REGION I
Data Review Worksheets

II. HOLDING TIMES Complete table for all samples and circle the Analysis date for samples not within criteria.

SAMPLE ID	DATE SAMPLED	HG DATE ANALYSIS	CYANIDE DATE ANALYSIS	OTHERS DATE ANALYSIS	pH	ACTION
MEW-3	2/15/06	2/28/06		3/3/06	< 2	None
MEW-7	↓	↓		↓	↓	↓
MEW-9	↓	↓		↓	↓	↓
MEW-4	↓	↓		↓	↓	↓
MEW-4CS	↓	↓		↓	↓	↓
P-3	↓	↓		↓	↓	↓

- METALS - 180 DAYS FROM SAMPLE COLLECTION
- MERCURY - 28 DAYS FROM SAMPLE COLLECTION
- CYANIDE - 14 DAYS FROM SAMPLE COLLECTION

ACTION:

1. If holding times are exceeded all positive results are estimated (J) and non-detects are estimated (UJ).
2. If holding times are greatly exceeded, the reviewer may determine that non-detects are usable (R).

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REGION I
Data Review Worksheets

III A. INSTRUMENT CALIBRATION (Section 1)

1. Recovery Criteria

List the analytes which did not meet the percent recovery (%R) criteria for Initial or Continuing Calibration.

<u>DATE</u>	<u>ICV/CCV#</u>	<u>ANALYTE</u>	<u>%R</u>	<u>ACTION</u>	<u>SAMPLES AFFECTED</u>
<i>all criteria met for initial and continuing calibration recoveries.</i>					
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

ACTIONS:

If any analyte does not meet the %R criteria follow the actions stated below:

For positive results:

	<u>Accept</u>	<u>Estimate (J)</u>	<u>Reject (R)</u>
Metals	90-110%R	75-89%R, 111-125%R	<75%R, >125%R
Mercury	80-120%R	65-79%R, 121-135%R	<65%R, >135%R
Cyanide	85-115%R	70-84%R, 116-130%R	<70%R, >130%R

For Non-detected results

	<u>Accept</u>	<u>Estimate (UJ)</u>	<u>Reject (R)</u>
Metals	90-110%R	75-89%R, 111-125%R	<75%R, >125%R
Mercury	80-120%R	65-79%R, 121-135%R	<65%R, >135%R
Cyanide	85-115%R	70-84%R, 116-130%R	<70%R, >130%R

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REGION I

Data Review Worksheets

III B. INSTRUMENT CALIBRATION (Section 2)

2. Analytical Sequence

- A. Did the laboratory use the proper number of Standards for calibration as described in the SOW? Yes or No
- B. Were calibrations performed at the beginning of Each analysis? Yes or No
- C. Were calibration standards analyzed at the beginning of sample analysis and at a minimum frequency of ten percent or every two hours during analysis, whichever is more frequent? Yes or No
- D. Were the correlation coefficients for the calibration curves for AA, Hg, and CN ≥ 0.995 ? Yes or No
- E. Was a standard at CRQL analyzed for all ICP analyses? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

A standard at CRQL (low-level calibration check standard, CR1) was not analyzed but the low calibration point was at or below CRQL.
No actions taken.

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REGION I
Data Review Worksheets

III C. INSTRUMENT CALIBRATION (Section 3)

1. Quantitation Limit Criteria

List the analytes which did not meet the percent recovery (%R) criteria for the CRQL standard. *CRQL standard not analyzed (see prev. page)*

<u>DATE</u>	<u>CRI#</u>	<u>ANALYTE</u>	<u>%R</u>	<u>ACTION</u>	<u>SAMPLES AFFECTED</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

ACTIONS:

Recovery Criteria

Metals/Mercury/Cyanide	70% - 130%
Antimony, Lead, Thallium (by ICP-AES)	50% - 150%
Cobalt, Manganese, Zinc (by ICP-MS)	50% - 150%

If any analyte does not meet the %R criteria follow the actions stated below:

<u>Recovery</u>	<u>≤MDL</u>	<u><2xCRQL</u>	<u>≥2xCRQL</u>
<50%	R	R	J
<30% Sb, Pb, Tl (AES)	R	R	J
<30% Co, Mn, Zn (MS)	R	R	J
50% - 69%	UJ	J	A
<30% - 49% Sb, Pb, Tl (AES)	UJ	J	A
<30% - 49% Co, Mn, Zn (MS)	UJ	J	A
130% < R ≤180%			
150% < R ≤200% Sb, Pb, Tl (AES)	A	J	A
150% < R ≤200% Co, Mn, Zn (MS)	A	J	A
130% < R ≤165% Cyanide	A	J	A
>180%			
>200% Sb, Pb, Tl (AES)	R	R	R
>200% Co, Mn, Zn (MS)	R	R	R
>165% Cyanide	R	R	R

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Data Review Worksheets

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IV A. BLANK ANALYSIS RESULTS (Section 1-3)

List the blank contamination in Sections 1 & 2 below. A separate worksheet should be used for soil and water samples.

1. Laboratory Blanks

MATRIX: AQ GW

<u>DATE</u>	<u>ICB/CCB#</u>	<u>PREP BL</u>	<u>ANALYTE</u>	<u>CONC./UNITS</u> <u>ug/L</u>
<u>3/3/06</u>	<u>ICB</u>	<u></u>	<u>Sb</u>	<u>-6.8</u>
<u> </u>	<u>CCB1</u>	<u></u>	<u> </u>	<u>-13.2</u>
<u> </u>	<u>CCB2</u>	<u></u>	<u> </u>	<u>-14.3</u>
<u> </u>	<u>CCB3</u>	<u></u>	<u> </u>	<u>-14.8</u>
<u> </u>	<u></u>	<u>PBW2/23/06</u>	<u> </u>	<u>-14.272</u>

2. Equipment/Trip Blanks

<u>DATE</u>	<u>EQUIP BL#</u>	<u>ANALYTE</u>	<u>CONC./UNITS</u>
<u>NA</u>	<u></u>	<u></u>	<u></u>
<u></u>	<u></u>	<u></u>	<u></u>
<u></u>	<u></u>	<u></u>	<u></u>
<u></u>	<u></u>	<u></u>	<u></u>
<u></u>	<u></u>	<u></u>	<u></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 every 10 samples or every 2 hours whichever is more frequent? Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected.

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IV A. BLANK ANALYSIS RESULTS (Section 1-3)

List the blank contamination in Sections 1 & 2 below. A separate worksheet should be used for soil and water samples.

1. Laboratory Blanks

MATRIX: BW

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC./UNITS $\mu\text{g/L}$
3/3/06		PBW	Ba	2.416
	ICB		Cd	0.1
	ICB		Se	-1.4
	CCB3			-3.3
		PBW	↓	-3.516
	ICB		Ag	-2.8
	CCB1			-6.7
	CCB2			-7.5
	CCB3			-7.7
		PBW	↓	-1.346
	ICB		Zn	2.5
	CCB1			-10.2
	CCB2			-13.1
	CCB3			-12.7
		PBW	↓	2.506

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Data Review Worksheets

IV B. BLANK ANALYSIS RESULTS (Section 4)

4. Blank Actions

The Action Levels for any analyte is equal to five times the highest concentration of that element's contamination in any blank. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive sample result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL). Specific actions are as follows:

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

MATRIX: GW

MATRIX: GW

<u>ELEMENT</u>	<u>MAX CONC./</u> <u>UNITS</u> <i>ug/L</i>	<u>AL/</u> <u>UNITS</u> <i>ug/L</i>	<u>ELEMENT</u>	<u>MAX CONC./</u> <u>UNITS</u>	<u>AL/</u> <u>UNITS</u>
<u>Sb</u>	<u>-14.8</u>	<u>-74</u>	<u> </u>	<u> </u>	<u> </u>
<u>Ba</u>	<u>2.416</u>	<u>12.1</u>	<u> </u>	<u> </u>	<u> </u>
<u>Cd</u>	<u>0.1</u>	<u>0.5</u>	<u> </u>	<u> </u>	<u> </u>
<u>Se</u>	<u>-3.516</u>	<u>-17.6</u>	<u> </u>	<u> </u>	<u> </u>
<u>Ag</u>	<u>-7.7</u>	<u>-38.5</u>	<u> </u>	<u> </u>	<u> </u>
<u>Zn</u>	<u>2.5</u>	<u>12.5</u>	<u> </u>	<u> </u>	<u> </u>
<u>Zn</u>	<u>-13.1</u>	<u>-65.5</u>	<u> </u>	<u> </u>	<u> </u>

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

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

Multiplying this result by 5 to arrive at the action level gives a final result in mg/kg which can then be applied to sample results.

E3/22/06

REGION I
Data Review Worksheets

V A. ICP INTERFERENCE CHECK SAMPLE (Sections 1 & 2)

1. Recovery Criteria

List any elements in the ICS AB solution which did not meet the criteria for %R.

DATE	ELEMENT	%R	ACTION	SAMPLES AFFECTED
<i>All recovery criteria met for ICSAB solution.</i>				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

ACTIONS:

If an element does not meet the %R criteria, follow the actions stated below:

	PERCENT RECOVERY		
	<50%	50-79%	>120%
Positive Sample Results	R	J	J
Non-detected Sample Results	R	UJ	A

2. Frequency Requirements

Were Interference QC samples run at the beginning and end of each sample analysis run or a minimum of twice per 8 hour working shift, whichever is more frequent?

Yes or No

If No,

The data may be affected. Use professional judgement to determine the severity of the effect and qualify the data accordingly. Discuss any actions below and list the samples affected.

3/27/06

REGION I

Data Review Worksheets

p. 1

V B. ICP INTERFERENCE CHECK SAMPLE (Section 3) NOT EVALUATED

1. Report the concentration of any element detected in the ICS A solution >MDL that should not be present.

ELEMENT	CONC. DETECTED IN THE ICS <i>ug/L</i>	CONC. OF INTERFERENTS IN THE ICS			
		AL	CA	FE	MG
<u>Sb</u>	<u>-5</u>	<div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;"> Not provided </div> ↓			
<u>Sb</u>	<u>-9</u>				
<u>As</u>	<u>4</u>				
<u>As</u>	<u>5</u>				
<u>Ba</u>	<u>11</u>				
<u>Ba</u>	<u>11</u>				

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

SAMPLE AFFECTED	ELEMENT AFFECTED	SAMPLE CONC. (ug/L)	SAMPLE INTERFERENT CONC.				ESTIMATED INTERF. (ug/L)
			AL	CA	FE	MG	
<p><u>Interference cannot be determined since same interfering concentrations were not provided.</u></p>							

ACTIONS:

- In general, the sample data can be accepted without qualification if the sample concentrations of Al, Ca, Fe, 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 explanations for any actions taken below:

Non-detect antimony, cadmium, copper, silver results in all samples qualified as estimated (U). Positive zinc result in sample MEU-3 qualified as estimated (J).

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3/27/06

REGION I
Data Review Worksheets

VI. MATRIX SPIKE

TR # MEW-3

MATRIX: GW

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
<i>All criteria met for MS recovery.</i>					

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

ACTIONS:

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

	PERCENT RECOVERY		
	<30%	30%-74%	>125%
Positive Samples 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 required criteria for matrix spike recovery? Yes or No NA

A separate worksheet should be used for each matrix spike pair.

4/23/22-106

REGION I
Data Review Worksheets

VII. LABORATORY DUPLICATES

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

MATRIX: GW

Element	CRQL		Sample # <u>MEW-3</u>	Duplicate# <u>MEW-3D</u>	RPD	Action
	water ug/L	soil mg/kg				
Aluminum	200					
Antimony	60					
Arsenic	10					
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100					
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10					

All criteria met for lab duplicate precision.

Laboratory Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

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 CRQL, estimate (J) positive results for elements whose absolute difference is >CRQL, (2xCRQL for soil). If both samples are non-detected the RPD is not calculated (NC).

2/27/06

REGION I

Data Review Worksheets

VIII. FIELD DUPLICATES

List the concentrations of all analytes in the field duplicate pair. For soil duplicates, calculate the CRQL in mg/kg using the sample weight, volume and percents solids data for the sample. Indicate what criteria was used to evaluate precision by circling either the RPD or CRQL for each element.

MATRIX: GW

Element	CRQL		Sample # <u>MEW-4</u>	Duplicate# <u>MEW-4CS</u>	RPD	Action
	water ug/L	soil mg/kg				
Aluminum	200					
Antimony	60		Both samples were ND at CRQL for all analytes.			
Arsenic	10					
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100					
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10					

Field Duplicate Actions should be applied to all other samples of the same matrix type.

ACTIONS:

1. Estimate (J) positive results for elements which have an RPD >30% for waters and >50% for soils.
2. If sample results are less than 5x the CRQL, estimate (J) positive results and (UJ) nondetected results for elements whose absolute difference is >2xCRQL, (4xCRQL for soil). If both samples are non-detected the RPD is not calculated (NC).

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REGION I
Data Review Worksheets

IX. LABORATORY CONTROL SAMPLE

1. Aqueous LCS

List any LCS recoveries not within the 80-120% criteria and the samples affected.

<u>DATE</u>	<u>ELEMENT</u>	<u>%R</u>	<u>ACTION</u>	<u>SAMPLES AFFECTED</u>
<u>All criteria met for LCS recovery.</u>				
<u>No LCS was analyzed. Lab duplicate precision was acceptable.</u>				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

2. Solid LCS

List any analytes that were not within the control windows set by the EPA for the solids LCS sample. The 80-120% criteria is not used to evaluate solid LCS results.

<u>ELEMENT</u>	<u>LCS CONC.</u>	<u>CONTROL WINDOWS</u>	<u>ACTION</u>	<u>SAMPLES AFFECTED</u>
<u>N/A</u>	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

ACTIONS:

<u>AQUEOUS LCS</u>	<u>Percent Recovery</u>		
	<u><50%</u>	<u>51-79%</u>	<u>>120%</u>
Positive Results	R	J	A
Non-detected Results	R	J	A

<u>SOLID LCS</u>	<u><EPA Control Windows</u>	<u>>EPA Control Windows</u>
Positive Results	J	J
Non-detected Results	UJ	A

3. Frequency Criteria

A. Was an LCS analyzed for every matrix, every digestion batch, and every 20 samples?

Yes or No

Handwritten signature and date: 3/27/06

REGION I

Data Review Worksheets

X A. FURNACE ATOMIC ABSORPTION ANALYSIS

NA

1. Duplicate Precision

_____ Duplicate injections one-point analytical spikes were performed for all samples; duplicate injections agreed within $\pm 20\%$.

_____ Duplicate injections and/or spikes were not performed for the following samples/elements: _____

_____ Duplicate injections did not agree within $\pm 20\%$ for samples/elements: _____

2. Post Digestion Spike Recoveries

_____ Spike recoveries met the 85-115% recovery criteria for all samples.

_____ Spike recoveries did not meet the 85-115% criteria but did not require MSA for the following samples/elements: _____

_____ MSA was used to quantitate analytical results when contractually required.

_____ Correlation coefficients ≥ 0.995 , accept results

_____ Correlation coefficients < 0.995 for sample numbers/elements: _____

_____ Method of Standard Addition (MSA) was not performed as required for samples/elements: _____

ACTIONS:

1. Estimate (J) positive results if duplicate injections are outside $\pm 20\%$ RSD or CV.
2. If the sample absorbance is $< 50\%$ of post digestion spike absorbance the following actions should be applied:

	PERCENT RECOVERY		
	<u>$< 10\%$</u>	<u>11%-84%</u>	<u>$> 115\%$</u>
Positive Sample Results	J or R	J	J
Non-detected Results	R	UJ	A

3. Estimate (J) sample results if MSA was required and not performed.
4. Estimate (J) sample results if correlation coefficient was < 0.995 .

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REGION I
Data Review Worksheets

XI. INDUCTIVELY COUPLED PLASMA (ICP) SERIAL DILUTION ANALYSIS

Serial dilutions were performed for each matrix and results of the diluted sample analysis agreed within 10% of the original undiluted analysis, for concentrations greater than 50x MDL.

Serial dilutions were not performed for the following:

✓ Serial dilutions were performed, but analytical results did not agree within 10% for analyte concentrations greater than 50x MDL before dilution.

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

MATRIX: GW

ELEMENT $\mu\text{g/L}$	MDL	50xMDL	SAMPLE RESULT	SERIAL DILUTION	%D	ACTION
Aluminum						
Antimony						
Arsenic	1.6	80	2.25	ND	NC	
Barium						
Beryllium						
Cadmium	0.10	5	1.48	1.85	25	None (<50xMDL)
Calcium						
Chromium	0.38	1419	0.47	ND	NC	
Cobalt						
Copper	6.3	3345	13.22	ND	NC	
Iron						
Lead	0.46	23	1.63	ND	NC	
Magnesium						
Manganese						
Nickel	0.59	29.5	2.68	3.25	21.3	None (<50xMDL)
Potassium						
Selenium						
Silver						
Sodium						
Thallium						
Vanadium						
Zinc	2.3	115	143.58	114.83	20.0	J pos / W NOS

Actions apply to all samples of the same matrix.

ACTIONS:

1. Estimate (J) positive results if %D >15.

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2/22/06

REGION I
Data Review Worksheets

XII. DETECTION LIMIT ANALYSIS

1. Method Detection Limits

Method Detection Limit results were present and found to be less than the Contract Required Quantitation Limits.

MDLs were not included in the data package on Form 9.

MDLs were present, but the criteria was not met for the following elements: _____

2. Reporting Requirements

Were sample results on Form I reported down to the MDL not the CRQL for all analytes? Yes or No

Were sample results that were analyzed for ICP for Se, Tl, As, or Pb at least 5x IDL. Yes or No NA

Were sample weights, volumes, and dilutions taken into account when reporting detection limits on Form I. Yes or No NA

If No, the reported results may be inaccurate. Make the necessary changes on the data summary tables and request that the laboratory resubmit the corrected data.

3. Estimated Results

List the samples and elements that had concentrations that were qualified as estimated (J and UJ) for being greater than the MDL but less than the CRQL. Include blank-qualified results.

Element	Sample(s)	
Sb	all samples	Est. (UJ) non-detect at RL due to neg. drift
Se	all samples	↓
Ag	all samples	
Zn	MEW-4, MEW-4ES, MEW-7, MEW-9, P-3	Est. non-detect at <u>-BAL</u> due to neg. drift
Zn	all samples	Quality as estimated (J/UJ) positive and non-detect due to ICP Serial Dil. Resu

5/27/06

REGION I
Data Review Worksheets

XIII. SAMPLE QUANTITATION

Sample results fall within the linear range for ICP and within the calibrated range for all other parameters.

Sample results were beyond the linear range/calibration range of the instrument for the following elements:

In the space below, please show a minimum of one sample calculation per method:

ICP

Raw data not provided.

FURNACE

MERCURY

CYANIDE

For soil samples, the following equation may be necessary to convert raw data values (usually reported in ug/L) to actual sample concentrations (mg/kg):

$$C \times \frac{V}{W \times S} \times \frac{1L}{1000mL} \times DF \times \frac{1mg}{1000ug} \times \frac{1000g}{1kg} = \frac{mg}{kg} \text{ (dry weight)}$$

Where,

C = concentration, ug/L

V = final sample volume, mL

W = wet sample weight, g

S = percent solids

DF = dilution factor

Palma 106



"Environmental Testing For The New Millennium"

May 30, 2006

Metcalf & Eddy
701 Edgewater Drive
Wakefield, MA 01880
Attn: Ms. Cindy Castleberry

RE: Client Project: Brownfields, Mill St. Brookfield, MA, Water Samples
Lab Project #: E0652

Dear Ms. Castleberry:

Enclosed please find the data report of the required analyses for the samples associated with the above referenced project.

If you have any questions regarding this report, please call me.

We appreciate your business.

Sincerely,

A handwritten signature in cursive script that reads "Edward A. Lawler".

Edward A. Lawler
Laboratory Operations Manager

Analytical Data Package for Metcalf & Eddy, Inc.

Client Project: Brownfields, Brookfield, MA, Water Samples

Mitkem Project ID: E0652

May 30, 2006

Prepared For: Metcalf & Eddy
701 Edgewater Drive
Wakefield, MA 01880
Attn: Ms. Cindy Castleberry

Prepared By: Mitkem Corporation
175 Metro Center Boulevard
Warwick, RI 02886
(401) 732-3400

SDG Narrative

Mitkem Corporation submits the enclosed data package in response to Metcalf & Eddy's Brownfields, Brookfield, MA water sample project. Under this deliverable, analysis results are presented for six samples that were received on May 19, 2006 and logged in under Mitkem Work Order Number E0652. Analyses were performed per specifications in the chain of custody forms. For reference, a copy of the Mitkem Work Order form is included for cross-referencing the client sample ID and laboratory sample ID.

The analyses were performed according to Massachusetts and EPA SW-846 methods, with results presented in a Level 3 format deliverable.

The following observation and/or deviations are observed for the following analyses:

1. Metals Analysis:

Samples were analyzed by methods 6010B and 7470.

Lab control sample: spike recoveries were within the QC limits.

Sample analysis: the Method 6010 calibration is a three point calibration, where the low point is at or near the reporting limit. This lowest point is not able to be printed on a Form 2B using our data reporting system. The low level standard raw data (identified as S3) and the calibration summary showing the correlation coefficient for each instrument run are included. Matrix spike and duplicate analyses were not requested on any sample of this submittal. Matrix spike and duplicate analyses were performed on another sample in the preparation batch. No other unusual occurrences were noted during sample analysis.

All pages in this report have been numbered consecutively, starting with the title page and ending with a page saying only "Last Page of Data Report".

I certify that this data package is in compliance, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the laboratory manager or his designee, as verified by the following signature.



Edward A. Lawler
Laboratory Operations Manager
5/30/06

MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

Laboratory Name: <u>Mitkem</u>	Project #: <u>E0652</u>
Project Location: <u>Brookfield</u>	MADEP RTN ¹ :

This Form provides certifications for the following data set: [list Laboratory Sample ID Number(s)]

See 'workorder' for report E0652

Sample Matrices: Groundwater Soil/Sediment Drinking Water Other: _____

MCP SW-846 Methods Used	8260B ()	8151A ()	8330 ()	6010B <input checked="" type="checkbox"/>	7470A/1A <input checked="" type="checkbox"/>
	8270C ()	8081A ()	VPH ()	6020 ()	9014M ² ()
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	8082 ()	8021B ()	EPH ()	7000 S ³ ()	7196A ()
¹ List Release Tracking Number (RTN), if known ² M – SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method ³ S – SW-846 Methods 7000 Series List individual method and analyte.					

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ¹
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ¹
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ¹
D	VPH and EPH Methods only. Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)	<input type="checkbox"/> Yes <input type="checkbox"/> No ¹

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all analytical QC performance standards and recommendations for the specified methods achieved?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ¹
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No ¹

¹ All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: <u>Edward A. Lawler</u>	Position: <u>Operations Manager</u>
Printed Name: <u>Edward A. Lawler</u>	Date: <u>6/30/06</u>

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

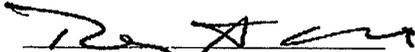
Lab Name: Mitkem Corporation Contract: 60011925.01
Lab Code: MITKEM Case No. SAS No.: SDG No.: ME0652
SOW No.: SW846

EPA Sample No.	Lab Sample ID.
<u>MEW-3</u>	<u>E0652-04</u>
<u>MEW-3CS</u>	<u>E0652-05</u>
<u>MEW-4</u>	<u>E0652-03</u>
<u>MEW-7</u>	<u>E0652-02</u>
<u>MEW-9</u>	<u>E0652-01</u>
<u>P-3</u>	<u>E0652-06</u>

Were ICP interelement corrections applied? Yes/No YES
Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature

Signature:  Name: REGINA A. CONWAY
Date: 5/30/16 Title: CHIEF

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

MEW-3

Lab Name: Mitkem Corporation

Contract: 60011925.

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Matrix (soil/water): WATER

Lab Sample ID: E0652-04

Level (low/med): MED

Date Received: 05/19/06

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	20	U		P
7440-38-2	Arsenic	20	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	20	U		P
7440-50-8	Copper	30	U		P
7439-92-1	Lead	10	U		P
7440-02-0	Nickel	50	U		P
7782-49-2	Selenium	30	U		P
7440-22-4	Silver	30	U		P
7440-28-0	Thallium	20	U		P
7440-62-2	Vanadium	50	U		P
7440-66-6	Zinc	202			P
7439-97-6	Mercury	0.28	U		CV

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

MEW-3CS

Lab Name: Mitkem Corporation

Contract: 60011925.

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Matrix (soil/water): WATER

Lab Sample ID: E0652-05

Level (low/med): MED

Date Received: 05/19/06

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	20	U		P
7440-38-2	Arsenic	20	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	20	U		P
7440-50-8	Copper	30	U		P
7439-92-1	Lead	17.3			P
7440-02-0	Nickel	50	U		P
7782-49-2	Selenium	30	U		P
7440-22-4	Silver	30	U		P
7440-28-0	Thallium	20	U		P
7440-62-2	Vanadium	50	U		P
7440-66-6	Zinc	188			P
7439-97-6	Mercury	0.28	U		CV

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

MEW-4

Lab Name: Mitkem Corporation

Contract: 60011925.

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Matrix (soil/water): WATER

Lab Sample ID: E0652-03

Level (low/med): MED

Date Received: 05/19/06

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	20	U		P
7440-38-2	Arsenic	20	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	20	U		P
7440-50-8	Copper	30	U		P
7439-92-1	Lead	10	U		P
7440-02-0	Nickel	50	U		P
7782-49-2	Selenium	30	U		P
7440-22-4	Silver	30	U		P
7440-28-0	Thallium	20	U		P
7440-62-2	Vanadium	50	U		P
7440-66-6	Zinc	73.2			P
7439-97-6	Mercury	0.28	U		CV

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

MEW-7

Lab Name: Mitkem Corporation

Contract: 60011925.

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Matrix (soil/water): WATER

Lab Sample ID: E0652-02

Level (low/med): MED

Date Received: 05/19/06

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	20	U		P
7440-38-2	Arsenic	20	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	20	U		P
7440-50-8	Copper	30	U		P
7439-92-1	Lead	10	U		P
7440-02-0	Nickel	50	U		P
7782-49-2	Selenium	30	U		P
7440-22-4	Silver	30	U		P
7440-28-0	Thallium	20	U		P
7440-62-2	Vanadium	50	U		P
7440-66-6	Zinc	71.9			P
7439-97-6	Mercury	0.28	U		CV

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

MEW-9

Lab Name: Mitkem Corporation

Contract: 60011925.

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Matrix (soil/water): WATER

Lab Sample ID: E0652-01

Level (low/med): MED

Date Received: 05/19/06

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	20	U		P
7440-38-2	Arsenic	20	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	20	U		P
7440-50-8	Copper	30	U		P
7439-92-1	Lead	10	U		P
7440-02-0	Nickel	50	U		P
7782-49-2	Selenium	30	U		P
7440-22-4	Silver	30	U		P
7440-28-0	Thallium	20	U		P
7440-62-2	Vanadium	50	U		P
7440-66-6	Zinc	69.6			P
7439-97-6	Mercury	0.28	U		CV

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

P-3

Lab Name: Mitkem Corporation

Contract: 60011925.

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Matrix (soil/water): WATER

Lab Sample ID: E0652-06

Level (Low/med): MED

Date Received: 05/19/06

% Solids: 0.0

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

CAS No.	Analyte	Concentration	C	Q	M
7440-36-0	Antimony	20	U		P
7440-38-2	Arsenic	20	U		P
7440-39-3	Barium	200	U		P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-47-3	Chromium	20	U		P
7440-50-8	Copper	30	U		P
7439-92-1	Lead	10	U		P
7440-02-0	Nickel	50	U		P
7782-49-2	Selenium	30	U		P
7440-22-4	Silver	30	U		P
7440-28-0	Thallium	20	U		P
7440-62-2	Vanadium	50	U		P
7440-66-6	Zinc	53.2			P
7439-97-6	Mercury	0.28	U		CV

Comments:

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Mitkem Corporation

Contract: 60011925.01

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Initial Calibration Verification Source:

Continuing Calibration Verification Source:

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration				M	
	True	Found	%R(1)	True	Found	%R(1)	Found		%R(1)
Mercury	5.0	4.72	94.4	5.0	5.13	102.6	5.07	101.4	CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Mitkem Corporation

Contract: 60011925.01

Lab Code: MITKEM

Case No.

SAS No.:

SDG No.: ME0652

Initial Calibration Verification Source:

Continuing Calibration Verification Source:

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Mercury				5.0	4.92	98.4	5.11	102.1	CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Mitkem Corporation

Contract: 60011925.01

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Initial Calibration Verification Source:

Continuing Calibration Verification Source:

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration				M	
	True	Found	%R(1)	True	Found	%R(1)	Found		%R(1)
Mercury				5.0	4.89	97.8			CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Mitkem Corporation

Contract: 60011925.01

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Initial Calibration Verification Source:

Continuing Calibration Verification Source:

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Antimony	500.0	503.05	100.6	500.0	497.15	99.4	491.49	98.3	P
Arsenic	500.0	510.77	102.2	500.0	510.28	102.1	506.34	101.3	P
Barium	10000.0	10470.23	104.7	10000.0	10748.56	107.5	10692.81	106.9	P
Beryllium	250.0	253.69	101.5	250.0	258.23	103.3	257.61	103.0	P
Cadmium	250.0	257.31	102.9	250.0	261.69	104.7	259.80	103.9	P
Chromium	1000.0	1019.41	101.9	1000.0	1001.89	100.2	1007.18	100.7	P
Copper	1250.0	1231.71	98.5	1250.0	1198.37	95.9	1194.70	95.6	P
Lead	500.0	516.06	103.2	500.0	516.64	103.3	511.11	102.2	P
Nickel	2500.0	2552.78	102.1	2500.0	2514.09	100.6	2533.99	101.4	P
Selenium	500.0	514.09	102.8	500.0	513.35	102.7	508.84	101.8	P
Silver	1250.0	1230.19	98.4	1250.0	1208.20	96.7	1217.98	97.4	P
Thallium	500.0	501.09	100.2	500.0	502.83	100.6	501.32	100.3	P
Vanadium	2500.0	2485.82	99.4	2500.0	2454.84	98.2	2467.95	98.7	P
Zinc	2500.0	2637.43	105.5	2500.0	2605.64	104.2	2582.63	103.3	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Mitkem Corporation

Contract: 60011925.01

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Initial Calibration Verification Source:

Continuing Calibration Verification Source:

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Antimony				500.0	488.72	97.7	494.50	98.9	P
Arsenic				500.0	500.36	100.1	505.57	101.1	P
Barium				10000.0	10590.66	105.9	10518.95	105.2	P
Beryllium				250.0	255.06	102.0	253.49	101.4	P
Cadmium				250.0	260.18	104.1	259.67	103.9	P
Chromium				1000.0	1008.87	100.9	1006.73	100.7	P
Copper				1250.0	1189.48	95.2	1195.56	95.6	P
Lead				500.0	507.04	101.4	512.02	102.4	P
Nickel				2500.0	2530.01	101.2	2524.63	101.0	P
Selenium				500.0	513.44	102.7	507.24	101.4	P
Silver				1250.0	1214.16	97.1	1214.77	97.2	P
Thallium				500.0	497.77	99.6	496.28	99.3	P
Vanadium				2500.0	2468.09	98.7	2459.56	98.4	P
Zinc				2500.0	2611.17	104.4	2535.49	101.4	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Mitkem Corporation

Contract: 60011925.01

Lab Code: MITKEM

Case No.

SAS No.:

SDG No.: ME0652

Initial Calibration Verification Source:

Continuing Calibration Verification Source:

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Antimony				500.0	500.12	100.0	510.86	102.2	P
Arsenic				500.0	517.32	103.5	524.88	105.0	P
Barium				10000.0	10635.00	106.4	10712.21	107.1	P
Beryllium				250.0	259.19	103.7	261.37	104.5	P
Cadmium				250.0	261.86	104.7	261.35	104.5	P
Chromium				1000.0	1032.03	103.2	1047.45	104.7	P
Copper				1250.0	1241.62	99.3	1259.47	100.8	P
Lead				500.0	517.13	103.4	519.23	103.8	P
Nickel				2500.0	2587.04	103.5	2624.22	105.0	P
Selenium				500.0	514.83	103.0	517.11	103.4	P
Silver				1250.0	1243.90	99.5	1262.56	101.0	P
Thallium				500.0	501.01	100.2	517.58	103.5	P
Vanadium				2500.0	2509.06	100.4	2544.15	101.8	P
Zinc				2500.0	2621.65	104.9	2632.74	105.3	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Mitkem Corporation

Contract: 60011925.01

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Initial Calibration Verification Source:

Continuing Calibration Verification Source:

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Antimony				500.0	514.86	103.0	511.53	102.3	P
Arsenic				500.0	534.25	106.9	527.34	105.5	P
Barium				10000.0	10731.66	107.3	10767.54	107.7	P
Beryllium				250.0	261.40	104.6	261.61	104.6	P
Cadmium				250.0	266.87	106.7	265.96	106.4	P
Chromium				1000.0	1056.72	105.7	1046.75	104.7	P
Copper				1250.0	1267.40	101.4	1240.93	99.3	P
Lead				500.0	530.67	106.1	524.88	105.0	P
Nickel				2500.0	2655.70	106.2	2643.50	105.7	P
Selenium				500.0	521.63	104.3	523.62	104.7	P
Silver				1250.0	1270.92	101.7	1268.38	101.5	P
Thallium				500.0	525.70	105.1	521.52	104.3	P
Vanadium				2500.0	2569.76	102.8	2554.57	102.2	P
Zinc				2500.0	2689.38	107.6	2701.72	108.1	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Mitkem Corporation

Contract: 60011925.01

Lab Code: MITKEM

Case No.

SAS No.:

SDG No.: ME0652

Initial Calibration Verification Source:

Continuing Calibration Verification Source:

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Antimony				500.0	512.58	102.5	497.52	99.5	P
Arsenic				500.0	524.19	104.8	521.01	104.2	P
Barium				10000.0	10901.78	109.0	10796.14	108.0	P
Beryllium				250.0	264.09	105.6	260.17	104.1	P
Cadmium				250.0	270.96	108.4	266.19	106.5	P
Chromium				1000.0	1044.96	104.5	1026.48	102.6	P
Copper				1250.0	1241.81	99.3	1203.98	96.3	P
Lead				500.0	530.52	106.1	525.24	105.0	P
Nickel				2500.0	2638.35	105.5	2601.94	104.1	P
Selenium				500.0	531.33	106.3	523.48	104.7	P
Silver				1250.0	1265.93	101.3	1196.84	95.7	P
Thallium				500.0	521.07	104.2	524.13	104.8	P
Vanadium				2500.0	2547.35	101.9	2516.75	100.7	P
Zinc				2500.0	2714.27	108.6	2676.24	107.0	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Mitkem Corporation

Contract: 60011925.01

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Initial Calibration Verification Source:

Continuing Calibration Verification Source:

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Antimony				500.0	493.68	98.7	504.08	100.8	P
Arsenic				500.0	516.93	103.4	531.78	106.4	P
Barium				10000.0	10570.43	105.7	10742.22	107.4	P
Beryllium				250.0	255.87	102.3	261.22	104.5	P
Cadmium				250.0	264.12	105.6	265.86	106.3	P
Chromium				1000.0	1027.19	102.7	1056.75	105.7	P
Copper				1250.0	1214.05	97.1	1254.93	100.4	P
Lead				500.0	515.95	103.2	525.46	105.1	P
Nickel				2500.0	2588.90	103.6	2663.85	106.6	P
Selenium				500.0	508.81	101.8	516.25	103.3	P
Silver				1250.0	1196.03	95.7	1234.11	98.7	P
Thallium				500.0	510.05	102.0	526.98	105.4	P
Vanadium				2500.0	2498.52	99.9	2574.91	103.0	P
Zinc				2500.0	2683.68	107.3	2690.22	107.6	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Mitkem Corporation

Contract: 60011925.01

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Initial Calibration Verification Source:

Continuing Calibration Verification Source:

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Antimony				500.0	499.73	99.9	496.62	99.3	P
Arsenic				500.0	520.95	104.2	519.41	103.9	P
Barium				10000.0	10698.07	107.0	10628.87	106.3	P
Beryllium				250.0	260.64	104.3	258.74	103.5	P
Cadmium				250.0	267.92	107.2	263.11	105.2	P
Chromium				1000.0	1036.22	103.6	1023.31	102.3	P
Copper				1250.0	1224.06	97.9	1206.34	96.5	P
Lead				500.0	521.96	104.4	517.78	103.6	P
Nickel				2500.0	2615.28	104.6	2585.62	103.4	P
Selenium				500.0	520.57	104.1	521.78	104.4	P
Silver				1250.0	1214.21	97.1	1201.12	96.1	P
Thallium				500.0	521.14	104.2	513.41	102.7	P
Vanadium				2500.0	2523.31	100.9	2495.51	99.8	P
Zinc				2500.0	2641.78	105.7	2631.48	105.3	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Mitkem Corporation

Contract: 60011925.01

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Initial Calibration Verification Source:

Continuing Calibration Verification Source:

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Antimony				500.0	493.60	98.7			P
Arsenic				500.0	515.33	103.1			P
Barium				10000.0	10684.04	106.8			P
Beryllium				250.0	260.06	104.0			P
Cadmium				250.0	265.56	106.2			P
Chromium				1000.0	1000.81	100.1			P
Copper				1250.0	1169.19	93.5			P
Lead				500.0	517.08	103.4			P
Nickel				2500.0	2527.10	101.1			P
Selenium				500.0	514.72	102.9			P
Silver				1250.0	1169.82	93.6			P
Thallium				500.0	509.88	102.0			P
Vanadium				2500.0	2447.06	97.9			P
Zinc				2500.0	2604.85	104.2			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

3
BLANKS

Lab Name: Mitkem Corporation

Contract: 60011925.01

Lab Code: MITKEM Case No.

SAS No.:

SDG No.: ME0652

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Method Blank ID:
MB-23882

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
	C		1	C	2	C	3	C	C		
Mercury	0.047	U	0.047	U	0.047	U	0.047	U	0.047	U	