Wickham, Jerry, Env. Health

From: Joe Mangine [joe@allterraenv.com]
Sent: Friday, September 14, 2012 1:59 PM
To: Wickham, Jerry, Env. Health
Subject: Re: 160 Holmes, Livermore

Hi Jerry,

Do you have any time to discuss this project? Are you available for a quick call on Tuesday, September 18th at 10am?

Thanks for your time,

Joe

On Wed, Sep 12, 2012 at 12:09 PM, Joe Mangine <joe@allterraenv.com> wrote:
Jerry,

Please find attached recent analytical results from the third quarter 2012 groundwater sampling event at the subject site. Hexachrome results look favorable, but please note that key wells EW-3, MW-1A, and MW-7A were dry during this event. A grab sample was collected from EW-3, but there was only enough water available to run petroleum constituent analyses. Data indicates that residual petroleum-impacts remain limited to the immediate area around EW-3 and MTBE levels in groundwater have dropped even further in the source area since last quarter. TBA concentrations in groundwater have increased in source area, likely indicating further biodegradation beneath the site.

Also, I've attached a figure depicting a conservative estimated radius of influence (approximately 15 lateral feet) for additional ISCO using existing well EW-1 and proposed well EW-3B as injection points. We moved the location of EW-3B slightly to optimize further source area treatment. As shown on the figure, we expect proposed remedial injections at these locations will adequately address areas with the highest remaining concentrations of MTBE and TBA in soil and groundwater beneath the site (including 2008 boring locations GP-8, GP-9, and GP-14).

Before submitting an additional workplan, I would again like to discuss our remedial approach moving forward at this site. Let me know a good time to reach you to discuss these issues. Thanks!

Joe

--
Joe Mangine, PG
Environmental Division Manager
Allterra Environmental, Inc.
207-B McPherson Street
Santa Cruz, CA 95060
831.425.2608

--

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Environmental Division Manager
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Santa Cruz, CA 95060
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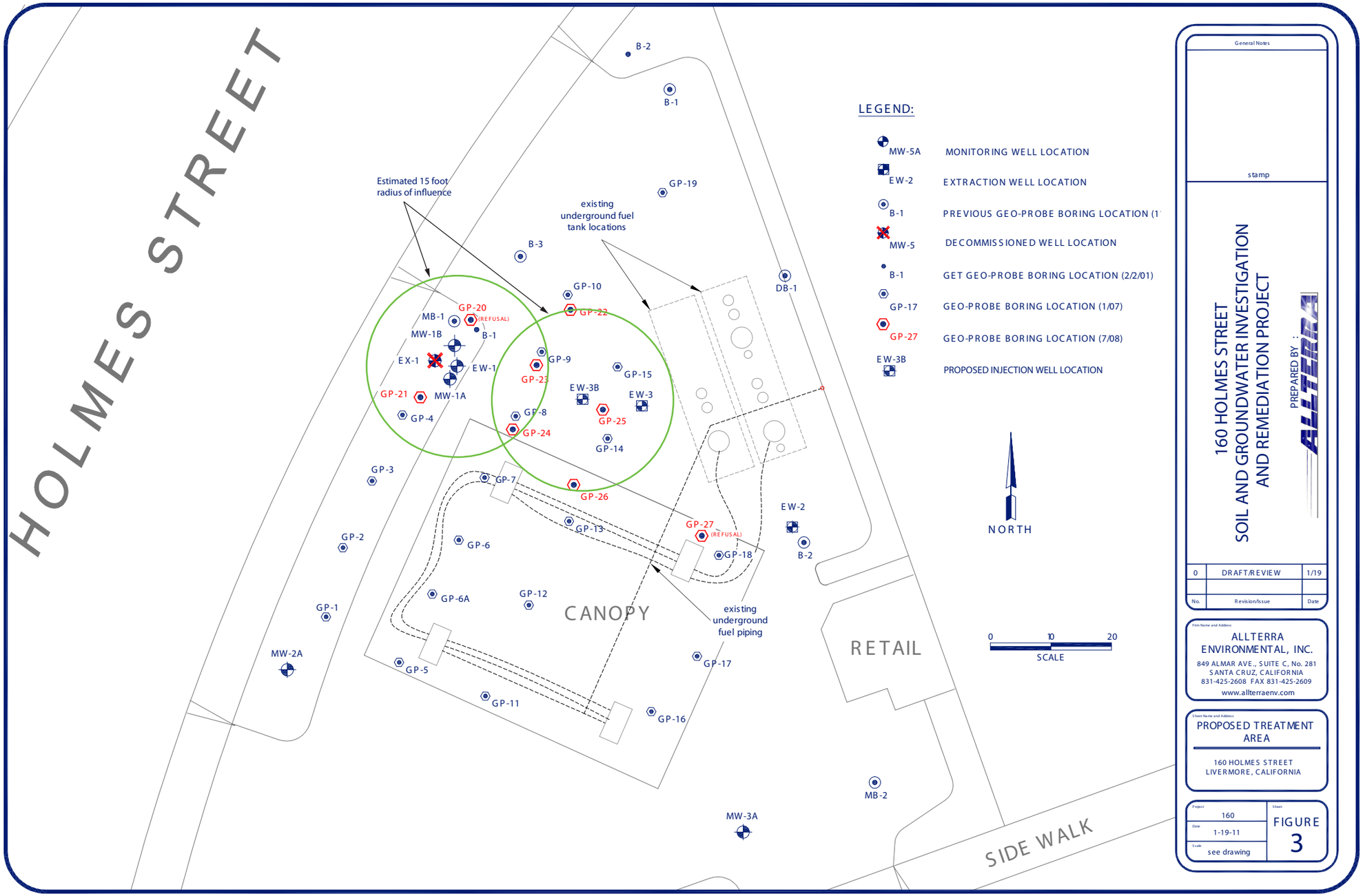

General Notes

stamp

160 HOLMES STREET
SOIL AND GROUNDWATER INVESTIGATION AND REMEDIATION PROJECT

PREPARED BY: ALLTERRA

No.	Revision/Issue	Date
0	DRAFT/REVIEW	1/19

Firm Name and Address
ALLTERRA ENVIRONMENTAL, INC.
849 ALMAR AVE., SUITE C, No. 281
SANTA CRUZ, CALIFORNIA
831-425-2608 FAX 831-425-2609
www.allterraenv.com

Sheet Name and Address
PROPOSED TREATMENT AREA
160 HOLMES STREET
LIVERMORE, CALIFORNIA

Project	Sheet
160	FIGURE 3
Date: 1-19-11	
Scale: see drawing	

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Analytical Report

Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/30/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Reported: 09/07/12
Santa Cruz, CA 95060	Client P.O.:	Date Completed: 09/07/12

WorkOrder: 1208788

September 07, 2012

Dear James:

Enclosed within are:

1) The results of the **12** analyzed samples from your project: **#160; 160 Holmes,**
2) QC data for the above samples, and
3) A copy of the chain of custody.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius
Laboratory Manager
McCampbell Analytical, Inc.

The analytical results relate only to the items tested.

12 05788

ALLTERRA

849 Almar Avenue, Suite C, #281
Santa Cruz, California 95060
Website: www.allterraenv.com
Phone: (831) 425-2608 Facsimile: (831) 425-2609

Chain of Custody Record

Turn Around Time (circle one) RUSH 24HR 48HR 72HR 5 Day

Report and Bill to: **Allterra Environmental, Inc.**
Project Number: **160**
Project Location: **160 Holmes**
Project Name:
Sampler Signature:

Field Point Name / Sample ID	Sample Collection: Date	Sample Collection: Time	Sample Containers: Number of Containers	Sample Containers: Container Type	Matrix: Air	Matrix: Water	Matrix: Soil	Matrix: Sludge	Matrix: Other	Preservation: Ice	Preservation: HCl	Preservation: HNO_3	Preservation: Other	TPHg/ BTEX/ MTBE (EPA 8015/8021)	TPHd (EPA 8015)	5-fuel oxys (EPA 8260)	Lead Scavengers (8260)	Dissolved Oxygen	Carbon Dioxide	Methane	Total Dissolved Solids	Arsenic, Total Chromium, Total iron, Manganese, Sodium	Hexachrome	Ferrous Iron	Alkalinity	Sulfate		EDF required
~~MW-1A~~			~~17~~	~~(19) VARIOUS~~		x				x	x	x		x	x	x	x	x	x	x	x	x	x	x	x		x
MW-1B	8/28	3:00	17	(19) VARIOUS		x				x	x	x		x	x	x	x	x	x	x	x	x	x	x	x		x
~~MW-7A~~			~~17~~	~~(19) VARIOUS~~		x				x	x	x		x	x	x	x	x	x	x	x	x	x	x	x		x
MW-7B	8/29	3:00	17	(19) VARIOUS		x				x	x	x		x	x	x	x	x	x	x	x	x	x	x	x		x
EW-1	8/29	12:00	17	(19) VARIOUS		x				x	x	x		x	x	x	x	x	x	x	x	x	x	x	x		x
EW-3	8/30	11:00	~~19~~	~~(19) VARIOUS~~		x				x	x	x		x	x	x	x	x	x	x	x	x	x	x	x		x
MW-9A	8/30	1:30	6	(5) VOA (1) AMBER		x				x	x			x	x	x	x										x
MW-9B	8/30	1:00	6	(5) VOA (1) AMBER		x				x	x			x	x	x	x										x
MW-7C	8/30	12:00	6	(5) VOA (1) AMBER		x				x	x			x	x	x	x										x
MW-8A	8/29	4:00	5	VOA		x				x	x			x		x											x
MW-8B	8/30	2:30	5	VOA		x				x	x			x		x											x
MW-5A	8/29	2:30	5	VOA		x				x	x			x		x											x
MW-5B	8/29	1:45	5	VOA		x				x	x			x		x											x
MW-6	8/29	1:00	5	VOA		x				x	x			x		x											x

Sampled By: Joseph Bryan	Date: 8/30	Time: 1545	Received By:		
Received By:	Date: 8/31/12	Time: 1089	Received By:		
Received By:	Date:	Time:	Received By:		

Comments:

ICE/t° 0.8
GOOD CONDITION ____ APPROPRIATE
HEAD SPACE ABSENT ____ CONTAINERS ____
DECHLORINATED IN LAB ____ PRESERVED IN LAB ____

PRESERVATION	VOAS	O&G	METALS	OTHER

* WE WILL CONTACT YOU ABOUT SAMPLES TO ANALYZE

*set up what was possible with VOAs

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1208788 **ClientCode: ATRS**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
James Allen
Allterra Environmental
849 Almar Ave, Ste. C #281
Santa Cruz, CA 95060
831-425-2608 FAX: 831-425-2609

Email: allterraenvironmental@yahoo.com; micah
cc:
PO:
ProjectNo: #160; 160 Holmes

Bill to:
Accounts Payable
Allterra Environmental
849 Almar Ave, Ste. C #281
Santa Cruz, CA 95060
micah@allterraenv.com

Requested TAT: 5 days

Date Received: **08/30/2012**
Date Printed: **08/30/2012**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1208788-001	MW-1B	Water	8/28/2012 15:00	☐	E	F		B	G	I	K	D	A	I	C	H
1208788-002	MW-7B	Water	8/29/2012 15:00	☐	E	F		B	G	I	K	D	A	I	C	H
1208788-003	EW-1	Water	8/29/2012 12:00	☐	E	F		B	G	I	K	D	A	I	C	H
1208788-004	EW-3	Water	8/29/2012 11:00	☐				B				D	A		C	
1208788-005	MW-9A	Water	8/30/2012 13:30	☐				B					A			
1208788-006	MW-9B	Water	8/30/2012 13:00	☐				B					A			
1208788-007	MW-7C	Water	8/30/2012 12:00	☐				B					A			
1208788-008	MW-8A	Water	8/29/2012 16:00	☐			B						A			
1208788-009	MW-8B	Water	8/30/2012 14:30	☐			B						A			
1208788-010	MW-5A	Water	8/29/2012 14:30	☐			B						A			
1208788-011	MW-5B	Water	8/29/2012 13:45	☐			B						A			
1208788-012	MW-6	Water	8/29/2012 13:00	☐			B						A			

Test Legend:

1	218_6_W	2	300_1_W	3	5-OXYS_W	4	5-OXYS+PBSCV_W	5	Alka(spe)_W
6	ALKIMET_W	7	DO_W	8	FE2_W	9	G-MBTEX_W	10	METALSMS_W
11	RSK174_W	12	TDS_W						

Prepared by: Zoraida Cortez

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1208788 **ClientCode: ATRS**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
James Allen
Allterra Environmental
849 Almar Ave, Ste. C #281
Santa Cruz, CA 95060
831-425-2608 FAX: 831-425-2609

Email: allterraenvironmental@yahoo.com; micah
cc:
PO:
ProjectNo: #160; 160 Holmes

Bill to:
Accounts Payable
Allterra Environmental
849 Almar Ave, Ste. C #281
Santa Cruz, CA 95060
micah@allterraenv.com

Requested TAT: **5 days**

Date Received: **08/30/2012**
Date Printed: **08/30/2012**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					13	14	15	16	17	18	19	20	21	22	23	24
1208788-001	MW-1B	Water	8/28/2012 15:00	☐	J											
1208788-002	MW-7B	Water	8/29/2012 15:00	☐	J											
1208788-003	EW-1	Water	8/29/2012 12:00	☐	J											
1208788-004	EW-3	Water	8/29/2012 11:00	☐	E											
1208788-005	MW-9A	Water	8/30/2012 13:30	☐	C											
1208788-006	MW-9B	Water	8/30/2012 13:00	☐	C											
1208788-007	MW-7C	Water	8/30/2012 12:00	☐	C											
1208788-008	MW-8A	Water	8/29/2012 16:00	☐												
1208788-009	MW-8B	Water	8/30/2012 14:30	☐												
1208788-010	MW-5A	Water	8/29/2012 14:30	☐												
1208788-011	MW-5B	Water	8/29/2012 13:45	☐												
1208788-012	MW-6	Water	8/29/2012 13:00	☐												

Test Legend:

13	TPH(D)_W	14		15		16		17	
18		19		20		21		22	
23		24							

Prepared by: Zoraida Cortez

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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Sample Receipt Checklist

Client Name: **Allterra Environmental**

Date and Time Received: **8/30/2012 8:04:08 PM**

Project Name: **#160; 160 Holmes**

LogIn Reviewed by: Zoraida Cortez

WorkOrder N°: **1208788** Matrix: Water

Carrier: Benjamin Yslas (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☑	No ☐

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☐	No ☑	
Container/Temp Blank temperature	Cooler Temp: 0.8°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☑	No ☐	No VOA vials submitted ☐
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☑	No ☐	NA ☐
Samples Received on Ice?	Yes ☑	No ☐	

(Ice Type: WET ICE)

** NOTE: If the "No" box is checked, see comments below.*

Comments: Ferrous Iron received out of hold time for MW-1B. DO and Hexachrome was received out of hold time for MW-1B, MW-7B and EW-1.

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/29/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Extracted: 08/31/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 08/31/12

Hexachrome by IC*

Analytical Method: E218.6 Work Order: 1208788

Lab ID	Client ID	Matrix	Hexachrome	DF	Comments
1208788-001E	MW-1B	W	1.6	1	
1208788-002E	MW-7B	W	ND	1	
1208788-003E	EW-1	W	ND	1	

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	0.2 µg/L	
	S	NA	

* water samples are reported in µg/L.

N/A means surrogate not applicable to this analysis; # means surrogate diluted out of range or surrogate coelutes with another peak.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

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Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/29/12
849 Almar Ave, Ste. C #281		Date Received: 08/30/12
	Client Contact: James Allen	Date Extracted 08/31/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed 08/31/12

Inorganic Anions by IC*

Extraction method: E300.1 Analytical methods: E300.1 Work Order: 1208788

Lab ID	Client ID	Matrix	Sulfate	DF	% SS	Comments
1208788-001F	MW-1B	W	36	50	---#	
1208788-002F	MW-7B	W	34	50	---#	
1208788-003F	EW-1	W	36	50	---#	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	0.1	mg/L
	S	NA	NA

* water samples are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in mg/wipe, product/oil/non-aqueous liquid samples in mg/L.

* [Nitrate as $NO3^{-}$] = 4.4268 x [Nitrate as N]

means surrogate diluted out of range or surrogate coelutes with another peak; N/A means surrogate not applicable to this analysis; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

DHS ELAP Certification 1644

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Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/29/12-08/30/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Extracted: 09/05/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 09/05/12

Oxygenated Volatile Organics by P&T and GC/MS*

Extraction Method: SW5030B | Analytical Method: SW8260B | Work Order: 1208788

Lab ID	1208788-008B	1208788-009B	1208788-010B	1208788-011B	Reporting Limit for DF =1	
Client ID	MW-8A	MW-8B	MW-5A	MW-5B		
Matrix	W	W	W	W		
DF	1	1	1	1	S	W
Compound	**Concentration**				ug/kg	µg/L
tert-Amyl methyl ether (TAME)	ND	ND	ND	ND	NA	0.5
t-Butyl alcohol (TBA)	ND	ND	ND	ND	NA	2.0
Diisopropyl ether (DIPE)	ND	ND	ND	ND	NA	0.5
Ethyl tert-butyl ether (ETBE)	ND	ND	ND	ND	NA	0.5
Methyl-t-butyl ether (MTBE)	3.0	ND	ND	ND	NA	0.5
Surrogate Recoveries (%)						
%SS1:	95	95	109	108		
Comments	b1					

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

surrogate diluted out of range or surrogate coelutes with another peak.

b1) aqueous sample that contains greater than ~1 vol. % sediment

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Angela Rydelius, Lab Manager

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Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/29/12-08/30/12
849 Almar Ave, Ste. C #281		Date Received: 08/30/12
	Client Contact: James Allen	Date Extracted: 09/05/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 09/05/12

Oxygenated Volatile Organics by P&T and GC/MS*

Extraction Method: SW5030B | Analytical Method: SW8260B | Work Order: 1208788

Lab ID	1208788-012B				Reporting Limit for DF =1	
Client ID	MW-6					
Matrix	W					
DF	1				S	W
Compound	**Concentration**				ug/kg	µg/L
tert-Amyl methyl ether (TAME)	ND				NA	0.5
t-Butyl alcohol (TBA)	ND				NA	2.0
Diisopropyl ether (DIPE)	ND				NA	0.5
Ethyl tert-butyl ether (ETBE)	ND				NA	0.5
Methyl-t-butyl ether (MTBE)	ND				NA	0.5
Surrogate Recoveries (%)						
%SS1:	108					
Comments						

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

surrogate diluted out of range or surrogate coelutes with another peak.

b1) aqueous sample that contains greater than ~1 vol. % sediment

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/30/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Extracted: 09/04/12-09/06/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 09/04/12-09/06/12

Oxygenated Volatile Organics + EDB and 1,2-DCA by P&T and GC/MS*

Extraction Method: SW5030B | Analytical Method: SW8260B | Work Order: 1208788

Lab ID	1208788-001B	1208788-002B	1208788-003B	1208788-004B	Reporting Limit for DF =1	
Client ID	MW-1B	MW-7B	EW-1	EW-3		
Matrix	W	W	W	W		
DF	1	25	100	1000	S	W
Compound	**Concentration**				ug/kg	µg/L
tert-Amyl methyl ether (TAME)	ND	ND<12	ND<50	ND<500	NA	0.5
Benzene	ND	ND<12	ND<50	ND<500	NA	0.5
t-Butyl alcohol (TBA)	ND	2000	8100	82,000	NA	2.0
Chlorobenzene	ND	ND<12	ND<50	ND<500	NA	0.5
1,2-Dibromoethane (EDB)	ND	ND<12	ND<50	ND<500	NA	0.5
1,2-Dichloroethane (1,2-DCA)	ND	ND<12	ND<50	ND<500	NA	0.5
Diisopropyl ether (DIPE)	ND	ND<12	ND<50	ND<500	NA	0.5
Ethyl tert-butyl ether (ETBE)	ND	ND<12	ND<50	ND<500	NA	0.5
Methyl-t-butyl ether (MTBE)	ND	ND<12	ND<50	3900	NA	0.5
Toluene	ND	ND<12	ND<50	ND<500	NA	0.5
Trichloroethene	ND	ND<12	ND<50	ND<500	NA	0.5
Xylenes, Total	ND	ND<12	ND<50	ND<500	NA	0.5
Surrogate Recoveries (%)						
%SS1:	92	109	112	110		
Comments						

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

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Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/30/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Extracted: 09/04/12-09/06/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 09/04/12-09/06/12

Oxygenated Volatile Organics + EDB and 1,2-DCA by P&T and GC/MS*

Extraction Method: SW5030B | Analytical Method: SW8260B | Work Order: 1208788

Lab ID	1208788-005B	1208788-006B	1208788-007B		Reporting Limit for DF =1	
Client ID	MW-9A	MW-9B	MW-7C			
Matrix	W	W	W			
DF	1	1	1		S	W
Compound	**Concentration**				ug/kg	µg/L
tert-Amyl methyl ether (TAME)	ND	ND	ND		NA	0.5
Benzene	ND	ND	ND		NA	0.5
t-Butyl alcohol (TBA)	ND	ND	ND		NA	2.0
Chlorobenzene	ND	ND	ND		NA	0.5
1,2-Dibromoethane (EDB)	ND	ND	ND		NA	0.5
1,2-Dichloroethane (1,2-DCA)	ND	ND	ND		NA	0.5
Diisopropyl ether (DIPE)	ND	ND	ND		NA	0.5
Ethyl tert-butyl ether (ETBE)	ND	ND	ND		NA	0.5
Methyl-t-butyl ether (MTBE)	ND	0.55	ND		NA	0.5
Toluene	ND	ND	ND		NA	0.5
Trichloroethene	ND	ND	ND		NA	0.5
Xylenes, Total	ND	ND	ND		NA	0.5
Surrogate Recoveries (%)						
%SS1:	95	94	92			
Comments						

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit/method detection limit; N/A means analyte not applicable to this analysis; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

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Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
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1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/29/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Extracted: 08/31/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 08/31/12

Total & Speciated Alkalinity as Calcium Carbonate*

Extraction method: SM2320B Analytical methods: SM2320B Work Order: 1208788

Lab ID	Client ID	Matrix	Total*	Carbonate*	Bicarbonate*	Hydroxide*	DF	Comments
001G	MW-1B	W	208	ND	208	ND	1	
002G	MW-7B	W	285	ND	285	ND	1	
003G	EW-1	W	276	ND	276	ND	1	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	1.0	1.0	1.0	1.0	mg $CaCO_3$/L
	S	NA	NA	NA	NA	mg/Kg

*water samples are reported in mg calcium carbonate/L. Hydroxide, Carbonate & Bicarbonate alkalinity measure @ end-point of pH = 8.3 & 4.5 per SM2320B.

DF = Dilution Factor

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/29/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Extracted: 08/30/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 08/31/12

Alkali Metals by ICP*

Extraction method: E200.7 Analytical methods: E200.7 Work Order: 1208788

Lab ID	Client ID	Matrix	Extraction Type	Iron	Manganese	Sodium	DF	% SS	Comments
001I	MW-1B	W	TOTAL	1000	35	43,000	1	102	
002I	MW-7B	W	TOTAL	2100	1800	43,000	1	101	
003I	EW-1	W	TOTAL	14,000	2300	44,000	1	95	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	TOTAL	20	20	500	µg/L
	S	TOTAL	NA	NA	NA	NA

*water samples are reported in ug/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate recovery outside of acceptance range due to matrix interference; & means low or no surrogate due to matrix interference; ND means not detected above the reporting limit/method detection limit; N/A means not applicable to this sample or instrument; %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

TOTAL = Hot acid digestion of a representative sample aliquot.
TRM = Total recoverable metals is the "direct analysis" of a sample aliquot taken from its acid-preserved container.
DISS = Dissolved metals by direct analysis of 0.45 µm filtered and acidified sample.

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McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/29/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Extracted: 08/30/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 08/30/12

Dissolved Oxygen

Analytical Method: SM4500OG Work Order: 1208788

Lab ID	Client ID	Matrix	Dissolved Oxygen	DF	Comments
1208788-001K	MW-1B	W	6.87 @ 15.1°C	1	
1208788-002K	MW-7B	W	5.12 @ 14.9°C	1	
1208788-003K	EW-1	W	4.18 @ 15.1°C	1	

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	1.0 mg DO/L @ °C	
	S	NA	

DF = Dilution Factor

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Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/29/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Extracted: 08/30/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 08/30/12

Ferrous Iron*

Analytical Method: SM3500-Fe B4c | Work Order: 1208788

Lab ID	Client ID	Matrix	Ferrous Iron	DF	Comments
1208788-001D	MW-1B	W	ND	1	
1208788-002D	MW-7B	W	ND	1	
1208788-003D	EW-1	W	570	1	
1208788-004D	EW-3	W	580	1	

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	50 µg/L	
	S	NA	

*water samples are reported in ug/L; soil samples are reported in mg/kg.

DF = Dilution Factor

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/30/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Extracted: 08/31/12-09/04/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 08/31/12-09/04/12

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE*

Extraction method: SW5030B Analytical methods: SW8021B/8015Bm Work Order: 1208788

Lab ID	Client ID	Matrix	TPH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS	Comments
001A	MW-1B	W	ND	ND	ND	ND	ND	ND	1	104	
002A	MW-7B	W	ND	ND	ND	0.73	ND	ND	1	87	
003A	EW-1	W	ND	ND	ND	0.62	ND	ND	1	90	
004A	EW-3	W	430	3900	ND<1.7	ND<1.7	5.7	20	3.3	90	d1
005A	MW-9A	W	ND	ND	ND	ND	ND	ND	1	102	
006A	MW-9B	W	ND	ND	ND	ND	ND	ND	1	110	
007A	MW-7C	W	ND	ND	ND	ND	ND	ND	1	106	
008A	MW-8A	W	ND	ND	ND	ND	ND	ND	1	106	b1
009A	MW-8B	W	ND	ND	ND	ND	ND	ND	1	105	
010A	MW-5A	W	ND	ND	ND	ND	ND	ND	1	106	
011A	MW-5B	W	ND	ND	ND	ND	ND	ND	1	107	
012A	MW-6	W	ND	ND	ND	ND	ND	ND	1	107	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	50	5.0	0.5	0.5	0.5	0.5	µg/L
	S	1.0	0.05	0.005	0.005	0.005	0.005	mg/Kg

* water and vapor samples are reported in ug/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts in mg/L.

cluttered chromatogram; sample peak coelutes w/surrogate peak; low surrogate recovery due to matrix interference. %SS = Percent Recovery of Surrogate Standard; DF = Dilution Factor

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation:
b1) aqueous sample that contains greater than ~1 vol. % sediment
d1) weakly modified or unmodified gasoline is significant

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/29/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Extracted: 08/30/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 08/31/12-09/01/12

Metals*

Extraction method: E200.8 Analytical methods: E200.8 Work Order: 1208788

Lab ID	Client ID	Matrix	Extraction Type	Arsenic	Chromium	DF	% SS	Comments
001I	MW-1B	W	TOTAL	ND	3.7	1	101	
002I	MW-7B	W	TOTAL	1.7	3.3	1	102	
003I	EW-1	W	TOTAL	8.6	31	1	103	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	TOTAL	0.5	0.5	µg/L
	S	TOTAL	NA	NA	NA

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / WET / DI WET / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit/method detection limit; N/A means not applicable to this sample or instrument.

TOTAL = Hot acid digestion of a representative sample aliquot.
TRM = Total recoverable metals is the "direct analysis" of a sample aliquot taken from its acid-preserved container.
DISS = Dissolved metals by direct analysis of 0.45 µm filtered and acidified sample.

%SS = Percent Recovery of Surrogate Standard
DF = Dilution Factor

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Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/29/12
849 Almar Ave, Ste. C #281		Date Received: 08/30/12
	Client Contact: James Allen	Date Extracted: 09/06/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 09/06/12

Light Gases*

Extraction method: RSK 174/175 Analytical methods: RSK174/175 Work Order: 1208788

Lab ID	Client ID	Matrix	Initial Pressure	Final Pressure	Methane	DF	% SS	Comments
001C	MW-1B	W	1.00	1.00	ND	1	N/A	
002C	MW-7B	W	1.00	1.00	6.1	1	N/A	
003C	EW-1	W	1.00	1.00	5.3	1	N/A	
004C	EW-3	W	1.00	1.00	1.7	1	N/A	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	psia	psia	0.1	µg/L
	S	psia	psia	NA	NA

* water samples are reported in µg/L.

%SS = Percent Recovery of Surrogate Standard

N/A = Not applicable to this analysis

DF = Dilution Factor

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Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/29/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Extracted: 09/04/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed: 09/05/12

Total Dissolved Solids*

Analytical Method: SM2540C — Work Order: 1208788

Lab ID	Client ID	Matrix	Total Dissolved Solids	DF	Comments
1208788-001H	MW-1B	W	315	1	
1208788-002H	MW-7B	W	367	1	
1208788-003H	EW-1	W	394	1	

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 mg/L	
	S	NA	

* water samples reported in mg/L.

DF = Dilution Factor

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"When Quality Counts"

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Allterra Environmental	Client Project ID: #160; 160 Holmes	Date Sampled: 08/28/12-08/30/12
		Date Received: 08/30/12
849 Almar Ave, Ste. C #281	Client Contact: James Allen	Date Extracted 08/30/12
Santa Cruz, CA 95060	Client P.O.:	Date Analyzed 08/31/12-09/01/12

Total Extractable Petroleum Hydrocarbons*

Extraction method: SW3510C Analytical methods: SW8015B Work Order: 1208788

Lab ID	Client ID	Matrix	TPH-Diesel (C10-C23)	DF	% SS	Comments
1208788-001J	MW-1B	W	ND	1	95	
1208788-002J	MW-7B	W	ND	1	97	
1208788-003J	EW-1	W	ND	1	96	
1208788-004E	EW-3	W	580	1	98	e11/e4
1208788-005C	MW-9A	W	ND	1	97	
1208788-006C	MW-9B	W	ND	1	96	
1208788-007C	MW-7C	W	ND	1	97	

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	50	µg/L
	S	NA	NA

* water samples are reported in ug/L, wipe samples in µg/wipe, soil/solid/sludge samples in mg/kg, product/oil/non-aqueous liquid samples in mg/L, and all DISTLC / STLC / SPLP / TCLP extracts are reported in µg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

%SS = Percent Recovery of Surrogate Standard. DF = Dilution Factor

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: e11) stoddard solvent/mineral spirit (?); and/or e4) gasoline range compounds are significant.

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QC SUMMARY REPORT FOR E218.6

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 70361 | WorkOrder: 1208788

EPA Method: E218.6 **Extraction: E218.6** **Spiked Sample ID: 1208746-011C**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
Hexachrome	170	25	NR	NR	NR	100	N/A	N/A	90 - 110

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70361 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-001E	08/28/12 3:00 PM	08/31/12	08/31/12 8:19 PM	1208788-002E	08/29/12 3:00 PM	08/31/12	08/31/12 8:38 PM
1208788-003E	08/29/12 12:00 PM	08/31/12	08/31/12 8:56 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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QA/QC Officer

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QC SUMMARY REPORT FOR E300.1

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 70399 | WorkOrder: 1208788

EPA Method: E300.1 | **Extraction: E300.1** | **Spiked Sample ID: 1208788-003F**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	mg/L	mg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
Sulfate	36	1	NR	NR	NR	89.4	N/A	N/A	85 - 115
%SS:	---#	0.10	NR	NR	NR	103	N/A	N/A	90 - 115

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70399 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-001F	08/28/12 3:00 PM	08/31/12	08/31/12 3:57 PM	1208788-002F	08/29/12 3:00 PM	08/31/12	08/31/12 4:41 PM
1208788-003F	08/29/12 12:00 PM	08/31/12	08/31/12 5:24 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

surrogate diluted out of range or surrogate coelutes with another peak.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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QA/QC Officer

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http://www.mccampbell.com / E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 70388 | WorkOrder: 1208788

EPA Method: SW8260B **Extraction: SW5030B** **Spiked Sample ID: 1208788-007B**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
tert-Amyl methyl ether (TAME)	ND	10	104	101	2.55	109	70 - 130	20	70 - 130
t-Butyl alcohol (TBA)	ND	40	100	99.9	0.107	107	70 - 130	20	70 - 130
Diisopropyl ether (DIPE)	ND	10	102	98.6	3.81	109	70 - 130	20	79 - 111
Ethyl tert-butyl ether (ETBE)	ND	10	103	101	2.04	110	70 - 130	20	70 - 130
Methyl-t-butyl ether (MTBE)	ND	10	100	101	0.815	108	70 - 130	20	70 - 130
%SS1:	92	25	97	96	0.682	97	70 - 130	20	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70388 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-008B	08/29/12 4:00 PM	09/05/12	09/05/12 10:24 PM	1208788-009B	08/30/12 2:30 PM	09/05/12	09/05/12 11:06 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

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QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 70468 | WorkOrder: 1208788

EPA Method: SW8260B **Extraction: SW5030B** **Spiked Sample ID: 1208788-012B**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
tert-Amyl methyl ether (TAME)	ND	10	99.9	97.8	2.11	107	70 - 130	20	70 - 130
t-Butyl alcohol (TBA)	ND	40	115	119	3.68	118	70 - 130	20	70 - 130
Diisopropyl ether (DIPE)	ND	10	94.6	92	2.77	109	70 - 130	20	70 - 130
Ethyl tert-butyl ether (ETBE)	ND	10	99.8	97	2.84	111	70 - 130	20	70 - 130
Methyl-t-butyl ether (MTBE)	ND	10	101	100	0.335	104	70 - 130	20	70 - 130
%SS1:	108	25	110	111	0.653	106	70 - 130	20	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70468 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-010B	08/29/12 2:30 PM	09/05/12	09/05/12 10:10 PM	1208788-011B	08/29/12 1:45 PM	09/05/12	09/05/12 10:50 PM
1208788-012B	08/29/12 1:00 PM	09/05/12	09/05/12 4:46 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

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QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 70388 | WorkOrder: 1208788

EPA Method: SW8260B **Extraction: SW5030B** **Spiked Sample ID: 1208788-007B**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
tert-Amyl methyl ether (TAME)	ND	10	104	101	2.55	109	70 - 130	20	70 - 130
Benzene	ND	10	97.6	92.5	5.37	101	70 - 130	20	76 - 106
t-Butyl alcohol (TBA)	ND	40	100	99.9	0.107	107	70 - 130	20	70 - 130
Chlorobenzene	ND	10	100	94.5	5.66	104	70 - 130	20	79 - 105
1,2-Dibromoethane (EDB)	ND	10	97.7	95.1	2.68	100	70 - 130	20	76 - 116
1,2-Dichloroethane (1,2-DCA)	ND	10	97.1	94.6	2.64	106	70 - 130	20	69 - 111
Diisopropyl ether (DIPE)	ND	10	102	98.6	3.81	109	70 - 130	20	79 - 111
Ethyl tert-butyl ether (ETBE)	ND	10	103	101	2.04	110	70 - 130	20	70 - 130
Methyl-t-butyl ether (MTBE)	ND	10	100	101	0.815	108	70 - 130	20	70 - 130
Toluene	ND	10	102	96	6.04	105	70 - 130	20	70 - 130
Trichloroethene	ND	10	105	99.1	5.47	112	70 - 130	20	70 - 130
%SS1:	92	25	97	96	0.682	97	70 - 130	20	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70388 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-006B	08/30/12 1:00 PM	09/05/12	09/05/12 9:42 PM	1208788-007B	08/30/12 12:00 PM	09/05/12	09/05/12 4:34 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

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QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 70421 | WorkOrder: 1208788

EPA Method: SW8260B **Extraction: SW5030B** **Spiked Sample ID: 1208788-001B**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
tert-Amyl methyl ether (TAME)	ND	10	99.6	103	3.75	106	70 - 130	20	70 - 130
Benzene	ND	10	93.5	94.9	1.49	97.1	70 - 130	20	70 - 130
t-Butyl alcohol (TBA)	ND	40	101	108	7.20	107	70 - 130	20	70 - 130
Chlorobenzene	ND	10	91.9	91.4	0.585	93.4	70 - 130	20	70 - 130
1,2-Dibromoethane (EDB)	ND	10	97.2	97.3	0.175	98.3	70 - 130	20	70 - 130
1,2-Dichloroethane (1,2-DCA)	ND	10	92.8	94.9	2.30	96.9	70 - 130	20	70 - 130
Diisopropyl ether (DIPE)	ND	10	101	102	1.30	105	70 - 130	20	70 - 130
Ethyl tert-butyl ether (ETBE)	ND	10	102	104	1.53	105	70 - 130	20	70 - 130
Methyl-t-butyl ether (MTBE)	ND	10	100	103	2.63	105	70 - 130	20	70 - 130
Toluene	ND	10	96.4	96.2	0.273	98	70 - 130	20	70 - 130
Trichloroethene	ND	10	97.7	97.9	0.244	99.4	70 - 130	20	70 - 130
%SS1:	92	25	95	96	1.28	97	70 - 130	20	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70421 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-001B	08/28/12 3:00 PM	09/04/12	09/04/12 8:40 PM	1208788-002B	08/29/12 3:00 PM	09/06/12	09/06/12 1:22 AM
1208788-003B	08/29/12 12:00 PM	09/06/12	09/06/12 2:01 AM	1208788-004B	08/29/12 11:00 AM	09/06/12	09/06/12 2:40 AM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

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QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 70521 | WorkOrder: 1208788

EPA Method: SW8260B **Extraction: SW5030B** **Spiked Sample ID: 1208788-005B**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
tert-Amyl methyl ether (TAME)	ND	10	106	103	2.62	112	70 - 130	20	70 - 130
Benzene	ND	10	99.2	97.4	1.84	104	70 - 130	20	70 - 130
t-Butyl alcohol (TBA)	ND	40	102	103	1.05	107	70 - 130	20	70 - 130
Chlorobenzene	ND	10	99	99.7	0.690	107	70 - 130	20	70 - 130
1,2-Dibromoethane (EDB)	ND	10	95.6	98.3	2.80	106	70 - 130	20	70 - 130
1,2-Dichloroethane (1,2-DCA)	ND	10	101	99.3	1.63	109	70 - 130	20	70 - 130
Diisopropyl ether (DIPE)	ND	10	107	106	1.25	113	70 - 130	20	70 - 130
Ethyl tert-butyl ether (ETBE)	ND	10	106	103	2.60	113	70 - 130	20	70 - 130
Methyl-t-butyl ether (MTBE)	ND	10	110	107	2.16	112	70 - 130	20	70 - 130
Toluene	ND	10	100	101	0.831	111	70 - 130	20	70 - 130
Trichloroethene	ND	10	105	105	0	113	70 - 130	20	70 - 130
%SS1:	95	25	97	97	0	109	70 - 130	20	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70521 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-005B	08/30/12 1:30 PM	09/06/12	09/06/12 9:30 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

Laboratory extraction solvents such as methylene chloride and acetone may occasionally appear in the method blank at low levels.

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QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: **SM2320B (Alkalinity)** **Matrix:** **W** **WorkOrder:** **1208788**

Method Name: SM2320B			Units: mg $CaCO_3$/L			BatchID: 70209
Lab ID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
1208788-001G	208	1	209	1	0.48	<20
1208788-002G	285	1	284	1	0.211	<20
1208788-003G	276	1	276	1	0.192	<20

BATCH 70209 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-001G	08/28/12 3:00 PM	08/31/12	08/31/12 12:28 PM	1208788-002G	08/29/12 3:00 PM	08/31/12	08/31/12 12:35 PM
1208788-003G	08/29/12 12:00 PM	08/31/12	08/31/12 12:43 PM				

Test Method: **SM4500-O G (Dissolved Oxygen)** **Matrix:** **W** **WorkOrder:** **1208788**

Method Name: SM4500OG			Units: mg DO/L @ °C			BatchID: 70342
Lab ID	Sample	DF	Dup / Ser. Dil.	DF	Precision	Acceptance Criteria
1208788-001K	6.87 @ 15.1°C	1	6.90 @ 15.0°C	1	0.03	0.05
1208788-002K	5.12 @ 14.9°C	1	5.13 @ 14.9°C	1	0.01	0.05
1208788-003K	4.18 @ 15.1°C	1	4.19 @ 15.2°C	1	0.01	0.05

BATCH 70342 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-001K	08/28/12 3:00 PM	08/30/12	08/30/12 9:00 PM	1208788-002K	08/29/12 3:00 PM	08/30/12	08/30/12 9:10 PM
1208788-003K	08/29/12 12:00 PM	08/30/12	08/30/12 9:20 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

Precision = Absolute Value (Sample - Duplicate)

RPD = 100 * (Sample - Duplicate) / [(Sample + Duplicate) / 2]

%RPD is calculated using results of up to 10 significant figures, however the reported results are rounded to 2 or 3 significant figures. Therefore there may be a slight discrepancy between the %RPD displayed above and %RPD calculated using the reported results. MAI considers %RPD based upon more significant figures to be more accurate.

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QC SUMMARY REPORT FOR E200.7

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 70317 | WorkOrder: 1208788

EPA Method: E200.7 **Extraction: E200.7** **Spiked Sample ID: 1208640-005A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
Iron	ND	1000	94.3	104	9.64	103	70 - 130	20	85 - 115
Manganese	ND	1000	108	125	14.2	113	70 - 130	20	85 - 115
Sodium	72,000	10000	NR	NR	NR	92	N/A	N/A	85 - 115
%SS:	103	750	91	105	14.0	93	70 - 130	30	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70317 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-001I	08/28/12 3:00 PM	08/30/12	08/31/12 4:31 PM	1208788-002I	08/29/12 3:00 PM	08/30/12	08/31/12 4:37 PM
1208788-003I	08/29/12 12:00 PM	08/30/12	08/31/12 4:43 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

* MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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QC SUMMARY REPORT FOR SM3500 Fe B4c

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 70340 | WorkOrder: 1208788

EPA Method: SM3500-Fe B4c **Extraction: SM3500-Fe B4c** **Spiked Sample ID: 1208788-002D**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
Ferrous Iron	ND	200	96	112	15.1	106	70 - 130	20	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70340 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-001D	08/28/12 3:00 PM	08/30/12	08/30/12 8:45 PM	1208788-002D	08/29/12 3:00 PM	08/30/12	08/30/12 8:56 PM
1208788-003D	08/29/12 12:00 PM	08/30/12	08/30/12 9:29 PM	1208788-004D	08/29/12 11:00 AM	08/30/12	08/30/12 9:40 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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QC SUMMARY REPORT FOR SW8021B/8015Bm

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 70384 | WorkOrder: 1208788

EPA Method: SW8021B/8015Bm **Extraction: SW5030B** **Spiked Sample ID: 1208788-011A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
TPH(btex)£	ND	60	100	103	2.16	104	70 - 130	20	70 - 130
MTBE	ND	10	88.9	95.8	6.93	103	70 - 130	20	70 - 130
Benzene	ND	10	106	109	2.89	116	70 - 130	20	70 - 130
Toluene	ND	10	106	110	4.03	116	70 - 130	20	70 - 130
Ethylbenzene	ND	10	103	109	5.82	115	70 - 130	20	70 - 130
Xylenes	ND	30	103	110	6.50	115	70 - 130	20	70 - 130
%SS:	107	10	104	102	2.01	103	70 - 130	20	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70384 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-001A	08/28/12 3:00 PM	08/31/12	08/31/12 6:05 PM	1208788-002A	08/29/12 3:00 PM	09/04/12	09/04/12 5:22 PM
1208788-003A	08/29/12 12:00 PM	09/04/12	09/04/12 5:53 PM	1208788-004A	08/29/12 11:00 AM	09/04/12	09/04/12 10:31 PM
1208788-004A	08/29/12 11:00 AM	09/04/12	09/04/12 11:01 PM	1208788-005A	08/30/12 1:30 PM	08/31/12	08/31/12 10:02 PM
1208788-006A	08/30/12 1:00 PM	09/01/12	09/01/12 12:30 AM	1208788-007A	08/30/12 12:00 PM	09/01/12	09/01/12 12:59 AM
1208788-008A	08/29/12 4:00 PM	09/01/12	09/01/12 1:29 AM	1208788-009A	08/30/12 2:30 PM	09/01/12	09/01/12 2:28 AM
1208788-010A	08/29/12 2:30 PM	09/01/12	09/01/12 3:26 AM	1208788-011A	08/29/12 1:45 PM	09/01/12	09/01/12 3:56 AM
1208788-012A	08/29/12 1:00 PM	09/01/12	09/01/12 4:25 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

£ TPH(btex) = sum of BTEX areas from the FID.

cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content, or inconsistency in sample containers.

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QC SUMMARY REPORT FOR E200.8

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 70300 | WorkOrder: 1208788

EPA Method: E200.8 **Extraction: E200.8** **Spiked Sample ID: 1208640-005A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
Arsenic	2.3	50	103	104	6.34	95.4	70 - 130	20	85 - 115
Chromium	ND	50	100	98	9.55	104	70 - 130	20	85 - 115
%SS:	108	750	109	106	4.82	96	70 - 130	20	85 - 115

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70300 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-001I	08/28/12 3:00 PM	08/30/12	08/31/12 11:51 PM	1208788-002I	08/29/12 3:00 PM	08/30/12	08/31/12 11:58 PM
1208788-003I	08/29/12 12:00 PM	08/30/12	09/01/12 12:05 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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QC SUMMARY REPORT FOR RSK174/175

W.O. Sample Matrix: Water | QC Matrix: Air | BatchID: 70494 | WorkOrder: 1208788

EPA Method: RSK174/175 **Extraction: RSK 174/175** **Spiked Sample ID: N/A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µL/L	µL/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
Methane	N/A	10	N/A	N/A	N/A	104	N/A	N/A	80 - 120

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70494 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-001C	08/28/12 3:00 PM	09/06/12	09/06/12 2:09 PM	1208788-002C	08/29/12 3:00 PM	09/06/12	09/06/12 2:27 PM
1208788-003C	08/29/12 12:00 PM	09/06/12	09/06/12 2:38 PM	1208788-004C	08/29/12 11:00 AM	09/06/12	09/06/12 2:54 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS ELAP Certification 1644

QA/QC Officer

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: **SM2540C (TDS)** **Matrix:** **W** **WorkOrder:** **1208788**

Method Name: SM2540C | Units: mg/L | BatchID: 70460

Lab ID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
1208788-001H	315	1	308	1	2.25	<20
1208788-002H	367	1	367	1	0	<20
1208788-003H	394	1	394	1	0	<20

BATCH 70460 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-001H	08/28/12 3:00 PM	09/04/12	09/05/12 6:50 PM	1208788-002H	08/29/12 3:00 PM	09/04/12	09/05/12 7:00 PM
1208788-003H	08/29/12 12:00 PM	09/04/12	09/05/12 7:10 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

Precision = Absolute Value (Sample - Duplicate)

RPD = 100 * (Sample - Duplicate) / [(Sample + Duplicate) / 2]

%RPD is calculated using results of up to 10 significant figures, however the reported results are rounded to 2 or 3 significant figures. Therefore there may be a slight discrepancy between the %RPD displayed above and %RPD calculated using the reported results. MAI considers %RPD based upon more significant figures to be more accurate.

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QC SUMMARY REPORT FOR SW8015B

W.O. Sample Matrix: Water | QC Matrix: Water | BatchID: 70338 | WorkOrder: 1208788

EPA Method: SW8015B **Extraction: SW3510C** **Spiked Sample ID: N/A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	Acceptance Criteria (%)		
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	MS / MSD	RPD	LCS
TPH-Diesel (C10-C23)	N/A	1000	N/A	N/A	N/A	118	N/A	N/A	70 - 130
%SS:	N/A	625	N/A	N/A	N/A	103	N/A	N/A	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 70338 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
1208788-001J	08/28/12 3:00 PM	08/30/12	08/31/12 5:50 PM	1208788-002J	08/29/12 3:00 PM	08/30/12	09/01/12 12:30 AM
1208788-003J	08/29/12 12:00 PM	08/30/12	08/31/12 6:57 PM	1208788-004E	08/29/12 11:00 AM	08/30/12	08/31/12 10:17 PM
1208788-005C	08/30/12 1:30 PM	08/30/12	09/01/12 2:42 AM	1208788-006C	08/30/12 1:00 PM	08/30/12	08/31/12 11:23 PM
1208788-007C	08/30/12 12:00 PM	08/30/12	09/01/12 3:48 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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