Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778

(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

Date: 16-Mar-2011

QC Summary Report

Work Order: 11030901

Sample Matrix Spike Type **MS** Test Code: **EPA Method SW8260B**

File ID: **11031008.D** Batch ID: **MS15W0310M** Analysis Date: **03/10/2011 10:53**

Sample ID: **11030901-02AMS** Units : **µg/L** Run ID: **MSD_15_110310C** Prep Date: **03/10/2011 10:53**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Dichlorodifluoromethane	38.2	2.5	50	0	76	21	138			
Chloromethane	44.1	10	50	0	88	23	144			
Vinyl chloride	47.2	2.5	50	0	94	49	136			
Chloroethane	48.1	2.5	50	0	96	21	159			
Bromomethane	30.4	10	50	0	61	10	174			
Trichlorofluoromethane	50.5	2.5	50	0	101	32	154			
1,1-Dichloroethene	46.9	2.5	50	0	94	64	130			
Dichloromethane	42.8	10	50	0	86	69	130			
Freon-113	49.9	2.5	50	0	99.7	55	141			
trans-1,2-Dichloroethene	45.9	2.5	50	0	92	63	130			
Methyl tert-butyl ether (MTBE)	45.9	1.3	50	0	92	47	150			
1,1-Dichloroethane	47	2.5	50	0	94	66	130			
2-Butanone (MEK)	726	50	1000	0	73	23	182			
cis-1,2-Dichloroethene	44.9	2.5	50	0	90	70	130			
Bromochloromethane	46.3	2.5	50	0	93	70	132			
Chloroform	43.7	2.5	50	0	87	70	130			
2,2-Dichloropropane	48.1	2.5	50	0	96	38	154			
1,2-Dichloroethane	46.7	2.5	50	0	93	65	134			
1,1,1-Trichloroethane	48	2.5	50	0	96	65	136			
1,1-Dichloropropene	48.3	2.5	50	0	97	68	132			
Carbon tetrachloride	44.5	2.5	50	0	89	58	148			
Benzene	43.9	1.3	50	0	88	59	138			
Dibromomethane	47	2.5	50	0	94	70	130			
1,2-Dichloropropane	46.3	2.5	50	0	93	70	131			
Trichloroethene	46.8	2.5	50	0	94	65	144			
Bromodichloromethane	48.5	2.5	50	0	97	50	157			
4-Methyl-2-pentanone (MIBK)	101	13	125	0	81	20	182			
cis-1,3-Dichloropropene	42.2	2.5	50	0	84	63	131			
trans-1,3-Dichloropropene	39.3	2.5	50	0	79	65	136			
1,1,2-Trichloroethane	44.3	2.5	50	0	89	70	131			
Toluene	47.9	1.3	50	0	96	68	130			
1,3-Dichloropropane	49.1	2.5	50	0	98	70	130			
Dibromochloromethane	48.3	2.5	50	0	97	42	155			
1,2-Dibromoethane (EDB)	98	5	100	0	98	70	130			
Tetrachloroethene	48	2.5	50	0	96	65	130			
1,1,1,2-Tetrachloroethane	49.2	2.5	50	0	98	70	130			
Chlorobenzene	46.3	2.5	50	0	93	70	130			
Ethylbenzene	46.2	1.3	50	0	92	68	130			
m,p-Xylene	46.4	1.3	50	0	93	68	131			
Bromoform	44.2	2.5	50	0	88	65	143			
Styrene	46.7	2.5	50	0	93	59	153			
o-Xylene	46.4	1.3	50	0	93	70	130			
1,1,2,2-Tetrachloroethane	44.8	2.5	50	0	90	67	130			
1,2,3-Trichloropropane	86.1	10	100	0	86	70	130			
Isopropylbenzene	46.8	2.5	50	0	94	55	138			
Bromobenzene	44.6	2.5	50	0	89	70	130			
n-Propylbenzene	47.4	2.5	50	0	95	67	133			
4-Chlorotoluene	47.9	2.5	50	0	96	70	130			
2-Chlorotoluene	45.9	2.5	50	0	92	70	130			
1,3,5-Trimethylbenzene	47.1	2.5	50	0	94	67	134			
tert-Butylbenzene	45.9	2.5	50	0	92	55	147			
1,2,4-Trimethylbenzene	47.4	2.5	50	0	95	65	135			
sec-Butylbenzene	47.5	2.5	50	0	95	68	135			
1,3-Dichlorobenzene	46.9	2.5	50	0	94	70	130			
1,4-Dichlorobenzene	45.1	2.5	50	0	90	70	130			
4-Isopropyltoluene	47.8	2.5	50	0	96	68	132			
1,2-Dichlorobenzene	44.5	2.5	50	0	89	70	130			
n-Butylbenzene	50.9	2.5	50	0	102	62	134			
1,2-Dibromo-3-chloropropane (DBCP)	214	15	250	0	86	64	130			
1,2,4-Trichlorobenzene	51	10	50	0	102	62	133			
Naphthalene	44.7	10	50	0	89	32	166			
Hexachlorobutadiene	88.5	10	100	0	88	63	130			
1,2,3-Trichlorobenzene	52.4	10	50	0	105	55	138			
Surr: 1,2-Dichloroethane-d4	51.2		50		102	70	130			
Surr: Toluene-d8	51.9		50		104	70	130			

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Date: *16-Mar-2011*

QC Summary Report

Work Order: 11030901

Surr: 4-Bromofluorobenzene	48.1	50	96	70	130	

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Date: *16-Mar-2011*

QC Summary Report

Work Order: 11030901

Sample Matrix Spike Duplicate Type **MSD** Test Code: **EPA Method SW8260B**

File ID: **11031009.D** Batch ID: **MS15W0310M** Analysis Date: **03/10/2011 11:15**

Sample ID: **11030901-02AMSD** Units : **µg/L** Run ID: **MSD_15_110310C** Prep Date: **03/10/2011 11:15**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Dichlorodifluoromethane	40.4	2.5	50	0	81	21	138	38.2	5.5(33)	
Chloromethane	42.1	10	50	0	84	23	144	44.1	4.7(27)	
Vinyl chloride	48.9	2.5	50	0	98	49	136	47.2	3.6(21)	
Chloroethane	49.7	2.5	50	0	99	21	159	48.14	3.3(40)	
Bromomethane	37	10	50	0	74	10	174	30.42	19.5(40)	
Trichlorofluoromethane	52.1	2.5	50	0	104	32	154	50.45	3.2(37)	
1,1-Dichloroethene	50.3	2.5	50	0	101	64	130	46.87	7.1(21)	
Dichloromethane	44.6	10	50	0	89	69	130	42.82	4.1(20)	
Freon-113	52.5	2.5	50	0	105	55	141	49.86	5.1(40)	
trans-1,2-Dichloroethene	50.4	2.5	50	0	101	63	130	45.86	9.4(20)	
Methyl tert-butyl ether (MTBE)	50.5	1.3	50	0	101	47	150	45.85	9.6(40)	
1,1-Dichloroethane	50.9	2.5	50	0	102	66	130	47.01	7.9(20)	
2-Butanone (MEK)	775	50	1000	0	77	23	182	725.9	6.5(22)	
cis-1,2-Dichloroethene	49.3	2.5	50	0	99	70	130	44.9	9.4(20)	
Bromochloromethane	49.2	2.5	50	0	98	70	132	46.28	6.1(20)	
Chloroform	47	2.5	50	0	94	70	130	43.74	7.2(20)	
2,2-Dichloropropane	54.2	2.5	50	0	108	38	154	48.12	11.9(22)	
1,2-Dichloroethane	49.3	2.5	50	0	99	65	134	46.66	5.6(20)	
1,1,1-Trichloroethane	52.1	2.5	50	0	104	65	136	47.95	8.3(20)	
1,1-Dichloropropene	52.9	2.5	50	0	106	68	132	48.27	9.1(20)	
Carbon tetrachloride	49.8	2.5	50	0	99.6	58	148	44.54	11.1(20)	
Benzene	47.8	1.3	50	0	96	59	138	43.89	8.6(21)	
Dibromomethane	49.6	2.5	50	0	99	70	130	46.97	5.4(20)	
1,2-Dichloropropane	50.8	2.5	50	0	102	70	131	46.29	9.3(20)	
Trichloroethene	50.3	2.5	50	0	101	65	144	46.78	7.2(20)	
Bromodichloromethane	51.9	2.5	50	0	104	50	157	48.5	6.7(20)	
4-Methyl-2-pentanone (MIBK)	110	13	125	0	88	20	182	101.3	8.5(20)	
cis-1,3-Dichloropropene	46.5	2.5	50	0	93	63	131	42.2	9.7(20)	
trans-1,3-Dichloropropene	42.7	2.5	50	0	85	65	136	39.32	8.2(20)	
1,1,2-Trichloroethane	49	2.5	50	0	98	70	131	44.26	10.2(20)	
Toluene	50.9	1.3	50	0	102	68	130	47.93	6.1(20)	
1,3-Dichloropropane	52.1	2.5	50	0	104	70	130	49.14	5.9(20)	
Dibromochloromethane	52.1	2.5	50	0	104	42	155	48.3	7.5(20)	
1,2-Dibromoethane (EDB)	105	5	100	0	105	70	130	98	6.6(20)	
Tetrachloroethene	50.8	2.5	50	0	102	65	130	48.01	5.7(20)	
1,1,1,2-Tetrachloroethane	52.7	2.5	50	0	105	70	130	49.16	7.0(20)	
Chlorobenzene	49.7	2.5	50	0	99	70	130	46.34	7.0(20)	
Ethylbenzene	49.9	1.3	50	0	99.8	68	130	46.23	7.6(20)	
m,p-Xylene	50.9	1.3	50	0	102	68	131	46.38	9.2(20)	
Bromoform	48.7	2.5	50	0	97	65	143	44.24	9.5(20)	
Styrene	51.8	2.5	50	0	104	59	153	46.67	10.4(37)	
o-Xylene	51	1.3	50	0	102	70	130	46.39	9.5(20)	
1,1,2,2-Tetrachloroethane	50	2.5	50	0	100	67	130	44.83	10.9(20)	
1,2,3-Trichloropropane	96.1	10	100	0	96	70	130	86.1	11.0(20)	
Isopropylbenzene	49	2.5	50	0	98	55	138	46.83	4.4(20)	
Bromobenzene	47.3	2.5	50	0	95	70	130	44.57	6.0(20)	
n-Propylbenzene	50.5	2.5	50	0	101	67	133	47.38	6.4(30)	
4-Chlorotoluene	50.4	2.5	50	0	101	70	130	47.93	4.9(20)	
2-Chlorotoluene	49.6	2.5	50	0	99	70	130	45.91	7.8(20)	
1,3,5-Trimethylbenzene	50.5	2.5	50	0	101	67	134	47.13	6.9(21)	
tert-Butylbenzene	49.5	2.5	50	0	99	55	147	45.92	7.5(20)	
1,2,4-Trimethylbenzene	50.6	2.5	50	0	101	65	135	47.37	6.5(25)	
sec-Butylbenzene	50.7	2.5	50	0	101	68	135	47.46	6.6(20)	
1,3-Dichlorobenzene	51.4	2.5	50	0	103	70	130	46.86	9.3(20)	
1,4-Dichlorobenzene	48.3	2.5	50	0	97	70	130	45.11	6.8(20)	
4-Isopropyltoluene	51.3	2.5	50	0	103	68	132	47.84	7.0(20)	
1,2-Dichlorobenzene	48.3	2.5	50	0	97	70	130	44.52	8.1(20)	
n-Butylbenzene	55.4	2.5	50	0	111	62	134	50.85	8.6(21)	
1,2-Dibromo-3-chloropropane (DBCP)	236	15	250	0	94	64	130	214.4	9.6(20)	
1,2,4-Trichlorobenzene	56.6	10	50	0	113	62	133	51.04	10.3(29)	
Naphthalene	50	10	50	0	100	32	166	44.69	11.2(40)	
Hexachlorobutadiene	102	10	100	0	102	63	130	88.49	14.5(21)	
1,2,3-Trichlorobenzene	61.1	10	50	0	122	55	138	52.44	15.2(36)	
Surr: 1,2-Dichloroethane-d4	50.5		50		101	70	130			
Surr: Toluene-d8	50.8		50		102	70	130			

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Date: *16-Mar-2011*

QC Summary Report

Work Order: 11030901

Surr: 4-Bromofluorobenzene	48.5	50	97	70	130	

Comments:

Calculations are based off of raw (non-rounded) data. However, for reporting purposes, all QC data is rounded to three significant figures. Therefore, hand calculated values may differ slightly.

L50 = Analyte recovery was below acceptance limits for the LCS, but was acceptable in the MS/MSD.

Alpha uses descriptive data qualifier flags, which could be replaced with either a DOD Q or J flag.

Billing Information :

CHAIN-OF-CUSTODY RECORD

CA

Alpha Analytical, Inc.
255 Glendale Avenue, Suite 21 Sparks, Nevada 89431-5778
TEL: (775) 355-1044 FAX: (775) 355-0406

WorkOrder : BMIS11030901

Report Due By : 5:00 PM On : 22-Mar-2011

Client:
Battelle Memorial Institute
655 West Broadway
Suite 1420
San Diego, CA 92101

Report Attention	Phone Number	EMail Address
David Conner	(619) 726-7311 x	connerd@battelle.org
Betsy Cutie	(614) 424-4899 x	cutiee@batelle.org
Shane Walton	(614) 424-4117 x	waltons@battelle.org

EDD Required : **Yes**

Sampled by : Chase Brogdon

PO : 218013

Client's COC # : 33405 Job : G005862/JPL Groundwater Monitoring

Cooler Temp	Samples Received	Date Printed
0 °C	09-Mar-2011	09-Mar-2011

QC Level : DS4 = DOD QC Required : Final Rpt, MBLK, InitCal/ConCal data, LCS, MS/MSD With Surrogates

Alpha Sample ID	Client Sample ID	Matrix	Collection Date	No. of Bottles Alpha	Sub	TAT	Requested Tests 314_W	VOC_TIC_W	VOC_W						Sample Remarks
BMI11030901-01A	MW-19-5	AQ	03/08/11 08:45	4	0	9	Perchlorate	VOC by 524 Criteria	VOC by 524 Criteria						
BMI11030901-02A	MW-19-4	AQ	03/08/11 09:12	8	0	9	Perchlorate	VOC by 524 Criteria	VOC by 524 Criteria						MS/MSD
BMI11030901-03A	MW-19-3	AQ	03/08/11 09:38	4	0	9	Perchlorate	VOC by 524 Criteria	VOC by 524 Criteria						Sample time on sample containers state 9:32 logged in per COC.
BMI11030901-04A	MW-19-2	AQ	03/08/11 09:51	4	0	9	Perchlorate	VOC by 524 Criteria	VOC by 524 Criteria						
BMI11030901-05A	MW-19-1	AQ	03/08/11 10:15	4	0	9	Perchlorate	VOC by 524 Criteria	VOC by 524 Criteria						
BMI11030901-06A	EB-11-03/08/11	AQ	03/08/11 10:07	4	0	9	Perchlorate	VOC by 524 Criteria	VOC by 524 Criteria						
BMI11030901-07A	TB-11-03/08/11	AQ	03/08/11 07:00	1	0	9		VOC by 524 Criteria	VOC by 524 Criteria						Reno Trip Blank 12/14/10

Comments: Security seals intact. Frozen ice. Temp Blank #8966 received @ 0°C. Level IV QC. Samples should be used as the control spike sample if possible (I.E.: MS/MSD). :

	Signature	Print Name	Company	Date/Time
Logged in by:	Elizabeth Adcox	Elizabeth Adcox	**Alpha Analytical, Inc.**	3-9-11 1025

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.
The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this COC. The liability of the laboratory is limited to the amount paid for the report.
Matrix Type : AQ(Aqueous) AR(Air) SO(Soil) WS(Waste) DW(Drinking Water) OT(Other) Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

Billing Information:
Company Name BATTELLE
Attn: GERALD TOMPKINS
Address 505 KING AVE.
City, State, Zip COLUMBUS, OH 43201
Phone Number ______ Fax ______

Alpha Analytical, Inc.
255 Glendale Avenue, Suite 21
Sparks, Nevada 89431-5778
Phone (775) 355-1044
Fax (775) 355-0406

Samples Collected From Which State?
AZ ___ **CA** X **NV** ___ **WA** ___ **DOD Site** ___
ID ___ **OR** ___ **OTHER** ___ **Page #** 1 **of** 1

Consultant / Client Name: BATTELLE / DAVID CONNEW
Address: 3990 OLD TOWN AVE. C-205
City, State, Zip: SAN DIEGO, CA 92110
P.O. #: 218013

Job #: G005862
Job Name: JPL GW. MON. 1Q11

Report Attention / Project Manager
Name: DAVID CONNEW
Email: CONNEWD@BATTELLE.ORG
~~Phone~~ FAX 614-458-6614 Mobile: 619-726-7311

Analyses Required

Data Validation Level: (III) or IV
(EDD)/EDF? YES X NO ___
Global ID # ______

Time Sampled	Date Sampled	Matrix* See Key Below	Lab ID Number (Office Use Only)	Sample Description	TAT	Field Filtered	# Containers**	VOCs (524.2)	TOTAL Cr (200.8)	ClO4 (314.0)					REMARKS
0845	3/8/11	AQ	BMI1030901-01	MW-19-5			3v 1p	X		X					
0912	↓	↓	-02	MW-19-4			6v 2p	X		X					MS/MSD
0938			-03	MW-19-3			3v 1p	X		X					
0951			-04	MW-19-2			↓	X		X					
1015			-05	MW-19-1				X		X					
1007			-06	EB-11-03/08/11			3v 1p	X		X					EQUIP BLANK
0700	3/8/11	AQ	-07	TB-11-03/08/11			1v	X							TRIP BLANK

FOR LAB USE ONLY

ADDITIONAL INSTRUCTIONS:

I, (field sampler), attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action (NAC 445.0636 (c) (2)). Sampled By: CHASE BLOGDON

Relinquished by: (Signature/Affiliation)	Received by: (Signature/Affiliation)	Date:	Time:
/ INSIGHT	/ Alpha Analytical	03/08/11	1130
/ Alpha Analytical	/ Alpha	3.9.11	1025

*Key: AQ - Aqueous SO - Soil WA - Waste OT - Other AR - Air **: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense. The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this coc. The liability of the laboratory is limited to the amount paid for the report.

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(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

Date: *16-Mar-2011*

David Conner
Battelle Memorial Institute
655 West Broadway Suite 1420
San Diego, CA 92101
(619) 726-7311

CASE NARRATIVE

Job: G005862/JPL Groundwater Monitoring
Work Order: BMI11031007 **Cooler Temp:** 2 °C

Alpha's Sample ID	Client's Sample ID	Matrix
11031007-01A	MW-26-2	Aqueous
11031007-02A	MW-26-1	Aqueous
11031007-03A	EB-12-03/09/11	Aqueous
11031007-04A	TB-12-03/09/11	Aqueous
11031007-05A	SB-02-03/09/11	Aqueous
11031007-06A	MW-25-5	Aqueous
11031007-07A	MW-25-4	Aqueous
11031007-08A	MW-25-3	Aqueous
11031007-09A	MW-25-2	Aqueous
11031007-10A	MW-25-1	Aqueous

Manually Integrated Analytes

Alpha's Sample ID	Test Reference	Analyte
NONE		

Enclosed please find the analytical results of the samples received by Alpha Analytical, Inc. under the above mentioned Work Order/Chain-of-Custody.

Alpha Analytical, Inc. has a formal Quality Assurance/Quality Control program, which is designed to meet or exceed the EPA requirements. All relevant QC met quality assurance objectives for this project unless otherwise stated in the footnotes.

If you have any questions with regards to this report, please contact Randy Gardner, Project Manager, at (800) 283-1183.

Alpha Analytical, Inc.

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(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641
Date Received : 03/10/11

Job: G005862/JPL Groundwater Monitoring

Perchlorate by Ion Chromatography
EPA Method 314.0

Parameter	Concentration	Reporting Limit	Date Extracted	Date Analyzed
Client ID: **MW-26-2**				
Lab ID : BMI11031007-01A Perchlorate	ND	1.00 µg/L	03/18/11 10:14	03/18/11 13:46
Date Sampled 03/09/11 08:13				
Client ID: **MW-26-1**				
Lab ID : BMI11031007-02A Perchlorate	3.31	1.00 µg/L	03/18/11 10:14	03/18/11 14:41
Date Sampled 03/09/11 08:37				
Client ID: **EB-12-03/09/11**				
Lab ID : BMI11031007-03A Perchlorate	ND	1.00 µg/L	03/18/11 10:14	03/18/11 14:59
Date Sampled 03/09/11 08:29				
Client ID: **SB-02-03/09/11**				
Lab ID : BMI11031007-05A Perchlorate	ND	1.00 µg/L	03/18/11 10:14	03/18/11 15:18
Date Sampled 03/09/11 08:47				
Client ID: **MW-25-5**				
Lab ID : BMI11031007-06A Perchlorate	ND	1.00 µg/L	03/18/11 10:14	03/21/11 12:50
Date Sampled 03/09/11 09:56				
Client ID: **MW-25-4**				
Lab ID : BMI11031007-07A Perchlorate	8.34	1.00 µg/L	03/18/11 10:14	03/18/11 15:54
Date Sampled 03/09/11 10:23				
Client ID: **MW-25-3**				
Lab ID : BMI11031007-08A Perchlorate	9.81	1.00 µg/L	03/18/11 10:14	03/18/11 16:50
Date Sampled 03/09/11 10:50				
Client ID: **MW-25-2**				
Lab ID : BMI11031007-09A Perchlorate	14.0	1.00 µg/L	03/18/11 10:14	03/18/11 17:08
Date Sampled 03/09/11 11:12				
Client ID: **MW-25-1**				
Lab ID : BMI11031007-10A Perchlorate	9.69	1.00 µg/L	03/18/11 10:14	03/18/11 17:26
Date Sampled 03/09/11 11:32				

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778

(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer

Sacramento, CA • (916) 366-9089 / Las Vegas, NV • (702) 736-7522 / Carson, CA • (714) 386-2901 / info@alpha-analytical.com

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3/22/11

Report Date

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778
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ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641
Date Received : 03/10/11

Job: G005862/JPL Groundwater Monitoring

Metals by ICPMS
EPA Method 200.8

Parameter	Concentration	Reporting Limit	Date Extracted	Date Analyzed
Client ID: **MW-26-2**				
Lab ID : BMI11031007-01A Chromium (Cr)	ND	0.0050 mg/L	03/14/11 13:42	03/14/11 20:26
Date Sampled 03/09/11 08:13				
Client ID: **MW-26-1**				
Lab ID : BMI11031007-02A Chromium (Cr)	ND	0.0050 mg/L	03/14/11 13:42	03/14/11 20:31
Date Sampled 03/09/11 08:37				
Client ID: **EB-12-03/09/11**				
Lab ID : BMI11031007-03A Chromium (Cr)	ND	0.0050 mg/L	03/14/11 13:42	03/14/11 20:37
Date Sampled 03/09/11 08:29				
Client ID: **SB-02-03/09/11**				
Lab ID : BMI11031007-05A Chromium (Cr)	ND	0.0050 mg/L	03/14/11 13:42	03/14/11 20:43
Date Sampled 03/09/11 08:47				
Client ID: **MW-25-5**				
Lab ID : BMI11031007-06A Chromium (Cr)	ND	0.0050 mg/L	03/14/11 13:42	03/14/11 20:48
Date Sampled 03/09/11 09:56				
Client ID: **MW-25-4**				
Lab ID : BMI11031007-07A Chromium (Cr)	ND	0.0050 mg/L	03/14/11 13:42	03/14/11 20:54
Date Sampled 03/09/11 10:23				
Client ID: **MW-25-3**				
Lab ID : BMI11031007-08A Chromium (Cr)	ND	0.0050 mg/L	03/14/11 13:42	03/14/11 21:22
Date Sampled 03/09/11 10:50				
Client ID: **MW-25-2**				
Lab ID : BMI11031007-09A Chromium (Cr)	ND	0.0050 mg/L	03/14/11 13:42	03/14/11 21:28
Date Sampled 03/09/11 11:12				
Client ID: **MW-25-1**				
Lab ID : BMI11031007-10A Chromium (Cr)	ND	0.0050 mg/L	03/14/11 13:42	03/14/11 20:03
Date Sampled 03/09/11 11:32				

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ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

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✓

3/22/11

Report Date

Alpha Analytical, Inc.

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ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101
Job: G005862/JPL Groundwater Monitoring

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641

Tentatively Identified Compounds - Volatile Organics by GC/MS

	Parameter	Estimated Concentration	Estimated Reporting Limit	Date Extracted	Date Analyzed
Client ID : **MW-26-2**					
Lab ID : BMI11031007-01A	* * * None Found * * *	ND	2.0 µg/L	03/14/11 12:31	03/14/11 12:31
Date Received : 03/10/11					
Date Sampled : 03/09/11 08:13					
Client ID : **MW-26-1**					
Lab ID : BMI11031007-02A	* * * None Found * * *	ND	2.0 µg/L	03/14/11 12:52	03/14/11 12:52
Date Received : 03/10/11					
Date Sampled : 03/09/11 08:37					
Client ID : **EB-12-03/09/11**					
Lab ID : BMI11031007-03A	* * * None Found * * *	ND	2.0 µg/L	03/14/11 11:48	03/14/11 11:48
Date Received : 03/10/11					
Date Sampled : 03/09/11 08:29					
Client ID : **TB-12-03/09/11**					
Lab ID : BMI11031007-04A	* * * None Found * * *	ND	2.0 µg/L	03/14/11 11:26	03/14/11 11:26
Date Received : 03/10/11					
Date Sampled : 03/09/11 07:00					
Client ID : **SB-02-03/09/11**					
Lab ID : BMI11031007-05A	* * * None Found * * *	ND	2.0 µg/L	03/14/11 12:09	03/14/11 12:09
Date Received : 03/10/11					
Date Sampled : 03/09/11 08:47					
Client ID : **MW-25-5**					
Lab ID : BMI11031007-06A	Sulfur dioxide	18	2.0 µg/L	03/14/11 13:14	03/14/11 13:14
Date Received : 03/10/11					
Date Sampled : 03/09/11 09:56					
Client ID : **MW-25-4**					
Lab ID : BMI11031007-07A	* * * None Found * * *	ND	2.0 µg/L	03/14/11 13:36	03/14/11 13:36
Date Received : 03/10/11					
Date Sampled : 03/09/11 10:23					
Client ID : **MW-25-3**					
Lab ID : BMI11031007-08A	* * * None Found * * *	ND	2.0 µg/L	03/14/11 13:57	03/14/11 13:57
Date Received : 03/10/11					
Date Sampled : 03/09/11 10:50					
Client ID : **MW-25-2**					
Lab ID : BMI11031007-09A	* * * None Found * * *	ND	2.0 µg/L	03/14/11 14:19	03/14/11 14:19
Date Received : 03/10/11					
Date Sampled : 03/09/11 11:12					

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Client ID : **MW-25-1**

Lab ID :	BMI11031007-10A	* * * None Found * * *	ND	2.0 µg/L	03/14/11 14:40	03/14/11 14:40

Date Received : 03/10/11

Date Sampled : 03/09/11 11:32

Note: Analysis conducted using EPA Method 524.2 criteria.

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer

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Report Date

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ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101
Job: G005862/JPL Groundwater Monitoring

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641

Alpha Analytical Number: BMI11031007-01A
Client I.D. Number: MW-26-2

Sampled: 03/09/11 08:13
Received: 03/10/11
Extracted: 03/14/11 12:31
Analyzed: 03/14/11 12:31

Volatile Organics by GC/MS
EPA Method SW8260B

	Compound	Concentration	Reporting Limit		Compound	Concentration	Reporting Limit	
1	Dichlorodifluoromethane	ND	0.50	µg/L	36 1,1,1,2-Tetrachloroethane	ND	0.50	µg/L
2	Chloromethane	ND	1.0	µg/L	37 Chlorobenzene	ND	0.50	µg/L
3	Vinyl chloride	ND	0.50	µg/L	38 Ethylbenzene	ND	0.50	µg/L
4	Chloroethane	ND	0.50	µg/L	39 m,p-Xylene	ND	0.50	µg/L
5	Bromomethane	ND	1.0	µg/L	40 Bromoform	ND	0.50	µg/L
6	Trichlorofluoromethane	ND	0.50	µg/L	41 Styrene	ND	0.50	µg/L
7	1,1-Dichloroethene	ND	0.50	µg/L	42 o-Xylene	ND	0.50	µg/L
8	Dichloromethane	ND	1.0	µg/L	43 1,1,2,2-Tetrachloroethane	ND	0.50	µg/L
9	Freon-113	ND	0.50	µg/L	44 1,2,3-Trichloropropane	ND	1.0	µg/L
10	trans-1,2-Dichloroethene	ND	0.50	µg/L	45 Isopropylbenzene	ND	0.50	µg/L
11	Methyl tert-butyl ether (MTBE)	ND	0.50	µg/L	46 Bromobenzene	ND	0.50	µg/L
12	1,1-Dichloroethane	ND	0.50	µg/L	47 n-Propylbenzene	ND	0.50	µg/L
13	2-Butanone (MEK)	ND	10	µg/L	48 4-Chlorotoluene	ND	0.50	µg/L
14	cis-1,2-Dichloroethene	ND	0.50	µg/L	49 2-Chlorotoluene	ND	0.50	µg/L
15	Bromochloromethane	ND	0.50	µg/L	50 1,3,5-Trimethylbenzene	ND	0.50	µg/L
16	Chloroform	ND	0.50	µg/L	51 tert-Butylbenzene	ND	0.50	µg/L
17	2,2-Dichloropropane	ND	0.50	µg/L	52 1,2,4-Trimethylbenzene	ND	0.50	µg/L
18	1,2-Dichloroethane	ND	0.50	µg/L	53 sec-Butylbenzene	ND	0.50	µg/L
19	1,1,1-Trichloroethane	ND	0.50	µg/L	54 1,3-Dichlorobenzene	ND	0.50	µg/L
20	1,1-Dichloropropene	ND	0.50	µg/L	55 1,4-Dichlorobenzene	ND	0.50	µg/L
21	Carbon tetrachloride	ND	0.50	µg/L	56 4-Isopropyltoluene	ND	0.50	µg/L
22	Benzene	ND	0.50	µg/L	57 1,2-Dichlorobenzene	ND	0.50	µg/L
23	Dibromomethane	ND	0.50	µg/L	58 n-Butylbenzene	ND	0.50	µg/L
24	1,2-Dichloropropane	ND	0.50	µg/L	59 1,2-Dibromo-3-chloropropane (DBCP)	ND	2.5	µg/L
25	Trichloroethene	ND	0.50	µg/L	60 1,2,4-Trichlorobenzene	ND	1.0	µg/L
26	Bromodichloromethane	ND	0.50	µg/L	61 Naphthalene	ND	1.0	µg/L
27	4-Methyl-2-pentanone (MIBK)	ND	2.5	µg/L	62 Hexachlorobutadiene	ND	1.0	µg/L
28	cis-1,3-Dichloropropene	ND	0.50	µg/L	63 1,2,3-Trichlorobenzene	ND	1.0	µg/L
29	trans-1,3-Dichloropropene	ND	0.50	µg/L	64 Surr: 1,2-Dichloroethane-d4	97	(70-130)	%REC
30	1,1,2-Trichloroethane	ND	0.50	µg/L	65 Surr: Toluene-d8	112	(70-130)	%REC
31	Toluene	ND	0.50	µg/L	66 Surr: 4-Bromofluorobenzene	95	(70-130)	%REC
32	1,3-Dichloropropane	ND	0.50	µg/L				
33	Dibromochloromethane	ND	0.50	µg/L				
34	1,2-Dibromoethane (EDB)	ND	1.0	µg/L				
35	Tetrachloroethene	ND	0.50	µg/L				

Note: Analysis conducted using EPA Method 524.2 criteria.

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer
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Report Date

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ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101
Job: G005862/JPL Groundwater Monitoring

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641

Alpha Analytical Number: BMI11031007-02A
Client I.D. Number: MW-26-1

Sampled: 03/09/11 08:37
Received: 03/10/11
Extracted: 03/14/11 12:52
Analyzed: 03/14/11 12:52

Volatile Organics by GC/MS
EPA Method SW8260B

	Compound	Concentration	Reporting Limit			Compound	Concentration	Reporting Limit	
1	Dichlorodifluoromethane	ND	0.50	µg/L	36	1,1,1,2-Tetrachloroethane	ND	0.50	µg/L
2	Chloromethane	ND	1.0	µg/L	37	Chlorobenzene	ND	0.50	µg/L
3	Vinyl chloride	ND	0.50	µg/L	38	Ethylbenzene	ND	0.50	µg/L
4	Chloroethane	ND	0.50	µg/L	39	m,p-Xylene	ND	0.50	µg/L
5	Bromomethane	ND	1.0	µg/L	40	Bromoform	ND	0.50	µg/L
6	Trichlorofluoromethane	ND	0.50	µg/L	41	Styrene	ND	0.50	µg/L
7	1,1-Dichloroethene	ND	0.50	µg/L	42	o-Xylene	ND	0.50	µg/L
8	Dichloromethane	ND	1.0	µg/L	43	1,1,2,2-Tetrachloroethane	ND	0.50	µg/L
9	Freon-113	ND	0.50	µg/L	44	1,2,3-Trichloropropane	ND	1.0	µg/L
10	trans-1,2-Dichloroethene	ND	0.50	µg/L	45	Isopropylbenzene	ND	0.50	µg/L
11	Methyl tert-butyl ether (MTBE)	ND	0.50	µg/L	46	Bromobenzene	ND	0.50	µg/L
12	1,1-Dichloroethane	ND	0.50	µg/L	47	n-Propylbenzene	ND	0.50	µg/L
13	2-Butanone (MEK)	ND	10	µg/L	48	4-Chlorotoluene	ND	0.50	µg/L
14	cis-1,2-Dichloroethene	ND	0.50	µg/L	49	2-Chlorotoluene	ND	0.50	µg/L
15	Bromochloromethane	ND	0.50	µg/L	50	1,3,5-Trimethylbenzene	ND	0.50	µg/L
16	Chloroform	ND	0.50	µg/L	51	tert-Butylbenzene	ND	0.50	µg/L
17	2,2-Dichloropropane	ND	0.50	µg/L	52	1,2,4-Trimethylbenzene	ND	0.50	µg/L
18	1,2-Dichloroethane	ND	0.50	µg/L	53	sec-Butylbenzene	ND	0.50	µg/L
19	1,1,1-Trichloroethane	ND	0.50	µg/L	54	1,3-Dichlorobenzene	ND	0.50	µg/L
20	1,1-Dichloropropene	ND	0.50	µg/L	55	1,4-Dichlorobenzene	ND	0.50	µg/L
21	Carbon tetrachloride	ND	0.50	µg/L	56	4-Isopropyltoluene	ND	0.50	µg/L
22	Benzene	ND	0.50	µg/L	57	1,2-Dichlorobenzene	ND	0.50	µg/L
23	Dibromomethane	ND	0.50	µg/L	58	n-Butylbenzene	ND	0.50	µg/L
24	1,2-Dichloropropane	ND	0.50	µg/L	59	1,2-Dibromo-3-chloropropane (DBCP)	ND	2.5	µg/L
25	Trichloroethene	0.56	0.50	µg/L	60	1,2,4-Trichlorobenzene	ND	1.0	µg/L
26	Bromodichloromethane	ND	0.50	µg/L	61	Naphthalene	ND	1.0	µg/L
27	4-Methyl-2-pentanone (MIBK)	ND	2.5	µg/L	62	Hexachlorobutadiene	ND	1.0	µg/L
28	cis-1,3-Dichloropropene	ND	0.50	µg/L	63	1,2,3-Trichlorobenzene	ND	1.0	µg/L
29	trans-1,3-Dichloropropene	ND	0.50	µg/L	64	Surr: 1,2-Dichloroethane-d4	97	(70-130)	%REC
30	1,1,2-Trichloroethane	ND	0.50	µg/L	65	Surr: Toluene-d8	110	(70-130)	%REC
31	Toluene	ND	0.50	µg/L	66	Surr: 4-Bromofluorobenzene	96	(70-130)	%REC
32	1,3-Dichloropropane	ND	0.50	µg/L					
33	Dibromochloromethane	ND	0.50	µg/L					
34	1,2-Dibromoethane (EDB)	ND	1.0	µg/L					
35	Tetrachloroethene	2.3	0.50	µg/L					

Note: Analysis conducted using EPA Method 524.2 criteria.

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer

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ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101
Job: G005862/JPL Groundwater Monitoring

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641

Alpha Analytical Number: BMI11031007-03A
Client I.D. Number: EB-12-03/09/11

Sampled: 03/09/11 08:29
Received: 03/10/11
Extracted: 03/14/11 11:48
Analyzed: 03/14/11 11:48

Volatile Organics by GC/MS
EPA Method SW8260B

	Compound	Concentration	Reporting Limit		Compound	Concentration	Reporting Limit	
1	Dichlorodifluoromethane	ND	0.50	µg/L	36 1,1,1,2-Tetrachloroethane	ND	0.50	µg/L
2	Chloromethane	ND	1.0	µg/L	37 Chlorobenzene	ND	0.50	µg/L
3	Vinyl chloride	ND	0.50	µg/L	38 Ethylbenzene	ND	0.50	µg/L
4	Chloroethane	ND	0.50	µg/L	39 m,p-Xylene	ND	0.50	µg/L
5	Bromomethane	ND	1.0	µg/L	40 Bromoform	ND	0.50	µg/L
6	Trichlorofluoromethane	ND	0.50	µg/L	41 Styrene	ND	0.50	µg/L
7	1,1-Dichloroethene	ND	0.50	µg/L	42 o-Xylene	ND	0.50	µg/L
8	Dichloromethane	ND	1.0	µg/L	43 1,1,2,2-Tetrachloroethane	ND	0.50	µg/L
9	Freon-113	ND	0.50	µg/L	44 1,2,3-Trichloropropane	ND	1.0	µg/L
10	trans-1,2-Dichloroethene	ND	0.50	µg/L	45 Isopropylbenzene	ND	0.50	µg/L
11	Methyl tert-butyl ether (MTBE)	ND	0.50	µg/L	46 Bromobenzene	ND	0.50	µg/L
12	1,1-Dichloroethane	ND	0.50	µg/L	47 n-Propylbenzene	ND	0.50	µg/L
13	2-Butanone (MEK)	ND	10	µg/L	48 4-Chlorotoluene	ND	0.50	µg/L
14	cis-1,2-Dichloroethene	ND	0.50	µg/L	49 2-Chlorotoluene	ND	0.50	µg/L
15	Bromochloromethane	ND	0.50	µg/L	50 1,3,5-Trimethylbenzene	ND	0.50	µg/L
16	Chloroform	ND	0.50	µg/L	51 tert-Butylbenzene	ND	0.50	µg/L
17	2,2-Dichloropropane	ND	0.50	µg/L	52 1,2,4-Trimethylbenzene	ND	0.50	µg/L
18	1,2-Dichloroethane	ND	0.50	µg/L	53 sec-Butylbenzene	ND	0.50	µg/L
19	1,1,1-Trichloroethane	ND	0.50	µg/L	54 1,3-Dichlorobenzene	ND	0.50	µg/L
20	1,1-Dichloropropene	ND	0.50	µg/L	55 1,4-Dichlorobenzene	ND	0.50	µg/L
21	Carbon tetrachloride	ND	0.50	µg/L	56 4-Isopropyltoluene	ND	0.50	µg/L
22	Benzene	ND	0.50	µg/L	57 1,2-Dichlorobenzene	ND	0.50	µg/L
23	Dibromomethane	ND	0.50	µg/L	58 n-Butylbenzene	ND	0.50	µg/L
24	1,2-Dichloropropane	ND	0.50	µg/L	59 1,2-Dibromo-3-chloropropane (DBCP)	ND	2.5	µg/L
25	Trichloroethene	ND	0.50	µg/L	60 1,2,4-Trichlorobenzene	ND	1.0	µg/L
26	Bromodichloromethane	ND	0.50	µg/L	61 Naphthalene	ND	1.0	µg/L
27	4-Methyl-2-pentanone (MIBK)	ND	2.5	µg/L	62 Hexachlorobutadiene	ND	1.0	µg/L
28	cis-1,3-Dichloropropene	ND	0.50	µg/L	63 1,2,3-Trichlorobenzene	ND	1.0	µg/L
29	trans-1,3-Dichloropropene	ND	0.50	µg/L	64 Surr: 1,2-Dichloroethane-d4	96	(70-130)	%REC
30	1,1,2-Trichloroethane	ND	0.50	µg/L	65 Surr: Toluene-d8	105	(70-130)	%REC
31	Toluene	ND	0.50	µg/L	66 Surr: 4-Bromofluorobenzene	99	(70-130)	%REC
32	1,3-Dichloropropane	ND	0.50	µg/L				
33	Dibromochloromethane	ND	0.50	µg/L				
34	1,2-Dibromoethane (EDB)	ND	1.0	µg/L				
35	Tetrachloroethene	ND	0.50	µg/L				

Note: Analysis conducted using EPA Method 524.2 criteria.

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer
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3/22/11
Report Date

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778
(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101
Job: G005862/JPL Groundwater Monitoring

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641

Alpha Analytical Number: BMI11031007-04A
Client I.D. Number: TB-12-03/09/11

Sampled: 03/09/11 07:00
Received: 03/10/11
Extracted: 03/14/11 11:26
Analyzed: 03/14/11 11:26

Volatile Organics by GC/MS
EPA Method SW8260B

	Compound	Concentration	Reporting Limit			Compound	Concentration	Reporting Limit	
1	Dichlorodifluoromethane	ND	0.50	µg/L	36	1,1,1,2-Tetrachloroethane	ND	0.50	µg/L
2	Chloromethane	ND	1.0	µg/L	37	Chlorobenzene	ND	0.50	µg/L
3	Vinyl chloride	ND	0.50	µg/L	38	Ethylbenzene	ND	0.50	µg/L
4	Chloroethane	ND	0.50	µg/L	39	m,p-Xylene	ND	0.50	µg/L
5	Bromomethane	ND	1.0	µg/L	40	Bromoform	ND	0.50	µg/L
6	Trichlorofluoromethane	ND	0.50	µg/L	41	Styrene	ND	0.50	µg/L
7	1,1-Dichloroethene	ND	0.50	µg/L	42	o-Xylene	ND	0.50	µg/L
8	Dichloromethane	ND	1.0	µg/L	43	1,1,2,2-Tetrachloroethane	ND	0.50	µg/L
9	Freon-113	ND	0.50	µg/L	44	1,2,3-Trichloropropane	ND	1.0	µg/L
10	trans-1,2-Dichloroethene	ND	0.50	µg/L	45	Isopropylbenzene	ND	0.50	µg/L
11	Methyl tert-butyl ether (MTBE)	ND	0.50	µg/L	46	Bromobenzene	ND	0.50	µg/L
12	1,1-Dichloroethane	ND	0.50	µg/L	47	n-Propylbenzene	ND	0.50	µg/L
13	2-Butanone (MEK)	ND	10	µg/L	48	4-Chlorotoluene	ND	0.50	µg/L
14	cis-1,2-Dichloroethene	ND	0.50	µg/L	49	2-Chlorotoluene	ND	0.50	µg/L
15	Bromochloromethane	ND	0.50	µg/L	50	1,3,5-Trimethylbenzene	ND	0.50	µg/L
16	Chloroform	ND	0.50	µg/L	51	tert-Butylbenzene	ND	0.50	µg/L
17	2,2-Dichloropropane	ND	0.50	µg/L	52	1,2,4-Trimethylbenzene	ND	0.50	µg/L
18	1,2-Dichloroethane	ND	0.50	µg/L	53	sec-Butylbenzene	ND	0.50	µg/L
19	1,1,1-Trichloroethane	ND	0.50	µg/L	54	1,3-Dichlorobenzene	ND	0.50	µg/L
20	1,1-Dichloropropene	ND	0.50	µg/L	55	1,4-Dichlorobenzene	ND	0.50	µg/L
21	Carbon tetrachloride	ND	0.50	µg/L	56	4-Isopropyltoluene	ND	0.50	µg/L
22	Benzene	ND	0.50	µg/L	57	1,2-Dichlorobenzene	ND	0.50	µg/L
23	Dibromomethane	ND	0.50	µg/L	58	n-Butylbenzene	ND	0.50	µg/L
24	1,2-Dichloropropane	ND	0.50	µg/L	59	1,2-Dibromo-3-chloropropane (DBCP)	ND	2.5	µg/L
25	Trichloroethene	ND	0.50	µg/L	60	1,2,4-Trichlorobenzene	ND	1.0	µg/L
26	Bromodichloromethane	ND	0.50	µg/L	61	Naphthalene	ND	1.0	µg/L
27	4-Methyl-2-pentanone (MIBK)	ND	2.5	µg/L	62	Hexachlorobutadiene	ND	1.0	µg/L
28	cis-1,3-Dichloropropene	ND	0.50	µg/L	63	1,2,3-Trichlorobenzene	ND	1.0	µg/L
29	trans-1,3-Dichloropropene	ND	0.50	µg/L	64	Surr: 1,2-Dichloroethane-d4	96	(70-130)	%REC
30	1,1,2-Trichloroethane	ND	0.50	µg/L	65	Surr: Toluene-d8	106	(70-130)	%REC
31	Toluene	ND	0.50	µg/L	66	Surr: 4-Bromofluorobenzene	99	(70-130)	%REC
32	1,3-Dichloropropane	ND	0.50	µg/L					
33	Dibromochloromethane	ND	0.50	µg/L					
34	1,2-Dibromoethane (EDB)	ND	1.0	µg/L					
35	Tetrachloroethene	ND	0.50	µg/L					

Note: Analysis conducted using EPA Method 524.2 criteria.

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer
Sacramento, CA • (916) 366-9089 / Las Vegas, NV • (702) 736-7522 / Carson, CA • (714) 386-2901 / info@alpha-analytical.com

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Alpha Analytical, Inc. currently holds appropriate and available California (#2019) and NELAC (01154CA) certifications for the data reported. Test results relate only to reported samples.

3/22/11
Report Date

Alpha Analytical, Inc.

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ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101
Job: G005862/JPL Groundwater Monitoring

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641

Alpha Analytical Number: BMI11031007-05A
Client I.D. Number: SB-02-03/09/11

Sampled: 03/09/11 08:47
Received: 03/10/11
Extracted: 03/14/11 12:09
Analyzed: 03/14/11 12:09

Volatile Organics by GC/MS
EPA Method SW8260B

	Compound	Concentration	Reporting Limit			Compound	Concentration	Reporting Limit	
1	Dichlorodifluoromethane	ND	0.50	µg/L	36	1,1,1,2-Tetrachloroethane	ND	0.50	µg/L
2	Chloromethane	ND	1.0	µg/L	37	Chlorobenzene	ND	0.50	µg/L
3	Vinyl chloride	ND	0.50	µg/L	38	Ethylbenzene	ND	0.50	µg/L
4	Chloroethane	ND	0.50	µg/L	39	m,p-Xylene	ND	0.50	µg/L
5	Bromomethane	ND	1.0	µg/L	40	Bromoform	ND	0.50	µg/L
6	Trichlorofluoromethane	ND	0.50	µg/L	41	Styrene	ND	0.50	µg/L
7	1,1-Dichloroethene	ND	0.50	µg/L	42	o-Xylene	ND	0.50	µg/L
8	Dichloromethane	ND	1.0	µg/L	43	1,1,2,2-Tetrachloroethane	ND	0.50	µg/L
9	Freon-113	ND	0.50	µg/L	44	1,2,3-Trichloropropane	ND	1.0	µg/L
10	trans-1,2-Dichloroethene	ND	0.50	µg/L	45	Isopropylbenzene	ND	0.50	µg/L
11	Methyl tert-butyl ether (MTBE)	ND	0.50	µg/L	46	Bromobenzene	ND	0.50	µg/L
12	1,1-Dichloroethane	ND	0.50	µg/L	47	n-Propylbenzene	ND	0.50	µg/L
13	2-Butanone (MEK)	ND	10	µg/L	48	4-Chlorotoluene	ND	0.50	µg/L
14	cis-1,2-Dichloroethene	ND	0.50	µg/L	49	2-Chlorotoluene	ND	0.50	µg/L
15	Bromochloromethane	ND	0.50	µg/L	50	1,3,5-Trimethylbenzene	ND	0.50	µg/L
16	Chloroform	ND	0.50	µg/L	51	tert-Butylbenzene	ND	0.50	µg/L
17	2,2-Dichloropropane	ND	0.50	µg/L	52	1,2,4-Trimethylbenzene	ND	0.50	µg/L
18	1,2-Dichloroethane	ND	0.50	µg/L	53	sec-Butylbenzene	ND	0.50	µg/L
19	1,1,1-Trichloroethane	ND	0.50	µg/L	54	1,3-Dichlorobenzene	ND	0.50	µg/L
20	1,1-Dichloropropene	ND	0.50	µg/L	55	1,4-Dichlorobenzene	ND	0.50	µg/L
21	Carbon tetrachloride	ND	0.50	µg/L	56	4-Isopropyltoluene	ND	0.50	µg/L
22	Benzene	ND	0.50	µg/L	57	1,2-Dichlorobenzene	ND	0.50	µg/L
23	Dibromomethane	ND	0.50	µg/L	58	n-Butylbenzene	ND	0.50	µg/L
24	1,2-Dichloropropane	ND	0.50	µg/L	59	1,2-Dibromo-3-chloropropane (DBCP)	ND	2.5	µg/L
25	Trichloroethene	ND	0.50	µg/L	60	1,2,4-Trichlorobenzene	ND	1.0	µg/L
26	Bromodichloromethane	ND	0.50	µg/L	61	Naphthalene	ND	1.0	µg/L
27	4-Methyl-2-pentanone (MIBK)	ND	2.5	µg/L	62	Hexachlorobutadiene	ND	1.0	µg/L
28	cis-1,3-Dichloropropene	ND	0.50	µg/L	63	1,2,3-Trichlorobenzene	ND	1.0	µg/L
29	trans-1,3-Dichloropropene	ND	0.50	µg/L	64	Surr: 1,2-Dichloroethane-d4	98	(70-130)	%REC
30	1,1,2-Trichloroethane	ND	0.50	µg/L	65	Surr: Toluene-d8	105	(70-130)	%REC
31	Toluene	ND	0.50	µg/L	66	Surr: 4-Bromofluorobenzene	95	(70-130)	%REC
32	1,3-Dichloropropane	ND	0.50	µg/L					
33	Dibromochloromethane	ND	0.50	µg/L					
34	1,2-Dibromoethane (EDB)	ND	1.0	µg/L					
35	Tetrachloroethene	ND	0.50	µg/L					

Note: Analysis conducted using EPA Method 524.2 criteria.

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer
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3/22/11
Report Date

Alpha Analytical, Inc.

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ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101
Job: G005862/JPL Groundwater Monitoring

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641

Alpha Analytical Number: BMI11031007-06A
Client I.D. Number: MW-25-5

Sampled: 03/09/11 09:56
Received: 03/10/11
Extracted: 03/14/11 13:14
Analyzed: 03/14/11 13:14

Volatile Organics by GC/MS
EPA Method SW8260B

	Compound	Concentration	Reporting Limit	
1	Dichlorodifluoromethane	ND	0.50	µg/L
2	Chloromethane	ND	1.0	µg/L
3	Vinyl chloride	ND	0.50	µg/L
4	Chloroethane	ND	0.50	µg/L
5	Bromomethane	ND	1.0	µg/L
6	Trichlorofluoromethane	ND	0.50	µg/L
7	1,1-Dichloroethene	ND	0.50	µg/L
8	Dichloromethane	ND	1.0	µg/L
9	Freon-113	ND	0.50	µg/L
10	trans-1,2-Dichloroethene	ND	0.50	µg/L
11	Methyl tert-butyl ether (MTBE)	ND	0.50	µg/L
12	1,1-Dichloroethane	ND	0.50	µg/L
13	2-Butanone (MEK)	ND	10	µg/L
14	cis-1,2-Dichloroethene	ND	0.50	µg/L
15	Bromochloromethane	ND	0.50	µg/L
16	Chloroform	ND	0.50	µg/L
17	2,2-Dichloropropane	ND	0.50	µg/L
18	1,2-Dichloroethane	ND	0.50	µg/L
19	1,1,1-Trichloroethane	ND	0.50	µg/L
20	1,1-Dichloropropene	ND	0.50	µg/L
21	Carbon tetrachloride	ND	0.50	µg/L
22	Benzene	ND	0.50	µg/L
23	Dibromomethane	ND	0.50	µg/L
24	1,2-Dichloropropane	ND	0.50	µg/L
25	Trichloroethene	ND	0.50	µg/L
26	Bromodichloromethane	ND	0.50	µg/L
27	4-Methyl-2-pentanone (MIBK)	ND	2.5	µg/L
28	cis-1,3-Dichloropropene	ND	0.50	µg/L
29	trans-1,3-Dichloropropene	ND	0.50	µg/L
30	1,1,2-Trichloroethane	ND	0.50	µg/L
31	Toluene	ND	0.50	µg/L
32	1,3-Dichloropropane	ND	0.50	µg/L
33	Dibromochloromethane	ND	0.50	µg/L
34	1,2-Dibromoethane (EDB)	ND	1.0	µg/L
35	Tetrachloroethene	ND	0.50	µg/L
36	1,1,1,2-Tetrachloroethane	ND	0.50	µg/L
37	Chlorobenzene	ND	0.50	µg/L
38	Ethylbenzene	ND	0.50	µg/L
39	m,p-Xylene	ND	0.50	µg/L
40	Bromoform	ND	0.50	µg/L
41	Styrene	ND	0.50	µg/L
42	o-Xylene	ND	0.50	µg/L
43	1,1,2,2-Tetrachloroethane	ND	0.50	µg/L
44	1,2,3-Trichloropropane	ND	1.0	µg/L
45	Isopropylbenzene	ND	0.50	µg/L
46	Bromobenzene	ND	0.50	µg/L
47	n-Propylbenzene	ND	0.50	µg/L
48	4-Chlorotoluene	ND	0.50	µg/L
49	2-Chlorotoluene	ND	0.50	µg/L
50	1,3,5-Trimethylbenzene	ND	0.50	µg/L
51	tert-Butylbenzene	ND	0.50	µg/L
52	1,2,4-Trimethylbenzene	ND	0.50	µg/L
53	sec-Butylbenzene	ND	0.50	µg/L
54	1,3-Dichlorobenzene	ND	0.50	µg/L
55	1,4-Dichlorobenzene	ND	0.50	µg/L
56	4-Isopropyltoluene	ND	0.50	µg/L
57	1,2-Dichlorobenzene	ND	0.50	µg/L
58	n-Butylbenzene	ND	0.50	µg/L
59	1,2-Dibromo-3-chloropropane (DBCP)	ND	2.5	µg/L
60	1,2,4-Trichlorobenzene	ND	1.0	µg/L
61	Naphthalene	ND	1.0	µg/L
62	Hexachlorobutadiene	ND	1.0	µg/L
63	1,2,3-Trichlorobenzene	ND	1.0	µg/L
64	Surr: 1,2-Dichloroethane-d4	100	(70-130)	%REC
65	Surr: Toluene-d8	112	(70-130)	%REC
66	Surr: 4-Bromofluorobenzene	94	(70-130)	%REC

Note: Analysis conducted using EPA Method 524.2 criteria.

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer

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3/22/11
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ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101
Job: G005862/JPL Groundwater Monitoring

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641

Alpha Analytical Number: BMI11031007-07A
Client I.D. Number: MW-25-4

Sampled: 03/09/11 10:23
Received: 03/10/11
Extracted: 03/14/11 13:36
Analyzed: 03/14/11 13:36

Volatile Organics by GC/MS
EPA Method SW8260B

	Compound	Concentration	Reporting Limit			Compound	Concentration	Reporting Limit	
1	Dichlorodifluoromethane	ND	0.50	µg/L	36	1,1,1,2-Tetrachloroethane	ND	0.50	µg/L
2	Chloromethane	ND	1.0	µg/L	37	Chlorobenzene	ND	0.50	µg/L
3	Vinyl chloride	ND	0.50	µg/L	38	Ethylbenzene	ND	0.50	µg/L
4	Chloroethane	ND	0.50	µg/L	39	m,p-Xylene	ND	0.50	µg/L
5	Bromomethane	ND	1.0	µg/L	40	Bromoform	ND	0.50	µg/L
6	Trichlorofluoromethane	ND	0.50	µg/L	41	Styrene	ND	0.50	µg/L
7	1,1-Dichloroethene	ND	0.50	µg/L	42	o-Xylene	ND	0.50	µg/L
8	Dichloromethane	ND	1.0	µg/L	43	1,1,2,2-Tetrachloroethane	ND	0.50	µg/L
9	Freon-113	ND	0.50	µg/L	44	1,2,3-Trichloropropane	ND	1.0	µg/L
10	trans-1,2-Dichloroethene	ND	0.50	µg/L	45	Isopropylbenzene	ND	0.50	µg/L
11	Methyl tert-butyl ether (MTBE)	ND	0.50	µg/L	46	Bromobenzene	ND	0.50	µg/L
12	1,1-Dichloroethane	ND	0.50	µg/L	47	n-Propylbenzene	ND	0.50	µg/L
13	2-Butanone (MEK)	ND	10	µg/L	48	4-Chlorotoluene	ND	0.50	µg/L
14	cis-1,2-Dichloroethene	ND	0.50	µg/L	49	2-Chlorotoluene	ND	0.50	µg/L
15	Bromochloromethane	ND	0.50	µg/L	50	1,3,5-Trimethylbenzene	ND	0.50	µg/L
16	Chloroform	ND	0.50	µg/L	51	tert-Butylbenzene	ND	0.50	µg/L
17	2,2-Dichloropropane	ND	0.50	µg/L	52	1,2,4-Trimethylbenzene	ND	0.50	µg/L
18	1,2-Dichloroethane	ND	0.50	µg/L	53	sec-Butylbenzene	ND	0.50	µg/L
19	1,1,1-Trichloroethane	ND	0.50	µg/L	54	1,3-Dichlorobenzene	ND	0.50	µg/L
20	1,1-Dichloropropene	ND	0.50	µg/L	55	1,4-Dichlorobenzene	ND	0.50	µg/L
21	Carbon tetrachloride	ND	0.50	µg/L	56	4-Isopropyltoluene	ND	0.50	µg/L
22	Benzene	ND	0.50	µg/L	57	1,2-Dichlorobenzene	ND	0.50	µg/L
23	Dibromomethane	ND	0.50	µg/L	58	n-Butylbenzene	ND	0.50	µg/L
24	1,2-Dichloropropane	ND	0.50	µg/L	59	1,2-Dibromo-3-chloropropane (DBCP)	ND	2.5	µg/L
25	Trichloroethene	ND	0.50	µg/L	60	1,2,4-Trichlorobenzene	ND	1.0	µg/L
26	Bromodichloromethane	ND	0.50	µg/L	61	Naphthalene	ND	1.0	µg/L
27	4-Methyl-2-pentanone (MIBK)	ND	2.5	µg/L	62	Hexachlorobutadiene	ND	1.0	µg/L
28	cis-1,3-Dichloropropene	ND	0.50	µg/L	63	1,2,3-Trichlorobenzene	ND	1.0	µg/L
29	trans-1,3-Dichloropropene	ND	0.50	µg/L	64	Surr: 1,2-Dichloroethane-d4	100	(70-130)	%REC
30	1,1,2-Trichloroethane	ND	0.50	µg/L	65	Surr: Toluene-d8	111	(70-130)	%REC
31	Toluene	ND	0.50	µg/L	66	Surr: 4-Bromofluorobenzene	96	(70-130)	%REC
32	1,3-Dichloropropane	ND	0.50	µg/L					
33	Dibromochloromethane	ND	0.50	µg/L					
34	1,2-Dibromoethane (EDB)	ND	1.0	µg/L					
35	Tetrachloroethene	ND	0.50	µg/L					

Note: Analysis conducted using EPA Method 524.2 criteria.

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer

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3/22/11
Report Date

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ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101
Job: G005862/JPL Groundwater Monitoring

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641

Alpha Analytical Number: BMI11031007-08A
Client I.D. Number: MW-25-3

Sampled: 03/09/11 10:50
Received: 03/10/11
Extracted: 03/14/11 13:57
Analyzed: 03/14/11 13:57

Volatile Organics by GC/MS
EPA Method SW8260B

	Compound	Concentration	Reporting Limit			Compound	Concentration	Reporting Limit	
1	Dichlorodifluoromethane	ND	0.50	µg/L	36	1,1,1,2-Tetrachloroethane	ND	0.50	µg/L
2	Chloromethane	ND	1.0	µg/L	37	Chlorobenzene	ND	0.50	µg/L
3	Vinyl chloride	ND	0.50	µg/L	38	Ethylbenzene	ND	0.50	µg/L
4	Chloroethane	ND	0.50	µg/L	39	m,p-Xylene	ND	0.50	µg/L
5	Bromomethane	ND	1.0	µg/L	40	Bromoform	ND	0.50	µg/L
6	Trichlorofluoromethane	ND	0.50	µg/L	41	Styrene	ND	0.50	µg/L
7	1,1-Dichloroethene	ND	0.50	µg/L	42	o-Xylene	ND	0.50	µg/L
8	Dichloromethane	ND	1.0	µg/L	43	1,1,2,2-Tetrachloroethane	ND	0.50	µg/L
9	Freon-113	ND	0.50	µg/L	44	1,2,3-Trichloropropane	ND	1.0	µg/L
10	trans-1,2-Dichloroethene	ND	0.50	µg/L	45	Isopropylbenzene	ND	0.50	µg/L
11	Methyl tert-butyl ether (MTBE)	ND	0.50	µg/L	46	Bromobenzene	ND	0.50	µg/L
12	1,1-Dichloroethane	ND	0.50	µg/L	47	n-Propylbenzene	ND	0.50	µg/L
13	2-Butanone (MEK)	ND	10	µg/L	48	4-Chlorotoluene	ND	0.50	µg/L
14	cis-1,2-Dichloroethene	ND	0.50	µg/L	49	2-Chlorotoluene	ND	0.50	µg/L
15	Bromochloromethane	ND	0.50	µg/L	50	1,3,5-Trimethylbenzene	ND	0.50	µg/L
16	Chloroform	0.74	0.50	µg/L	51	tert-Butylbenzene	ND	0.50	µg/L
17	2,2-Dichloropropane	ND	0.50	µg/L	52	1,2,4-Trimethylbenzene	ND	0.50	µg/L
18	1,2-Dichloroethane	ND	0.50	µg/L	53	sec-Butylbenzene	ND	0.50	µg/L
19	1,1,1-Trichloroethane	ND	0.50	µg/L	54	1,3-Dichlorobenzene	ND	0.50	µg/L
20	1,1-Dichloropropene	ND	0.50	µg/L	55	1,4-Dichlorobenzene	ND	0.50	µg/L
21	Carbon tetrachloride	ND	0.50	µg/L	56	4-Isopropyltoluene	ND	0.50	µg/L
22	Benzene	ND	0.50	µg/L	57	1,2-Dichlorobenzene	ND	0.50	µg/L
23	Dibromomethane	ND	0.50	µg/L	58	n-Butylbenzene	ND	0.50	µg/L
24	1,2-Dichloropropane	ND	0.50	µg/L	59	1,2-Dibromo-3-chloropropane (DBCP)	ND	2.5	µg/L
25	Trichloroethene	ND	0.50	µg/L	60	1,2,4-Trichlorobenzene	ND	1.0	µg/L
26	Bromodichloromethane	ND	0.50	µg/L	61	Naphthalene	ND	1.0	µg/L
27	4-Methyl-2-pentanone (MIBK)	ND	2.5	µg/L	62	Hexachlorobutadiene	ND	1.0	µg/L
28	cis-1,3-Dichloropropene	ND	0.50	µg/L	63	1,2,3-Trichlorobenzene	ND	1.0	µg/L
29	trans-1,3-Dichloropropene	ND	0.50	µg/L	64	Surr: 1,2-Dichloroethane-d4	101	(70-130)	%REC
30	1,1,2-Trichloroethane	ND	0.50	µg/L	65	Surr: Toluene-d8	112	(70-130)	%REC
31	Toluene	ND	0.50	µg/L	66	Surr: 4-Bromofluorobenzene	94	(70-130)	%REC
32	1,3-Dichloropropane	ND	0.50	µg/L					
33	Dibromochloromethane	ND	0.50	µg/L					
34	1,2-Dibromoethane (EDB)	ND	1.0	µg/L					
35	Tetrachloroethene	ND	0.50	µg/L					

Note: Analysis conducted using EPA Method 524.2 criteria.

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer

Sacramento, CA • (916) 366-9089 / Las Vegas, NV • (702) 736-7522 / Carson, CA • (714) 386-2901 / info@alpha-analytical.com

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3/22/11
Report Date

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778
(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101
Job: G005862/JPL Groundwater Monitoring

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641

Alpha Analytical Number: BMI11031007-09A
Client I.D. Number: MW-25-2

Sampled: 03/09/11 11:12
Received: 03/10/11
Extracted: 03/14/11 14:19
Analyzed: 03/14/11 14:19

Volatile Organics by GC/MS
EPA Method SW8260B

	Compound	Concentration	Reporting Limit			Compound	Concentration	Reporting Limit	
1	Dichlorodifluoromethane	ND	0.50	µg/L	36	1,1,1,2-Tetrachloroethane	ND	0.50	µg/L
2	Chloromethane	ND	1.0	µg/L	37	Chlorobenzene	ND	0.50	µg/L
3	Vinyl chloride	ND	0.50	µg/L	38	Ethylbenzene	ND	0.50	µg/L
4	Chloroethane	ND	0.50	µg/L	39	m,p-Xylene	ND	0.50	µg/L
5	Bromomethane	ND	1.0	µg/L	40	Bromoform	ND	0.50	µg/L
6	Trichlorofluoromethane	ND	0.50	µg/L	41	Styrene	ND	0.50	µg/L
7	1,1-Dichloroethene	ND	0.50	µg/L	42	o-Xylene	ND	0.50	µg/L
8	Dichloromethane	ND	1.0	µg/L	43	1,1,2,2-Tetrachloroethane	ND	0.50	µg/L
9	Freon-113	ND	0.50	µg/L	44	1,2,3-Trichloropropane	ND	1.0	µg/L
10	trans-1,2-Dichloroethene	ND	0.50	µg/L	45	Isopropylbenzene	ND	0.50	µg/L
11	Methyl tert-butyl ether (MTBE)	ND	0.50	µg/L	46	Bromobenzene	ND	0.50	µg/L
12	1,1-Dichloroethane	ND	0.50	µg/L	47	n-Propylbenzene	ND	0.50	µg/L
13	2-Butanone (MEK)	ND	10	µg/L	48	4-Chlorotoluene	ND	0.50	µg/L
14	cis-1,2-Dichloroethene	ND	0.50	µg/L	49	2-Chlorotoluene	ND	0.50	µg/L
15	Bromochloromethane	ND	0.50	µg/L	50	1,3,5-Trimethylbenzene	ND	0.50	µg/L
16	Chloroform	ND	0.50	µg/L	51	tert-Butylbenzene	ND	0.50	µg/L
17	2,2-Dichloropropane	ND	0.50	µg/L	52	1,2,4-Trimethylbenzene	ND	0.50	µg/L
18	1,2-Dichloroethane	ND	0.50	µg/L	53	sec-Butylbenzene	ND	0.50	µg/L
19	1,1,1-Trichloroethane	ND	0.50	µg/L	54	1,3-Dichlorobenzene	ND	0.50	µg/L
20	1,1-Dichloropropene	ND	0.50	µg/L	55	1,4-Dichlorobenzene	ND	0.50	µg/L
21	Carbon tetrachloride	ND	0.50	µg/L	56	4-Isopropyltoluene	ND	0.50	µg/L
22	Benzene	ND	0.50	µg/L	57	1,2-Dichlorobenzene	ND	0.50	µg/L
23	Dibromomethane	ND	0.50	µg/L	58	n-Butylbenzene	ND	0.50	µg/L
24	1,2-Dichloropropane	ND	0.50	µg/L	59	1,2-Dibromo-3-chloropropane (DBCP)	ND	2.5	µg/L
25	Trichloroethene	ND	0.50	µg/L	60	1,2,4-Trichlorobenzene	ND	1.0	µg/L
26	Bromodichloromethane	ND	0.50	µg/L	61	Naphthalene	ND	1.0	µg/L
27	4-Methyl-2-pentanone (MIBK)	ND	2.5	µg/L	62	Hexachlorobutadiene	ND	1.0	µg/L
28	cis-1,3-Dichloropropene	ND	0.50	µg/L	63	1,2,3-Trichlorobenzene	ND	1.0	µg/L
29	trans-1,3-Dichloropropene	ND	0.50	µg/L	64	Surr: 1,2-Dichloroethane-d4	100	(70-130)	%REC
30	1,1,2-Trichloroethane	ND	0.50	µg/L	65	Surr: Toluene-d8	112	(70-130)	%REC
31	Toluene	ND	0.50	µg/L	66	Surr: 4-Bromofluorobenzene	97	(70-130)	%REC
32	1,3-Dichloropropane	ND	0.50	µg/L					
33	Dibromochloromethane	ND	0.50	µg/L					
34	1,2-Dibromoethane (EDB)	ND	1.0	µg/L					
35	Tetrachloroethene	ND	0.50	µg/L					

Note: Analysis conducted using EPA Method 524.2 criteria.

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager • • Walter Hinchman, Quality Assurance Officer
Sacramento, CA • (916) 366-9089 / Las Vegas, NV • (702) 736-7522 / Carson, CA • (714) 386-2901 / info@alpha-analytical.com

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3/22/11
Report Date

Alpha Analytical, Inc.

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(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

ANALYTICAL REPORT

Battelle Memorial Institute
655 West Broadway
San Diego, CA 92101
Job: G005862/JPL Groundwater Monitoring

Attn: David Conner
Phone: (619) 726-7311
Fax: (614) 458-6641

Alpha Analytical Number: BMI11031007-10A
Client I.D. Number: MW-25-1

Sampled: 03/09/11 11:32
Received: 03/10/11
Extracted: 03/14/11 14:40
Analyzed: 03/14/11 14:40

Volatile Organics by GC/MS
EPA Method SW8260B

	Compound	Concentration	Reporting Limit			Compound	Concentration	Reporting Limit	
1	Dichlorodifluoromethane	ND	0.50	µg/L	36	1,1,1,2-Tetrachloroethane	ND	0.50	µg/L
2	Chloromethane	ND	1.0	µg/L	37	Chlorobenzene	ND	0.50	µg/L
3	Vinyl chloride	ND	0.50	µg/L	38	Ethylbenzene	ND	0.50	µg/L
4	Chloroethane	ND	0.50	µg/L	39	m,p-Xylene	ND	0.50	µg/L
5	Bromomethane	ND	1.0	µg/L	40	Bromoform	ND	0.50	µg/L
6	Trichlorofluoromethane	ND	0.50	µg/L	41	Styrene	ND	0.50	µg/L
7	1,1-Dichloroethene	ND	0.50	µg/L	42	o-Xylene	ND	0.50	µg/L
8	Dichloromethane	ND	1.0	µg/L	43	1,1,2,2-Tetrachloroethane	ND	0.50	µg/L
9	Freon-113	ND	0.50	µg/L	44	1,2,3-Trichloropropane	ND	1.0	µg/L
10	trans-1,2-Dichloroethene	ND	0.50	µg/L	45	Isopropylbenzene	ND	0.50	µg/L
11	Methyl tert-butyl ether (MTBE)	ND	0.50	µg/L	46	Bromobenzene	ND	0.50	µg/L
12	1,1-Dichloroethane	ND	0.50	µg/L	47	n-Propylbenzene	ND	0.50	µg/L
13	2-Butanone (MEK)	ND	10	µg/L	48	4-Chlorotoluene	ND	0.50	µg/L
14	cis-1,2-Dichloroethene	ND	0.50	µg/L	49	2-Chlorotoluene	ND	0.50	µg/L
15	Bromochloromethane	ND	0.50	µg/L	50	1,3,5-Trimethylbenzene	ND	0.50	µg/L
16	Chloroform	0.52	0.50	µg/L	51	tert-Butylbenzene	ND	0.50	µg/L
17	2,2-Dichloropropane	ND	0.50	µg/L	52	1,2,4-Trimethylbenzene	ND	0.50	µg/L
18	1,2-Dichloroethane	ND	0.50	µg/L	53	sec-Butylbenzene	ND	0.50	µg/L
19	1,1,1-Trichloroethane	ND	0.50	µg/L	54	1,3-Dichlorobenzene	ND	0.50	µg/L
20	1,1-Dichloropropene	ND	0.50	µg/L	55	1,4-Dichlorobenzene	ND	0.50	µg/L
21	Carbon tetrachloride	ND	0.50	µg/L	56	4-Isopropyltoluene	ND	0.50	µg/L
22	Benzene	ND	0.50	µg/L	57	1,2-Dichlorobenzene	ND	0.50	µg/L
23	Dibromomethane	ND	0.50	µg/L	58	n-Butylbenzene	ND	0.50	µg/L
24	1,2-Dichloropropane	ND	0.50	µg/L	59	1,2-Dibromo-3-chloropropane (DBCP)	ND	2.5	µg/L
25	Trichloroethene	5.4	0.50	µg/L	60	1,2,4-Trichlorobenzene	ND	1.0	µg/L
26	Bromodichloromethane	ND	0.50	µg/L	61	Naphthalene	ND	1.0	µg/L
27	4-Methyl-2-pentanone (MIBK)	ND	2.5	µg/L	62	Hexachlorobutadiene	ND	1.0	µg/L
28	cis-1,3-Dichloropropene	ND	0.50	µg/L	63	1,2,3-Trichlorobenzene	ND	1.0	µg/L
29	trans-1,3-Dichloropropene	ND	0.50	µg/L	64	Surr: 1,2-Dichloroethane-d4	101	(70-130)	%REC
30	1,1,2-Trichloroethane	ND	0.50	µg/L	65	Surr: Toluene-d8	112	(70-130)	%REC
31	Toluene	ND	0.50	µg/L	66	Surr: 4-Bromofluorobenzene	94	(70-130)	%REC
32	1,3-Dichloropropane	ND	0.50	µg/L					
33	Dibromochloromethane	ND	0.50	µg/L					
34	1,2-Dibromoethane (EDB)	ND	1.0	µg/L					
35	Tetrachloroethene	ND	0.50	µg/L					

Note: Analysis conducted using EPA Method 524.2 criteria.

ND = Not Detected

Roger Scholl Randy Gardner Walter Hinchman

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3/22/11
Report Date

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778

(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

VOC Sample Preservation Report

Work Order: BMI11031007 **Job:** G005862/JPL Groundwater Monitoring

Alpha's Sample ID	Client's Sample ID	Matrix	pH
11031007-01A	MW-26-2	Aqueous	2
11031007-02A	MW-26-1	Aqueous	2
11031007-03A	EB-12-03/09/11	Aqueous	2
11031007-04A	TB-12-03/09/11	Aqueous	2
11031007-05A	SB-02-03/09/11	Aqueous	2
11031007-06A	MW-25-5	Aqueous	2
11031007-07A	MW-25-4	Aqueous	2
11031007-08A	MW-25-3	Aqueous	2
11031007-09A	MW-25-2	Aqueous	2
11031007-10A	MW-25-1	Aqueous	2

3/22/11

Report Date

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778

(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

Date: 22-Mar-11

QC Summary Report

Work Order: 11031007

Method Blank

Type **MBLK** Test Code: **EPA Method 314.0**

File ID: **14** Batch ID: **26176** Analysis Date: **03/18/2011 11:37**

Sample ID: **MB-26176** Units : **µg/L** Run ID: **IC_3_110318A** Prep Date: **03/18/2011 10:14**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Perchlorate	ND	1								

Laboratory Fortified Blank

Type **LFB** Test Code: **EPA Method 314.0**

File ID: **15** Batch ID: **26176** Analysis Date: **03/18/2011 11:55**

Sample ID: **LFB-26176** Units : **µg/L** Run ID: **IC_3_110318A** Prep Date: **03/18/2011 10:14**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Perchlorate	25.8	2	25		103	85	115			

Sample Matrix Spike

Type **LFM** Test Code: **EPA Method 314.0**

File ID: **22** Batch ID: **26176** Analysis Date: **03/18/2011 14:04**

Sample ID: **11031007-01ALFM** Units : **µg/L** Run ID: **IC_3_110318A** Prep Date: **03/18/2011 10:14**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Perchlorate	26.8	2	25	0	107	80	120			

Sample Matrix Spike Duplicate

Type **LFMD** Test Code: **EPA Method 314.0**

File ID: **23** Batch ID: **26176** Analysis Date: **03/18/2011 14:22**

Sample ID: **11031007-01ALFMD** Units : **µg/L** Run ID: **IC_3_110318A** Prep Date: **03/18/2011 10:14**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Perchlorate	27	2	25	0	108	80	120	26.76	1.0(15)	

Comments:

Calculations are based off of raw (non-rounded) data. However, for reporting purposes, all QC data is rounded to three significant figures. Therefore, hand calculated values may differ slightly.

Alpha Analytical, Inc.

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Date: *17-Mar-11*

QC Summary Report

Work Order: 11031007

Method Blank

Type **MBLK** Test Code: **EPA Method 200.8**

File ID: **031411.B\032_M.D** Batch ID: **26155** Analysis Date: **03/14/2011 19:35**

Sample ID: **MB-26155** Units : **mg/L** Run ID: **ICP/MS_110314B** Prep Date: **03/14/2011 13:42**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Chromium (Cr)	ND	0.005								

Laboratory Control Spike

Type **LCS** Test Code: **EPA Method 200.8**

File ID: **031411.B\033_M.D** Batch ID: **26155** Analysis Date: **03/14/2011 19:41**

Sample ID: **LCS-26155** Units : **mg/L** Run ID: **ICP/MS_110314B** Prep Date: **03/14/2011 13:42**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Chromium (Cr)	0.0466	0.005	0.05		93	85	115			

Sample Matrix Spike

Type **MS** Test Code: **EPA Method 200.8**

File ID: **031411.B\038_M.D** Batch ID: **26155** Analysis Date: **03/14/2011 20:09**

Sample ID: **11031007-10AMS** Units : **mg/L** Run ID: **ICP/MS_110314B** Prep Date: **03/14/2011 13:42**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Chromium (Cr)	0.0491	0.005	0.05	0	98	70	130			

Sample Matrix Spike Duplicate

Type **MSD** Test Code: **EPA Method 200.8**

File ID: **031411.B\039_M.D** Batch ID: **26155** Analysis Date: **03/14/2011 20:14**

Sample ID: **11031007-10AMSD** Units : **mg/L** Run ID: **ICP/MS_110314B** Prep Date: **03/14/2011 13:42**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Chromium (Cr)	0.0488	0.005	0.05	0	98	70	130	0.04907	0.6(20)	

Comments:

Calculations are based off of raw (non-rounded) data. However, for reporting purposes, all QC data is rounded to three significant figures. Therefore, hand calculated values may differ slightly.

Alpha Analytical, Inc.

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Date: *16-Mar-2011*

QC Summary Report

Work Order: 11031007

Method Blank Type **MBLK** Test Code: **EPA Method SW8260B**

File ID: **11031406.D** Batch ID: **MS15W0314M** Analysis Date: **03/14/2011 10:00**

Sample ID: **MBLK MS15W0314M** Units : **µg/L** Run ID: **MSD_15_110314D** Prep Date: **03/14/2011 10:00**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Dichlorodifluoromethane	ND	0.5								
Chloromethane	ND	1								
Vinyl chloride	ND	0.5								
Chloroethane	ND	0.5								
Bromomethane	ND	1								
Trichlorofluoromethane	ND	0.5								
1,1-Dichloroethene	ND	0.5								
Dichloromethane	ND	1								
Freon-113	ND	0.5								
trans-1,2-Dichloroethene	ND	0.5								
Methyl tert-butyl ether (MTBE)	ND	0.5								
1,1-Dichloroethane	ND	0.5								
2-Butanone (MEK)	ND	10								
cis-1,2-Dichloroethene	ND	0.5								
Bromochloromethane	ND	0.5								
Chloroform	ND	0.5								
2,2-Dichloropropane	ND	0.5								
1,2-Dichloroethane	ND	0.5								
1,1,1-Trichloroethane	ND	0.5								
1,1-Dichloropropene	ND	0.5								
Carbon tetrachloride	ND	0.5								
Benzene	ND	0.5								
Dibromomethane	ND	0.5								
1,2-Dichloropropane	ND	0.5								
Trichloroethene	ND	0.5								
Bromodichloromethane	ND	0.5								
4-Methyl-2-pentanone (MIBK)	ND	2.5								
cis-1,3-Dichloropropene	ND	0.5								
trans-1,3-Dichloropropene	ND	0.5								
1,1,2-Trichloroethane	ND	0.5								
Toluene	ND	0.5								
1,3-Dichloropropane	ND	0.5								
Dibromochloromethane	ND	0.5								
1,2-Dibromoethane (EDB)	ND	1								
Tetrachloroethene	ND	0.5								
1,1,1,2-Tetrachloroethane	ND	0.5								
Chlorobenzene	ND	0.5								
Ethylbenzene	ND	0.5								
m,p-Xylene	ND	0.5								
Bromoform	ND	0.5								
Styrene	ND	0.5								
o-Xylene	ND	0.5								
1,1,2,2-Tetrachloroethane	ND	0.5								
1,2,3-Trichloropropane	ND	1								
Isopropylbenzene	ND	0.5								
Bromobenzene	ND	0.5								
n-Propylbenzene	ND	0.5								
4-Chlorotoluene	ND	0.5								
2-Chlorotoluene	ND	0.5								
1,3,5-Trimethylbenzene	ND	0.5								
tert-Butylbenzene	ND	0.5								
1,2,4-Trimethylbenzene	ND	0.5								
sec-Butylbenzene	ND	0.5								
1,3-Dichlorobenzene	ND	0.5								
1,4-Dichlorobenzene	ND	0.5								
4-Isopropyltoluene	ND	0.5								
1,2-Dichlorobenzene	ND	0.5								
n-Butylbenzene	ND	0.5								
1,2-Dibromo-3-chloropropane (DBCP)	ND	2.5								
1,2,4-Trichlorobenzene	ND	1								
Naphthalene	ND	1								
Hexachlorobutadiene	ND	1								
1,2,3-Trichlorobenzene	ND	1								
Surr: 1,2-Dichloroethane-d4	9.29		10		93	70	130			
Surr: Toluene-d8	10.5		10		105	70	130			

Alpha Analytical, Inc.

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(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

Date: *16-Mar-2011*

QC Summary Report

Work Order: 11031007

Surr: 4-Bromofluorobenzene	9.79	10	98	70	130	

Alpha Analytical, Inc.

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Date: *16-Mar-2011*

QC Summary Report

Work Order: 11031007

Laboratory Control Spike Type **LCS** Test Code: **EPA Method SW8260B**

File ID: **11031403.D** Batch ID: **MS15W0314M** Analysis Date: **03/14/2011 08:47**

Sample ID: **LCS MS15W0314M** Units : **µg/L** Run ID: **MSD_15_110314D** Prep Date: **03/14/2011 08:47**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Dichlorodifluoromethane	8.48	1	10		85	70	130			
Chloromethane	10.5	2	10		105	70	130			
Vinyl chloride	10.1	1	10		101	70	130			
Chloroethane	9.94	1	10		99	70	130			
Bromomethane	8.79	2	10		88	70	130			
Trichlorofluoromethane	9.38	1	10		94	70	130			
1,1-Dichloroethene	10.5	1	10		105	70	130			
Dichloromethane	9.55	2	10		96	70	130			
Freon-113	10.3	1	10		103	70	137			
trans-1,2-Dichloroethene	10.5	1	10		105	70	130			
Methyl tert-butyl ether (MTBE)	8.99	0.5	10		90	70	130			
1,1-Dichloroethane	10.3	1	10		103	70	130			
2-Butanone (MEK)	174	10	200		87	70	130			
cis-1,2-Dichloroethene	10.5	1	10		105	70	130			
Bromochloromethane	9.86	1	10		99	70	130			
Chloroform	9.33	1	10		93	70	130			
2,2-Dichloropropane	10.5	1	10		105	70	130			
1,2-Dichloroethane	9.1	1	10		91	70	130			
1,1,1-Trichloroethane	10.1	1	10		101	70	130			
1,1-Dichloropropene	10.6	1	10		106	70	130			
Carbon tetrachloride	9.03	1	10		90	70	130			
Benzene	9.8	0.5	10		98	70	130			
Dibromomethane	9.47	1	10		95	70	130			
1,2-Dichloropropane	10.3	1	10		103	70	130			
Trichloroethene	10.4	1	10		104	70	130			
Bromodichloromethane	9.85	1	10		99	70	130			
4-Methyl-2-pentanone (MIBK)	21	2.5	25		84	20	182			
cis-1,3-Dichloropropene	9.52	1	10		95	70	130			
trans-1,3-Dichloropropene	8.55	1	10		86	70	130			
1,1,2-Trichloroethane	9.44	1	10		94	70	130			
Toluene	10.4	0.5	10		104	70	130			
1,3-Dichloropropane	9.79	1	10		98	70	130			
Dibromochloromethane	9.68	1	10		97	70	130			
1,2-Dibromoethane (EDB)	19.9	2	20		99	70	130			
Tetrachloroethene	10.5	1	10		105	70	130			
1,1,1,2-Tetrachloroethane	10.5	1	10		105	70	130			
Chlorobenzene	10.2	1	10		102	70	130			
Ethylbenzene	10.3	0.5	10		103	70	130			
m,p-Xylene	10.6	0.5	10		106	70	130			
Bromoform	8.79	1	10		88	70	130			
Styrene	10.6	1	10		106	70	130			
o-Xylene	10.6	0.5	10		106	70	130			
1,1,2,2-Tetrachloroethane	9.5	1	10		95	70	130			
1,2,3-Trichloropropane	17.7	2	20		89	70	130			
Isopropylbenzene	10.7	1	10		107	70	130			
Bromobenzene	10.2	1	10		102	70	130			
n-Propylbenzene	10.8	1	10		108	70	130			
4-Chlorotoluene	11	1	10		110	70	130			
2-Chlorotoluene	10.7	1	10		107	70	130			
1,3,5-Trimethylbenzene	10.7	1	10		107	70	130			
tert-Butylbenzene	10.3	1	10		103	70	130			
1,2,4-Trimethylbenzene	10.7	1	10		107	70	130			
sec-Butylbenzene	10.6	1	10		106	70	130			
1,3-Dichlorobenzene	10.8	1	10		108	70	130			
1,4-Dichlorobenzene	10	1	10		100	70	130			
4-Isopropyltoluene	10.6	1	10		106	70	130			
1,2-Dichlorobenzene	9.61	1	10		96	70	130			
n-Butylbenzene	11.1	1	10		111	70	130			
1,2-Dibromo-3-chloropropane (DBCP)	41.2	3	50		82	67	130			
1,2,4-Trichlorobenzene	10.9	2	10		109	70	130			
Naphthalene	9.65	2	10		97	70	130			
Hexachlorobutadiene	18.5	2	20		92	70	130			
1,2,3-Trichlorobenzene	11.3	2	10		113	70	130			
Surr: 1,2-Dichloroethane-d4	9.49		10		95	70	130			
Surr: Toluene-d8	10.1		10		101	70	130			

Alpha Analytical, Inc.

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Date: *16-Mar-2011*

QC Summary Report

Work Order: 11031007

Surr: 4-Bromofluorobenzene	9.99	10	99.9	70	130	

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Date: *16-Mar-2011*

QC Summary Report

Work Order: 11031007

Sample Matrix Spike Type **MS** Test Code: **EPA Method SW8260B**

File ID: **11031407.D** Batch ID: **MS15W0314M** Analysis Date: **03/14/2011 10:21**

Sample ID: **11031007-02AMS** Units : **µg/L** Run ID: **MSD_15_110314D** Prep Date: **03/14/2011 10:21**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Dichlorodifluoromethane	25.2	2.5	50	0	50	21	138			
Chloromethane	41.7	10	50	0	83	23	144			
Vinyl chloride	39.7	2.5	50	0	79	49	136			
Chloroethane	42.6	2.5	50	0	85	21	159			
Bromomethane	35.7	10	50	0	71	10	174			
Trichlorofluoromethane	41.6	2.5	50	0	83	32	154			
1,1-Dichloroethene	45.1	2.5	50	0	90	64	130			
Dichloromethane	42.3	10	50	0	85	69	130			
Freon-113	46.6	2.5	50	0	93	55	141			
trans-1,2-Dichloroethene	45	2.5	50	0	90	63	130			
Methyl tert-butyl ether (MTBE)	43	1.3	50	0	86	47	150			
1,1-Dichloroethane	46.1	2.5	50	0	92	66	130			
2-Butanone (MEK)	714	50	1000	0	71	23	182			
cis-1,2-Dichloroethene	46	2.5	50	0	92	70	130			
Bromochloromethane	46.5	2.5	50	0	93	70	132			
Chloroform	42.1	2.5	50	0	84	70	130			
2,2-Dichloropropane	47.8	2.5	50	0	96	38	154			
1,2-Dichloroethane	42.7	2.5	50	0	85	65	134			
1,1,1-Trichloroethane	44.8	2.5	50	0	90	65	136			
1,1-Dichloropropene	47.4	2.5	50	0	95	68	132			
Carbon tetrachloride	40.4	2.5	50	0	81	58	148			
Benzene	44.1	1.3	50	0	88	59	138			
Dibromomethane	44.8	2.5	50	0	90	70	130			
1,2-Dichloropropane	48	2.5	50	0	96	70	131			
Trichloroethene	47.6	2.5	50	0.56	94	65	144			
Bromodichloromethane	45.6	2.5	50	0	91	50	157			
4-Methyl-2-pentanone (MIBK)	103	13	125	0	83	20	182			
cis-1,3-Dichloropropene	42.9	2.5	50	0	86	63	131			
trans-1,3-Dichloropropene	39.6	2.5	50	0	79	65	136			
1,1,2-Trichloroethane	46.1	2.5	50	0	92	70	131			
Toluene	46.6	1.3	50	0	93	68	130			
1,3-Dichloropropane	46.5	2.5	50	0	93	70	130			
Dibromochloromethane	43.8	2.5	50	0	88	42	155			
1,2-Dibromoethane (EDB)	94.7	5	100	0	95	70	130			
Tetrachloroethene	48.4	2.5	50	2.25	92	65	130			
1,1,1,2-Tetrachloroethane	46.1	2.5	50	0	92	70	130			
Chlorobenzene	46.7	2.5	50	0	93	70	130			
Ethylbenzene	46.5	1.3	50	0	93	68	130			
m,p-Xylene	48.2	1.3	50	0	96	68	131			
Bromoform	40.9	2.5	50	0	82	65	143			
Styrene	48.5	2.5	50	0	97	59	153			
o-Xylene	48.3	1.3	50	0	97	70	130			
1,1,2,2-Tetrachloroethane	46	2.5	50	0	92	67	130			
1,2,3-Trichloropropane	85.1	10	100	0	85	70	130			
Isopropylbenzene	47.8	2.5	50	0	96	55	138			
Bromobenzene	45.6	2.5	50	0	91	70	130			
n-Propylbenzene	48.9	2.5	50	0	98	67	133			
4-Chlorotoluene	49.4	2.5	50	0	99	70	130			
2-Chlorotoluene	47.8	2.5	50	0	96	70	130			
1,3,5-Trimethylbenzene	47.3	2.5	50	0	95	67	134			
tert-Butylbenzene	46.7	2.5	50	0	93	55	147			
1,2,4-Trimethylbenzene	47.9	2.5	50	0	96	65	135			
sec-Butylbenzene	47.8	2.5	50	0	96	68	135			
1,3-Dichlorobenzene	48.7	2.5	50	0	97	70	130			
1,4-Dichlorobenzene	46.7	2.5	50	0	93	70	130			
4-Isopropyltoluene	48.2	2.5	50	0	96	68	132			
1,2-Dichlorobenzene	44.5	2.5	50	0	89	70	130			
n-Butylbenzene	51.1	2.5	50	0	102	62	134			
1,2-Dibromo-3-chloropropane (DBCP)	193	15	250	0	77	64	130			
1,2,4-Trichlorobenzene	47.8	10	50	0	96	62	133			
Naphthalene	42.2	10	50	0	84	32	166			
Hexachlorobutadiene	85.4	10	100	0	85	63	130			
1,2,3-Trichlorobenzene	48.6	10	50	0	97	55	138			
Surr: 1,2-Dichloroethane-d4	46.6		50		93	70	130			
Surr: Toluene-d8	49.6		50		99	70	130			

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Date: *16-Mar-2011*

QC Summary Report

Work Order: 11031007

Surr: 4-Bromofluorobenzene	49.7	50	99	70	130	

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Date: *16-Mar-2011*

QC Summary Report

Work Order: 11031007

Sample Matrix Spike Duplicate Type **MSD** Test Code: **EPA Method SW8260B**

File ID: **11031408.D** Batch ID: **MS15W0314M** Analysis Date: **03/14/2011 10:43**

Sample ID: **11031007-02AMSD** Units : **µg/L** Run ID: **MSD_15_110314D** Prep Date: **03/14/2011 10:43**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Dichlorodifluoromethane	26.6	2.5	50	0	53	21	138	25.15	5.6(33)	
Chloromethane	42.1	10	50	0	84	23	144	41.68	1.1(27)	
Vinyl chloride	42.4	2.5	50	0	85	49	136	39.67	6.7(21)	
Chloroethane	44.5	2.5	50	0	89	21	159	42.57	4.5(40)	
Bromomethane	38.5	10	50	0	77	10	174	35.65	7.8(40)	
Trichlorofluoromethane	43.4	2.5	50	0	87	32	154	41.59	4.2(37)	
1,1-Dichloroethene	48.2	2.5	50	0	96	64	130	45.06	6.7(21)	
Dichloromethane	44.7	10	50	0	89	69	130	42.3	5.4(20)	
Freon-113	49.8	2.5	50	0	99.6	55	141	46.6	6.6(40)	
trans-1,2-Dichloroethene	48.4	2.5	50	0	97	63	130	45	7.2(20)	
Methyl tert-butyl ether (MTBE)	47.4	1.3	50	0	95	47	150	43.01	9.8(40)	
1,1-Dichloroethane	49	2.5	50	0	98	66	130	46.06	6.2(20)	
2-Butanone (MEK)	738	50	1000	0	74	23	182	714.1	3.3(22)	
cis-1,2-Dichloroethene	49.6	2.5	50	0	99	70	130	46	7.6(20)	
Bromochloromethane	49.8	2.5	50	0	99.6	70	132	46.51	6.8(20)	
Chloroform	44.9	2.5	50	0	90	70	130	42.06	6.4(20)	
2,2-Dichloropropane	52.5	2.5	50	0	105	38	154	47.75	9.5(22)	
1,2-Dichloroethane	45.2	2.5	50	0	90	65	134	42.7	5.7(20)	
1,1,1-Trichloroethane	48.5	2.5	50	0	97	65	136	44.81	7.9(20)	
1,1-Dichloropropene	50.6	2.5	50	0	101	68	132	47.37	6.5(20)	
Carbon tetrachloride	45.2	2.5	50	0	90	58	148	40.37	11.2(20)	
Benzene	47	1.3	50	0	94	59	138	44.08	6.4(21)	
Dibromomethane	47.6	2.5	50	0	95	70	130	44.78	6.2(20)	
1,2-Dichloropropane	51.1	2.5	50	0	102	70	131	47.95	6.3(20)	
Trichloroethene	49.9	2.5	50	0.56	99	65	144	47.6	4.8(20)	
Bromodichloromethane	49.1	2.5	50	0	98	50	157	45.59	7.3(20)	
4-Methyl-2-pentanone (MIBK)	111	13	125	0	89	20	182	103.4	6.9(20)	
cis-1,3-Dichloropropene	46.7	2.5	50	0	93	63	131	42.91	8.5(20)	
trans-1,3-Dichloropropene	42.7	2.5	50	0	85	65	136	39.56	7.6(20)	
1,1,2-Trichloroethane	48.7	2.5	50	0	97	70	131	46.12	5.5(20)	
Toluene	50.8	1.3	50	0	102	68	130	46.58	8.7(20)	
1,3-Dichloropropane	51.1	2.5	50	0	102	70	130	46.49	9.4(20)	
Dibromochloromethane	48.7	2.5	50	0	97	42	155	43.82	10.6(20)	
1,2-Dibromoethane (EDB)	103	5	100	0	103	70	130	94.68	8.5(20)	
Tetrachloroethene	51.9	2.5	50	2.25	99	65	130	48.43	7.0(20)	
1,1,1,2-Tetrachloroethane	51.1	2.5	50	0	102	70	130	46.06	10.3(20)	
Chlorobenzene	50.7	2.5	50	0	101	70	130	46.72	8.1(20)	
Ethylbenzene	49.9	1.3	50	0	99.9	68	130	46.47	7.2(20)	
m,p-Xylene	51.5	1.3	50	0	103	68	131	48.17	6.7(20)	
Bromoform	47.1	2.5	50	0	94	65	143	40.9	14.2(20)	
Styrene	52.1	2.5	50	0	104	59	153	48.52	7.2(37)	
o-Xylene	51.7	1.3	50	0	103	70	130	48.27	6.9(20)	
1,1,2,2-Tetrachloroethane	50.2	2.5	50	0	100	67	130	46.03	8.6(20)	
1,2,3-Trichloropropane	93.6	10	100	0	94	70	130	85.08	9.5(20)	
Isopropylbenzene	51.8	2.5	50	0	104	55	138	47.78	8.1(20)	
Bromobenzene	50.1	2.5	50	0	100	70	130	45.57	9.6(20)	
n-Propylbenzene	53	2.5	50	0	106	67	133	48.91	8.0(30)	
4-Chlorotoluene	54.1	2.5	50	0	108	70	130	49.38	9.1(20)	
2-Chlorotoluene	52.4	2.5	50	0	105	70	130	47.83	9.0(20)	
1,3,5-Trimethylbenzene	51.9	2.5	50	0	104	67	134	47.34	9.2(21)	
tert-Butylbenzene	50.6	2.5	50	0	101	55	147	46.68	8.0(20)	
1,2,4-Trimethylbenzene	52.2	2.5	50	0	104	65	135	47.89	8.7(25)	
sec-Butylbenzene	52.1	2.5	50	0	104	68	135	47.82	8.6(20)	
1,3-Dichlorobenzene	53.4	2.5	50	0	107	70	130	48.68	9.3(20)	
1,4-Dichlorobenzene	50.1	2.5	50	0	100	70	130	46.66	7.2(20)	
4-Isopropyltoluene	51.7	2.5	50	0	103	68	132	48.17	7.1(20)	
1,2-Dichlorobenzene	48.9	2.5	50	0	98	70	130	44.46	9.6(20)	
n-Butylbenzene	55.8	2.5	50	0	112	62	134	51.1	8.8(21)	
1,2-Dibromo-3-chloropropane (DBCP)	216	15	250	0	87	64	130	193.3	11.2(20)	
1,2,4-Trichlorobenzene	55.4	10	50	0	111	62	133	47.84	14.6(29)	
Naphthalene	49.6	10	50	0	99	32	166	42.17	16.2(40)	
Hexachlorobutadiene	100	10	100	0	100	63	130	85.35	16.2(21)	
1,2,3-Trichlorobenzene	58.6	10	50	0	117	55	138	48.59	18.6(36)	
Surr: 1,2-Dichloroethane-d4	46.4		50		93	70	130			
Surr: Toluene-d8	50.2		50		100	70	130			

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Date: *16-Mar-2011*

QC Summary Report

Work Order: 11031007

Surr: 4-Bromofluorobenzene	49.5	50	99	70	130

Comments:

Calculations are based off of raw (non-rounded) data. However, for reporting purposes, all QC data is rounded to three significant figures. Therefore, hand calculated values may differ slightly.

Billing Information :

CHAIN-OF-CUSTODY RECORD

CA

Alpha Analytical, Inc.
255 Glendale Avenue, Suite 21 Sparks, Nevada 89431-5778
TEL: (775) 355-1044 FAX: (775) 355-0406

WorkOrder : BMIS11031007

Report Due By : 5:00 PM On : 23-Mar-2011

Client:
Battelle Memorial Institute
655 West Broadway
Suite 1420
San Diego, CA 92101

Report Attention	Phone Number	EMail Address
David Conner	(619) 726-7311 x	connerd@battelle.org
Betsy Cutie	(614) 424-4899 x	cutiee@batelle.org
Shane Walton	(614) 424-4117 x	waltons@battelle.org

EDD Required : **Yes**

Sampled by : Chase Brogdon

PO : 218013

Client's COC # : 33398 Job : G005862/JPL Groundwater Monitoring

Cooler Temp	Samples Received	Date Printed
2 °C	10-Mar-2011	**10-Mar-2011**

QC Level : DS4 = DOD QC Required : Final Rpt, MBLK, InitCal/ConCal data, LCS, MS/MSD With Surrogates

Alpha Sample ID	Client Sample ID	Matrix	Collection Date	No. of Bottles Alpha	Sub	TAT	Requested Tests 314_W	METALS_DW	VOC_TIC_W	VOC_W					Sample Remarks
BMI11031007-01A	MW-26-2	AQ	03/09/11 08:13	5	0	9	Perchlorate	Cr	VOC by 524 Criteria	VOC by 524 Criteria					
BMI11031007-02A	MW-26-1	AQ	03/09/11 08:37	5	0	9	Perchlorate	Cr	VOC by 524 Criteria	VOC by 524 Criteria					
BMI11031007-03A	EB-12-03/09/11	AQ	03/09/11 08:29	5	0	9	Perchlorate	Cr	VOC by 524 Criteria	VOC by 524 Criteria					
BMI11031007-04A	TB-12-03/09/11	AQ	03/09/11 07:00	1	0	9			VOC by 524 Criteria	VOC by 524 Criteria					Reno Trip Blank 12/14/10
BMI11031007-05A	SB-02-03/09/11	AQ	03/09/11 08:47	5	0	9	Perchlorate	Cr	VOC by 524 Criteria	VOC by 524 Criteria					
BMI11031007-06A	MW-25-5	AQ	03/09/11 09:56	5	0	9	Perchlorate	Cr	VOC by 524 Criteria	VOC by 524 Criteria					
BMI11031007-07A	MW-25-4	AQ	03/09/11 10:23	5	0	9	Perchlorate	Cr	VOC by 524 Criteria	VOC by 524 Criteria					
BMI11031007-08A	MW-25-3	AQ	03/09/11 10:50	5	0	9	Perchlorate	Cr	VOC by 524 Criteria	VOC by 524 Criteria					
BMI11031007-09A	MW-25-2	AQ	03/09/11 11:12	5	0	9	Perchlorate	Cr	VOC by 524 Criteria	VOC by 524 Criteria					
BMI11031007-10A	MW-25-1	AQ	03/09/11 11:32	5	0	9	Perchlorate	Cr	VOC by 524 Criteria	VOC by 524 Criteria					Level IV QC

Comments: Security seals intact. Frozen ice. Temp Blank #2702 received @ 2°C. Level IV QC. Samples should be used as the control spike sample if possible (I.E.: MS/MSD). :

	Signature	Print Name	Company	Date/Time
Logged in by:	Elizabeth Adcox	Elizabeth Adcox	**Alpha Analytical, Inc.**	3.10.11 1218

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.
The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this COC. The liability of the laboratory is limited to the amount paid for the report.
Matrix Type : AQ(Aqueous) AR(Air) SO(Soil) WS(Waste) DW(Drinking Water) OT(Other) Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

33398

Billing Information:
Company Name: BATTELLE
Attn: GERALD TOMPKINS
Address: 505 KING AVE.
City, State, Zip: COLUMBUS, OH 43201
Phone Number: _____ Fax: _____

Alpha Analytical, Inc.
255 Glendale Avenue, Suite 21
Sparks, Nevada 89431-5778
Phone (775) 355-1044
Fax (775) 355-0406

Samples Collected From Which State?
AZ ____ CA X NV ____ WA ____ DOD Site ____
ID ____ OR ____ OTHER ____ Page # 1 of 1

Consultant / Client Name: BATTELLE/DAVID CONNER
Address: 3990 OLD TOWN AVE, C-205
City, State, Zip: SAN DIEGO, CA 92110
Job #: 60058G2
Job Name: SPL GW. MON. 10/11
Report Attention / Project Manager
Name: DAVID CONNER
Email: CONNERD@BATTELLE.ORG.
~~FAX~~ Phone: 614-458-6641 Mobile: 619-726-7311
P.O. #: 218013

Data Validation Level: (III) or IV
EDD/EDF? YES X NO
Global ID #:

Analyses Required: VOC's (524.2); TOTAL Cr (6010B); Cl, (314.0)

Time Sampled	Date Sampled	Matrix* See Key Below	Lab ID Number (Office Use Only)	Sample Description	TAT	Field Filtered	# Containers**	VOC's (524.2)	TOTAL Cr (6010B)	Cl, (314.0)	REMARKS
0813	3/9/11	AQ	BMI1103007 -01	MW-26-2			3v 2p	X	X	X	
0837	↓	↓	-02	MW-26-1			3v 2p	X	X	X	
0829	↓	↓	-03	EB-12-03/09/11			3v 2p	X	X	X	EQUIP. BLANK
0700	3/9/11	AQ	-04	TB-12-03/09/11			1V	X			TRIP BLANK
0847	3/9/11	AQ	-05	SB-02-03/09/11			3v 2p	X	X	X	SOURCE BLANK
0956	3/9/11	AQ	-06	MW-25-5			3v 2p	X	X	X	
1023	↓	↓	-07	MW-25-4			↓	X	X	X	
1050	↓	↓	-08	MW-25-3			↓	X	X	X	
1112	↓	↓	-09	MW-25-2			↓	X	X	X	
1132	3/9/11	AQ	-10	MW-25-1			3v 2p	X	X	X	QC LEVEL III

FOR LAB USE ONLY

ADDITIONAL INSTRUCTIONS:

I, (field sampler), attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action (NAC 445.0636 (c) (2)). Sampled By: CHASE BRADDOCK

Relinquished by: (Signature/Affiliation)	Received by: (Signature/Affiliation)	Date:	Time:
Relinquished by: (Signature/Affiliation) JENSEN	Received by: (Signature/Affiliation) Alpha Analytical	Date: 03/09/11	Time: 1300
Relinquished by: (Signature/Affiliation) Alpha Analytical	Received by: (Signature/Affiliation) Elizabeth Adcox / Alpha	Date: 3.10.11	Time: 1218

*Key: AQ - Aqueous SO - Soil WA - Waste OT - Other AR - Air **: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense. The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this coc. The liability of the laboratory is limited to the amount paid for the report.

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LABORATORY REPORT

February 23, 2011

David Conner
Battelle
4800 Oak Grove Dr. M/S 180-801
Pasadena, CA 91109

RE: JPL GW Mon 1Q11 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on February 22, 2011. For your reference, these analyses have been assigned our service request number P1100678.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L10-3; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-09-TX; Minnesota Department of Health, Certificate No. 11495AA; Washington State Department of Ecology, ELAP Lab ID: C946. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Digitally signed by Sue Anderson
Date: 2011.02.23 13:29:34 -08'00'

Sue Anderson
Project Manager

Client: Battelle
Project: JPL GW Mon 1Q11 / G486090

CAS Project No: P1100678

CASE NARRATIVE

The samples were received intact under chain of custody on February 22, 2011 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Hexavalent Chromium by EPA Method 7196A

No anomalies were encountered during this analysis.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

DETAIL SUMMARY REPORT

Client: Battelle
Project ID: JPL GW Mon 1Q11 / G486090
Service Request: P1100678

Date Received: 2/22/2011
Time Received: 15:35

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	7196A - Cr6
MW-21-5	P1100678-001	Water	2/22/2011	11:37	X
MW-21-4	P1100678-002	Water	2/22/2011	12:35	X
MW-21-3	P1100678-003	Water	2/22/2011	12:35	X
MW-21-2	P1100678-004	Water	2/22/2011	13:00	X
MW-21-1	P1100678-005	Water	2/22/2011	13:37	X
DUPE-01-1Q11	P1100678-006	Water	2/22/2011	00:00	X
EB-01-2/22/11	P1100678-007	Water	2/22/2011	13:22	X
SB-01-2/22/11	P1100678-008	Water	2/22/2011	13:26	X

Acronyms

CA LUFT	California DHS LUFT Metho
ASTM	American Society for Testing and Materials
BTEX	Benzene/Toluene/Ethylbenzene/Xylenes
CAS Number	Chemical Abstract Service Registry Number
CFC	Chlorofluorocarbon
CRDL	Contract Required Detection Limit
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOH or DHS	Department of Health Services
EPA	U.S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified Method
MDL	Method Detection Limit
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl *tert* -Butyl Ether
NA	Not Applicable
NC	Not Calculated
ND	None Detected at or above the Method Reporting/Detection Limit (MRL/MDL)
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	*Standard Methods for the Examination of Water and Wastewater* , 19th Ed., 1995.
SW	*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* , SW-846, Third Edition, 1986 and as amended by Updates I, II, IIA, and IIB.
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)
VOC	Volatile Organic Compound(s)

Qualifiers

U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
J	The result is an estimated concentration that is less than the MRL (PQL), but greater than or equal to the MDL.
B	Analyte detected in the method blank above MRL (PQL).
E	Estimated; result based on response which exceeded the instrument calibration range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
D	The reported result is from a dilution.
X	See case narrative.

Water & Soil - Chain of Custody Record & Analytical Service Request

Page 1 of 1

Columbia Analytical Services INC
An Employee - Owned Company

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day - Standard

CAS Project No. P1100678

CAS Contact:

Company Name & Address (Reporting Information)	Project Name	Project Manager	Phone	Fax
BATTELLE 3990 OLD TOWN AVE. C-205 SAN DIEGO, CA 92110	JPL GW. MON. 1Q11 Project Number 64486090	DAVID CONNEW	(619) 726-7311	(614) 458-6614

P.O. # / Billing Information: 214319/BATTELLE ATTN: GERALD TOMPKINS 505 KING AVE. COLUMBUS, OH 43201

Email Address for Result Reporting:

Sampler (Print & Sign): CHASE BURGDORF

Analysis Method and/or Analytes

Preservative Code

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Matrix	Number of Containers	Volatile Organics GC/MS 624 ☐ 8260B ☐ Oxygenates ☐ TPH Gas ☐	TPH Gas 8015B ☐ BTEX 8021B ☐ MTBE 8021B ☐	TPH Diesel 8015B ☐ (Subcontracted) TPH Diesel Low Level 8015B ☐ (Subcontracted)	TPH FC ☐ 8015M (Subcontracted)	Semi-Volatile Organics GC/MS 625 ☐ 8270C ☐ (Subcontracted)	0	Cr VI (7196)	Remarks
MW-21-5	1	2/22/11	1137	W	1						X		
MW-21-4	2		1211		1						X		
MW-21-3	3		1235		1						X		
MW-21-2	4		1300		1						X		
MW-21-1	5		1337		1						X		
DUPE-01-1Q11	6	2/22/11	"		1						X		DUPLICATE
EB-01-2/22/11	7		1322		1						X		EQUIPMENT BLANK
SB-01-2/22/11	8	2/22/11	1326	W	1						X		SOURCE BLANK

Preservative Key

0	None
1	HCL
2	HNO3
3	H2SO4
4	NaOH
5	Zn Acetate
6	Asc Acid
7	Other

Report Tier Levels - please select

Tier I - (Results/Default if not specified) ____
Tier II - (Results + QC) ____
Tier III - (Data Validation Package) 10% Surcharge ____
Tier V - (client specified) ____

MRL required Yes / No
MDL / PQL / J required Yes / No

EDD required Yes / No
Type: ____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date: 2/22/11	Time: 1454	Received by: (Signature)	Date: 2/22/11	Time: 1454
Relinquished by: (Signature)	Date: 2/22/11	Time: 1535	Received by: (Signature)	Date: 2/22/11	Time: 1535
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank / Ice / No Ice
Temperature 3 °C °C

5 of 22

Client: Battelle **Service Request:** P1100678

Project: JPL GW Mon 1Q11/G486090

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1100678-001.01					
	7196A				
		2/22/11	1546	SMO / MZAMORA	
		2/22/11	1547	P-37 / MZAMORA	
		2/22/11	1600	In Lab / SANDERSON	
		2/22/11	1653	P-37 / SANDERSON	
P1100678-002.01					
	7196A				
		2/22/11	1546	SMO / MZAMORA	
		2/22/11	1547	P-37 / MZAMORA	
		2/22/11	1600	In Lab / SANDERSON	
		2/22/11	1653	P-37 / SANDERSON	
P1100678-003.01					
	7196A				
		2/22/11	1546	SMO / MZAMORA	
		2/22/11	1547	P-37 / MZAMORA	
		2/22/11	1600	In Lab / SANDERSON	
		2/22/11	1653	P-37 / SANDERSON	
P1100678-004.01					
	7196A				
		2/22/11	1546	SMO / MZAMORA	
		2/22/11	1547	P-37 / MZAMORA	
		2/22/11	1600	In Lab / SANDERSON	
		2/22/11	1653	P-37 / SANDERSON	
P1100678-005.01					
	7196A				
		2/22/11	1546	SMO / MZAMORA	
		2/22/11	1547	P-37 / MZAMORA	
		2/22/11	1600	In Lab / SANDERSON	
		2/22/11	1653	P-37 / SANDERSON	
P1100678-006.01					
	7196A				
		2/22/11	1546	SMO / MZAMORA	
		2/22/11	1547	P-37 / MZAMORA	
		2/22/11	1600	In Lab / SANDERSON	
		2/22/11	1653	P-37 / SANDERSON	
P1100678-007.01					
	7196A				
		2/22/11	1546	SMO / MZAMORA	
		2/22/11	1547	P-37 / MZAMORA	
		2/22/11	1600	In Lab / SANDERSON	
		2/22/11	1653	P-37 / SANDERSON	
P1100678-008.01					

Client: Battelle **Service Request:** P1100678
Project: JPL GW Mon 1Q11/G486090

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
	7196A				
		2/22/11	1546	SMO / MZAMORA	
		2/22/11	1547	P-37 / MZAMORA	
		2/22/11	1600	In Lab / SANDERSON	
		2/22/11	1653	P-37 / SANDERSON	

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Sample Acceptance Check Form

Client: Battelle Work order: P1100678

Project: JPL GW Mon 1Q11 / G486090

Sample(s) received on: 2/22/11 Date opened: 2/22/11 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 3 °C			
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☒	☐	☐
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1100678-001.01	125mL Plastic NP					
P1100678-002.01	125mL Plastic NP					
P1100678-003.01	125mL Plastic NP					
P1100678-004.01	125mL Plastic NP					
P1100678-005.01	125mL Plastic NP					
P1100678-006.01	125mL Plastic NP					
P1100678-007.01	125mL Plastic NP					
P1100678-008.01	125mL Plastic NP					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : Battelle
Project Name : JPL GW Mon 1Q11
Project Number : G486090
Sample Matrix : WATER

Service Request : P1100678
Date Collected : 02/22/11
Date Received : 02/22/11

Chromium, Hexavalent

Prep Method : None
Analysis Method : 7196A
Test Notes :

Units : mg/L (ppm)
Basis : NA

Sample Name	Lab Code	PQL	MDL	Dilution Factor	Date Extracted	Date/Time Analyzed	Result	Result Notes
MW-21-5	P1100678-001	0.010	0.004	1	NA	02/22/11 16:30	ND	
MW-21-4	P1100678-002	0.010	0.004	1	NA	02/22/11 16:30	ND	
MW-21-3	P1100678-003	0.010	0.004	1	NA	02/22/11 16:30	ND	
MW-21-2	P1100678-004	0.010	0.004	1	NA	02/22/11 16:30	ND	
MW-21-1	P1100678-005	0.010	0.004	1	NA	02/22/11 16:30	ND	
DUPE-01-1Q11	P1100678-006	0.010	0.004	1	NA	02/22/11 16:30	ND	
EB-01-2/22/11	P1100678-007	0.010	0.004	1	NA	02/22/11 16:30	ND	
SB-01-2/22/11	P1100678-008	0.010	0.004	1	NA	02/22/11 16:30	ND	
Method Blank	P1100678-MB	0.010	0.004	1	NA	02/22/11 16:30	ND	

Approved By Karen Ryan Date : 2/23/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1100678
Project:	JPL GW Mon. 1Q11 / G486090	**Date Analyzed:**	02/22/11

Title: Initial and Continuing Calibration Blank (ICB and CCB) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	PQL	MDL	Result
ICB	0.010	0.004	ND
CCB1	0.010	0.004	ND
CCB2	0.010	0.004	ND

Approved By: Karen Rya Date: 2/23/11

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon. 1Q11 / G486090

Service Request: P1100678
Date Analyzed: 02/22/11

Title: Initial and Continuing Calibration Verification (ICV and CCV) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	True Value	Result	Percent Recovery	Acceptance Criteria
ICV	0.0500	0.0481	96	90-110
CCV1	0.0500	0.0481	96	90-110
CCV2	0.0500	0.0490	98	90-110

Approved By: Karen Rya Date: 2/23/11

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100678
Project Name :	JPL GW Mon 1Q11	**Date Collected :**	NA
Project Number :	G486090	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	02/22/11

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1100678-LCS	Basis :	NA

Test Notes :

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Chromium, Hexavalent	None	7196A	0.0400	0.0396	99	90-109	

Approved By Karen Ryan Date : 2/23/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100678
Project Name :	JPL GW Mon 1Q11	**Date Collected :**	02/22/11
Project Number :	G486090	**Date Received :**	02/22/11
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	02/22/11

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name :	MW-21-5		Units :	mg/L (ppm)
Lab Code :	P1100678-001MS	P1100678-001DMS	Basis :	NA
Test Notes :				

Analyte	Prep Method	Analysis Method	PQL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Spike Recovery MS	Spike Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Chromium, Hexavalent	None	7196A	0.010	0.0500	0.0500	ND	0.0524	0.0524	105	105	78-112	<1	

Approved By Karen Ryan Date : 2/23/11

Report By:SAnderson

Columbia Analytical Services™

pH Run Log

Service Request #(s): 678

Time: 0750

Sample	VWR lot #	Exp.
pH 2 Buffer	524-1104100 2	1/2012
pH 4 Buffer	524-1104100 3	8/31/12
pH 7 Buffer	524-1104100 4	9/30/12
pH 10 Buffer	524-0302100 1	9/30/11

Slope	Prep.Run #
98.9%	—
	Run#
	—

pH in liquid: (1) 9040B, (2) 9040C **pH in solid:** (3) 9045C, (4) 9045D (*Note method number in column labeled # below*)

pH adjustment: (5) 7196A, (6) 7199 (Note method # in column labeled #)

Sample	#	pH	Temp. °C
pH 2.000	5	1.975	20.8°
pH 4.000		3.987	20.9°
pH 7.000		7.002	20.8°
pH 10.000		9.979	21.3°
Ref#: 524-1123050 2 IV = 6.416		6.356	98% 21.0°
DI H2O		2.035	17.7°
pH 2.000		1.974	20.9°
TIME: 1600			
pH 2.000	5	2.002	22.8°
678-1.01		2.077	9.0°
-2.01		1.995	9.3°
-3.01		1.871	10.6°
-4.01		2.046	11.3°
-5.01		1.907	11.8°
-6.01		1.977	12.5°
-7.01		1.946	12.4°
-8.01		1.990	11.5°

Sample	#	pH	Temp. °C
pH 2.000	5	2.001	22.4°
		Space not used	

pH Adjustments: ~~7196A~~: Diluted/Conc H_2SO_4 EMD 49284 EXP: 11/20/14

☐ **7199A**: Diluted NaOH _____ EXP: _____

Comments: _____

* Soil or Solid prep: 1:1(wt:vol) with DI water: ** Samples received past recommended hold time.

Date buffers and filling solution changed: 2/21/11

Note: ATC probe used; therefore, temperature correction calculation is not necessary.

Analyst: _____ Date: 2/22/11

Reviewer: KR Date: 2/23/11

pH.XLS

Hexavalent Chromium (Liquids)

Columbia Analytical Services™

Method EPA 7196A

Service Request#(s): 678 Run#: 236883

Stock#: 524-10191001 T.V=10PPM EXP: 3/1/11 Prep Run#: —

ICV/CCV#: 524-10151001 @10 T.V=10PPM EXP: 08/20/12 Conc. H_2SO_4 Lot#: EMD 49284 EXP: 11/20/14

Coloring Reagent Ref#: 524-0221102 EXP: 3/31/11

Working Curve:

Prep Dilution	NA	0.05/50	0.25/50	0.5/50	Corr. Coeff.
Concentration mg/L	0.00	0.01	0.05	0.1	0.99988106
Absorbance @ 540 nm	0.000	0.012	0.057	0.117	

	Sample #	Sample Vol.(mL)	Dilution	pH ✓	Bkg.	Absorbance @ 540nm	Corrected Abs. (minus bkg.)	Results - mg/L	QA/QC - %R / RPD
	ICB	10 ml	—	✓	0.000	0.000	0.000	0.000124	<0.004
1	ICV 0.0500 PPM		—	✓	0.000	0.056	0.056	0.0481	96%
2	MB		—	✓	0.000	0.000	0.000	0.000124	<0.004
3	LCS 0.0400 PPM		—	✓	0.000	0.046	0.046	0.0396	99%
4	678-1.01		—	✓	0.001	0.003	0.002	0.00184	<0.004
5	-1.01 MS 0.0500PPM		—	✓	0.001	0.062	0.061	0.0524	105% 4%
6	-1.01 MSD ↓		—	✓	0.001	0.062	0.061	0.0524	105% 0 RPD
7	-2.01		—	✓	0.001	0.004	0.003	0.00270	<0.004
8	-2.01 MS 0.0300PPM		—	✓	0.001	0.036	0.035	0.0301	100%
9	-3.01		—	✓	0.001	0.003	0.002	0.00184	<0.004
10	-4.01		—	✓	0.001	0.004	0.003	0.00270	<0.004
11	-5.01		—	✓	0.005	0.007	0.002	0.00184	<0.004
12	CCV1 0.0500PPM		—	✓	0.000	0.056	0.056	0.0481	96%
	CCB1		—	✓	0.000	0.000	0.000	0.000124	<0.004
13	678-6.01		—	✓	0.001	0.003	0.002	0.00184	<0.004
14	-7.01		—	✓	0.001	0.001	0.000	0.000124	<0.004
15	-8.01		—	✓	0.001	0.001	0.000	↓	↓
16	CCV2 0.0500PPM		—	✓	0.000	0.057	0.057	0.0490	98%
17	CCB2	↓	—	✓	0.000	0.000	0.000	0.000124	<0.004

pH Requirement: Method 7196A (2 ± 0.5) * Samples filtered prior to pH adjustment

ICV/CCV spiked with 0.25 ml of 524-10151001 @10 ↑ 50 ml of pH adjusted DI WATER (T.V.= 0.05 ppm)

MS/MSD spiked with 0.05 ml of 524-10191001 ↑ 10 ml of pH adjusted sample (T.V.= 0.05 ppm)

LCS spiked with 0.2 ml of ↓ ↑ 50 ml of pH adjusted DI Water (T.V.= 0.04 ppm)

Verification Standard Spiked 524-10191001 @10 2/22/11 ml of 524-10191001 @10 ↑ 10 ml of sample (T.V.= 0.03 ppm)

Comments:

Prepared By: Date/Time: 2/22/11 @ 1615

Analyzed By: Date/Time: 2/22/11 @ 1630

Reviewed By: Date: 2/23/11

Cr6LIQ.xls

11/23/09 SIG-1123090 2 1000 ppm SO_3 (ICV/CCV)
Sr 0.1607g Na_2SO_3 (Mallinckrodt; H25469; EXP 8/11/1
↑ 100ml w/ DI
EXP: 5/23/10

11/23/09 SIG-1123090 3 A, B, C, D pH REFERENCE
Sr PURCHASED
ERA CAT # 977
LOT # 129934
EXP: 1/2012

11/24/09 SIG-1124090 1 1000 ppm SO_4 Standard
Sr PURCHASED CAT # ICC-006
LOT # K007794
EXP: 9/30/13

Sr 11/25/09
11/25/09 SIG-~~1125~~ 1125090 1 0.1N H_2SO_4
Sr 5.6ml conc H_2SO_4 (EMD 4705D EXP: 9/13/10)
EXP: ~~9/13/10~~ 9/13/10
Sr 11/25/09

11/30/09 SIG-1130090 1 Cr^{6+} Coloring Reagent
Sr 0.250g diphenylcarbohydrazide (EMD) 47103ED; EXP: 1/30/13) ↑ 50ml w/ Acetone (EMD 4715 4D; EXP: 9/24/12
EXP: 12/20/09

11/30/09 SIG-1130090 2 25133 ppb Stock for O_3 in Air
Sr 0.05ml Pyridine-4-Carboxaldehyde (Alfa Aesar LOT 10140598; EXP 8/11/12
↑ 500ml deionized H_2O
EXP: 12/14/09

11/30/09 SIG-1130090 3 25133 ppb ICV/CCV for O_3 in Air
Sr 0.05ml Pyridine-4-carboxaldehyde (TCI LOT # IGIINC; EXP: 8/10/12
↑ 500ml w/ DI H_2O
EXP: 12/14/09

Reviewed And Approved By:
Initial: KL Date: 12/22/09

1/27/10 JR 524-0127001 10000PPM SO_3 (STOCK)
0.1541 g Na_2SO_3 (JT Baker H10627 EXP: 8/31/14)
↑ 100ml w/ DI H_2O
EXP: 7/27/10

1/27/10 JR 524-0127002 1000PPM SO_3 (ICV/CCV)
0.1607g Na_2SO_3 (Mallinckrodt H25469, EXP: 8/11/14) ↑ 100ml w/ DI H_2O
EXP: 7/27/10

2/1/10 JR 524-02011001 ICV/CCV Cr^{6+} Soln T.V = 0.579PPM
0.5ml 319-04090904 (115.8PPM; EXP: 12/2010) ↑ 100ml w/ DI H_2O
EXP: 2/15/10

2/1/10 JR 524-02011002 Cr^{6+} Coloring Reagent
0.2500g Diphenylcarbohydrazide (EMD ~~4710~~ 4710373I 2/1/10
EXP: 1/30/13 ↑ 50 ml w/Acetone (EMD 471540; EXP: 9/24/1
EXP: 2/15/10

2/2/10 JR 524-02021001 Cr^{6+} 1000 PPM STOCK
Purchased Inorganic Ventures CGCR(6)1-1
LOT # C2-CR03026
EXP: 3/1/11

3/1/10 SV — 524-03011001 pH 4.000 Buffer
Purchased 500 ml CAT # 5657-01
JT BAKER LOT # H31526
EXP 8/31/11

3/1/10 SV — 524-03011002 pH 7.000 Buffer
Purchased 500 ml CAT # 5656-01
JT BAKER LOT # H47531
EXP: 1/31/12

3/1/10 SV — 524-03011003 1000 PPM Cl (LCS)
Purchased 120 ml Cat # 1955-4
RICCA CHEM CO LOT # 1001395
EXP: 7/2011

3/1/10 SV — 524-03011004 NH3 Filling Sol'n
Purchased 60 ml Orion 951202
Thermo Scientific LOT # MT1
P/N: 702613-A04
EXP: 3/1/11

3/2/10 SV — 524-03021001 pH 10.000 buffer
Purchased 500 ml Cat # 5655-01
JT Baker LOT H34508
EXP: 9/30/11

10/6/10 524-10061001 25133 ppb stock for O3

0.05 ml Pyridine-4-carboxaldehyde Alfa Aesar
10146598 ;Exp: 8/11/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

10/6/10 524-10061002 25133 ppb ICV/CCV for O3

0.05 ml Pyridine-4-carboxaldehyde TCI
(IG3INC ;Exp: 8/10/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

10/6/10 524-10061003 MBTH SO/17

0.5000 g MBTH (Aldrich 54696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 49284; EXP 11/2

EXP: 10/7/10

10/15/10 524-10151001 Cr6+ ICV/CCV Stock
Purchased 100PPM Cr6+
RICCA Chemical Co Cat No 2095-16
500ml Plastic
LOT # 101017 7
EXP: 3/20/12

10/15/10 524-10151002 500PPM NO_2 Stock
Purchased
RICCA Chemical Co Cat No: 5444.5-4
LOT # 101027 1 120ml amber glass
EXP: 4/2011

524-10191001 10ppm Cr6+ Std/Ln

10/19/10 1.0ml S24-0202 1001 (1000ppm Cr6+; EXP: 3/1/11) ↑ 100ml w/ DI H2O
EXP: 3/1/11

10/19/10 524-10191002 ICV/CCV Cr6+ T.V = 0.579ppm
0.5ml S19-0409090 4 (T.V = 115.8 mg/L; EXP 12/2010
↑ 100ml w/ DI
EXP: 11/2/10

10/19/10 524-10191003 Cr6+ Coloring Reagent
0.2500g 1,5-Diphenylcarbohydrazide (LOT D 471037 21; EXP. 1/30/13) ↑ 50ml Acetone (LOT 47152 4; EXP: 9/24/12
EXP: 11/2/10

10/22/10 524-10221001 25133ppb Stock 03

0.05 ml Pyridine-4-carboxaldehyde Alfa ACSAR
10140598 ;Exp: 8/11/12) up to 500 ml w/ DI Water.

EXP: 11/5/10

10/22/10 524-10221002 25133ppb ICV/CCV Cr6+

0.05 ml Pyridine-4-carboxaldehyde TCI
IGENC ;Exp: 8/10/12) up to 500 ml w/ DI Water.

EXP 11/05/10

10/28/10 S24-10281002 1000 ppm SO_3 ICV/CCV

0.1607 Na_2SO_3 (Mallinckrodt Lot #H25469; Exp: 8/11/14) up to 100 ml w/ DI Water.

EXP: 11/11/10

11/1/10 S24-11011001 ICV/CCV Cr^{6+} T.V = 0.579 ppm

0.5 ml S19-04090904 (T.V = 115.8 mg/L ; EXP: 12/2010)

↑ 100 ml W/ DI

EXP: 11/15/10

11/1/10 S24-11011002 Cr^{6+} Coloring Reagent

0.2500g 1,5-Diphenylcarbohydrazide (EMD 47103721; EXP. 1/30/13) ↑ 50 ml W/ Acetone (EMD 47154D; EXP. 9/24/12).

EXP: 11/15/10

11/4/10 S24-11041001 A→E pH Filling Soln

PURCHASED (3M KCl)

Thermo Scientific P/N 702613-A02

LOT Code: 0R1

EXP: 11/4/11

11/4/10 S24-11041002 pH 2.000 Buffer

Purchased

BDH CAT NO: 5010-500ml

LOT # 1002199

EXP: 1/2012

11/4/10 524-11041003 pH 4.000 Buffer
Purchased
JT Baker Cat No: 5657-01 500 ml
LOT # J30507
EXP: 8/31/12

11/4/10 524-11041004 pH 7.000 Buffer
Purchased
J.T. Baker Cat No: 5656-01 500 ml
LOT # J35515
EXP: 9/30/12

11/5/10 524-11051001 MBTH Std

0.5000 g MBTH (Aldrich 516696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 4198 EXP: 11/20/14

EXP: 11/6/10

11/8/10 524-11081001 1000 ppm NH_3
0.3141g NH_4Cl (EMD 49198931; EXP: 10/19/14) q 100 ml
w/ 524-10221006 EXP: 10/22/11
EXP: 10/22/11

11/12/10 524-11121001 1000 ppm SO_3 STOCK

0.1591 Na2SO3 (JT Baker Lot #H10627; Exp: 8/31/14) up to 100 ml w/ DI Water.

EXP: 11/26/10

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LABORATORY REPORT

March 1, 2011

David Conner
Battelle
4800 Oak Grove Dr. M/S 180-801
Pasadena, CA 91109

RE: JPL GW Mon 1Q11 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on February 23, 2011. For your reference, these analyses have been assigned our service request number P1100688.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L10-3; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-09-TX; Minnesota Department of Health, Certificate No. 11495AA; Washington State Department of Ecology, ELAP Lab ID: C946. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Digitally signed by Sue Anderson
Date: 2011.03.01 15:03:07 -08'00'

Sue Anderson
Project Manager

Client: Battelle CAS Project No: P1100688
Project: JPL GW Mon 1Q11 / G486090

CASE NARRATIVE

The samples were received intact under chain of custody on February 23, 2011 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Hexavalent Chromium by EPA Method 7196A

No anomalies were encountered during this analysis.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

DETAIL SUMMARY REPORT

Client: Battelle
Project ID: JPL GW Mon 1Q11 / G486090
Service Request: P1100688

Date Received: 2/23/2011
Time Received: 13:20

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	7196A - Cr6
MW-14-3	P1100688-001	Water	2/23/2011	10:42	X
MW-14-2	P1100688-002	Water	2/23/2011	11:20	X
MW-14-1	P1100688-003	Water	2/23/2011	12:05	X
DUPE-02-1Q11	P1100688-004	Water	2/23/2011	00:00	X
EB-02-02/23/11	P1100688-005	Water	2/23/2011	11:46	X

Columbia Analytical Services, Inc.

Acronyms

CA LUFT	California DHS LUFT Method
ASTM	American Society for Testing and Materials
BTEX	Benzene/Toluene/Ethylbenzene/Xylenes
CAS Number	Chemical Abstract Service Registry Number
CFC	Chlorofluorocarbon
CRDL	Contract Required Detection Limit
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOH or DHS	Department of Health Services
EPA	U.S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified Method
MDL	Method Detection Limit
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl *tert* -Butyl Ether
NA	Not Applicable
NC	Not Calculated
ND	None Detected at or above the Method Reporting/Detection Limit (MRL/MDL)
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	*Standard Methods for the Examination of Water and Wastewater*, 19th Ed., 1995.
SW	*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, 1986 and as amended by Updates I, II, IIA, and IIB.
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)
VOC	Volatile Organic Compound(s)

Qualifiers

U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
J	The result is an estimated concentration that is less than the MRL (PQL), but greater than or equal to the MDL.
B	Analyte detected in the method blank above MRL (PQL).
E	Estimated; result based on response which exceeded the instrument calibration range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
D	The reported result is from a dilution.
X	See case narrative.

Water & Soil - Chain of Custody Record & Analytical Service Request

Columbia Analytical Services INC.
An Employee - Owned Company

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day - Standard

CAS Project No. P1100688

CAS Contact:

Company Name & Address (Reporting Information)
BATTELLE
3990 OLD TOWN AVE. C-205
SAN DIEGO, CA 92110

Project Name
JPL GW. MON. 1Q11

Project Number
G486090

Project Manager
DAVID CONNEN

P.O. # / Billing Information
21439/BATTELLE
ATTN: GERALD TOMPKINS
505 KING AVE.
COLUMBUS, OH 43201

Phone
(619) 726-7311

Fax
(614) 458-6614

Email Address for Result Reporting

Sampler (Print & Sign)
CHASE BROGDON

Analysis Method and/or Analytes

Preservative Code

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Matrix	Number of Containers	Volatile Organics GC/MS 624 ☐ 8260B ☐ Oxygenates ☐ TPH Gas ☐	TPH Gas 8015B ☐ BTEX 8021B ☐ MTBE 8021B ☐	TPH Diesel 8015B ☐ (Subcontracted)	TPH Diesel Low Level 8015B ☐ (Subcontracted)	TPH FC ☐ 8015M (Subcontracted)	Semi-Volatile Organics GC/MS 625 ☐ 8270C ☐ (Subcontracted)	0 Cr VI (7196)	Remarks
MW-14-3	1	2/23/11	1042	W	1							X	
MW-14-2	2		1120		1							X	
MW-14-1	3		1205		1							X	
DUPE-02-110223	4		"		1							X	DUPLICATE
EB-02-02/23/11	5	2/23/11	1146	W	1							X	EQUIPMENT BLANK

Preservative Key

0	None
1	HCL
2	HNO3
3	H2SO4
4	NaOH
5	Zn Acetate
6	Asc Acid
7	Other

Report Tier Levels - please select

Tier I - (Results/Default if not specified) ____
Tier II - (Results + QC) ____
Tier III - (Data Validation Package) 10% Surcharge ____
Tier V - (client specified) ____

MRL required Yes / No
MDL / PQL / J required Yes / No

EDD required Yes / No
Type: ____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date: 2/23/11	Time: 1236	Received by: (Signature) M Turner	Date: 2/24/11	Time: 1136
Relinquished by: (Signature)	Date: 2/23/11	Time: 1320	Received by: (Signature)	Date: 2/23/11	Time: 1320
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank / Ice / No Ice
Temperature 3.0C °C

Client: Battelle **Service Request:** P1100688

Project: JPL GW Mon 1Q11/G486090

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1100688-001.01					
	7196A				
		2/23/11	1412	SMO / MZAMORA	
		2/23/11	1412	P-37 / MZAMORA	
		2/23/11	1421	In Lab / SANDERSON	
		2/23/11	1601	P-37 / SANDERSON	
P1100688-002.01					
	7196A				
		2/23/11	1412	SMO / MZAMORA	
		2/23/11	1412	P-37 / MZAMORA	
		2/23/11	1421	In Lab / SANDERSON	
		2/23/11	1601	P-37 / SANDERSON	
P1100688-003.01					
	7196A				
		2/23/11	1412	SMO / MZAMORA	
		2/23/11	1412	P-37 / MZAMORA	
		2/23/11	1421	In Lab / SANDERSON	
		2/23/11	1601	P-37 / SANDERSON	
P1100688-004.01					
	7196A				
		2/23/11	1412	SMO / MZAMORA	
		2/23/11	1412	P-37 / MZAMORA	
		2/23/11	1421	In Lab / SANDERSON	
		2/23/11	1601	P-37 / SANDERSON	
P1100688-005.01					
	7196A				
		2/23/11	1412	SMO / MZAMORA	
		2/23/11	1412	P-37 / MZAMORA	
		2/23/11	1421	In Lab / SANDERSON	
		2/23/11	1601	P-37 / SANDERSON	

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Sample Acceptance Check Form

Client: Battelle Work order: P1100688

Project: JPL GW. Mon. 1Q11 / G486090

Sample(s) received on: 2/23/11 Date opened: 2/23/11 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 3 °C			
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1100688-001.01	125mL Plastic NP					
P1100688-002.01	125mL Plastic NP					
P1100688-003.01	125mL Plastic NP					
P1100688-004.01	125mL Plastic NP					
P1100688-005.01	125mL Plastic NP					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : Battelle
Project Name : JPL GW Mon 1Q11
Project Number : G486090
Sample Matrix : WATER

Service Request : P1100688
Date Collected : 02/23/11
Date Received : 02/23/11

Chromium, Hexavalent

Prep Method : None
Analysis Method : 7196A
Test Notes :

Units : mg/L (ppm)
Basis : NA

Sample Name	Lab Code	PQL	MDL	Dilution Factor	Date Extracted	Date/Time Analyzed	Result	Result Notes
MW-14-3	P1100688-001	0.010	0.004	1	NA	02/23/11 15:00	ND	
MW-14-2	P1100688-002	0.010	0.004	1	NA	02/23/11 15:00	ND	
MW-14-1	P1100688-003	0.010	0.004	1	NA	02/23/11 15:00	ND	
DUPE-02-1Q11	P1100688-004	0.010	0.004	1	NA	02/23/11 15:00	ND	
EB-02-02/23/11	P1100688-005	0.010	0.004	1	NA	02/23/11 15:00	ND	
Method Blank	P1100688-MB	0.010	0.004	1	NA	02/23/11 15:00	ND	

Approved By Karen Ryan Date : 2/25/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1100688
Project:	JPL GW Mon. 1Q11 / G486090	**Date Analyzed:**	02/23/11

Title: Initial and Continuing Calibration Blank (ICB and CCB) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	PQL	MDL	Result
ICB	0.010	0.004	ND
CCB1	0.010	0.004	ND

Approved By: Karen Ryan Date: 2/25/11

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1100688
Project:	JPL GW Mon. 1Q11 / G486090	**Date Analyzed:**	02/23/11

Title: Initial and Continuing Calibration Verification (ICV and CCV) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	True Value	Result	Percent Recovery	Acceptance Criteria
ICV	0.0500	0.0485	97	90-110
CCV1	0.0500	0.0485	97	90-110

Approved By: Karen Ryan Date: 2/25/11

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100688
Project Name :	JPL GW Mon 1Q11	**Date Collected :**	NA
Project Number :	G486090	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	02/23/11

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1100688-LCS	Basis :	NA
Test Notes :			

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Chromium, Hexavalent	None	7196A	0.0400	0.0375	94	90-109	

Approved By Karen Ryan Date : 2/25/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100688
Project Name :	JPL GW Mon 1Q11	**Date Collected :**	02/23/11
Project Number :	G486090	**Date Received :**	02/23/11
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	02/23/11

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name :	MW-14-3		Units :	mg/L (ppm)
Lab Code :	P1100688-001MS	P1100688-001DMS	Basis :	NA
Test Notes :				

Analyte	Prep Method	Analysis Method	PQL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Spike Recovery MS	Spike Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Chromium, Hexavalent	None	7196A	0.010	0.0500	0.0500	ND	0.0466	0.0476	93	95	78-112	2	

Approved By Karen Rya Date : 2/25/11

Report By:SAnderson

Columbia Analytical Services™

pH Run Log

Service Request #(s): 688

Time: 0750

Sample	VWR lot #	Exp.
pH 2 Buffer	S24-1104 1002	1/2012
pH 4 Buffer	S24-1104 1003	8/31/12
pH 7 Buffer	S24-1104 1004	9/30/12
pH 10 Buffer	S24-0302 1001	9/30/11

Slope	Prep.Run #
99.3%	—
	Run#
	—

pH in liquid: (1) 9040B, (2) 9040C **pH in solid:** (3) 9045C, (4) 9045D (*Note method number in column labeled # below*)

pH adjustment:(5) 7196A,(6) 7199 (Note method # In column labeled #)

Sample	#	pH	Temp. °C
pH 2.000	5	2.004	20.9°
pH 4.000		3.991	20.7°
pH 7.000		6.995	20.8°
pH 10.000		10.005	20.8°
Ref#: S24-1123090 3C Tv = 6.46 Exp. 11/2012		6.369	20.9°
DI H_2O		2.046	16.9°
pH 2.000		2.000	20.5°
TIME: 1425 SR			
pH 2.000	5	2.012	22.3°
6.88 - 1.01		1.858	7.8°
-2.01		2.099	8.0°
-3.01		2.089	7.8°C
-4.01		2.037	8.5°C
-5.01		1.911	9.0°
pH 2.000		2.022	21.6°

Sample	#	pH	Temp. °C

Spike not added

pH Adjustments: ☒ **7196A**: Diluted/Conc H_2SO_4 EMD 49284 EXP: 11/12/14

☐ **7199A**: Diluted NaOH _____ EXP: _____

Comments: _____

* Soil or Solid prep: 1:1(wt:vol) with DI water: ** Samples received past recommended hold time.

Date buffers and filling solution changed: 2/21/11

Note: ATC probe used; therefore, temperature correction calculation is not necessary.

Analyst: _____ Date: 2/23/11

Reviewer: KR Date: 2/23/11

pH.XLS

Columbia Analytical Services™

Hexavalent Chromium (Liquids)

Method EPA 7196A

Service Request#(s): 688 Run#: 236985

Stock#: 524-10191001 T.V=10ppm EXP: 3/1/11 Prep Run#: —

ICV/CCV#: 524-10151001 T.V=1000ppm EXP: 2/2012 Conc. H_2SO_4 Lot#: EMD 49284 EXP: 11/20/14

Coloring Reagent Ref#: 524-02211102 EXP: 3/21/11

Working Curve:

Prep Dilution	NA	0.05/50	0.25/50	0.5/50	Corr. Coeff.
Concentration mg/L	0.00	0.01	0.05	0.1	0.99971782
Absorbance @ 540 nm	0.000	0.010	0.052	0.109	

	Sample #	Sample Vol.(mL)	Dilution	pH ✓	Bkg.	Absorbance @ 540nm	Corrected Abs. (minus bkg.)	Results - mg/L	QA/QC - %R / RPD
1	ICB	10ml	—	✓	0.000	0.000	0.000	0.000791	<0.004
2	ICV 0.0500ppm		—	✓	0.000	0.052	0.052	0.0485	97%
3	MB		—	✓	0.000	0.000	0.000	0.000791	<0.004
4	LCS 0.0400ppm		—	✓	0.000	0.040	0.040	0.0375	94%
5	688-1.01		—	✓	0.000	0.001	0.001	0.00171	<0.004
6	-1.01 MS 0.0500ppm		—	✓	0.000	0.050	0.050	0.0466	93% 2% RPD
7	-1.01 MSD		—	✓	0.000	0.051	0.051	0.0476	95%
8	-2.01		—	✓	0.000	0.000	0.000	0.000791	<0.004
9	-2.01 MS 0.0400ppm		—	✓	0.000	0.029	0.029	0.0274	91%
10	-3.01		—	✓	0.000	0.000	0.000	0.000791	<0.004
11	-4.01		—	✓	0.000	0.000	0.000	↓	↓
12	-5.01		—	✓	0.000	0.000	0.000	↓	↓
13	CCV1 0.0500ppm		—	✓	0.000	0.052	0.052	0.0485	97%
14	CCB1	↓	—	✓	0.000	0.000	0.000	0.000791	<0.004
15									
16									
17									

pH Requirement: Method 7196A (2 ± 0.5) * Samples filtered prior to pH adjustment

ICV/CCV spiked with 0.25 ml of 524-10151001 @ 1/10 ↑ 50 ml of pH adjusted DI WATER (T.V.= 0.0500 ppm)

MS/MSD spiked with 0.05 ml of 524-10191001 ↑ 10 ml of pH adjusted sample (T.V.= 0.05 ppm)

LCS spiked with 0.2 ml of — ↑ 50 ml of pH adjusted DI Water (T.V.= 0.04 ppm)

Verification Standard Spiked 0.3 ml of ↓ @ 1/10 ↑ 10 ml of sample (T.V.= 0.03 ppm)

Comments: —

Prepared By: _____ Date/Time: 2/23/11 @ 1445

Analyzed By: _____ Date/Time: 2/23/11 @ 1500

Reviewed By: _____ Date: 2/23/11

Cr6LIQ.xls

11/23/09 SIG-1123090Z 1000 ppm SO_3 (ICV/CCV)
SR 0.1607g Na_2SO_3 (Mallinckrodt; H25469; EXP 8/11/12)
↑ 100ml w/ DI
EXP: 5/23/10

11/23/09 SIG-1123090 3 A, B, C, D pH REFERENCE
SR PURCHASED
ERA CAT # 977
LOT # 129934
EXP: 1/2012

11/24/09 SIG-1124090 1 1000 ppm SO_4 Standard
SR PURCHASED CAT # ICC-006
LOT # K007794
EXP: 9/30/13

SR 11/25/09
11/25/09 SIG-~~H25~~ 1125090 1 0.1N H_2SO_4
SR 5.6ml conc H_2SO_4 (EMD 4705D EXP: 9/13/10)
EXP: ~~H25~~ 9/13/10
SR 11/25/09

11/30/09 SIG-1130090 1 Cr^{6+} Coloring Reagent
SR 0.250g diphenylcarbohydrazide (EMD) 4710ZD; EXP: 1/30/13) ↑ 50ml w/ Acetone (EMD 4715ZD; EXP: 9/24/12
EXP: 12/20/09

11/30/09 SIG-1130090 2 25133 ppb Stock for O_3 in Air
SR 0.05ml Pyridine-4-Carboxaldehyde (Alfa Aesar LOT 10140598; EXP 8/11/12)
↑ 500ml deionized H_2O
EXP: 12/14/09

11/30/09 SIG-1130090 3 25133 ppb ICV/CCV for O_3 in Air
SR 0.05ml Pyridine-4-carboxaldehyde (TCI LOT # IGIINC; EXP: 8/10/12)
↑ 500ml w/ DI H_2O
EXP: 12/14/09

Reviewed And Approved By:
Initial: KL Date: 12/22/09

1/27/10 524-0127001 10000ppm SO_3 (STOCK)
JR 0.1541 g Na_2SO_3 (JT Baker H10627 EXP: 8/31/14)
↑ 100ml w/ DI H_2O
Exp: 7/27/10

1/27/10 524-0127002 1000ppm SO_3 (ICV/CCV)
JR 0.1607g Na_2SO_3 (Mallinckrodt H25469, Exp: 8/11/14) ↑ 100ml w/ DI H_2O
Exp: 7/27/10

2/1/10 524-02011001 ICV/CCV Cr^{6+} Soln T.V = 0.579ppm
JR 0.5ml 319-04090904 (115.8ppm; EXP: 12/2010) ↑ 100ml w/ DI H_2O
EXP: 2/15/10

2/1/10 524-02011002 Cr^{6+} Coloring Reagent
JR 0.2500g Diphenylcarbohydrazide (EMD ~~47103~~ 4710371 5/21/10
Exp: 1/30/13) ↑ 50 ml w/Acetone (EMD 47154D; EXP: 9/24/1
EXP: 2/15/10

2/2/10 524-02021001 Cr^{6+} 1000 ppm STOCK
JR Purchased Inorganic Ventures CGCR(6)1-1
LOT # C2-CR03026
EXP: 3/1/11

3/1/10 SV
524-03011001 pH 4.000 Buffer
Purchased 500 ml CAT # 5657-01
JT BAKER LOT # H31526
EXP 8/31/11

3/1/10 SV
524-03011002 pH 7.000 Buffer
Purchased 500 ml CAT # 5656-01
JT BAKER LOT # H47531
EXP: 1/31/12

3/1/10 SV
524-03011003 1000 PPM Cl (LCS)
Purchased 120 ml Cat # 1955-4
RICCA CHEM CO LOT # 1001395
EXP: 7/2011

3/1/10 SV
524-03011004 NH3 Filling Sol'n
Purchased 60 ml Orion 951202
Thermo Scientific LOT # MT1
P/N: 702613-A04
EXP: 3/1/11

3/2/10 SV
524-03021001 pH 10.000 buffer
Purchased 500 ml Cat # 5655-01
JT Baker LOT H34508
EXP: 9/30/11

10/6/10 524-10061001 25133 ppb stock for O3

0.05 ml Pyridine-4-carboxaldehyde Alfa Aesar
10146598 ;Exp: 8/11/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

10/6/10 524-10061002 25133 ppb ICV/CCV for O3

0.05 ml Pyridine-4-carboxaldehyde TCI
(IG3INC ;Exp: 8/10/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

10/6/10 524-10061003 MBTH SO/17

0.5000 g MBTH (Aldrich 54696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 49284; EXP 11/2

EXP: 10/7/10

10/15/10 524-10151001 Cr6+ ICV/CCV Stock
Purchased 100PPM Cr6+
RICCA Chemical Co Cat No 2095-16
500ml Plastic
LOT # 101017 7
EXP: 3/20/12

10/15/10 524-10151002 500PPM NO_2 Stock
Purchased
RICCA Chemical Co Cat No: 5444.5-4
LOT # 101027 1 120ml amber glass
EXP: 4/2011

524-10191001 10PPM Cr6+ Std/Ln

10/19/10 1.0ml S24-0202 1001 (1000PPM Cr6+; EXP: 3/1/11) ↑ 100M
W/DI H2O
EXP: 3/1/11

10/19/10 524-10191002 ICV/CCV Cr6+ T.V = 0.579PPM
0.5ml S19-0409090L4 (T.V = 115.8 mg/L; EXP 12/2010
↑ 100ml W/DI
EXP: 11/2/10

10/19/10 524-10191003 Cr6+ Coloring Reagent
0.2500g 1,5-Diphenylcarbohydrazide (LOT D471037121; EXP. 1/30/13) ↑ 50ml Acetone (LOT 471524; EXP: 9/24/12
EXP: 11/2/10

10/22/10 524-1022 1001 25133ppb Stock 03

0.05 ml Pyridine-4-carboxaldehyde Alfa AESAR
10140598 ;Exp: 8/11/12) up to 500 ml w/ DI Water.

EXP: 11/5/10

10/22/10 524-1022 1002 25133ppb ICV/CCV Cr6+

0.05 ml Pyridine-4-carboxaldehyde TCI
IGENC ;Exp: 8/10/12) up to 500 ml w/ DI Water.

EXP 11/05/10

10/28/10 JR — S24-10281002 1000 ppm SO_3 ICV/CCV

0.1607 Na_2SO_3 (Mallinckrodt Lot #H25469; Exp: 8/11/14) up to 100 ml w/ DI Water.

EXP: 11/11/10

11/1/10 JR — S24-11011001 ICV/CCV Cr^{6+} T.V = 0.579 ppm

0.5 ml S19-04090904 (T.V = 115.8 mg/L ; EXP: 12/2010)

↑ 100 ml W/ DI

EXP: 11/15/10

11/1/10 JR — S24-11011002 Cr^{6+} Coloring Reagent

0.2500g 1,5-Diphenylcarbohydrazide (EMD 47103721; EXP. 1/30/13) ↑ 50 ml W/ Acetone (EMD 47154D; EXP. 9/24/12).

EXP: 11/15/10

11/4/10 JR — S24-11041001 A→E pH Filling Soln

PURCHASED (3M KCl)

Thermo Scientific P/N 702613-A02

LOT Code: 0R1

EXP: 11/4/11

11/4/10 JR — S24-11041002 pH 2.000 Buffer

Purchased

BDH CAT NO: 5010-500ml

LOT # 1002199

EXP: 1/2012

11/4/10 JA

524-11041003 pH 4.000 Buffer
Purchased
JT Baker Cat No: 5657-01 500 ml
LOT # J30507
EXP: 8/31/12

11/4/10 JA

524-11041004 pH 7.000 Buffer
Purchased
J.T. Baker Cat No: 5656-01 500 ml
LOT # J35515
EXP: 9/30/12

11/5/10 JA

524-11051001 MBTH Std

0.5000 g MBTH (Aldrich 516696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 4198 EXP: 11/20/14

EXP: 11/6/10

11/8/10 JA

524-11081001 1000 ppm NH_3
0.3141g NH_4Cl (EMD 49198931; EXP: 10/19/14) q 100 ml
w/ 524-10221006 EXP: 10/22/11
EXP: 10/22/11

11/12/10 JA

524-11121001 1000 ppm SO_3 STOCK

0.1591 Na2SO3 (JT Baker Lot #H10627; Exp: 8/31/14) up to 100 ml w/ DI Water.

EXP: 11/26/10

LABORATORY REPORT

March 2, 2011

David Conner
Battelle
4800 Oak Grove Dr. M/S 180-801
Pasadena, CA 91109

RE: JPL GW Mon 1Q11 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on February 24, 2011. For your reference, these analyses have been assigned our service request number P1100723.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L10-3; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-09-TX; Minnesota Department of Health, Certificate No. 11495AA; Washington State Department of Ecology, ELAP Lab ID: C946. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Digitally signed by Sue Anderson
Date: 2011.03.02 13:48:43 -08'00'

Sue Anderson
Project Manager

Client: Battelle CAS Project No: P1100723
Project: JPL GW Mon 1Q11 / G486090

CASE NARRATIVE

The samples were received intact under chain of custody on February 24, 2011 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Hexavalent Chromium by EPA Method 7196A

No anomalies were encountered during this analysis.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

DETAIL SUMMARY REPORT

Client: Battelle
Service Request: P1100723
Project ID: JPL GW Mon 1Q11 / G486090

Date Received: 2/24/2011
Time Received: 17:00

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	7196A - Cr6
MW-18-4	P1100723-001	Water	2/24/2011	10:45	X
MW-18-3	P1100723-002	Water	2/24/2011	11:26	X
MW-18-2	P1100723-003	Water	2/24/2011	12:04	X
DUPE-03-1Q11	P1100723-004	Water	2/24/2011	00:00	X
EB-3-2/24/11	P1100723-005	Water	2/24/2011	11:47	X

Acronyms

CA LUFT	California DHS LUFT Metho
ASTM	American Society for Testing and Materials
BTEX	Benzene/Toluene/Ethylbenzene/Xylenes
CAS Number	Chemical Abstract Service Registry Number
CFC	Chlorofluorocarbon
CRDL	Contract Required Detection Limit
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOH or DHS	Department of Health Services
EPA	U.S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified Method
MDL	Method Detection Limit
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl *tert* -Butyl Ether
NA	Not Applicable
NC	Not Calculated
ND	None Detected at or above the Method Reporting/Detection Limit (MRL/MDL)
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	*Standard Methods for the Examination of Water and Wastewater* , 19th Ed., 1995.
SW	*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* , SW-846, Third Edition, 1986 and as amended by Updates I, II, IIA, and IIB.
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)
VOC	Volatile Organic Compound(s)

Qualifiers

U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
J	The result is an estimated concentration that is less than the MRL (PQL), but greater than or equal to the MDL.
B	Analyte detected in the method blank above MRL (PQL).
E	Estimated; result based on response which exceeded the instrument calibration range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
D	The reported result is from a dilution.
X	See case narrative.

Water & Soil - Chain of Custody Record & Analytical Service Request

Columbia Analytical Services INC.
An Employee - Owned Company

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day - Standard

CAS Project No. P1100723

CAS Contact:

Company Name & Address (Reporting Information)	Project Name
BATTELLE 3990 OLD TOWN AVE. C-205 SAN DIEGO, CA 92110	JPL GW MON. 1Q11
	Project Number G4F66090
Project Manager DAVID CONNEW	P.O. # / Billing Information 214319/BATTELLE ATTN: GERALD TOMPKINS 505 KING AVE. COLUMBUS, OH 43201
Phone (619) 726-7311	Fax (614) 458-6614
Email Address for Result Reporting	Sampler (Print & Sign) CHASE BRANDON

Analysis Method and/or Analytes

Preservative Code

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Matrix	Number of Containers	Volatile Organics GC/MS 624 ☐ 8260B ☐ Oxygenates ☐ TPH Gas ☐	TPH Gas 8015B ☐ BTEX 8021B ☐ MTBE 8021B ☐	TPH Diesel 8015B ☐ (Subcontracted)	TPH Diesel Low Level 8015B ☐ (Subcontracted)	TPH FC ☐ 8015M (Subcontracted)	Semi-Volatile Organics GC/MS 625 ☐ 8270C ☐ (Subcontracted)	0 Cr VI (7196)	Remarks
MW-18-4		2/24/11	1045	W	1							X	
MW-18-3			1126		1							X	
MW-18-2			1204		1							X	
~~MW-18-1 (DUP)~~												X	
DUP-03-1Q11			—		1							X	DUPLICATE
EB-3-2/24/11		2/24/11	1147	W	1							X	EQUIP. BLANK

Preservative Key

0	None
1	HCL
2	HNO3
3	H2SO4
4	NaOH
5	Zn Acetate
6	Asc Acid
7	Other

Report Tier Levels - please select

Tier I - (Results/Default if not specified) ____
Tier II - (Results + QC) ____
Tier III - (Data Validation Package) 10% Surcharge ____
Tier V - (client specified) ____
MRL required Yes / No
MDL / PQL / J required Yes / No
EDD required Yes / No
Type: ____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	2/24/11	1307		2/24/11	1309
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	2/24/11	1708		2/24/11	1703
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank / Ice / No Ice
Temperature 3 & C °C

Client: Battelle **Service Request:** P1100723
Project: JPL GW Mon 1Q11/G486090

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1100723-001.01					
	7196A				
		2/24/11	1705	SMO / MZAMORA	
		2/24/11	1705	P-37 / MZAMORA	
		2/25/11	0811	In Lab / SANDERSON	
		2/25/11	0916	P-37 / SANDERSON	
P1100723-002.01					
	7196A				
		2/24/11	1705	SMO / MZAMORA	
		2/24/11	1705	P-37 / MZAMORA	
		2/25/11	0811	In Lab / SANDERSON	
		2/25/11	0916	P-37 / SANDERSON	
P1100723-003.01					
	7196A				
		2/24/11	1705	SMO / MZAMORA	
		2/24/11	1705	P-37 / MZAMORA	
		2/25/11	0811	In Lab / SANDERSON	
		2/25/11	0916	P-37 / SANDERSON	
P1100723-004.01					
	7196A				
		2/24/11	1705	SMO / MZAMORA	
		2/24/11	1705	P-37 / MZAMORA	
		2/25/11	0811	In Lab / SANDERSON	
		2/25/11	0916	P-37 / SANDERSON	
P1100723-005.01					
	7196A				
		2/24/11	1705	SMO / MZAMORA	
		2/24/11	1705	P-37 / MZAMORA	
		2/25/11	0811	In Lab / SANDERSON	
		2/25/11	0916	P-37 / SANDERSON	

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Sample Acceptance Check Form

Client: Battelle Work order: P1100723

Project: JPL GW Mon 1Q11 / G486090

Sample(s) received on: 2/24/11 Date opened: 2/24/11 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
	Cooler Temperature _____ °C Blank Temperature 3 °C			
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☒	☐	☐
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1100723-001.01	125mL Plastic NP					
P1100723-002.01	125mL Plastic NP					
P1100723-003.01	125mL Plastic NP					
P1100723-004.01	125mL Plastic NP					
P1100723-005.01	125mL Plastic NP					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : Battelle
Project Name : JPL GW Mon 1Q11
Project Number : G486090
Sample Matrix : WATER

Service Request : P1100723
Date Collected : 02/24/11
Date Received : 02/24/11

Chromium, Hexavalent

Prep Method : None
Analysis Method : 7196A
Test Notes :

Units : mg/L (ppm)
Basis : NA

Sample Name	Lab Code	PQL	MDL	Dilution Factor	Date Extracted	Date/Time Analyzed	Result	Result Notes
MW-18-4	P1100723-001	0.010	0.004	1	NA	02/25/11 09:20	ND	
MW-18-3	P1100723-002	0.010	0.004	1	NA	02/25/11 09:20	ND	
MW-18-2	P1100723-003	0.010	0.004	1	NA	02/25/11 09:20	ND	
DUPE-03-1Q11	P1100723-004	0.010	0.004	1	NA	02/25/11 09:20	ND	
EB-3-2/24/11	P1100723-005	0.010	0.004	1	NA	02/25/11 09:20	ND	
Method Blank	P1100723-MB	0.010	0.004	1	NA	02/25/11 09:20	ND	

Approved By Karen Ryan Date : 2/25/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1100723
Project:	JPL GW Mon. 1Q11 / G486090	**Date Analyzed:**	02/25/11

Title: Initial and Continuing Calibration Blank (ICB and CCB) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	PQL	MDL	Result
ICB	0.010	0.004	ND
CCB1	0.010	0.004	ND

Approved By: Karen Ryan Date: 2/25/11

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon. 1Q11 / G486090

Service Request: P1100723
Date Analyzed: 02/25/11

Title: Initial and Continuing Calibration Verification (ICV and CCV) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	True Value	Result	Percent Recovery	Acceptance Criteria
ICV	0.0500	0.0522	104	90-110
CCV1	0.0500	0.0522	104	90-110

Approved By: Karen Rya Date: 2/25/11

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100723
Project Name :	JPL GW Mon 1Q11	**Date Collected :**	NA
Project Number :	G486090	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	02/25/11

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1100723-LCS	Basis :	NA
Test Notes :			

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Chromium, Hexavalent	None	7196A	0.0400	0.0402	101	90-109	

Approved By Karen Rya Date : 2/25/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100723
Project Name :	JPL GW Mon 1Q11	**Date Collected :**	02/24/11
Project Number :	G486090	**Date Received :**	02/24/11
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	02/25/11

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name : MW-18-4
Lab Code : P1100723-001MS P1100723-001DMS
Test Notes :

Units : mg/L (ppm)
Basis : NA

Analyte	Prep Method	Analysis Method	PQL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Spike Recovery MS	Spike Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Chromium, Hexavalent	None	7196A	0.010	0.0500	0.0500	ND	0.0496	0.0505	99	101	78-112	2	

Approved By Karen Ryan Date : 2/25/11

Report By:SAnderson

Columbia Analytical Services

pH Run Log

Service Request #(s): 723 (BATCH #1)

Time: 0825

Sample	VWR lot #	Exp.
pH 2 Buffer	524-1104100.2	1/2012
pH 4 Buffer	524-1104100.3	5/31/12
pH 7 Buffer	524-1104100.4	9/30/12
pH 10 Buffer	524-0302100.1	9/30/11

Slope	Prep.Run #
99.2%	—
	Run#
	—

pH in liquid: (1) 9040B, (2) 9040C **pH in solid:** (3) 9045C, (4) 9045D (*Note method number in column labeled # below*)

pH adjustment:(5) 7196A,(6) 7199 (Note method # In column labeled #)

Sample	#	pH	Temp. °C
pH 2.000	5	2.00	21.5°
pH 4.000		3.995	21.6°
pH 7.000		6.993	21.6°
pH 10.000		10.006	21.7°
Ref#: T.V. = 6.46 EXP: 11/2012 519-1123090.3C		6.355 98%	21.7°
DI		1.934	20.5°
723-1.01		1.783	16.8°
-2.01		2.050	16.0°
-3.01		1.829	16.7°
-4.01		1.968	17.5°
V -5.01		1.892	17.8°
pH 2.000	↓	1.986	21.5°

Sample	#	pH	Temp. °C

pH Adjustments: ☒ **7196A**: Diluted/Conc H_2SO_4 EMD 49284 EXP: 11/20/14

☐ **7199A**: Diluted NaOH _____ EXP: _____

Comments: _____

* Soil or Solid prep: 1:1(wt:vol) with DI water: ** Samples received past recommended hold time.

Date buffers and filling solution changed: 2/21/11

Note: ATC probe used; therefore, temperature correction calculation is not necessary.

Analyst: _____ Date: 2/25/11

Reviewer: KR Date: 2/25/11

pH.XLS

Hexavalent Chromium (Liquids)

Columbia Analytical Services™

Method EPA 7196A

Service Request#(s): 723 Run#: 237185 BATCH #1

Stock#: 524-1019,1001 1.0 - 10ppm EXP: 3/1/11 Prep Run#: —

CV/CCV#: 524-1015,1001 1.0 - 100ppm EXP: 3/2012 Conc. H_2SO_4 Lot#: EMD 1492-84 EXP: 11/20/14

Coloring Reagent Ref#: 524-0231102 EXP: 3/21/11

Working Curve:

Prep Dilution	NA	0.05/50	0.25/50	0.5/50	Corr. Coeff.
Concentration mg/L	0.00	0.01	0.05	0.1	0.999903927
Absorbance @ 540 nm	0.000	0.010	0.057	0.116	

	Sample #	Sample Vol.(mL)	Dilution	pH ✓	Bkg.	Absorbance @ 540nm	Corrected Abs. (minus bkg.)	Results - mg/L	QA/QC - %R / RPD
1	ICB	10ml	—	✓	0.000	0.000	0.000768	<0.004	
2	ICV 0.050 ppm		—	✓	0.000	0.060	0.060	0.0522	104%
3	MB		—	✓	0.000	0.000	0.000768	<0.004	
4	LCS 0.040 ppm		—	✓	0.000	0.046	0.046	0.0402	101%
5	723-1.01		—	✓	0.001	0.002	0.001	0.00163	<0.004
6	-1.01 MS 0.050ppm		—	✓	0.001	0.058	0.057	0.0496	99% 2%
7	-1.01 MSD		—	✓	0.001	0.059	0.058	0.0505	101% 2% RPD
8	-2.01		—	✓	0.000	0.002	0.002	0.00248	<0.004
9	-2.01 MS 0.03ppm		—	✓	0.000	0.035	0.035	0.0308	103%
10	-3.01		—	✓	0.003	0.003	0.000	0.000768	<0.004
11	-4.01		—	✓	0.001	0.003	0.002	0.00248	<0.004
12	-5.01		—	✓	0.000	0.000	0.000	0.000768	<0.004
13	CCV 0.050 ppm		—	✓	0.000	0.060	0.060	0.0522	104%
14	CCB1		—	✓	0.000	0.000	0.000	0.000768	<0.004
15									
16	space not used								
17									

pH Requirement: Method 7196A *(2 ± 0.5)* * Samples filtered prior to pH adjustment

ICV/CCV spiked with 0.25 ml of 524-1015,1001@1ppm ↑ 50 ml of pH adjusted DI WATER (T.V.= 0.05 ppm)

MS/MSD spiked with 0.05 ml of 524-1019,1001 ↑ 10 ml of pH adjusted sample (T.V.= 0.05 ppm)

LCS spiked with 0.2 ml of ____ ↑ 50 ml of pH adjusted DI Water (T.V.= 0.04 ppm)

Verification Standard Spiked 0.03 ml of ____ @1ppm ↑ 10 ml of sample (T.V.= 0.03 ppm)

Comments: ____

Prepared By: [signature] Date/Time: 2/25/11 @ 0905

Analyzed By: [signature] Date/Time: 2/25/11 @ 0920

Reviewed By: [signature] Date: 2/25/11

Cr6LIQ.xls

11/23/09 SIG-1123090Z 1000 ppm SO_3 (ICV/CCV)
SR 0.1607g Na_2SO_3 (Mallinckrodt; H25469; EXP 8/11/12)
↑ 100ml w/ DI
EXP: 5/23/10

11/23/09 SIG-1123090 3 A, B, C, D pH REFERENCE
SR PURCHASED
ERA CAT # 977
LOT # 129934
EXP: 1/2012

11/24/09 SIG-1124090 1 1000 ppm SO_4 Standard
SR PURCHASED CAT # ICC-006
LOT # K007794
EXP: 9/30/13

SR 11/25/09
11/25/09 SIG-~~H25~~ 1125090 1 0.1N H_2SO_4
SR 5.6ml conc H_2SO_4 (EMD 4705D EXP: 9/13/10)
EXP: ~~H25~~ 9/13/10
SR 11/25/09

11/30/09 SIG-1130090 1 Cr^{6+} Coloring Reagent
SR 0.250g diphenylcarbohydrazide (EMD) 4710ZD; EXP: 1/30/13) ↑ 50ml w/ Acetone (EMD 4715ZD; EXP: 9/24/12
EXP: 12/20/09

11/30/09 SIG-1130090 2 25133 ppb Stock for O_3 in Air
SR 0.05ml Pyridine-4-Carboxaldehyde (Alfa Aesar LOT 10140598; EXP 8/11/12)
↑ 500ml deionized H_2O
EXP: 12/14/09

11/30/09 SIG-1130090 3 25133 ppb ICV/CCV for O_3 in Air
SR 0.05ml Pyridine-4-carboxaldehyde (TCI LOT # IGIINC; EXP: 8/10/12)
↑ 500ml w/ DI H_2O
EXP: 12/14/09

Reviewed And Approved By:
Initial: KL Date: 12/22/09

1/27/10 524-0127001 10000ppm SO_3 (STOCK)
JR 0.1541 g Na_2SO_3 (JT Baker H10627 EXP: 8/31/14)
↑ 100ml w/ DI H_2O
Exp: 7/27/10

1/27/10 524-0127002 1000ppm SO_3 (ICV/CCV)
JR 0.1607g Na_2SO_3 (Mallinckrodt H25469, Exp: 8/11/14) ↑ 100ml w/ DI H_2O
Exp: 7/27/10

2/1/10 524-02011001 ICV/CCV Cr^{6+} Soln T.V = 0.579ppm
JR 0.5ml 319-04090904 (115.8ppm; EXP: 12/2010) ↑ 100ml w/ DI H_2O
EXP: 2/15/10

2/1/10 524-02011002 Cr^{6+} Coloring Reagent
JR 0.2500g Diphenylcarbohydrazide (EMD ~~47103~~ 4710371 5/21/10
Exp: 1/30/13) ↑ 50 ml w/Acetone (EMD 47154D; EXP: 9/24/1
EXP: 2/15/10

2/2/10 524-02021001 Cr^{6+} 1000 ppm STOCK
JR Purchased Inorganic Ventures CGCR(6)1-1
LOT # C2-CR03026
EXP: 3/1/11

3/1/10 SV
524-03011001 pH 4.000 Buffer
Purchased 500 ml CAT # 5657-01
JT BAKER LOT # H31526
EXP 8/31/11

3/1/10 SV
524-03011002 pH 7.000 Buffer
Purchased 500 ml CAT # 5656-01
JT BAKER LOT # H47531
EXP: 1/31/12

3/1/10 SV
524-03011003 1000 PPM Cl (LCS)
Purchased 120 ml Cat # 1955-4
RICCA CHEM CO LOT # 1001395
EXP: 7/2011

3/1/10 SV
524-03011004 NH3 Filling Sol'n
Purchased 60 ml Orion 951202
Thermo Scientific LOT # MT1
P/N: 702613-A04
EXP: 3/1/11

3/2/10 SV
524-03021001 pH 10.000 buffer
Purchased 500 ml Cat # 5655-01
JT Baker LOT H34508
EXP: 9/30/11

10/6/10 524-10061001 25133 ppb stock for O3

0.05 ml Pyridine-4-carboxaldehyde Alfa Aesar
10146598 ;Exp: 8/11/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

10/6/10 524-10061002 25133 ppb ICV/CCV for O3

0.05 ml Pyridine-4-carboxaldehyde TCI
(IG3INC ;Exp: 8/10/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

10/6/10 524-10061003 MBTH SO/17

0.5000 g MBTH (Aldrich 54696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 49284; EXP 11/2

EXP: 10/7/10

10/15/10 524-10151001 Cr6+ ICV/CCV Stock
Purchased 100PPM Cr6+
RICCA Chemical Co Cat No 2095-16
500ml Plastic
LOT # 101017 7
EXP: 3/20/12

10/15/10 524-10151002 500PPM NO_2 Stock
Purchased
RICCA Chemical Co Cat No: 5444.5-4
LOT # 101027 1 120ml amber glass
EXP: 4/2011

524-10191001 10PPM Cr6+ Std/Ln

10/19/10 1.0ml S24-0202 1001 (1000PPM Cr6+; EXP: 3/1/11) ↑ 100M
W/DI H2O
EXP: 3/1/11

10/19/10 524-10191002 ICV/CCV Cr6+ T.V = 0.579PPM
0.5ml S19-0409090L4 (T.V = 115.8 mg/L; EXP 12/2010
↑ 100ml W/DI
EXP: 11/2/10

10/19/10 524-10191003 Cr6+ Coloring Reagent
0.2500g 1,5-Diphenylcarbohydrazide (LOT D471037121; EXP. 1/30/13) ↑ 50ml Acetone (LOT 471524; EXP: 9/24/12
EXP: 11/2/10

10/22/10 524-1022 1001 25133ppb Stock 03

0.05 ml Pyridine-4-carboxaldehyde Alfa AESAR
10140598 ;Exp: 8/11/12) up to 500 ml w/ DI Water.

EXP: 11/5/10

10/22/10 524-1022 1002 25133ppb ICV/CCV Cr6+

0.05 ml Pyridine-4-carboxaldehyde TCI
IGENC ;Exp: 8/10/12) up to 500 ml w/ DI Water.

EXP 11/05/10

10/28/10 JR — S24-10281002 1000 ppm SO_3 ICV/CCV

0.1607 Na_2SO_3 (Mallinckrodt Lot #H25469; Exp: 8/11/14) up to 100 ml w/ DI Water.

EXP: 11/11/10

11/1/10 JR — S24-11011001 ICV/CCV Cr^{6+} T.V = 0.579 ppm

0.5 ml S19-04090904 (T.V = 115.8 mg/L ; EXP: 12/2010)

↑ 100 ml W/ DI

EXP: 11/15/10

11/1/10 JR — S24-11011002 Cr^{6+} Coloring Reagent

0.2500g 1,5-Diphenylcarbohydrazide (EMD 47103721; EXP. 1/30/13) ↑ 50 ml W/ Acetone (EMD 47154D; EXP. 9/24/12).

EXP: 11/15/10

11/4/10 JR — S24-11041001 A→E pH Filling Soln

PURCHASED (3M KCl)

Thermo Scientific P/N 702613-A02

LOT Code: 0R1

EXP: 11/4/11

11/4/10 JR — S24-11041002 pH 2.000 Buffer

Purchased

BDH CAT NO: 5010-500ml

LOT # 1002199

EXP: 1/2012

11/4/10 JA

524-11041003 pH 4.000 Buffer
Purchased
JT Baker Cat No: 5657-01 500 ml
LOT # J30507
EXP: 8/31/12

11/4/10 JA

524-11041004 pH 7.000 Buffer
Purchased
J.T. Baker Cat No: 5656-01 500 ml
LOT # J35515
EXP: 9/30/12

11/5/10 JA

524-11051001 MBTH Std

0.5000 g MBTH (Aldrich 516696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 4198 EXP: 11/20/14

EXP: 11/6/10

11/8/10 JA

524-11081001 1000 ppm NH_3
0.3141g NH_4Cl (EMD 49198931; EXP: 10/19/14) q 100 ml
w/ 524-10221006 EXP: 10/22/11
EXP: 10/22/11

11/12/10 JA

524-11121001 1000 ppm SO_3 STOCK

0.1591 Na2SO3 (JT Baker Lot #H10627; Exp: 8/31/14) up to 100 ml w/ DI Water.

EXP: 11/26/10

Columbia Analytical Services™ 2655 Park Center Drive, Suite A, Simi Valley, CA 93065 | 805.526.7161 | www.caslab.com

LABORATORY REPORT

March 2, 2011

David Conner
Battelle
4800 Oak Grove Dr. M/S 180-801
Pasadena, CA 91109

RE: JPL GW Mon 1Q11 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on February 25, 2011. For your reference, these analyses have been assigned our service request number P1100733.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L10-3; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-09-TX; Minnesota Department of Health, Certificate No. 11495AA; Washington State Department of Ecology, ELAP Lab ID: C946. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Digitally signed by Sue Anderson
Date: 2011.03.02 14:09:36 -08'00'

Sue Anderson
Project Manager

Client: Battelle
Project: JPL GW Mon 1Q11 / G486090

CAS Project No: P1100733

CASE NARRATIVE

The samples were received intact under chain of custody on February 25, 2011 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Hexavalent Chromium by EPA Method 7196A

No anomalies were encountered during this analysis.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

DETAIL SUMMARY REPORT

Client: Battelle
Project ID: JPL GW Mon 1Q11 / 6486090
Service Request: P1100733

Date Received: 2/25/2011
Time Received: 12:45

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	7196A - Cr6
MW-17-4	P1100733-001	Water	2/25/2011	09:15	X
MW-17-3	P1100733-002	Water	2/25/2011	09:48	X
MW-17-2	P1100733-003	Water	2/25/2011	10:34	X
EB-04-2/25/11	P1100733-004	Water	2/25/2011	10:14	X

Acronyms

CA LUFT	California DHS LUFT Metho
ASTM	American Society for Testing and Materials
BTEX	Benzene/Toluene/Ethylbenzene/Xylenes
CAS Number	Chemical Abstract Service Registry Number
CFC	Chlorofluorocarbon
CRDL	Contract Required Detection Limit
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOH or DHS	Department of Health Services
EPA	U.S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified Method
MDL	Method Detection Limit
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl *tert* -Butyl Ether
NA	Not Applicable
NC	Not Calculated
ND	None Detected at or above the Method Reporting/Detection Limit (MRL/MDL)
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	*Standard Methods for the Examination of Water and Wastewater* , 19th Ed., 1995.
SW	*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* , SW-846, Third Edition, 1986 and as amended by Updates I, II, IIA, and IIB.
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)
VOC	Volatile Organic Compound(s)

Qualifiers

U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
J	The result is an estimated concentration that is less than the MRL (PQL), but greater than or equal to the MDL.
B	Analyte detected in the method blank above MRL (PQL).
E	Estimated; result based on response which exceeded the instrument calibration range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
D	The reported result is from a dilution.
X	See case narrative.

Water & Soil - Chain of Custody Record & Analytical Service Request

Page 1 of 1

Columbia Analytical Services INC.
An Employee - Owned Company

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day - Standard

CAS Project No. P1100733

CAS Contact:

Company Name & Address (Reporting Information)	Project Name
BATTELLE 3990 OLD TOWN AVE. C-205 SAN DIEGO, CA 92110	JPL GW. MON. 10/11
Project Manager	**Project Number**
DAVID CONNER	6486090
Phone / **Fax**	**P.O. # / Billing Information**
(619) 726-7311 / (614) 458-6614	21389/BATTELLE ATTN: GERALD TOMPKINS 505 KING AVE. COLUMBUS, OH 43201
Email Address for Result Reporting	**Sampler (Print & Sign)**
	CHASE BRADDON

Analysis Method and/or Analytes

Preservative Code

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Matrix	Number of Containers	Volatile Organics GC/MS 624 ☐ 8260B ☐ Oxygenates ☐ TPH Gas ☐	TPH Gas 8015B ☐ BTEX 8021B ☐ MTBE 8021B ☐	TPH Diesel 8015B ☐ (Subcontracted)	TPH Diesel Low Level 8015B ☐ (Subcontracted)	TPH FC ☐ 8015M (Subcontracted)	Semi-Volatile Organics GC/MS 625 ☐ 8270C ☐ (Subcontracted)	0	Cr VI (H96)	Remarks
MW-17-4	1	2/25/11	0915	W	1							X		
MW-17-3	2	↓	0948	↓	1							X		
MW-17-2	3	↓	1034	↓	2							X		MS/MSD
EB-04-2/25/11	4	2/25/11	1014	W	1							X		EQUIP. BLANK

Preservative Key

0	None
1	HCL
2	HNO3
3	H2SO4
4	NaOH
5	Zn Acetate
6	Asc Acid
7	Other

Report Tier Levels - please select

Tier I - (Results/Default if not specified) ____
Tier II - (Results + QC) ____
Tier III - (Data Validation Package) 10% Surcharge ____
Tier V - (client specified) ____

MRL required Yes / No
MDL / PQL / J required Yes / No

EDD required Yes / No
Type: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	2/25/11	1200		2/25/11	1200
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	2/25/11	1245		2/25/11	1245
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank / Ice / No Ice
Temperature 20c °C

5 of 21

Client: Battelle **Service Request:** P1100733

Project: JPL GW Mon 1Q11/6486090

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1100733-001.01					
	7196A				
		2/25/11	1252	SMO / MZAMORA	
		2/25/11	1253	P-37 / MZAMORA	
		2/25/11	1333	In Lab / SANDERSON	
		2/25/11	1520	P-37 / SANDERSON	
P1100733-002.01					
	7196A				
		2/25/11	1252	SMO / MZAMORA	
		2/25/11	1253	P-37 / MZAMORA	
		2/25/11	1333	In Lab / SANDERSON	
		2/25/11	1520	P-37 / SANDERSON	
P1100733-003.01					
	7196A				
		2/25/11	1252	SMO / MZAMORA	
		2/25/11	1253	P-37 / MZAMORA	
		2/25/11	1333	In Lab / SANDERSON	
		2/25/11	1520	P-37 / SANDERSON	
P1100733-003.02					
		2/25/11	1252	SMO / MZAMORA	
		2/25/11	1253	P-37 / MZAMORA	
		2/25/11	1333	In Lab / SANDERSON	
		2/25/11	1520	P-37 / SANDERSON	
P1100733-004.01					
	7196A				
		2/25/11	1252	SMO / MZAMORA	
		2/25/11	1253	P-37 / MZAMORA	
		2/25/11	1333	In Lab / SANDERSON	
		2/25/11	1520	P-37 / SANDERSON	

Columbia Analytical Services™ 2655 Park Center Drive, Suite A, Simi Valley, CA 93065 | 805.526.7161 | www.caslab.com

Sample Acceptance Check Form

Client: Battelle Work order: P1100733

Project: JPL GW Mon 1Q11 / 6486090

Sample(s) received on: 2/25/11 Date opened: 2/25/11 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
	Cooler Temperature _____ °C Blank Temperature 2 °C			
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☒	☐	☐
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1100733-001.01	125mL Plastic NP					
P1100733-002.01	125mL Plastic NP					
P1100733-003.01	125mL Plastic NP					
P1100733-003.02	125mL Plastic NP					
P1100733-004.01	125mL Plastic NP					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : Battelle
Project Name : JPL GW Mon 1Q11
Project Number : 6486090
Sample Matrix : WATER

Service Request : P1100733
Date Collected : 02/25/11
Date Received : 02/25/11

Chromium, Hexavalent

Prep Method : None
Analysis Method : 7196A
Test Notes :

Units : mg/L (ppm)
Basis : NA

Sample Name	Lab Code	PQL	MDL	Dilution Factor	Date Extracted	Date/Time Analyzed	Result	Result Notes
MW-17-4	P1100733-001	0.010	0.004	1	NA	02/25/11 15:00	ND	
MW-17-3	P1100733-002	0.010	0.004	1	NA	02/25/11 15:00	ND	
MW-17-2	P1100733-003	0.010	0.004	1	NA	02/25/11 15:00	ND	
EB-04-2/25/11	P1100733-004	0.010	0.004	1	NA	02/25/11 15:00	ND	
Method Blank	P1100733-MB2	0.010	0.004	1	NA	02/25/11 15:00	ND	

Approved By Karen Ryan Date : 2/25/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon. 1Q11 / G486090

Service Request: P1100733
Date Analyzed: 02/25/11

Title: Initial and Continuing Calibration Blank (ICB and CCB) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	PQL	MDL	Result
ICB2	0.010	0.004	ND
CCB1-2	0.010	0.004	ND

Approved By: Karen Ryan Date: 2/25/11

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon. 1Q11 / G486090

Service Request: P1100733
Date Analyzed: 02/25/11

Title: Initial and Continuing Calibration Verification (ICV and CCV) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	True Value	Result	Percent Recovery	Acceptance Criteria
ICV2	0.0500	0.0535	107	90-110
CCV1-2	0.0500	0.0526	105	90-110

Approved By: Karen Ryan Date: 2/25/11

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100733
Project Name :	JPL GW Mon 1Q11	**Date Collected :**	NA
Project Number :	6486090	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	02/25/11

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1100733-LCS2	Basis :	NA

Test Notes :

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Chromium, Hexavalent	None	7196A	0.0400	0.0404	101	90-109	

Approved By Karen Ryan Date : 2/25/11

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100733
Project Name :	JPL GW Mon 1Q11	**Date Collected :**	02/25/11
Project Number :	6486090	**Date Received :**	02/25/11
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	02/25/11

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name :	MW-17-2		Units :	mg/L (ppm)
Lab Code :	P1100733-003MS	P1100733-003DMS	Basis :	NA
Test Notes :				

Analyte	Prep Method	Analysis Method	PQL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Spike Recovery MS	Spike Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Chromium, Hexavalent	None	7196A	0.010	0.0500	0.0500	ND	0.0500	0.0500	100	100	78-112	<1	

Approved By Kathe Ryan Date : 2/25/11

Columbia Analytical Services™

pH Run Log

Service Request #(s): 723 (BATCH#1) 733 (BATCH#2)

Time: 0825

Sample	VWR lot #	Exp.
pH 2 Buffer	524-1104/002	1/2012
pH 4 Buffer	524-1104/003	8/31/12
pH 7 Buffer	524-1104/004	9/30/12
pH 10 Buffer	524-0302/001	9/30/11

Slope	Prep.Run #
99.2%	—
	Run#
	—

pH in liquid: (1) 9040B, (2) 9040C **pH in solid:** (3) 9045C, (4) 9045D (*Note method number in column labeled # below*)

pH adjustment:(5) 7196A,(6) 7199 (Note method # In column labeled #)

Sample	#	pH	Temp. °C
pH 2.000	5	2.012	21.5°
pH 4.000		3.995	21.6°
pH 7.000		6.993	21.6°
pH 10.000		10.006	21.7°
Ref#: 7.V=6.46 EXP:1/2012 519-1123/0903C		6.355 98%	21.7°
DI		1.934	20.5°
723-1.01		1.783	16.8°
-2.01		2.050	16.0°
-3.01		1.829	16.7°
-4.01		1.968	17.5°
V -5.01		1.892	17.8°
pH 2.000	↓	1.986	21.5°
TIME: 1430			
pH 2.000	5	2.005	22.3°
733-1.01	↓	2.115	19.2°
-2.01		2.030	19.4°
-3.01	↓	1.967	19.5°

Sample	#	pH	Temp. °C
733-4.01	5	1.955	20.0°
pH 2.000	5	1.995	22.1°

not used

pH Adjustments: ☒ **7196A**: Diluted/Conc H_2SO_4 GMD 49284 EXP: 1/20/12

☐ **7199A**: Diluted NaOH _____ EXP: _____

Comments: _____

* Soil or Solid prep: 1:1(wt:vol) with DI water: ** Samples received past recommended hold time.

Date buffers and filling solution changed: 2/21/11

Note: ATC probe used; therefore, temperature correction calculation is not necessary.

Analyst: _____ Date: 2/25/11

Reviewer: KR Date: 2/25/11

pH.XLS

Columbia Analytical Services™

Hexavalent Chromium (Liquids)

Method EPA 7196A

Service Request#(s): 733 11 Run#: 237260 Batch# 2

Stock#: 524-1019100I T.V=10PPM EXP: 3/1/11 Prep Run#:

ICV/CCV#: 524-1015100I T.V=10PPM EXP: 3/2012 Conc. H_2SO_4 Lot#: EM0 492044 EXP: 11/20/14

Coloring Reagent Ref#: 524-0221102 EXP: 3/21/11

Working Curve:

Prep Dilution	NA	0.05/50	0.25/50	0.5/50	Corr. Coeff.
Concentration mg/L	0.00	0.01	0.05	0.1	0.999908543
Absorbance @ 540 nm	0.000	0.011	0.056	0.115	

	Sample #	Sample Vol.(mL)	Dilution	pH ✓	Bkg.	Absorbance @ 540nm	Corrected Abs. (minus bkg.)	Results - mg/L	QA/QC - %R / RPD
1	ICB2	10ml	—	✓	0.000	0.000	0.000	0.000435	<0.004
2	ICV2 0.0500 PPM		—	✓	0.000	0.061	0.061	0.0535	107%
3	MB2		—	✓	0.000	0.000	0.000	0.000435	<0.004
4	LCS2 0.0400 PPM			✓	0.000	0.046	0.046	0.0404	101%
5	733-1.01		—	✓	0.003	0.003	0.000	0.000435	<0.004
6	-1.01 VS 0.03PPM		—	✓	0.003	0.036	0.033	0.0291	97%
7	-2.01		—	✓	0.008	0.008	0.000	0.000435	<0.004
8	-3.01		—	✓	0.000	0.002	0.002	0.00217	<0.004
9	-3.01 MS 0.05PPM		—	✓	0.000	0.057	0.057	0.0500	100%
10	-3.01 MSD ↓		—	✓	0.000	0.057	0.057	0.0500	100%
11	-4.01		—	✓	0.000	0.000	0.000	0.000435	<0.004
12	~~-5.01~~		—	✓				~~No Sample~~ -005	
13	CCV1-2 0.0500PPM		—	✓	0.000	0.060	0.060	0.0526	105%
14	CCB1-2	↓	—	✓	0.000	0.000	0.000	0.000435	<0.004
15									
16									
17									

pH Requirement: Method 7196A (2 ± 0.5) * Samples filtered prior to pH adjustment

ICV/CCV spiked with 0.25 ml of 524-1015100I @ 1/10 ↑ 50 ml of pH adjusted DI WATER (T.V.= 0.05 ppm)

MS/MSD spiked with 0.05 ml of 524-1019100I ↑ 10 ml of pH adjusted sample (T.V.= 0.05 ppm)

LCS spiked with 0.2 ml of ↑ 50 ml of pH adjusted DI Water (T.V.= 0.04 ppm)

Verification Standard Spiked 0.3 ml of @ 1/10 ↑ 10 ml of sample (T.V.= 0.03 ppm)

Comments:

Prepared By: Date/Time: 2/25/11 @ 1445

Analyzed By: Date/Time: 2/25/11 @ 1500

Reviewed By: KR Date: 2/25/11

11/23/09 SIG-1123090Z 1000 ppm SO_3 (ICV/CCV)
SR 0.1607g Na_2SO_3 (Mallinckrodt; H25469; EXP 8/11/14
↑ 100ml w/ DI
EXP: 5/23/10

11/23/09 SIG-1123090 3 A,B,C,D pH REFERENCE
SR PURCHASED
ERA CAT # 977
LOT # 129934
EXP: 1/2012

11/24/09 SIG-1124090 1 1000 ppm SO_4 Standard
SR PURCHASED CAT # ICC-006
LOT # K007794
EXP: 9/30/13

SR 11/25/09
11/25/09 SIG-~~H25~~ 1125090 1 0.1N H_2SO_4
5~~6~~ml Conc H_2SO_4 (EMD 4705D EXP: 9/13/10)
EXP: ~~9/13~~ 9/13/10
SR 11/25/09

11/30/09 SIG-1130090 1 Cr^{6+} Coloring Reagent
SR 0.2500g Diphenylcarbohydrazide (EMD) 4710ED; EXP: 1/30/13) ↑ 50ml w/ Acetone (EMD 4715ED; EXP: 9/24/12
EXP: 12/30/09

11/30/09 SIG-1130090 2 25133 ppb Stock for O_3 in Air
SR 0.05ml Pyridine-4-Carboxaldehyde (Alfa Aesar LOT 10144 0558; EXP 8/11/12)
↑ 500ml deionized H_2O
EXP: 12/14/09

11/30/09 SIG-1130090 3 25133 ppb ICV/CCV for O_3 in Air
SR 0.05ml Pyridine-4-carboxaldehyde (TCI LOT # I6TINC; EXP: 8/10/12)
↑ 500ml w/ DI H_2O
EXP: 12/14/09

Reviewed And Approved By:
Initial: VL Date: 12/22/09

1/27/10 524-0127/001 1000ppm SO_3 (STOCK)
Sr 0.1591 g Na_2SO_3 (JT Baker H10627 EXP: 8/31/14)
↑ 100 ml w/ DI H_2O
EXP: 7/27/10

1/27/10 524-01271002 1000 PPM SO_3 (ICV/CCV)
Sr 0.1607g Na_2SO_3 (Mallinckrodt H25469; EXP: 8/11/14) ↑ 100ml w/ DI H_2O
EXP: 7/27/10

2/1/10 524-02011001 ICV/CCV Cr6+ Soln T.V = 0.579 PPM
Sr 0.5ml 519-04090904 (115.8 PPM; EXP: 12/2010) ↑ 100ml w/ DI H_2O
EXP: 2/15/10

2/1/10 524-02011002 Cr6+ Coloring Reagent
Sr 0.2500g Diphenylcarbohydrazide (EMD ~~47103~~ 4711O 4710373)
EXP: 1/30/13 ↑ 50 ml w/Acetone (EMD 47154D; EXP: 9/24/12
EXP: 2/15/10

2/2/10 524-02021001 Cr6+ 1000 PPM STOCK
Sr Purchased Inorganic Ventures CGCR(6)1-1
LOT # C2-CR03026
EXP: 3/1/11

3/1/10 SV — 524-03011001 pH 4.000 Buffer
Purchased 500 ml CAT # 5657-01
JT BAKER LOT # H31526
EXP 8/31/11

3/1/10 SV — 524-03011002 pH 7.000 Buffer
Purchased 500ml CAT # 5656-01
JT BAKER LOT # H47531
EXP: 1/31/12

3/1/10 SV — 524-03011003 1000 PPM Cl (LCS)
Purchased 120ml Cat # 1955-4
RICA CHEM CO LOT # 1001395
EXP: 7/2011

3/1/10 SV — 524-03011004 NH3 Filling Sol'n
Purchased 60ml Orion 951202
Thermo Scientific LOT # MT1
P/N. 703613-A04
EXP: 3/1/11

3/2/10 SV — 524-03021001 pH 10.000 buffer
Purchased 500ml Cat # 5655-01
JT Baker LOT H34508
EXP: 9/30/11

10/6/10 SZ — 524-10061001 — 25133 ppb Stock for O3

0.05 ml Pyridine-4-carboxaldehyde Alfa Aesar (10146598 ;Exp: 8/11/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

10/6/10 SZ — 524-10061002 — 25133 ppb ICV/CCV for O3

0.05 ml Pyridine-4-carboxaldehyde TCI (IG INC ;Exp: 8/10/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

10/6/10 SZ — 524-10061003 — MBTH Sol'n

0.5000 g MBTH (Aldrich 54696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 49284; EXP 11/2

EXP: 10/7/10

10/15/10 SZ — 524-10151001 — Cr6+ ICV/CCV Stock 100 PPM Cr6+

Purchased RICCA Chemical Co Cat No 2095-16

500 mL Plastic

LOT # 101017 7

EXP: 3/30/12

10/15/10 SZ — 524-10151002 — 500 PPM NO_2 Stock

Purchased RICCA Chemical Co Cat No: 5444-54

LOT # 101027 1 120 ml amber glass

EXP: 4/2011

S24-10191001 10ppm Cr6+ Soln

10/19/10 1.0ml S24-0202 1001 (1000ppm Cr6+; EXP: 3/1/11) ↑ 100ml
w/ DI H2O
EXP: 3/1/11

10/19/10 S24-10191002 ICV/CCV Cr6+ T.V = 0.574ppm
0.5ml S19-0409060 4 (T.V = 115.8 mg/L; EXP 12/2010
↑ 100ml w/ DI
EXP: 11/2/10

10/19/10 S24-10191003 Cr6+ Coloring Reagent
0.2500g 1,5-Diphenylcarbohydrazide (LOT 47103721; EXP:
1/30/13) ↑ 50ml Acetone (LOT 47154; EXP: 9/24/12
EXP: 11/2/10

10/22/10 S24-10221001 25133ppb Stock 03

0.05 ml Pyridine-4-carboxaldehyde Alfa AESAR
10140598 ;Exp: 8/11/12) up to 500 ml w/ DI Water.

EXP: 11/5/10

10/22/10 S24-10221002 25133ppb ICV/CCV Cr6+

0.05 ml Pyridine-4-carboxaldehyde TCI
IGENC ;Exp: 8/10/12) up to 500 ml w/ DI Water.

EXP 11/05/10

10/28/10 S24-10281002 1000 ppm SO_3 ICV/CCV

0.1607 Na_2SO_3 (Mallinckrodt Lot #H25469; Exp: 8/11/14) up to 100 ml w/ DI Water.

EXP: 11/11/10

11/1/10 S24-11011001 ICV/CCV Cr^{6+} T.V = 0.579 ppm

0.5ml S19-04090604 (T.V = 115.8 mg/L ; EXP: 12/2010)

↑ 100ml W/ DI

EXP: 11/15/10

11/1/10 S24-11011002 Cr^{6+} Coloring Reagent

0.2500g 1,5-Diphenylcarbohydrazide (EMD 47/03721; EXP: 1/30/13) ↑ 50ml W/ Acetone (EMD 47154D; EXP: 9/24/12).

EXP: 11/15/10

11/4/10 S24-11041001 A→E pH Filling Sol'n

PURCHASED (3M KCl)

Thermo Scientific

P/N 702613-A02

LOT Code: QR1

EXP: 11/4/11

11/4/10 S24-11041002 pH 2.000 Buffer

Purchased

BDH CAT NO: 5010-500ml

LOT # 100219

EXP: 1/2012

11/4/10 SZ

524-11041003 pH 4.000 Buffer
Purchased
JT Baker Cat No: 5657-01 500ml
Lot # J30507
Exp: 8/31/13

11/4/10 SZ

524-11041004 pH 7.000 Buffer
Purchased
J.T. Baker Cat No: 5656-01 500ml
Lot # J35515
Exp: 9/30/12

11/5/10 SZ

524-11051001 MBTH Std

0.5000 g MBTH (Aldrich 521696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 4988 Exp. 11/20/14

Exp: 11/6/10

11/8/10 SZ

524-11081001 1000 ppm NH_3

0.3144g NH_4Cl (EMD 4198931; Exp: 10/29/14) 100ml
w/ 524-10221006 Exp: 10/22/11

Exp: 10/22/11

11/12/10 SZ

524-11121001 1000ppm SO_3 Stock

0.1591 Na2SO3 (JT Baker Lot #H10627; Exp: 8/31/14) up to 100 ml w/ DI Water.

Exp: 11/26/10

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LABORATORY REPORT

March 2, 2011

David Conner
Battelle
4800 Oak Grove Dr. M/S 180-801
Pasadena, CA 91109

RE: JPL GW Mon 1Q11 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on February 28, 2011. For your reference, these analyses have been assigned our service request number P1100757.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L10-3; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-09-TX; Minnesota Department of Health, Certificate No. 11495AA; Washington State Department of Ecology, ELAP Lab ID: C946. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Digitally signed by Sue Anderson
Date: 2011.03.02 15:27:18 -08'00'

Sue Anderson
Project Manager

Client: Stantec Consulting Group, Inc. CAS Project No: P1100557
Project: East Central Phoenix / 185902049 Task 200.3300 Arizona License No: AZ0694

CASE NARRATIVE

The samples were received intact under chain of custody on February 14, 2011 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt. The laboratory is Arizona certified for EPA Method TO-15; therefore, the Arizona Department of Health Services does not consider results reported utilizing other air methods to be for the purposes of compliance.

Helium Analysis

The samples were analyzed for helium according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD).

Volatile Organic Compound Analysis

The samples were also analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

DETAIL SUMMARY REPORT

Client: Stantec Consulting Group, Inc. Service Request: P1100557
Project ID: East Central Phoenix / 185902049 Task 200.3300

Date Received: 2/14/2011
Time Received: 09:00

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	3C Modified - Helium Can	TO-15 - VOC Cans
SG-1A	P1100557-001	Air	1/31/2011	16:28	1SC00185	-1.2	5.5	X	X
SG-1B	P1100557-002	Air	1/31/2011	16:28	1SC00414	-1.6	5.2	X	X
SG-1C	P1100557-003	Air	1/31/2011	16:28	1SC00687	-1.2	6.1	X	X
SG-2A	P1100557-004	Air	2/1/2011	09:01	1SC00036	-1.9	5.1	X	X
SG-2B	P1100557-005	Air	2/1/2011	09:00	1SC00128	-1.7	5.0	X	X
SG-2C	P1100557-006	Air	2/1/2011	08:59	1SC00751	-1.1	6.2	X	X
SG-3A	P1100557-007	Air	2/1/2011	09:41	1SC00476	-0.2	5.7	X	X
SG-3B	P1100557-008	Air	2/1/2011	09:39	1SC00100	-0.9	5.2	X	X
SG-3C	P1100557-009	Air	2/1/2011	09:42	1SC00231	-0.6	5.2	X	X
SG-4A	P1100557-010	Air	2/1/2011	10:17	1SC00481	-1.3	5.9	X	X
SG-4B	P1100557-011	Air	2/1/2011	10:20	1SC00071	-1.3	5.2	X	X
SG-4C	P1100557-012	Air	2/1/2011	10:19	1SC00533	-1.3	5.4	X	X
SG-5A	P1100557-013	Air	2/1/2011	11:00	1SC00392	-1.6	6.4	X	X
SG-5B	P1100557-014	Air	2/1/2011	10:58	1SC00351	-1.7	5.4	X	X

Columbia Analytical Services

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Air - Chain of Custody Record & Analytical Service Request

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

CAS Project No. P1100557

Company Name & Address (Reporting Information)	STANTEC Consulting Co. 8211 S. 48th ST. Phoenix, AZ 85044
Project Name	EAST Central Phoenix
Project Number	185902049 TASK 200.3300
Project Manager	THERESA KALAghan
P.O. # / Billing Information	Please copy Pat Vaughan on Lab results & PVaughan@STANTEC.com
Phone	602-707-4623
Fax	602-431-9562
Email Address for Result Reporting	TKalaghan@STANTEC.com
Sampler (Print & Sign)	Chuck Graves

CAS Contact:

Analysis Method

TO-15

Comments e.g. Actual Preservative or specific instructions

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	TO-15		Comments
SG-1A	(1)-1.3	1/31/11	1628	ISC00185	OA01276	26	5	1L	X		
SG-1B	(2)-1.8	1/31/11	1628	ISC00414	OA01211	29	4	1L	X		
SG-1C	(3)-1.3	1/31/11	1628	ISC00687	OA01207	29	5	1L	X		
SG-2A	(4)-2.0	2/1/11	0901	00036	01213	28	5	1L	X		
SG-2B	(5)-1.8	2/1/11	0900	00128	01294	27	5	1L	X		
SG-2C	(6)-1.2	2/1/11	0859	00751	01259	27	5	1L	X		
SG-3A	(7)-0.3	2/1/11	0941	00476	01304	30	5	1L	X		
SG-3B	(8)-1.0	2/1/11	0939	00100	01295	25	5	1L	X		
SG-3C	(9)-0.7	2/1/11	0942	00231	01234	30	5	1L	X		
SG-4A	(10)-1.3	2/1/11	1017	00481	01288	26	5	1L	X		
SG-4B	(11)-1.4	2/1/11	1020	00071	00965	26	5	1L	X		
SG-4C	(12)-1.3	2/1/11	1019	00533	01217	30	5	1L	X		
SG-5A	(13)-1.7	2/1/11	1100	00392	00962	27	5	1L	X		
SG-5B	(14)-1.8	2/1/11	1058	00351	01265	29	5	1L	X		

Report Tier Levels - please select

Tier I - (Results/Default if not specified) _____
Tier II (Results + QC) _____
Tier III (Data Validation Package) 10% Surcharge _____
Tier V (client specified) _____

EDD required Yes / No
Type: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date: 2/10/11	Time: 1800	Received by: (Signature)	Time: 0900	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Time:	Cooler / Blank Temperature ____°C

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Sample Acceptance Check Form

Client: Stantec Consulting Group, Inc. Work order: P1100557

Project: East Central Phoenix / 185902049 Task 200.3300

Sample(s) received on: 2/14/11 Date opened: 2/14/11 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
	Cooler Temperature _____ °C Blank Temperature _____ °C			
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1100557-001.01	1.0 L Source Can					
P1100557-002.01	1.0 L Source Can					
P1100557-003.01	1.0 L Source Can					
P1100557-004.01	1.0 L Source Can					
P1100557-005.01	1.0 L Source Can					
P1100557-006.01	1.0 L Source Can					
P1100557-007.01	1.0 L Source Can					
P1100557-008.01	1.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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Sample Acceptance Check Form

Client: Stantec Consulting Group, Inc. Work order: P1100557

Project: East Central Phoenix / 185902049 Task 200.3300

Sample(s) received on: 2/14/11 Date opened: 2/14/11 by: MZAMORA

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1100557-009.01	1.0 L Source Can					
P1100557-010.01	1.0 L Source Can					
P1100557-011.01	1.0 L Source Can					
P1100557-012.01	1.0 L Source Can					
P1100557-013.01	1.0 L Source Can					
P1100557-014.01	1.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Project ID: P1100557

Helium

Test Code: EPA 3C Modified
Instrument ID: HP5890 II/GC8/TCD
Analyst: Dante Munoz-Castaneda
Sampling Media: 1.0 L Summa Canister(s)
Test Notes:

Date(s) Collected: 1/31 - 2/1/11
Date Received: 2/14/11
Date Analyzed: 2/16/11

Client Sample ID	CAS Sample ID	Injection Volume ml(s)	Canister Dilution Factor	**Result ppmV**	MRL ppmV	**Result %, v/v**	MRL %, v/v	Data Qualifier
SG-1A	P1100557-001	1.00	1.50	**250**	38	**0.025**	0.0038	
SG-1B	P1100557-002	1.00	1.52	**300**	38	**0.030**	0.0038	
SG-1C	P1100557-003	1.00	1.54	**290**	39	**0.029**	0.0039	
SG-2A	P1100557-004	1.00	1.55	**82**	39	**0.0082**	0.0039	
SG-2B	P1100557-005	1.00	1.52	**78**	38	**0.0078**	0.0038	
SG-2C	P1100557-006	1.00	1.54	**60**	39	**0.0060**	0.0039	
SG-3A	P1100557-007	1.00	1.41	**120**	35	**0.012**	0.0035	
SG-3B	P1100557-008	1.00	1.44	**130**	36	**0.013**	0.0036	
SG-3C	P1100557-009	1.00	1.41	**130**	35	**0.013**	0.0035	
SG-4A	P1100557-010	1.00	1.54	**63**	39	**0.0063**	0.0039	
SG-4B	P1100557-011	1.00	1.49	**140**	37	**0.014**	0.0037	
SG-4C	P1100557-012	1.00	1.50	**83**	38	**0.0083**	0.0038	
SG-5A	P1100557-013	1.00	1.61	**52**	40	**0.0052**	0.0040	
SG-5B	P1100557-014	1.00	1.55	**73**	39	**0.0073**	0.0039	
Method Blank	P110216-MB	1.00	1.00	ND	25	ND	0.0025	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P110216-LCS

Test Code: EPA 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/TCD Date Received: NA
Analyst: Dante Munoz-Castaneda Date Analyzed: 2/16/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	CAS Acceptance Limits	Data Qualifier
7440-59-7	Helium	1,000	**1,120**	**112**	85-115	

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-1A** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-001

Test Code: EPA TO-15 Date Collected: 1/31/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00185

Initial Pressure (psig): -1.2 Final Pressure (psig): 5.5

Canister Dilution Factor: 1.50

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.9	ND	0.73	
75-35-4	1,1-Dichloroethene	ND	1.9	ND	0.47	
75-09-2	Methylene Chloride	ND	1.9	ND	0.54	
156-60-5	trans-1,2-Dichloroethene	ND	1.9	ND	0.47	
75-34-3	1,1-Dichloroethane	ND	1.9	ND	0.46	
156-59-2	cis-1,2-Dichloroethene	ND	1.9	ND	0.47	
107-06-2	1,2-Dichloroethane	ND	1.9	ND	0.46	
71-55-6	1,1,1-Trichloroethane	ND	1.9	ND	0.34	
71-43-2	Benzene	ND	1.9	ND	0.59	
56-23-5	Carbon Tetrachloride	ND	1.9	ND	0.30	
79-01-6	Trichloroethene	ND	1.9	ND	0.35	
108-88-3	Toluene	ND	1.9	ND	0.50	
127-18-4	Tetrachloroethene	**5.9**	1.9	**0.87**	0.28	
100-41-4	Ethylbenzene	ND	1.9	ND	0.43	
179601-23-1	m,p-Xylenes	ND	3.8	ND	0.86	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	ND	0.27	
106-46-7	1,4-Dichlorobenzene	ND	1.9	ND	0.31	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-1B** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-002

Test Code: EPA TO-15 Date Collected: 1/31/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00414

Initial Pressure (psig): -1.6 Final Pressure (psig): 5.2

Canister Dilution Factor: 1.52

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.9	ND	0.74	
75-35-4	1,1-Dichloroethene	ND	1.9	ND	0.48	
75-09-2	Methylene Chloride	ND	1.9	ND	0.55	
156-60-5	trans-1,2-Dichloroethene	ND	1.9	ND	0.48	
75-34-3	1,1-Dichloroethane	ND	1.9	ND	0.47	
156-59-2	cis-1,2-Dichloroethene	ND	1.9	ND	0.48	
107-06-2	1,2-Dichloroethane	ND	1.9	ND	0.47	
71-55-6	1,1,1-Trichloroethane	ND	1.9	ND	0.35	
71-43-2	Benzene	ND	1.9	ND	0.59	
56-23-5	Carbon Tetrachloride	ND	1.9	ND	0.30	
79-01-6	Trichloroethene	ND	1.9	ND	0.35	
108-88-3	Toluene	ND	1.9	ND	0.50	
127-18-4	Tetrachloroethene	**4.5**	1.9	**0.67**	0.28	
100-41-4	Ethylbenzene	ND	1.9	ND	0.44	
179601-23-1	m,p-Xylenes	ND	3.8	ND	0.88	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	ND	0.28	
106-46-7	1,4-Dichlorobenzene	ND	1.9	ND	0.32	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-1C** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-003

Test Code: EPA TO-15 Date Collected: 1/31/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00687

Initial Pressure (psig): -1.2 Final Pressure (psig): 6.1

Canister Dilution Factor: 1.54

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.9	ND	0.75	
75-35-4	1,1-Dichloroethene	ND	1.9	ND	0.49	
75-09-2	Methylene Chloride	**4.6**	1.9	**1.3**	0.55	
156-60-5	trans-1,2-Dichloroethene	ND	1.9	ND	0.49	
75-34-3	1,1-Dichloroethane	ND	1.9	ND	0.48	
156-59-2	cis-1,2-Dichloroethene	ND	1.9	ND	0.49	
107-06-2	1,2-Dichloroethane	ND	1.9	ND	0.48	
71-55-6	1,1,1-Trichloroethane	ND	1.9	ND	0.35	
71-43-2	Benzene	ND	1.9	ND	0.60	
56-23-5	Carbon Tetrachloride	ND	1.9	ND	0.31	
79-01-6	Trichloroethene	ND	1.9	ND	0.36	
108-88-3	Toluene	**44**	1.9	**12**	0.51	
127-18-4	Tetrachloroethene	**14**	1.9	**2.0**	0.28	
100-41-4	Ethylbenzene	ND	1.9	ND	0.44	
179601-23-1	m,p-Xylenes	ND	3.9	ND	0.89	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	ND	0.28	
106-46-7	1,4-Dichlorobenzene	ND	1.9	ND	0.32	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-2A** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-004

Test Code: EPA TO-15 Date Collected: 2/1/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00036

Initial Pressure (psig): -1.9 Final Pressure (psig): 5.1

Canister Dilution Factor: 1.55

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.9	ND	0.76	
75-35-4	1,1-Dichloroethene	ND	1.9	ND	0.49	
75-09-2	Methylene Chloride	ND	1.9	ND	0.56	
156-60-5	trans-1,2-Dichloroethene	ND	1.9	ND	0.49	
75-34-3	1,1-Dichloroethane	ND	1.9	ND	0.48	
156-59-2	cis-1,2-Dichloroethene	ND	1.9	ND	0.49	
107-06-2	1,2-Dichloroethane	ND	1.9	ND	0.48	
71-55-6	1,1,1-Trichloroethane	ND	1.9	ND	0.36	
71-43-2	Benzene	ND	1.9	ND	0.61	
56-23-5	Carbon Tetrachloride	ND	1.9	ND	0.31	
79-01-6	Trichloroethene	ND	1.9	ND	0.36	
108-88-3	Toluene	ND	1.9	ND	0.51	
127-18-4	Tetrachloroethene	**5.5**	1.9	**0.81**	0.29	
100-41-4	Ethylbenzene	ND	1.9	ND	0.45	
179601-23-1	m,p-Xylenes	ND	3.9	ND	0.89	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	ND	0.28	
106-46-7	1,4-Dichlorobenzene	ND	1.9	ND	0.32	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-2B** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-005

Test Code: EPA TO-15 Date Collected: 2/1/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00128

Initial Pressure (psig): -1.7 Final Pressure (psig): 5.0

Canister Dilution Factor: 1.52

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.9	ND	0.74	
75-35-4	1,1-Dichloroethene	ND	1.9	ND	0.48	
75-09-2	Methylene Chloride	**2.6**	1.9	**0.76**	0.55	
156-60-5	trans-1,2-Dichloroethene	ND	1.9	ND	0.48	
75-34-3	1,1-Dichloroethane	ND	1.9	ND	0.47	
156-59-2	cis-1,2-Dichloroethene	ND	1.9	ND	0.48	
107-06-2	1,2-Dichloroethane	ND	1.9	ND	0.47	
71-55-6	1,1,1-Trichloroethane	ND	1.9	ND	0.35	
71-43-2	Benzene	ND	1.9	ND	0.59	
56-23-5	Carbon Tetrachloride	ND	1.9	ND	0.30	
79-01-6	Trichloroethene	ND	1.9	ND	0.35	
108-88-3	Toluene	**24**	1.9	**6.4**	0.50	
127-18-4	Tetrachloroethene	**13**	1.9	**2.0**	0.28	
100-41-4	Ethylbenzene	ND	1.9	ND	0.44	
179601-23-1	m,p-Xylenes	ND	3.8	ND	0.88	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	ND	0.28	
106-46-7	1,4-Dichlorobenzene	ND	1.9	ND	0.32	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-2C** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-006

Test Code: EPA TO-15 Date Collected: 2/1/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00751

Initial Pressure (psig): -1.1 Final Pressure (psig): 6.2

Canister Dilution Factor: 1.54

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.9	ND	0.75	
75-35-4	1,1-Dichloroethene	ND	1.9	ND	0.49	
75-09-2	Methylene Chloride	**4.3**	1.9	**1.2**	0.55	
156-60-5	trans-1,2-Dichloroethene	ND	1.9	ND	0.49	
75-34-3	1,1-Dichloroethane	ND	1.9	ND	0.48	
156-59-2	cis-1,2-Dichloroethene	ND	1.9	ND	0.49	
107-06-2	1,2-Dichloroethane	ND	1.9	ND	0.48	
71-55-6	1,1,1-Trichloroethane	ND	1.9	ND	0.35	
71-43-2	Benzene	ND	1.9	ND	0.60	
56-23-5	Carbon Tetrachloride	ND	1.9	ND	0.31	
79-01-6	Trichloroethene	ND	1.9	ND	0.36	
108-88-3	Toluene	**31**	1.9	**8.2**	0.51	
127-18-4	Tetrachloroethene	**16**	1.9	**2.3**	0.28	
100-41-4	Ethylbenzene	ND	1.9	ND	0.44	
179601-23-1	m,p-Xylenes	ND	3.9	ND	0.89	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	ND	0.28	
106-46-7	1,4-Dichlorobenzene	ND	1.9	ND	0.32	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-3A** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-007

Test Code: EPA TO-15 Date Collected: 2/1/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00476

Initial Pressure (psig): -0.2 Final Pressure (psig): 5.7

Canister Dilution Factor: 1.41

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.8	ND	0.69	
75-35-4	1,1-Dichloroethene	ND	1.8	ND	0.44	
75-09-2	Methylene Chloride	ND	1.8	ND	0.51	
156-60-5	trans-1,2-Dichloroethene	ND	1.8	ND	0.44	
75-34-3	1,1-Dichloroethane	ND	1.8	ND	0.44	
156-59-2	cis-1,2-Dichloroethene	ND	1.8	ND	0.44	
107-06-2	1,2-Dichloroethane	ND	1.8	ND	0.44	
71-55-6	1,1,1-Trichloroethane	ND	1.8	ND	0.32	
71-43-2	Benzene	ND	1.8	ND	0.55	
56-23-5	Carbon Tetrachloride	ND	1.8	ND	0.28	
79-01-6	Trichloroethene	ND	1.8	ND	0.33	
108-88-3	Toluene	ND	1.8	ND	0.47	
127-18-4	Tetrachloroethene	**14**	1.8	**2.1**	0.26	
100-41-4	Ethylbenzene	ND	1.8	ND	0.41	
179601-23-1	m,p-Xylenes	ND	3.5	ND	0.81	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.8	ND	0.26	
106-46-7	1,4-Dichlorobenzene	ND	1.8	ND	0.29	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-3B** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-008

Test Code: EPA TO-15 Date Collected: 2/1/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00100

Initial Pressure (psig): -0.9 Final Pressure (psig): 5.2

Canister Dilution Factor: 1.44

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.8	ND	0.70	
75-35-4	1,1-Dichloroethene	ND	1.8	ND	0.45	
75-09-2	Methylene Chloride	**13**	1.8	**3.8**	0.52	
156-60-5	trans-1,2-Dichloroethene	ND	1.8	ND	0.45	
75-34-3	1,1-Dichloroethane	ND	1.8	ND	0.44	
156-59-2	cis-1,2-Dichloroethene	ND	1.8	ND	0.45	
107-06-2	1,2-Dichloroethane	ND	1.8	ND	0.44	
71-55-6	1,1,1-Trichloroethane	ND	1.8	ND	0.33	
71-43-2	Benzene	**2.8**	1.8	**0.88**	0.56	
56-23-5	Carbon Tetrachloride	ND	1.8	ND	0.29	
79-01-6	Trichloroethene	ND	1.8	ND	0.34	
108-88-3	Toluene	**140**	1.8	**38**	0.48	
127-18-4	Tetrachloroethene	**18**	1.8	**2.7**	0.27	
100-41-4	Ethylbenzene	**1.8**	1.8	**0.41**	0.41	
179601-23-1	m,p-Xylenes	**4.1**	3.6	**0.94**	0.83	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.8	ND	0.26	
106-46-7	1,4-Dichlorobenzene	ND	1.8	ND	0.30	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-3C** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-009

Test Code: EPA TO-15 Date Collected: 2/1/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00231

Initial Pressure (psig): -0.6 Final Pressure (psig): 5.2

Canister Dilution Factor: 1.41

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.8	ND	0.69	
75-35-4	1,1-Dichloroethene	ND	1.8	ND	0.44	
75-09-2	Methylene Chloride	ND	1.8	ND	0.51	
156-60-5	trans-1,2-Dichloroethene	ND	1.8	ND	0.44	
75-34-3	1,1-Dichloroethane	ND	1.8	ND	0.44	
156-59-2	cis-1,2-Dichloroethene	ND	1.8	ND	0.44	
107-06-2	1,2-Dichloroethane	ND	1.8	ND	0.44	
71-55-6	1,1,1-Trichloroethane	ND	1.8	ND	0.32	
71-43-2	Benzene	ND	1.8	ND	0.55	
56-23-5	Carbon Tetrachloride	ND	1.8	ND	0.28	
79-01-6	Trichloroethene	ND	1.8	ND	0.33	
108-88-3	Toluene	ND	1.8	ND	0.47	
127-18-4	Tetrachloroethene	**41**	1.8	**6.0**	0.26	
100-41-4	Ethylbenzene	ND	1.8	ND	0.41	
179601-23-1	m,p-Xylenes	ND	3.5	ND	0.81	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.8	ND	0.26	
106-46-7	1,4-Dichlorobenzene	ND	1.8	ND	0.29	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-4A** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-010

Test Code: EPA TO-15 Date Collected: 2/1/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00481

Initial Pressure (psig): -1.3 Final Pressure (psig): 5.9

Canister Dilution Factor: 1.54

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.9	ND	0.75	
75-35-4	1,1-Dichloroethene	ND	1.9	ND	0.49	
75-09-2	Methylene Chloride	**8.7**	1.9	**2.5**	0.55	
156-60-5	trans-1,2-Dichloroethene	ND	1.9	ND	0.49	
75-34-3	1,1-Dichloroethane	ND	1.9	ND	0.48	
156-59-2	cis-1,2-Dichloroethene	ND	1.9	ND	0.49	
107-06-2	1,2-Dichloroethane	ND	1.9	ND	0.48	
71-55-6	1,1,1-Trichloroethane	ND	1.9	ND	0.35	
71-43-2	Benzene	ND	1.9	ND	0.60	
56-23-5	Carbon Tetrachloride	ND	1.9	ND	0.31	
79-01-6	Trichloroethene	ND	1.9	ND	0.36	
108-88-3	Toluene	**90**	1.9	**24**	0.51	
127-18-4	Tetrachloroethene	**45**	1.9	**6.6**	0.28	
100-41-4	Ethylbenzene	ND	1.9	ND	0.44	
179601-23-1	m,p-Xylenes	ND	3.9	ND	0.89	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	ND	0.28	
106-46-7	1,4-Dichlorobenzene	ND	1.9	ND	0.32	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-4B** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-011

Test Code: EPA TO-15 Date Collected: 2/1/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00071

Initial Pressure (psig): -1.3 Final Pressure (psig): 5.2

Canister Dilution Factor: 1.49

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.9	ND	0.73	
75-35-4	1,1-Dichloroethene	ND	1.9	ND	0.47	
75-09-2	Methylene Chloride	**8.4**	1.9	**2.4**	0.54	
156-60-5	trans-1,2-Dichloroethene	ND	1.9	ND	0.47	
75-34-3	1,1-Dichloroethane	ND	1.9	ND	0.46	
156-59-2	cis-1,2-Dichloroethene	ND	1.9	ND	0.47	
107-06-2	1,2-Dichloroethane	ND	1.9	ND	0.46	
71-55-6	1,1,1-Trichloroethane	ND	1.9	ND	0.34	
71-43-2	Benzene	ND	1.9	ND	0.58	
56-23-5	Carbon Tetrachloride	ND	1.9	ND	0.30	
79-01-6	Trichloroethene	ND	1.9	ND	0.35	
108-88-3	Toluene	**91**	1.9	**24**	0.49	
127-18-4	Tetrachloroethene	**91**	1.9	**13**	0.27	
100-41-4	Ethylbenzene	ND	1.9	ND	0.43	
179601-23-1	m,p-Xylenes	ND	3.7	ND	0.86	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	ND	0.27	
106-46-7	1,4-Dichlorobenzene	ND	1.9	ND	0.31	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-4C** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-012

Test Code: EPA TO-15 Date Collected: 2/1/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00533

Initial Pressure (psig): -1.3 Final Pressure (psig): 5.4

Canister Dilution Factor: 1.50

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.9	ND	0.73	
75-35-4	1,1-Dichloroethene	ND	1.9	ND	0.47	
75-09-2	Methylene Chloride	ND	1.9	ND	0.54	
156-60-5	trans-1,2-Dichloroethene	ND	1.9	ND	0.47	
75-34-3	1,1-Dichloroethane	ND	1.9	ND	0.46	
156-59-2	cis-1,2-Dichloroethene	ND	1.9	ND	0.47	
107-06-2	1,2-Dichloroethane	ND	1.9	ND	0.46	
71-55-6	1,1,1-Trichloroethane	ND	1.9	ND	0.34	
71-43-2	Benzene	ND	1.9	ND	0.59	
56-23-5	Carbon Tetrachloride	ND	1.9	ND	0.30	
79-01-6	Trichloroethene	**3.2**	1.9	**0.60**	0.35	
108-88-3	Toluene	ND	1.9	ND	0.50	
127-18-4	Tetrachloroethene	**180**	1.9	**27**	0.28	
100-41-4	Ethylbenzene	ND	1.9	ND	0.43	
179601-23-1	m,p-Xylenes	ND	3.8	ND	0.86	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	ND	0.27	
106-46-7	1,4-Dichlorobenzene	ND	1.9	ND	0.31	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-5A** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-013

Test Code: EPA TO-15 Date Collected: 2/1/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: 1SC00392

Initial Pressure (psig): -1.6 Final Pressure (psig): 6.4

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	2.0	ND	0.79	
75-35-4	1,1-Dichloroethene	ND	2.0	ND	0.51	
75-09-2	Methylene Chloride	ND	2.0	ND	0.58	
156-60-5	trans-1,2-Dichloroethene	ND	2.0	ND	0.51	
75-34-3	1,1-Dichloroethane	ND	2.0	ND	0.50	
156-59-2	cis-1,2-Dichloroethene	ND	2.0	ND	0.51	
107-06-2	1,2-Dichloroethane	ND	2.0	ND	0.50	
71-55-6	1,1,1-Trichloroethane	ND	2.0	ND	0.37	
71-43-2	Benzene	ND	2.0	ND	0.63	
56-23-5	Carbon Tetrachloride	ND	2.0	ND	0.32	
79-01-6	Trichloroethene	ND	2.0	ND	0.37	
108-88-3	Toluene	**7.5**	2.0	**2.0**	0.53	
127-18-4	Tetrachloroethene	**170**	2.0	**25**	0.30	
100-41-4	Ethylbenzene	ND	2.0	ND	0.46	
179601-23-1	m,p-Xylenes	ND	4.0	ND	0.93	
79-34-5	1,1,2,2-Tetrachloroethane	ND	2.0	ND	0.29	
106-46-7	1,4-Dichlorobenzene	ND	2.0	ND	0.33	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **SG-5B** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P1100557-014

Test Code: EPA TO-15 Date Collected: 2/1/11
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 2/14/11
Analyst: Wida Ang Date Analyzed: 2/17 - 2/18/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes: 0.10 Liter(s)
Container ID: 1SC00351

Initial Pressure (psig): -1.7 Final Pressure (psig): 5.4

Canister Dilution Factor: 1.55

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	1.9	ND	0.76	
75-35-4	1,1-Dichloroethene	ND	1.9	ND	0.49	
75-09-2	Methylene Chloride	ND	1.9	ND	0.56	
156-60-5	trans-1,2-Dichloroethene	ND	1.9	ND	0.49	
75-34-3	1,1-Dichloroethane	ND	1.9	ND	0.48	
156-59-2	cis-1,2-Dichloroethene	ND	1.9	ND	0.49	
107-06-2	1,2-Dichloroethane	ND	1.9	ND	0.48	
71-55-6	1,1,1-Trichloroethane	ND	1.9	ND	0.36	
71-43-2	Benzene	ND	1.9	ND	0.61	
56-23-5	Carbon Tetrachloride	ND	1.9	ND	0.31	
79-01-6	Trichloroethene	**6.4**	1.9	**1.2**	0.36	
108-88-3	Toluene	ND	1.9	ND	0.51	
127-18-4	Tetrachloroethene	**330**	7.8	**49**	1.1	**D2**
100-41-4	Ethylbenzene	ND	1.9	ND	0.45	
179601-23-1	m,p-Xylenes	ND	3.9	ND	0.89	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.9	ND	0.28	
106-46-7	1,4-Dichlorobenzene	ND	1.9	ND	0.32	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D2 = Sample required dilution due to high concentration of target analyte.

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P110217-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.50	ND	0.20	
75-35-4	1,1-Dichloroethene	ND	0.50	ND	0.13	
75-09-2	Methylene Chloride	ND	0.50	ND	0.14	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	ND	0.13	
75-34-3	1,1-Dichloroethane	ND	0.50	ND	0.12	
156-59-2	cis-1,2-Dichloroethene	ND	0.50	ND	0.13	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ND	0.092	
71-43-2	Benzene	ND	0.50	ND	0.16	
56-23-5	Carbon Tetrachloride	ND	0.50	ND	0.080	
79-01-6	Trichloroethene	ND	0.50	ND	0.093	
108-88-3	Toluene	ND	0.50	ND	0.13	
127-18-4	Tetrachloroethene	ND	0.50	ND	0.074	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ND	0.073	
106-46-7	1,4-Dichlorobenzene	ND	0.50	ND	0.083	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

RESULTS OF ANALYSIS

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **Method Blank** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P110218-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 2/18/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.50	ND	0.20	
75-35-4	1,1-Dichloroethene	ND	0.50	ND	0.13	
75-09-2	Methylene Chloride	ND	0.50	ND	0.14	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	ND	0.13	
75-34-3	1,1-Dichloroethane	ND	0.50	ND	0.12	
156-59-2	cis-1,2-Dichloroethene	ND	0.50	ND	0.13	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ND	0.092	
71-43-2	Benzene	ND	0.50	ND	0.16	
56-23-5	Carbon Tetrachloride	ND	0.50	ND	0.080	
79-01-6	Trichloroethene	ND	0.50	ND	0.093	
108-88-3	Toluene	ND	0.50	ND	0.13	
127-18-4	Tetrachloroethene	ND	0.50	ND	0.074	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ND	0.073	
106-46-7	1,4-Dichlorobenzene	ND	0.50	ND	0.083	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

SURROGATE SPIKE RECOVERY RESULTS

Client: **Stantec Consulting Group, Inc.**
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Project ID: P1100557

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sampling Media: 1.0 L Summa Canister(s)
Test Notes:

Date(s) Collected: 1/31 - 2/1/11
Date(s) Received: 2/14/11
Date(s) Analyzed: 2/17 - 2/18/11

Client Sample ID	CAS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P110217-MB	**103**	**100**	**89**	70-130	
Method Blank	P110218-MB	**103**	**100**	**93**	70-130	
Lab Control Sample	P110217-LCS	**104**	**99**	**96**	70-130	
Lab Control Sample	P110218-LCS	**104**	**97**	**98**	70-130	
SG-1A	P1100557-001	**103**	**96**	**95**	70-130	
SG-1B	P1100557-002	**104**	**99**	**94**	70-130	
SG-1C	P1100557-003	**103**	**98**	**95**	70-130	
SG-2A	P1100557-004	**102**	**98**	**95**	70-130	
SG-2B	P1100557-005	**103**	**97**	**95**	70-130	
SG-2C	P1100557-006	**103**	**98**	**95**	70-130	
SG-3A	P1100557-007	**101**	**99**	**96**	70-130	
SG-3B	P1100557-008	**101**	**97**	**96**	70-130	
SG-3C	P1100557-009	**100**	**98**	**97**	70-130	
SG-4A	P1100557-010	**101**	**98**	**96**	70-130	
SG-4B	P1100557-011	**102**	**97**	**96**	70-130	
SG-4C	P1100557-012	**101**	**99**	**97**	70-130	
SG-5A	P1100557-013	**102**	**98**	**95**	70-130	
SG-5B	P1100557-014	**101**	**99**	**95**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P110217-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 2/17/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	206	**208**	**101**	70-130	
75-35-4	1,1-Dichloroethene	220	**214**	**97**	70-130	
75-09-2	Methylene Chloride	216	**188**	**87**	70-130	
156-60-5	trans-1,2-Dichloroethene	216	**225**	**104**	70-130	
75-34-3	1,1-Dichloroethane	216	**223**	**103**	70-130	
156-59-2	cis-1,2-Dichloroethene	220	**227**	**103**	70-130	
107-06-2	1,2-Dichloroethane	216	**210**	**97**	70-130	
71-55-6	1,1,1-Trichloroethane	214	**203**	**95**	70-130	
71-43-2	Benzene	216	**200**	**93**	70-130	
56-23-5	Carbon Tetrachloride	218	**214**	**98**	70-130	
79-01-6	Trichloroethene	214	**191**	**89**	70-130	
108-88-3	Toluene	218	**196**	**90**	70-130	
127-18-4	Tetrachloroethene	206	**184**	**89**	70-130	
100-41-4	Ethylbenzene	214	**208**	**97**	70-130	
179601-23-1	m,p-Xylenes	424	**420**	**99**	70-130	
79-34-5	1,1,2,2-Tetrachloroethane	200	**214**	**107**	70-130	
106-46-7	1,4-Dichlorobenzene	218	**217**	**100**	70-130	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Stantec Consulting Group, Inc.**
Client Sample ID: **Lab Control Sample** CAS Project ID: P1100557
Client Project ID: **East Central Phoenix / 185902049 Task 200.3300** CAS Sample ID: P110218-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 2/18/11
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	206	**203**	**99**	70-130	
75-35-4	1,1-Dichloroethene	220	**213**	**97**	70-130	
75-09-2	Methylene Chloride	216	**183**	**85**	70-130	
156-60-5	trans-1,2-Dichloroethene	216	**219**	**101**	70-130	
75-34-3	1,1-Dichloroethane	216	**218**	**101**	70-130	
156-59-2	cis-1,2-Dichloroethene	220	**221**	**100**	70-130	
107-06-2	1,2-Dichloroethane	216	**204**	**94**	70-130	
71-55-6	1,1,1-Trichloroethane	214	**200**	**93**	70-130	
71-43-2	Benzene	216	**196**	**91**	70-130	
56-23-5	Carbon Tetrachloride	218	**210**	**96**	70-130	
79-01-6	Trichloroethene	214	**187**	**87**	70-130	
108-88-3	Toluene	218	**186**	**85**	70-130	
127-18-4	Tetrachloroethene	206	**175**	**85**	70-130	
100-41-4	Ethylbenzene	214	**198**	**93**	70-130	
179601-23-1	m,p-Xylenes	424	**399**	**94**	70-130	
79-34-5	1,1,2,2-Tetrachloroethane	200	**201**	**101**	70-130	
106-46-7	1,4-Dichlorobenzene	218	**206**	**94**	70-130	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

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LABORATORY REPORT

March 3, 2011

David Conner
Battelle
4800 Oak Grove Dr. M/S 180-801
Pasadena, CA 91109

RE: JPL GW Mon 1Q11 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on March 1, 2011. For your reference, these analyses have been assigned our service request number P1100777.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L10-3; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-09-TX; Minnesota Department of Health, Certificate No. 11495AA; Washington State Department of Ecology, ELAP Lab ID: C946. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Digitally signed by Sue Anderson
Date: 2011.03.03 09:25:07 -08'00'

Sue Anderson
Project Manager

Client: Battelle CAS Project No: P1100777
Project: JPL GW Mon 1Q11 / G486090

CASE NARRATIVE

The samples were received intact under chain of custody on March 1, 2011 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Hexavalent Chromium by EPA Method 7196A

No anomalies were encountered during this analysis.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

DETAIL SUMMARY REPORT

Client: Battelle
Project ID: JPL GW Mon 1Q11 / G486090
Service Request: P1100777

Date Received: 3/1/2011
Time Received: 15:45

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	7196A - Cr6
MW-20-5	P1100777-001	Water	3/1/2011	08:29	X
MW-20-4	P1100777-002	Water	3/1/2011	09:00	X
MW-20-3	P1100777-003	Water	3/1/2011	09:25	X
MW-20-2	P1100777-004	Water	3/1/2011	09:49	X
MW-20-1	P1100777-005	Water	3/1/2011	10:23	X
EB-06-3/01/11	P1100777-006	Water	3/1/2011	10:03	X

Acronyms

CA LUFT	California DHS LUFT Metho
ASTM	American Society for Testing and Materials
BTEX	Benzene/Toluene/Ethylbenzene/Xylenes
CAS Number	Chemical Abstract Service Registry Number
CFC	Chlorofluorocarbon
CRDL	Contract Required Detection Limit
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOH or DHS	Department of Health Services
EPA	U.S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified Method
MDL	Method Detection Limit
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl *tert* -Butyl Ether
NA	Not Applicable
NC	Not Calculated
ND	None Detected at or above the Method Reporting/Detection Limit (MRL/MDL)
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	*Standard Methods for the Examination of Water and Wastewater* , 19th Ed., 1995.
SW	*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* , SW-846, Third Edition, 1986 and as amended by Updates I, II, IIA, and IIB.
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)
VOC	Volatile Organic Compound(s)

Qualifiers

U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
J	The result is an estimated concentration that is less than the MRL (PQL), but greater than or equal to the MDL.
B	Analyte detected in the method blank above MRL (PQL).
E	Estimated; result based on response which exceeded the instrument calibration range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
D	The reported result is from a dilution.
X	See case narrative.

Water & Soil - Chain of Custody Record & Analytical Service Request

Page 1 of 1

Columbia Analytical Services INC.
An Employee - Owned Company

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day - Standard

CAS Project No.: P1100777

CAS Contact:

Company Name & Address (Reporting Information)	Project Name
BATTELLE 3990 OLD TOWN AVE, C-205 SAN DIEGO, CA 92110	JPL GW. MON. 2011
	Project Number: 54486090
Project Manager: DAVID CONNER	P.O. # / Billing Information: 214319 / BATTELLE ATTN: GERALD TOMPKINS 505 KING AVE. COLUMBUS, OH 43201
Phone: (619) 726-7311	Fax: (614) 458-6614
Email Address for Result Reporting	Sampler (Print & Sign): CHASE BRODDON

Analysis Method and/or Analytes

Preservative Code

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Matrix	Number of Containers	Volatile Organics GC/MS 624 ☐ 8260B ☐ Oxygenates ☐ TPH Gas ☐	TPH Gas 8015B ☐ BTEX 8021B ☐ MTBE 8021B ☐	TPH Diesel 8015B ☐ (Subcontracted)	TPH Diesel Low Level 8015B ☐ (Subcontracted)	TPH FC ☐ 8015M (Subcontracted)	Semi-Volatile Organics GC/MS 625 ☐ 8270C ☐ (Subcontracted)	0	Cr VI (7196)	Remarks
MW-20-5	1	3/1/11	0829	W	1							X		
MW-20-4	2		0900		1							X		
MW-20-3	3		0925		1							X		
MW-20-2	4		0949		1							X		QC LEVEL IV
MW-20-1	5		1023		1							X		
EB-06-03/01/11	6	3/1/11	1003	W	1							X		

Preservative Key

0	None
1	HCL
2	HNO3
3	H2SO4
4	NaOH
5	Zn Acetate
6	Asc Acid
7	Other

Report Tier Levels - please select

Tier I - (Results/Default if not specified) ____
Tier II - (Results + QC) ____
Tier III - (Data Validation Package) 10% Surcharge ____
Tier V - (client specified) ____

MRL required Yes / No
MDL / PQL / J required Yes / No

EDD required Yes / No
Type: ____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date: 3/1/11	Time: 1500	Received by: (Signature)	Date: 3/1/11	Time: 1507
Relinquished by: (Signature)	Date: 3/1/11	Time: 1545	Received by: (Signature)	Date: 3/1/11	Time: 1545
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank / Ice / No Ice
Temperature 3.0 °C

5 of 22

Client: Battelle **Service Request:** P1100777
Project: JPL GW Mon 1Q11/G486090

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1100777-001.01					
	7196A				
		3/1/11	1551	SMO / MZAMORA	
		3/1/11	1552	P-37 / MZAMORA	
		3/1/11	1640	In Lab / SANDERSON	
		3/1/11	1723	P-37 / SANDERSON	
P1100777-002.01					
	7196A				
		3/1/11	1551	SMO / MZAMORA	
		3/1/11	1552	P-37 / MZAMORA	
		3/1/11	1639	In Lab / SANDERSON	
		3/1/11	1723	P-37 / SANDERSON	
P1100777-003.01					
	7196A				
		3/1/11	1551	SMO / MZAMORA	
		3/1/11	1552	P-37 / MZAMORA	
		3/1/11	1639	In Lab / SANDERSON	
		3/1/11	1723	P-37 / SANDERSON	
P1100777-004.01					
	7196A				
		3/1/11	1551	SMO / MZAMORA	
		3/1/11	1552	P-37 / MZAMORA	
		3/1/11	1640	In Lab / SANDERSON	
		3/1/11	1723	P-37 / SANDERSON	
P1100777-005.01					
	7196A				
		3/1/11	1551	SMO / MZAMORA	
		3/1/11	1552	P-37 / MZAMORA	
		3/1/11	1639	In Lab / SANDERSON	
		3/1/11	1723	P-37 / SANDERSON	
P1100777-006.01					
	7196A				
		3/1/11	1551	SMO / MZAMORA	
		3/1/11	1552	P-37 / MZAMORA	
		3/1/11	1640	In Lab / SANDERSON	
		3/1/11	1723	P-37 / SANDERSON	

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Sample Acceptance Check Form

Client: Battelle Work order: P1100777

Project: JPL GW Mon 1Q11 / G486090

Sample(s) received on: 3/1/11 Date opened: 3/1/11 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 3 °C			
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☒	☐	☐
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1100777-001.01	125mL Plastic NP					
P1100777-002.01	125mL Plastic NP					
P1100777-003.01	125mL Plastic NP					
P1100777-004.01	125mL Plastic NP					
P1100777-005.01	125mL Plastic NP					
P1100777-006.01	125mL Plastic NP					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

Analytical Report

Client : Battelle
Project Name : JPL GW Mon 1Q11
Project Number : G486090
Sample Matrix : WATER

Service Request : P1100777
Date Collected : 03/01/11
Date Received : 03/01/11

Chromium, Hexavalent

Prep Method : None
Analysis Method : 7196A
Test Notes :

Units : mg/L (ppm)
Basis : NA

Sample Name	Lab Code	PQL	MDL	Dilution Factor	Date Extracted	Date/Time Analyzed	Result	Result Notes
MW-20-5	P1100777-001	0.010	0.004	1	NA	03/01/11 17:15	ND	
MW-20-4	P1100777-002	0.010	0.004	1	NA	03/01/11 17:15	ND	
MW-20-3	P1100777-003	0.010	0.004	1	NA	03/01/11 17:15	ND	
MW-20-2	P1100777-004	0.010	0.004	1	NA	03/01/11 17:15	ND	
MW-20-1	P1100777-005	0.010	0.004	1	NA	03/01/11 17:15	ND	
EB-06-3/01/11	P1100777-006	0.010	0.004	1	NA	03/01/11 17:15	ND	
Method Blank	P1100777-MB	0.010	0.004	1	NA	03/01/11 17:15	ND	

Approved By Karen Ryan Date : 3/2/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1100777
Project:	JPL GW Mon. 1Q11 / G486090	**Date Analyzed:**	03/01/11

Title: Initial and Continuing Calibration Blank (ICB and CCB) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	PQL	MDL	Result
ICB	0.010	0.004	ND
CCB1	0.010	0.004	ND
CCB2	0.010	0.004	ND

Approved By: Karen Ryan Date: 3/2/11

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon. 1Q11 / G486090

Service Request: P1100777
Date Analyzed: 03/01/11

Title: Initial and Continuing Calibration Verification (ICV and CCV) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	True Value	Result	Percent Recovery	Acceptance Criteria
ICV	0.0500	0.0480	96	90-110
CCV1	0.0500	0.0488	98	90-110
CCV2	0.0500	0.0488	98	90-110

Approved By: Karen Ryan Date: 3/2/11

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100777
Project Name :	JPL GW Mon 1Q11	**Date Collected :**	NA
Project Number :	G486090	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	03/01/11

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1100777-LCS	Basis :	NA
Test Notes :			

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Chromium, Hexavalent	None	7196A	0.0400	0.0400	100	90-109	

Approved By Karen Ryan Date : 3/2/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100777
Project Name :	JPL GW Mon 1Q11	**Date Collected :**	03/01/11
Project Number :	G486090	**Date Received :**	03/01/11
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	03/01/11

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name :	MW-20-5		Units :	mg/L (ppm)
Lab Code :	P1100777-001MS	P1100777-001DMS	Basis :	NA
Test Notes :				

Analyte	Prep Method	Analysis Method	PQL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Spike Recovery MS	Spike Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Chromium, Hexavalent	None	7196A	0.010	0.0500	0.0500	ND	ND	ND	NC	NC	78-112	<1	

Approved By Karen Ryan Date : 3/2/11

Report By:SAnderson

Columbia Analytical Services

pH Run Log

Service Request #(s): 777 778

Time: 1210

Sample	VWR lot #	Exp.
pH 2 Buffer	524-1104007	1/2012
pH 4 Buffer	524-1104/003	8/31/12
pH 7 Buffer	524-1104/1004	9/30/12
pH 10 Buffer	524-03021001	9/30/11

Slope	Prep.Run #
99.0%	—
	Run#
	—

pH in liquid: (1) 9040B, (2) 9040C **pH in solid:** (3) 9045C, (4) 9045D (*Note method number in column labeled # below*)

pH adjustment:(5) 7196A,(6) 7199 (Note method # In column labeled #)

Sample	#	pH	Temp. °C
pH 2.000	5	1.993	22.6°C
pH 4.000	|	3.984	22.7°C
pH 7.000	|	6.983	22.4°C
pH 10.000	|	10.011	22.7°C
T.V.=6.46 EXP:11/2012 Ref#:519-11230903D	|	6.377	22.3°C
DI	|	2.002	20.4°C
pH 2.000	↓	2.024	22.4°C
TIME: 1645		SV	
pH 2.000	5	2.012	22.8°
777-1.01	|	2.020	11.8°
-2.01	|	2.099	12.0°
-3.01	|	1.964	12.6°
-4.01	|	2.083	11.5°
-5.01	|	1.836	12.7°
↓ -6.01	|	1.923	13.4°
778-1.01	|	2.027	15.5°
pH 2.000	↓	1.991	22.3°

Sample	#	pH	Temp. °C

space not used

pH Adjustments: ☒ **7196A**: Diluted/Conc H_2SO_4 EMD 49284 EXP: 11/20/14

☐ **7199A**: Diluted NaOH _____ EXP: _____

Comments: _____

* Soil or Solid prep: 1:1(wt:vol) with DI water: ** Samples received past recommended hold time.

Date buffers and filling solution changed: 2/28/11

Note: ATC probe used; therefore, temperature correction calculation is not necessary.

Analyst: _____ Date: 3/1/11

Reviewer: KR Date: 3/2/11

pH.XLS

Hexavalent Chromium (Liquids)

Columbia Analytical Services™

Method EPA 7196A

Service Request#(s): _____ Run#: 237628

Stock#: 524-02281103 T.V=10PPM EXP: 2/28/12 Prep Run#: _____

ICV/CCV#: 524-10151001 T.V=100PPM EXP: 2/20/12 Conc. H_2SO_4 Lot#: EMD 49284 EXP:

Coloring Reagent Ref#: 524-02211102 EXP: 3/21/11

Working Curve:

Prep Dilution	NA	0.05/50	0.25/50	0.5/50	Corr. Coeff.
Concentration mg/L	0.00	0.01	0.05	0.1	0.99998807
Absorbance @ 540 nm	0.000	0.011	0.056	0.113	

	Sample #	Sample Vol.(mL)	Dilution	pH ✓	Bkg.	Absorbance @ 540nm	Corrected Abs. (minus bkg.)	Results - mg/L	QA/QC - %R / RPD
1	ICB	10ml	—	✓	0.000	0.000	0.000	0.000200	<0.004
2	ICV 0.050 PPM		—	✓	0.000	0.054	0.054	0.0480	96%
3	MB		—	✓	0.000	0.000	0.000	0.000200	<0.004
4	LCS 0.0400PPM		—	✓	0.000	0.045	0.045	0.040	100%
5	777-1.01		—	✓	0.000	0.000	0.000	0.000200	<0.004
6	-1.01 MS 0.05PPM		—	✓	0.000	0.053	0.053	0.0471	94% 2
7	-1.01 MSD		—	✓	0.000	0.053	0.053	0.0471	94% 0 RPD
8	-2.01		—	✓	0.007	0.008	0.001	0.00108	<0.004
9	-2.01 MS 0.03PPM		—	✓	0.007	0.037	0.030	0.0267	89%
10	-3.01		—	✓	0.000	0.000	0.000	0.000200	<0.004
11	-4.01		—	✓	0.001	0.001	0.000	↓	↓
12	-5.01		—	✓	0.004	0.005	0.001	0.00108	↓
13	CCV1 0.0500PPM		—	✓	0.000	0.055	0.055	0.0488	98%
14	CCB1		—	✓	0.000	0.000	0.000	0.000200	<0.004
15	777-6.01		—	✓	0.000	0.000	0.000	↓	
16	778-1.01		—	✓	0.000	0.013	0.013	0.0117	
17	↓ -1.01 VS 0.03PPM		—	✓	0.000	0.047	0.047	0.0418	100%

pH Requirement: Method 7196A (2 ± 0.5) * Samples filtered prior to pH adjustment

ICV/CCV spiked with 0.25 ml of 524-10151001 @10 ↑ 50 ml of pH adjusted DI WATER (T.V.= 0.05 ppm)

MS/MSD spiked with 0.05 ml of 524-02281103 ↑ 10 ml of pH adjusted sample (T.V.= 0.05 ppm)

LCS spiked with 0.2 ml of _____ ↑ 50 ml of pH adjusted DI Water (T.V.= 0.04 ppm)

Verification Standard Spiked 0.3 ml of ↓ @10 ↑ 10 ml of sample (T.V.= 0.03 ppm)

Comments: _____

Prepared By: _____ Date/Time: 3/1/11 @ 1700

Analyzed By: _____ Date/Time: 3/1/11 @ 1715

Reviewed By: _____ Date: 3/2/11

Cr6LIQ.xls

Hexavalent Chromium (Liquids)

Columbia Analytical Services™

Method EPA 7196A

page 2 of 2

Service Request#(s): 777 778

Stock#: 524-0228/103 T.V = 100PPM EXP: 7/28/12

ICV/CCV#: 524-1015/001 T.V=100PPM EXP: 2/2012

Run#: 237628

Prep Run#:

Conc. H_2SO_4 Lot#: EMD 49284 EXP: 11/20/14

Coloring Reagent Ref#: 524-0221/102 EXP: 3/21/11

Working Curve:

Prep Dilution		*NA*	*0.05/50*	*0.25/50*	*0.5/50*	*Corr. Coeff.*
Concentration mg/L		*0.00*	*0.01*	*0.05*	*0.1*	0.99998807
Absorbance @ 540 nm		0.000	0.011	0.056	0.113	

	Sample #	Sample Vol.(mL)	Dilution	pH ✓	Bkg.	Absorbance @ 540nm	Corrected Abs. (minus bkg.)	Results - mg/L	QA/QC - %R / RPD
1	778-1.01MS	10ml	—	✓	0.000	0.067	0.067	0.0595	96% (LCS)
2	778-1.01MSD	↓	—	✓	0.000	0.067	0.067	0.0595	96% 0% RPD
3	CCV2	↓	—	✓	0.000	0.055	0.055	0.0488	98%
4	CCB2	↓	—	✓	0.000	0.000	0.000	0.000200	<0.004
5									
6									
7									
8									
9									
10									
11									
12			space not used						
13									
14									
15									
16									
17									

pH Requirement: Method 7196A *(2 ± 0.5)* * Samples filtered prior to pH adjustment

ICV/CCV spiked with 0.25 ml of 524-1015100 1@1/10 ↑ 50 ml of pH adjusted DI WATER (T.V.= 0.05 ppm)

MS/MSD spiked with 0.05 ml of 524-0228/103 ↑ 10 ml of pH adjusted sample (T.V.= 0.05 ppm)

LCS spiked with 0.2 ml of ↓ ↑ 50 ml of pH adjusted DI Water (T.V.= 0.04 ppm)

Verification Standard Spiked 0.3 ml of ↓ @1/10 ↑ 10 ml of sample (T.V.= 0.03 ppm)

Comments:

Prepared By: [signature] Date/Time: 3/1/11 @ 1700

Analyzed By: [signature] Date/Time: 3/1/11 @ 1715

Reviewed By: KR Date: 3/2/11

Cr6LIQ.xls

11/23/09 SIG-1123090Z 1000 ppm SO_3 (ICV/CCV)
SR 0.1607g Na_2SO_3 (Mallinckrodt; H25469; EXP 8/11/14
↑ 100ml w/ DI
EXP: 5/23/10

11/23/09 SIG-1123090 3 A,B,C,D pH REFERENCE
SR PURCHASED
ERA CAT # 977
LOT # 129934
EXP: 1/2012

11/24/09 SIG-1124090 1 1000 ppm SO_4 Standard
SR PURCHASED CAT # ICC-006
LOT # K00794
EXP: 9/30/13
SR 11/25/09

11/25/09 SIG-~~H25~~ 1125090 1 0.1N H_2SO_4
SR ~~50~~ml conc H_2SO_4 (EMD 47050 EXP: 9/13/10)
EXP: ~~9/13/10~~ 9/13/10
SR 11/25/09

11/30/09 SIG-1130090 1 Cr^{6+} Coloring Reagent
SR 0.2500g diphenylcarbonylhydrazide (EMD) 47103ED; EXP: 1/30/13) ↑ 50ml w/ Acetone (EMD 47154D; EXP: 9/24/12
EXP: 12/30/09

11/30/09 SIG-1130090 2 25133 ppb Stock for O_3 in Air
SR 0.05ml Pyridine-4-Carboxaldehyde (Alfa Aesar LOT 10144 0598; EXP 8/11/12)
↑ 500ml deionized H_2O
EXP: 12/14/09

11/30/09 SIG-1130090 3 25133 ppb ICV/CCV for O_3 in Air
SR 0.05ml Pyridine-4-carboxaldehyde (TCI LOT # IGIINC EXP: 8/10/12)
↑ 500ml w/ DI H_2O
EXP: 12/14/09

Reviewed And Approved By:
Initial: VL Date: 12/22/09

3/1/10 SV
524-0301001 pH 4.000 Buffer
Purchased 500 ml CAT # 5657-01
JT BAKER LOT # H31526
EXP 8/31/11

3/1/10 SV
524-0301002 pH 7.000 Buffer
Purchased 500 ml CAT # 5656-01
JT BAKER LOT # H47531
EXP: 1/31/12

3/1/10 SV
524-0301003 1000 PPM Cl (LCS)
Purchased 120 ml Cat # 1955-4
RICA CHEM CO LOT # 1001395
EXP: 7/2011

3/1/10 SV
524-0301004 NH3 Filling Sol'n
Purchased 60 ml Orion 951202
Thermo Scientific LOT # MT1
P/N. 702613-A04
EXP: 3/1/11

3/2/10 SV
524-0302001 pH 10.000 buffer
Purchased 500 ml Cat # 5655-01
JT Baker LOT H34508
EXP: 9/30/11

10/6/10 524-10061001 25133ppb stock for O3

0.05 ml Pyridine-4-carboxaldehyde Alfa Aesar
10146598 ;Exp: 8/11/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

10/6/10 524-10061002 25133ppb ICA/CCV for O3

0.05 ml Pyridine-4-carboxaldehyde TCI
(IC&INC ;Exp: 8/10/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

524-10061003 MBTH SD/17

10/6/10 0.5000 g MBTH (Aldrich 54666EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 49384; EXP 11/2

EXP: 10/7/10

10/15/10 524-10151001 Cr6+ ICA/CCV Stock
Purchased 100PPM Cr6+
RICCA Chemical Co Cat No 2095-16
500ml Plastic
LOT # 101017
EXP: 3/30/12

10/15/10 524-10157002 500PPM NO_2 Stock
Purchased
RICCA Chemical Co Cat No: 5444-4
LOT # 101027 120ml amber glass
EXP: 4/2011

10/28/10 S24-10281002 1000 PPM SO_3 ICV/CCV

0.1607 Na_2SO_3 (Mallinckrodt Lot #H25469; Exp: 8/11/14) up to 100 ml w/ DI Water.

EXP: 11/11/10

11/1/10 S24-11011001 ICV/CCV Cr^{6+} T.V = 0.579 PPM

0.5ml S19-04090904 (T.V = 115.8 mg/L ; EXP: 12/2010)

↑ 100ml W/ DI

EXP: 11/15/10

11/1/10 S24-11011002 Cr^{6+} Coloring Reagent

0.2500g 1,5-Diphenylcarbohydrazide (EMD 47103721; EXP: 1/30/13) ↑ 50ml W/ Acetone (EMD 47154D; EXP: 9/24/12).

EXP: 11/15/10

11/4/10 S24-11041001 A→E pH Filling Sol'n

PURCHASED (3M KCl) P/N 702613-A02

Thermo Scientific

LOT Code: 0R1

EXP: 11/4/11

11/4/10 S24-11041002 pH 2.000 Buffer

Purchased

BDH CAT NO: 5010-500ml

LOT # 100219G

EXP: 1/2012

11/4/10 JL

524-1104003 pH 4.000 Buffer

Purchased

JT Baker Cat No: 5657-01 500 ml

Lot # J30507

Exp: 8/31/12

11/4/10 JL

524-1104004 pH 7.000 Buffer

Purchased

J.T. Baker Cat No: 5656-01 500 ml

Lot # J35515

Exp: 9/30/12

11/5/10 JL

524-1105001 MBTH Std

0.5000 g MBTH (Aldrich 52696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 4984 Exp: 11/20/14

Exp: 11/6/10

11/8/10 JL

524-1108001 1000 ppm NH_3

0.3141 g NH_4Cl (EMD 4499831; Exp: 10/19/14) @ 100 ml

W/ 524-1022006 Exp: 10/22/11

Exp: 10/22/11

11/12/10 JL

524-1112001 1000 ppm SO_3 Stock

0.1591 Na2SO3 (JT Baker Lot #H10627; Exp: 8/31/14) up to 100 ml w/ DI Water.

Exp: 11/26/10

524-022111101 1:1 H_2SO_4

2/21/11 Sr 250ml H_2SO_4 (EMD 49284; EXP: 11/20/1
ADDED SLOWLY TO 250ml DI. COOL
COMPLETELY
EXP: 2/21/12

2/21/11 Sr 524-022111102 Cr6+ Coloring Reagent
0.2500g 1,5-diphenylcarbohydrazide (EMD LOT 47/037
EXP: 1/30/13) T 50ml W/ Acetone (EMD
LOT# 47154D; EXP: 9/24/12).
EXP: 3/21/11

2/28/11 Sr 524-022811101 0.1 H_2SO_4
5.6ml Conc H_2SO_4 (EMD 49284 EXP: 11/20/14) T 2
W/ DI H_2O
EXP: 2/28/12

2/28/11 Sr 524-022811102 1001 mg/L Cr6+
Purchased
Inorganic Ventures CGCR(6)1-1
125mL Clear Glass
LOT# D2-CR03040
EXP: 3/1/2012

2/28/11 SL

524-02281103 10ppm Cr6+ Soln

1.0 mL 524-02281102 (1000 ppm Cr6+; Exp. 3/1/12) ↑

100 mL w/ DI H2O

Exp: 2/28/12

Columbia Analytical Services™ 2655 Park Center Drive, Suite A, Simi Valley, CA 93065 | 805.526.7161 | www.caslab.com

LABORATORY REPORT

March 3, 2011

David Conner
Battelle
4800 Oak Grove Dr. M/S 180-801
Pasadena, CA 91109

RE: JPL-GW-1Q11 / G005862/JPL GWM

Dear David:

Enclosed are the results of the sample submitted to our laboratory on March 1, 2011. For your reference, this analysis has been assigned our service request number P1100778.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L10-3; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-09-TX; Minnesota Department of Health, Certificate No. 11495AA; Washington State Department of Ecology, ELAP Lab ID: C946. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Digitally signed by Sue Anderson
Date: 2011.03.03 09:31:21 -08'00'

Sue Anderson
Project Manager

Client: Battelle CAS Project No: P1100778
Project: JPL-GW-1Q11 / G005862/JPL GWM

CASE NARRATIVE

The sample was received intact under chain of custody on March 1, 2011 and was stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

Hexavalent Chromium by EPA Method 7196A

No anomalies were encountered during this analysis.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

DETAIL SUMMARY REPORT

Client: Battelle
Service Request: P1100778
Project ID: JPL-GW-1Q11 / G005862 / JPL GWM

Date Received: 3/1/2011
Time Received: 15:45

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	7196A - Cr6
MW-7	P1100778-001	Water	3/1/2011	14:40	X

Acronyms

CA LUFT	California DHS LUFT Metho
ASTM	American Society for Testing and Materials
BTEX	Benzene/Toluene/Ethylbenzene/Xylenes
CAS Number	Chemical Abstract Service Registry Number
CFC	Chlorofluorocarbon
CRDL	Contract Required Detection Limit
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOH or DHS	Department of Health Services
EPA	U.S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified Method
MDL	Method Detection Limit
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl *tert* -Butyl Ether
NA	Not Applicable
NC	Not Calculated
ND	None Detected at or above the Method Reporting/Detection Limit (MRL/MDL)
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	*Standard Methods for the Examination of Water and Wastewater* , 19th Ed., 1995.
SW	*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* , SW-846, Third Edition, 1986 and as amended by Updates I, II, IIA, and IIB.
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)
VOC	Volatile Organic Compound(s)

Qualifiers

U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
J	The result is an estimated concentration that is less than the MRL (PQL), but greater than or equal to the MDL.
B	Analyte detected in the method blank above MRL (PQL).
E	Estimated; result based on response which exceeded the instrument calibration range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
D	The reported result is from a dilution.
X	See case narrative.

Water & Soil - Chain of Custody Record & Analytical Service Request

Page 1 of 1

Columbia Analytical Services INC.
An Employee - Owned Company

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) (10 Day - Standard)

CAS Project No. P1100778

CAS Contact:

Company Name & Address (Reporting Information)	Battelle 505 King Ave Columbus OH 43201
Project Name	JPL-GW-1Q11
Project Number	G005862/JPL GWM
Project Manager	David Conner
P.O. # / Billing Information	214375/Battelle 505 King Ave Columbus OH 43201
Phone	(614) 726-7311
Fax	(614) 458-6641
Email Address for Result Reporting	connerd@battelle.org
Sampler (Print & Sign)	David Loera / David L

Analysis Method and/or Analytes

Preservative Code

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Matrix	Number of Containers	Volatile Organics GC/MS 624 ☐ 8260B ☐ Oxygenates ☐ TPH Gas ☐	TPH Gas 8015B ☐ BTEX 8021B ☐ MTBE 8021B ☐	TPH Diesel 8015B ☐ (Subcontracted)	TPH Diesel Low Level 8015B ☐ (Subcontracted)	TPH FC ☐ 8015M (Subcontracted)	Semi-Volatile Organics GC/MS 625 ☐ 8270C ☐ (Subcontracted)	D Hexavalent Cr (7196)	Remarks
MW-7	(1)	3/1/11	1440	AQ	1P							X	

Preservative Key

0	None
1	HCL
2	HNO3
3	H2SO4
4	NaOH
5	Zn Acetate
6	Asc Acid
7	Other

Report Tier Levels - please select

Tier I - (Results/Default if not specified) ____
Tier II - (Results + QC) ____
Tier III - (Data Validation Package) 10% Surcharge X
Tier V - (client specified) ____

MRL required Yes / No
MDL / PQL / J required Yes / No

EDD required (Yes) / No
Type: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	David Loera	Date: 3-1-11	Time: 1450	Received by: (Signature)		Date: 3/1/11	Time: 1450
Relinquished by: (Signature)		Date: 3/1/11	Time: 1800	Received by: (Signature)		Date: 3/1/11	Time: 1807
Relinquished by: (Signature)		Date: 3/1/11	Time: 1545	Received by: (Signature)		Date: 3/1/11	Time: 1545

Cooler / Blank / Ice / No Ice
Temperature 3.0c °C

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Columbia Analytical Services

2655 Park Center Drive, Suite A, Simi Valley, CA 93065 | 805.526.7161 | www.caslab.com

Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle **Service Request:** P1100778

Project: JPL-GW-1Q11/G005862 / JPL GWM

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1100778-001.01					
	7196A				
		3/1/11	1559	SMO / MZAMORA	
		3/1/11	1600	P-37 / MZAMORA	
		3/1/11	1639	In Lab / SANDERSON	
		3/1/11	1724	P-37 / SANDERSON	

Columbia Analytical Services™ 2655 Park Center Drive, Suite A, Simi Valley, CA 93065 | 805.526.7161 | www.caslab.com

Sample Acceptance Check Form

Client: Battelle Work order: P1100778

Project: JPL-GW-1Q11 / G005862/JPL GWM

Sample(s) received on: 3/1/11 Date opened: 3/1/11 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 3 °C			
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☒	☐	☐
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1100778-001.01	125mL Plastic NP					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client :	Battelle	**Service Request :**	P1100778
Project Name :	JPL-GW-1Q11	**Date Collected :**	03/01/11
Project Number :	G005862 / JPL GWM	**Date Received :**	03/01/11
Sample Matrix :	WATER		

Chromium, Hexavalent

Prep Method :	None	Units :	mg/L (ppm)
Analysis Method :	7196A	Basis :	NA
Test Notes :			

Sample Name	Lab Code	PQL	MDL	Dilution Factor	Date Extracted	Date/Time Analyzed	Result	Result Notes
MW-7	P1100778-001	0.010	0.004	1	NA	03/01/11 17:15	0.012	
Method Blank	P1100778-MB	0.010	0.004	1	NA	03/01/11 17:15	ND	

Approved By Karen Rya Date : 3/2/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1100778
Project:	JPL-GW-1Q11 / G005862 / JPL GWM	**Date Analyzed:**	03/01/11

Title: Initial and Continuing Calibration Blank (ICB and CCB) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	PQL	MDL	Result
ICB	0.010	0.004	ND
CCB1	0.010	0.004	ND
CCB2	0.010	0.004	ND

Approved By: Karen Ryan Date: 3/2/11

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL-GW-1Q11 / G005862 / JPL GWM

Service Request: P1100778
Date Analyzed: 03/01/11

Title: Initial and Continuing Calibration Verification (ICV and CCV) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	True Value	Result	Percent Recovery	Acceptance Criteria
ICV	0.0500	0.0480	96	90-110
CCV1	0.0500	0.0488	98	90-110
CCV2	0.0500	0.0488	98	90-110

Approved By: Karen Ryan Date: 3/2/11

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100778
Project Name :	JPL-GW-1Q11	**Date Collected :**	NA
Project Number :	G005862 / JPL GWM	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	03/01/11

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1100778-LCS	Basis :	NA
Test Notes :			

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Chromium, Hexavalent	None	7196A	0.0400	0.0400	100	90-109	

Approved By Karen Ryan Date : 3/2/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100778
Project Name :	JPL-GW-1Q11	**Date Collected :**	03/01/11
Project Number :	G005862 / JPL GWM	**Date Received :**	03/01/11
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	03/01/11

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name :	MW-7		Units :	mg/L (ppm)
Lab Code :	P1100778-001MS	P1100778-001DMS	Basis :	NA
Test Notes :				

Analyte	Prep Method	Analysis Method	PQL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Spike Recovery MS	Spike Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Chromium, Hexavalent	None	7196A	0.010	0.0500	0.0500	0.0117	0.0595	0.0595	96	96	78-112	<1	

Approved By Karen Ryan Date : 3/2/11

Report By:SAnderson

Columbia Analytical Services

pH Run Log

Service Request #(s): 777 778

Time: 1210

Sample	VWR lot #	Exp.
pH 2 Buffer	524-1104007	1/2012
pH 4 Buffer	524-1104/003	8/31/12
pH 7 Buffer	524-1104/1004	9/30/12
pH 10 Buffer	524-03021001	9/30/11

Slope	Prep.Run #
99.0%	—
	Run#
	—

pH in liquid: (1) 9040B, (2) 9040C **pH in solid:** (3) 9045C, (4) 9045D (*Note method number in column labeled # below*)

pH adjustment:(5) 7196A,(6) 7199 (Note method # In column labeled #)

Sample	#	pH	Temp. °C
pH 2.000	5	1.993	22.6°C
pH 4.000	|	3.984	22.7°C
pH 7.000	|	6.983	22.4°C
pH 10.000	|	10.011	22.7°C
T.V.=6.46 EXP:11/2012 Ref#:519-11230903D	|	6.377	22.3°C
DI	|	2.002	20.4°C
pH 2.000	↓	2.024	22.4°C
TIME: 1645		SV	
pH 2.000	5	2.012	22.8°
777-1.01	|	2.020	11.8°
-2.01	|	2.099	12.0°
-3.01	|	1.964	12.6°
-4.01	|	2.083	11.5°
-5.01	|	1.836	12.7°
↓ -6.01	|	1.923	13.4°
778-1.01	|	2.027	15.5°
pH 2.000	↓	1.991	22.3°

Sample	#	pH	Temp. °C

space not used

pH Adjustments: ☒ **7196A**: Diluted/Conc H_2SO_4 EMD 49284 EXP: 11/20/14

☐ **7199A**: Diluted NaOH _____ EXP: _____

Comments: _____

* Soil or Solid prep: 1:1(wt:vol) with DI water: ** Samples received past recommended hold time.

Date buffers and filling solution changed: 2/28/11

Note: ATC probe used; therefore, temperature correction calculation is not necessary.

Analyst: _____ Date: 3/1/11

Reviewer: KR Date: 3/2/11

pH.XLS

Hexavalent Chromium (Liquids)

Columbia Analytical Services™

Method EPA 7196A

Service Request#(s): _____ Run#: 237628

Stock#: 524-02281103 T.V=10PPM EXP: 2/28/12 Prep Run#: _____

ICV/CCV#: 524-10151001 T.V=100PPM EXP: 2/2012 Conc. H_2SO_4 Lot#: EMD 49284 EXP:

Coloring Reagent Ref#: 524-02211102 EXP: 3/31/11

Working Curve:

Prep Dilution	NA	0.05/50	0.25/50	0.5/50	Corr. Coeff.
Concentration mg/L	0.00	0.01	0.05	0.1	0.99998807
Absorbance @ 540 nm	0.000	0.011	0.056	0.113	

	Sample #	Sample Vol.(mL)	Dilution	pH ✓	Bkg.	Absorbance @ 540nm	Corrected Abs. (minus bkg.)	Results - mg/L	QA/QC - %R / RPD
1	ICB	10ml	—	✓	0.000	0.000	0.000	0.000200	<0.004
2	ICV 0.050 PPM		—	✓	0.000	0.054	0.054	0.0480	96%
3	MB		—	✓	0.000	0.000	0.000	0.000200	<0.004
4	LCS 0.0400PPM		—	✓	0.000	0.045	0.045	0.040	100%
5	777-1.01		—	✓	0.000	0.000	0.000	0.000200	<0.004
6	-1.01 MS 0.05PPM		—	✓	0.000	0.053	0.053	0.0471	94% 2 1/2
7	-1.01 MSD ↓		—	✓	0.000	0.053	0.053	0.0471	94% 5 RPD
8	-2.01		—	✓	0.007	0.008	0.001	0.00108	<0.004
9	-2.01 MS 0.03PPM		—	✓	0.007	0.037	0.030	0.0267	89%
10	-3.01		—	✓	0.000	0.000	0.000	0.000200	<0.004
11	-4.01		—	✓	0.001	0.001	0.000	↓	↓
12	-5.01		—	✓	0.004	0.005	0.001	0.00108	↓
13	CCV1 0.0500PPM		—	✓	0.000	0.055	0.055	0.0488	98%
14	CCB1		—	✓	0.000	0.000	0.000	0.000200	<0.004
15	777-6.01		—	✓	0.000	0.000	0.000	↓	
16	778-1.01		—	✓	0.000	0.013	0.013	0.0117	
17	↓ -1.01 MS 0.03PPM		—	✓	0.000	0.047	0.047	0.0418	100%

pH Requirement: Method 7196A (2 ± 0.5) * Samples filtered prior to pH adjustment

ICV/CCV spiked with 0.25 ml of 524-10151001 @10 ↑ 50 ml of pH adjusted DI WATER (T.V.= 0.05 ppm)

MS/MSD spiked with 0.05 ml of 524-02281103 ↑ 10 ml of pH adjusted sample (T.V.= 0.05 ppm)

LCS spiked with 0.2 ml of _____ ↑ 50 ml of pH adjusted DI Water (T.V.= 0.04 ppm)

Verification Standard Spiked 0.3 ml of ↓ @10 ↑ 10 ml of sample (T.V.= 0.03 ppm)

Comments: _____

Prepared By: _____ Date/Time: 3/1/11 @ 1700

Analyzed By: _____ Date/Time: 3/1/11 @ 1715

Reviewed By: _____ Date: 3/2/11

Cr6LIQ.xls

Hexavalent Chromium (Liquids)

Columbia Analytical Services™

Method EPA 7196A

Service Request#(s): 777 778

Stock#: 524-0228/103 T.V = 100PPM EXP: 2/28/12

ICV/CCV#: 524-1015100/ T.V=100ppm EXP: 2/2012

Run#: 237628

Prep Run#:

Conc. H_2SO_4 Lot#: EMD 49284 EXP: 11/20/14

Coloring Reagent Ref#: 524-0221102 EXP: 3/21/11

Working Curve:

Prep Dilution	NA	0.05/50	0.25/50	0.5/50	Corr. Coeff.
Concentration mg/L	0.00	0.01	0.05	0.1	
Absorbance @ 540 nm	0.000	0.011	0.056	0.113	0.9999880

	Sample #	Sample Vol.(mL)	Dilution	pH ✓	Bkg.	Absorbance @ 540nm	Corrected Abs. (minus bkg.)	Results - mg/L	QA/QC - %R / RPD
1	778-1.01MS	10ml	—	✓	0.000	0.067	0.067	0.0595	96%
2	778-1.01MSD	↓	—	✓	0.000	0.067	0.067	0.0595	96% 0 RPD
3	CCV2	↓	—	✓	0.000	0.055	0.055	0.0488	98%
4	CCB2	↓	—	✓	0.000	0.000	0.000	0.000200	<0.004
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									

space not used

pH Requirement: Method 7196A *(2 ± 0.5)* * Samples filtered prior to pH adjustment

ICV/CCV spiked with 0.25 ml of 524-1015100 @ 1/10 ↑ 50 ml of pH adjusted DI WATER (T.V.= 0.05 ppm)

MS/MSD spiked with 0.05 ml of 524-0228/103 ↑ 10 ml of pH adjusted sample (T.V.= 0.05 ppm)

LCS spiked with 0.2 ml of ↓ ↑ 50 ml of pH adjusted DI Water (T.V.= 0.04 ppm)

Verification Standard Spiked 0.3 ml of ↓ @ 1/10 ↑ 10 ml of sample (T.V.= 0.03 ppm)

Comments:

Prepared By: [signature] Date/Time: 3/1/11 @ 1700

Analyzed By: [signature] Date/Time: 3/1/11 @ 1715

Reviewed By: KR Date: 3/2/11

Cr6LIQ.xls

11/23/09 SIG-1123090Z 1000 ppm SO_3 (ICV/CCV)
SR 0.1607g Na_2SO_3 (Mallinckrodt; H25469; EXP 8/11/14
↑ 100ml w/ DI
EXP: 5/23/10

11/23/09 SIG-1123090 3 A,B,C,D pH REFERENCE
SR PURCHASED
ERA CAT # 977
LOT # 129934
EXP: 1/2012

11/24/09 SIG-1124090 1 1000 ppm SO_4 Standard
SR PURCHASED CAT # ICC-006
LOT # K007794
EXP: 9/30/13

SR 11/25/09
11/25/09 SIG-~~H25~~ 1125090 1 0.1N H_2SO_4
~~5.6~~ ml conc H_2SO_4 (EMD 4705D EXP: 9/13/10)
EXP: ~~9/13/10~~ 9/13/10
SR 11/25/09

11/30/09 SIG-1130090 1 Cr^{6+} Coloring Reagent
SR 0.2500g Diphenylcarbonyldrazide (EMD) 4710ED; EXP: 1/30/13) ↑ 50ml w/ Acetone (EMD 4715ED; EXP: 9/24/12
EXP: 12/30/09

11/30/09 SIG-1130090 2 25133 ppb Stock for O_3 in Air
SR 0.05ml Pyridine-4-Carboxaldehyde (Alfa Aesar LOT 10144 0558; EXP 8/11/12)
↑ 500ml deionized H_2O
EXP: 12/14/09

11/30/09 SIG-1130090 3 25133ppb ICV/CCV for O_3 in Air
SR 0.05ml Pyridine-4-carboxaldehyde (TCI LOT # IGINC EXP: 8/10/12)
↑ 500ml w/ DI H_2O
EXP: 12/14/09

Reviewed And Approved By:
Initial: VL Date: 12/22/09

3/1/10 SV — 524-0301001 pH 4.000 Buffer
Purchased 500 ml CAT # 5657-07
JT BAKER LOT # H31526
EXP 8/31/11

3/1/10 SV — 524-0301002 pH 7.000 Buffer
Purchased 500ml CAT # 5656-01
JT BAKER LOT # H47531
EXP: 1/31/12

3/1/10 SV — 524-0301003 1000 PPM Cl (LCS)
Purchased 120ml Cat # 1955-4
RICCA CHEM CO LOT # 1001395
EXP: 7/2011

3/1/10 SV — 524-0301004 NH3 Filling Sol'n
Purchased 60ml Orion 951202
Thermo Scientific LOT # MT1
P/N: 703613-A04
EXP: 3/1/11

3/2/10 SV — 524-0302001 pH 10.000 buffer
Purchased 500ml Cat # 5655-01
JT Baker LOT H34508
EXP: 9/30/11

10/6/10 SL

524-1006/1001 25133 ppb Stock for O3

0.05 ml Pyridine-4-carboxaldehyde Alfa Aesar 10146598 ;Exp: 8/11/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

10/6/10 SL

524-1006/1002 25133 ppb ICAL/CCV for O3

0.05 ml Pyridine-4-carboxaldehyde TCI (IGINC ;Exp: 8/10/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

524-1006/1003 MBTH SO/17

10/6/10 SL

0.5000 g MBTH (Aldrich 54666EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 44284; EXP 11/2

EXP: 10/7/10

10/15/10 SL

524-1015/1001 Cr6+ ICAL/CCV Stock 100 PPM Cr6+

Purchased RICCA Chemical Co Cat No 2095-16

500 ml Plastic

LOT # 101077

EXP: 3/20/12

10/15/10 SL

524-1015/1002 500 PPM NO_2 Stock

Purchased RICCA Chemical Co Cat No: 5444-4

LOT # 101077 120 ml amber glass

EXP: 4/2011

10/28/10 S24-10281002 1000 PPM SO_3 ICV/CCV

0.1607 Na_2SO_3 (Mallinckrodt Lot #H25469; Exp: 8/11/14) up to 100 ml w/ DI Water.

Exp: 11/11/10

11/1/10 S24-11011001 ICV/CCV Cr^{6+} T.V = 0.579 PPM

0.5ml S19-04090904 (T.V = 115.8 mg/L ; EXP: 12/2010)

↑ 100ml W/ DI

Exp: 11/15/10

11/1/10 S24-11011002 Cr^{6+} Coloring Reagent

0.2500g 1,5-Diphenylcarbohydrazide (EMD 47103731; EXP: 1/30/13) ↑ 50ml W/ Acetone (EMD 47154D; EXP: 9/24/12).

EXP: 11/15/10

11/4/10 S24-11041001 A→E pH Filling Sol'n

PURCHASED (3M KCl) P/N 702613-A02

Thermo Scientific

LOT Code: 0R1

EXP: 11/4/11

11/4/10 S24-11041002 pH 2.000 Buffer

Purchased

BDH CAT NO: 5010-500ml

LOT # 100219

EXP: 1/2012

11/4/10 S24-1104I003 pH 4.000 Buffer
Purchased
JT Baker Cat No: 5657-01 500 ml
LOT # J30507
EXP: 8/31/12

11/4/10 S24-1104I004 pH 7.000 Buffer
Purchased
J.T. Baker Cat No: 5656-01 500 ml
LOT # J35515
EXP: 9/30/12

11/5/10 S24-1105I001 MBTH SOL'N

0.5000 g MBTH (Aldrich 521696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 4988 EXP: 11/20/14

EXP: 11/6/10

11/8/10 S24-1108I001 1000 PPM NH_3
0.3141 g NH_4Cl (EMD 4919893; EXP: 10/19/14) @ 100 ml
W/ S24-1022I006 EXP: 10/22/11
EXP: 10/22/11

11/12/10 S24-1112I001 1000 PPM SO_3 STOCK

0.1591 Na2SO3 (JT Baker Lot #H10627; Exp: 8/31/14) up to 100 ml w/ DI Water.

EXP: 11/26/10

524-0221101 1:1 H_2SO_4

2/21/11 SR 250mL H_2SO_4 (EMD 49284; EXP: 11/20/1
ADDED SLOWLY TO 250mL DI. COOL
COMPLETELY
EXP: 2/21/12

2/21/11 SR 524-0221102 Cr6+ Coloring Reagen
0.2500g 1,5-diphenylcarbohydrazide (EMD LOT 471037
EXP: 1/30/13) ↑ 50mL W/ Acetone (EMD
LOT# 471540; EXP: 9/24/12).
EXP: 3/21/11

2/28/11 SR 524-0228101 0.1 H_2SO_4
5.6mL conc H_2SO_4 (EMD 49284 EXP: 11/20/14) ↑ 2
W/ DI H_2O
EXP: 2/28/12

2/28/11 SR 524-0228102 1001 mg/L Cr6+
Purchased
Inorganic Ventures CGCR(6)1-1
125mL Clear Glass
LOT# D2-CR03040
EXP: 3/1/2012

2/28/11 524-02281103 10PPM Cr6+ Soln

1.0 mL 524-02281102 (1000 PPM Cr6+; Exp: 3/1/12) ↑

100 mL w/ DI H2O

Exp: 2/28/12

Columbia Analytical Services™ 2655 Park Center Drive, Suite A, Simi Valley, CA 93065 | 805.526.7161 | www.caslab.com

LABORATORY REPORT

March 7, 2011

David Conner
Battelle
4800 Oak Grove Dr. M/S 180-801
Pasadena, CA 91109

RE: JPL-GW-1Q11 / G005862 / JPL GWM

Dear David:

Enclosed are the results of the sample submitted to our laboratory on March 2, 2011. For your reference, this analysis has been assigned our service request number P1100790.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L10-3; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-09-TX; Minnesota Department of Health, Certificate No. 11495AA; Washington State Department of Ecology, ELAP Lab ID: C946. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Digitally signed by Sue Anderson
Date: 2011.03.07 13:46:01 -08'00'

Sue Anderson
Project Manager

Client: Battelle CAS Project No: P1100790
Project: JPL-GW-1Q11 / G005862 / JPL GWM

CASE NARRATIVE

The sample was received intact under chain of custody on March 2, 2011 and was stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

Hexavalent Chromium by EPA Method 7196A

No anomalies were encountered during this analysis.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

DETAIL SUMMARY REPORT

Client: Battelle
Service Request: P1100790
Project ID: JPL-GW-1Q11 / G005862 / JPL GWM

Date Received: 3/2/2011
Time Received: 09:30

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	7196A - Cr6
MW-16	P1100790-001	Water	3/1/2011	17:15	X

Acronyms

CA LUFT	California DHS LUFT Metho
ASTM	American Society for Testing and Materials
BTEX	Benzene/Toluene/Ethylbenzene/Xylenes
CAS Number	Chemical Abstract Service Registry Number
CFC	Chlorofluorocarbon
CRDL	Contract Required Detection Limit
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOH or DHS	Department of Health Services
EPA	U.S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified Method
MDL	Method Detection Limit
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl *tert* -Butyl Ether
NA	Not Applicable
NC	Not Calculated
ND	None Detected at or above the Method Reporting/Detection Limit (MRL/MDL)
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	*Standard Methods for the Examination of Water and Wastewater* , 19th Ed., 1995.
SW	*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* , SW-846, Third Edition, 1986 and as amended by Updates I, II, IIA, and IIB.
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)
VOC	Volatile Organic Compound(s)

Qualifiers

U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
J	The result is an estimated concentration that is less than the MRL (PQL), but greater than or equal to the MDL.
B	Analyte detected in the method blank above MRL (PQL).
E	Estimated; result based on response which exceeded the instrument calibration range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
D	The reported result is from a dilution.
X	See case narrative.

Water & Soil - Chain of Custody Record & Analytical Service Request

Columbia Analytical Services INC.
An Employee - Owned Company

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) (10 Day - Standard)

CAS Project No. P1100793

CAS Contact:

Company Name & Address (Reporting Information)
Battelle
505 King Ave
Columbus OH 43201

Project Name
SPL-GW-1Q11

Project Number
600586 2/SPL GWM

Project Manager
David Conner

P.O. # / Billing Information
214375/Battelle
505 King Ave
Columbus OH 43201

Phone: 619 726-7311
Fax: 614 458-6641

Email Address for Result Reporting
connerd@battelle.org

Sampler (Print & Sign)
David Loera / David L

Analysis Method and/or Analytes

Preservative Code

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Matrix	Number of Containers	Volatile Organics GC/MS 624 ☐ 8260B ☐ Oxygenates ☐ TPH Gas ☐	TPH Gas 8015B ☐ BTEX 8021B ☐ MTBE 8021B ☐	TPH Diesel 8015B ☐ (Subcontracted)	TPH Diesel Low Level 8015B ☐ (Subcontracted)	TPH FC ☐ 8015M (Subcontracted)	Semi-Volatile Organics GC/MS 625 ☐ 8270C ☐ (Subcontracted)	X Hexavalent Cr (7196) 0	Remarks
MW-16	①	3/1/11	1715	AQ	1P							X	
Temp Blank				AQ	1P								

Preservative Key

0	None
1	HCL
2	HNO3
3	H2SO4
4	NaOH
5	Zn Acetate
6	Asc Acid
7	Other

Report Tier Levels - please select

Tier I - (Results/Default if not specified) ____
Tier II - (Results + QC) ____
Tier III - (Data Validation Package) 10% Surcharge X
Tier V - (client specified) ____

MRL required Yes / No
MDL / PQL / J required Yes / No

EDD required Yes / No
Type: ____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
David L	3-1-11	1730		3/1/11	0020
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank / Ice / No Ice
Temperature 4°C °C

Columbia Analytical Services

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Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle **Service Request:** P1100790

Project: JPL-GW-1Q11/G005862 / JPL GWM

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1100790-001.01					
	7196A				
		3/2/11	1029	SMO / MZAMORA	
		3/2/11	1029	P-37 / MZAMORA	
		3/2/11	1044	In Lab / SANDERSON	
		3/2/11	1702	P-37 / SANDERSON	

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Sample Acceptance Check Form

Client: Battelle Work order: P1100790

Project: JPL-GW-1Q11 / G005862 / JPL GWM

Sample(s) received on: 3/2/11 Date opened: 3/2/11 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 4 °C			
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☒	☐	☐
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1100790-001.01	125mL Plastic NP					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : Battelle
Project Name : JPL-GW-1Q11
Project Number : G005862 / JPL GWM
Sample Matrix : WATER

Service Request : P1100790
Date Collected : 03/01/11
Date Received : 03/02/11

Chromium, Hexavalent

Prep Method : None
Analysis Method : 7196A
Test Notes :

Units : mg/L (ppm)
Basis : NA

Sample Name	Lab Code	PQL	MDL	Dilution Factor	Date Extracted	Date/Time Analyzed	Result	Result Notes
MW-16	P1100790-001	0.010	0.004	1	NA	03/02/11 16:45	0.027	
Method Blank	P1100790-MB	0.010	0.004	1	NA	03/02/11 16:45	ND	

Approved By Karen Ryan Date : 3/3/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1100790
Project:	JPL-GW-1Q11 / G005862 / JPL GWM	**Date Analyzed:**	03/02/11

Title: Initial and Continuing Calibration Blank (ICB and CCB) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	PQL	MDL	Result
ICB	0.010	0.004	ND
CCB1	0.010	0.004	ND

Approved By: Karen Ryan Date: 3/3/11

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL-GW-1Q11 / G005862 / JPL GWM

Service Request: P1100790
Date Analyzed: 03/02/11

Title: Initial and Continuing Calibration Verification (ICV and CCV) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	True Value	Result	Percent Recovery	Acceptance Criteria
ICV	0.0500	0.0509	102	90-110
CCV1	0.0500	0.0491	98	90-110

Approved By: Karen Rya Date: 3/3/11

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100790
Project Name :	JPL-GW-1Q11	**Date Collected :**	NA
Project Number :	G005862 / JPL GWM	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	03/02/11

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1100790-LCS	Basis :	NA
Test Notes :			

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Chromium, Hexavalent	None	7196A	0.0400	0.0391	98	90-109	

Approved By Karen Ryan Date : 3/3/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100790
Project Name :	JPL-GW-1Q11	**Date Collected :**	03/01/11
Project Number :	G005862 / JPL GWM	**Date Received :**	03/02/11
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	03/02/11

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name : MW-16 Units : mg/L (ppm)
Lab Code : P1100790-001MS P1100790-001DMS Basis : NA
Test Notes :

Analyte	Prep Method	Analysis Method	PQL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Spike Recovery MS	Spike Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Chromium, Hexavalent	None	7196A	0.010	0.0500	0.0500	0.0273	0.0755	0.0755	96	96	78-112	<1	

Approved By Karen Ryan Date : 3/3/11

Report By:SAnderson

Columbia Analytical Services™

pH Run Log

Service Request #(s): 790 797 798

Time: 0920

Sample	VWR lot #	Exp.
pH 2 Buffer	S24-1104100 2	1/2012
pH 4 Buffer	S24-1104100 3	8/31/12
pH 7 Buffer	S24-1104100 4	9/30/12
pH 10 Buffer	S24-0302 1001	9/30/11

Slope	Prep.Run #
99.0 %	—
	Run#
	~

pH in liquid: (1) 9040B, (2) 9040C **pH in solid:** (3) 9045C, (4) 9045D (*Note method number in column labeled # below*)

pH adjustment:(5) 7196A,(6) 7199 (Note method # In column labeled #)

Sample	#	pH	Temp. °C
pH 2.000	5	1.996	21.5°
pH 4.000	↓	3.953	21.5°
pH 7.000		6.991	21.5°
pH 10.000		9.999	21.6°
10-0946 Exp. 11/2012 Ref#: S19-1123090 3 0		6.364	21.7°
DI		2.061	19.1°
pH 2.000	↓	1.992	21.3°
TIME: 1615		SR	
pH 2.000	5	2.012	22.6°
790-1.01	T	2.026	22.1°
797-1.01		1.960	10.1°
T -2.01		1.867	9.7°
-3.01		1.800	10.4°
-4.01		1.996	9.5°
-5.01		1.866	10.6°
-6.01		2.183	11.4°
↓ -7.01	↓	2.093	11.5°

Sample	#	pH	Temp. °C
797-8.01	5	1.990	11.7°
798-1.01	T	2.062	12.1°
pH 2.000	↓	2.008	22.3°
798-2.01		1.883	12.6°
pH 2.000	↓	2.013	22.5°

Spike not used

pH Adjustments: ☒ **7196A**: Diluted/Conc H_2SO_4 EMD 49284 EXP: 11/30/14

☐ **7199A**: Diluted NaOH _____ EXP: _____

Comments: _____

* Soil or Solid prep: 1:1(wt:vol) with DI water: ** Samples received past recommended hold time.

Date buffers and filling solution changed: 2/28/11

Note: ATC probe used; therefore, temperature correction calculation is not necessary.

Analyst: SR Date: 3/2/11

Reviewer: KR Date: 3/3/11

pH.XLS

Hexavalent Chromium (Liquids)

Columbia Analytical Services — Method EPA 7196A

page 1 of 2 59

Service Request#(s): 790 793 798 — Run#: 237770

Stock#: 524-022811-03 T.V=10PPM EXP: 2/28/12 — Prep Run#: —

CCV/CCV#: 524-1015/1001 T.V=100PPM EXP: 3/12 — Conc. H_2SO_4 Lot#: EMD 49284 EXP: 11/20/14

Coloring Reagent Ref#: 524-022111-02 EXP: 3/21/11

Working Curve:

Prep Dilution	NA	0.05/50	0.25/50	0.5/50	Corr. Coeff.
Concentration mg/L	0.00	0.01	0.05	0.1	1.000
Absorbance @ 540 nm	0.000	0.011	0.055	0.110	

	Sample #	Sample Vol.(mL)	Dilution	pH ✓	Bkg.	Absorbance @ 540nm	Corrected Abs. (minus bkg.)	Results - mg/L	QA/QC - %R / RPD
1	ICB	10ml	—	✓	0.000	0.000	0.000	0	<0.004
2	ICV 0.0500 PPM		—	✓	0.000	0.056	0.056	0.0509	102%
3	MB		—	✓	0.000	0.043	0.043	0.0391	98%
4	LCS 0.0400 PPM		—	✓	0.000	0.000	0.000	0	<0.004
5	790-1.01		—	✓	0.000	0.030	0.030	0.0273	
6	-1.01 MS 0.05PPM VS 0.03PPM		—	✓	0.000	0.083	0.083	0.0755	96%
7	-1.01 MSD 0.05PPM		—	✓	0.000	0.083	0.083	0.0755	96% RPD <1%
8	-1.01 MSD VS 0.03PPM		—	✓	0.000	0.062	0.062	0.0564	97%
9	793-1.01		—	✓	0.003	0.004	0.001	0.000909	<0.004
10	-1.01 VS 0.03PPM		—	✓	0.003	0.036	0.033	0.030	100%
11	-2.01		—	✓	0.000	0.001	0.001	0.000909	<0.004
12	-3.01		—	✓	0.000	0.000	0.000	0	<0.004
13	CCV1 0.0500 PPM		—	✓	0.000	0.054	0.054	0.0491	98%
14	CCB1		—	✓	0.000	0.000	0.000	0	<0.004
15	793-4.01		—	✓	0.000	0.001	0.001	0.000909	
16	-5.01		—	✓	0.000	0.000	0.000	0	
17	-6.01		—	✓	0.000	0.001	0.001	0.000909	

pH Requirement: Method 7196A (2 ± 0.5) * Samples filtered prior to pH adjustment

ICV/CCV spiked with 0.25 ml of 524-1015/1001 @ 1/10 ↑ 50 ml of pH adjusted DI WATER (T.V.= 0.05 ppm)

MS/MSD spiked with 0.05 ml of 524-022811-03 ↑ 10 ml of pH adjusted sample (T.V.= 0.05 ppm)

LCS spiked with 0.2 ml of — ↑ 50 ml of pH adjusted DI Water (T.V.= 0.04 ppm)

Verification Standard Spiked 0.3 ml of ↓ @ 1/10 ↑ 10 ml of sample (T.V.= 0.03 ppm)

Comments:

Prepared By: — Date/Time: 3/2/11 @ 1630

Analyzed By: — Date/Time: 3/2/11 @ 1645

Reviewed By: — Date: 3/3/11

Cr6LIQ.xls

Hexavalent Chromium (Liquids)

Columbia Analytical Services, Inc.

Method EPA 7196A

60

Page 2 of 2

Service Request#(s): 798 798B 798 — Run#: 237770

Stock#: 524-0228/1103 TV=10ppm EXP: 2/28/12 — Prep Run#: —

ICV/CCV#: 524-1015/1001 TV=1000ppm EXP: 3/12 — Conc. H_2SO_4 Lot#: EMD 44254 EXP: 11/20/12

Coloring Reagent Ref#: 524-0221/1102 EXP: 3/21/11

Working Curve:

Prep Dilution	NA	0.05/50	0.25/50	0.5/50	Corr. Coeff.
Concentration mg/L	0.00	0.01	0.05	0.1	
Absorbance @ 540 nm	0.000	0.011	0.055	0.110	1.000

	Sample # (Sm 3/2/11)	Sample Vol.(mL)	Dilution	pH ✓	Bkg.	Absorbance @ 540nm	Corrected Abs. (minus bkg.)	Results - mg/L	QA/QC - %R / RPD
1	798-7.01	10ml	—	✓	0.000	0.002	0.002	0.00182	<0.004
2	I -8.01		—	✓	0.000	0.000	0.000	0	<0.004
3	798-1.01		—	✓	0.000	0.000	0.000	0	<0.004
4	-1.01 MS 0.05ppm		—	✓	0.000	0.055	0.055	0.0500	100% 2.0%
5	-1.01 MSD I		—	✓	0.000	0.056	0.056	0.089	102% RPD
6	-2.01		—	✓	0.000	0.009	0.009	0.00818	
7	-2.01 MS 0.05ppm		—	✓	0.000	0.064	0064	0.0582	100%
8	CCV2 0.0500ppm		—	✓	0.000	0.056	0.056	0.0509	102%
9	CCB2		—	✓	0.000	0.000	0.000	0	
10	798-2.01 MSD 0.05ppm		—	✓	0.000	0.064	0.064	0.0582	100% 4.0% RPD
11	CCV3 0.0500ppm		—	✓	0.000	0.056	0.056	0.0509	102%
12	CCB3		—	✓	0.000	0.000	0.000	0	
13									
14									
15	Spare not used								
16									
17									

pH Requirement: Method 7196A (2 ± 0.5) * Samples filtered prior to pH adjustment

ICV/CCV spiked with 0.25 ml of 524-1015/1001 @ tc ↑ 50 ml of pH adjusted DI WATER (T.V.= 0.05 ppm)

MS/MSD spiked with 0.05 ml of 524-0228/1103 ↑ 10 ml of pH adjusted sample (T.V.= 0.05 ppm)

LCS spiked with 0.2 ml of ↑ 50 ml of pH adjusted DI Water (T.V.= 0.04 ppm)

Verification Standard Spiked 0.3 ml of @ tc ↑ 10 ml of sample (T.V.= 0.03 ppm)

Comments:

Prepared By: [signature] Date/Time: 3/2/11 @1650

Analyzed By: [signature] Date/Time: 3/2/11 @ 1645

Reviewed By: RR Date: 3/3/11

Cr6LIQ.xls

11/23/09 SIG-1123090Z 1000 ppm SO_3 (ICV/CCV)
SV 0.160g Na_2SO_3 (Mallinckrodt; #254469; EXP 8/11/14
↑100ml w/ DI
EXP: 5/23/10

11/23/09 SIG-1123090 3 A,B,C,D pH REFERENCE
SV PURCHASED
ERA CAT # 977
LOT # 129934
EXP: 1/2012

11/24/09 SIG-1124090 1 1000 ppm SO_4 Standard
SV PURCHASED CAT # ICC-006
LOT # K60794
EXP: 9/30/13

SV 11/25/09
11/25/09 SIG-~~H25~~ 1125090 1 0.1N H_2SO_4
~~50~~ml conc H_2SO_4 (EMD 4705D EXP: 9/13/10)
EXP: ~~11/25~~ 9/13/10
SV 11/25/09

11/30/09 SIG-1130090 1 Cr^{6+} Coloring Reagent
SV 0.250g diphenylcarbohydrazide (EMD) 47103ED; EXP: 1/30/13) ↑50ml w/ Acetone (EMD 47154D; EXP: 9/24/12
EXP: 12/30/09

11/30/09 SIG-1130090 2 25133 ppb Stock for O_3 in Air
SV 0.05ml Pyridine-4-Carboxaldehyde (Alfa Aesar LOT 10144 0598; EXP 8/11/12)
↑500ml deionized H_2O
EXP: 12/14/09

11/30/09 SIG-1130090 3 25133 ppb ICV/CCV for O_3 in Air
SV 0.05ml Pyridine-4-carboxaldehyde (TCI LOT # IGINC EXP: 8/10/12)
↑500ml w/ DI H_2O
EXP: 12/14/09

Reviewed And Approved By:
Initial: VL Date: 12/30/09

3/1/10 SV — 524-03011001 pH 4.000 Buffer
Purchased 500 ml CAT # 5657-01
JT BAKER LOT # H31526
EXP 8/31/11

3/1/10 SV — 524-03011002 pH 7.000 Buffer
Purchased 500ml CAT # 5656-01
JT BAKER LOT # H47531
EXP: 1/31/12

3/1/10 SV — 524-03011003 1000 ppm Cl (LCS)
Purchased 120ml Cat # 1955-4
RICCA CHEM CO LOT # 1001395
EXP: 7/2011

3/1/10 SV — 524-03011004 NH3 Filling Sol'n
Purchased 60ml Order 9573023
Thermo Scientific LOT # MT1
P/N. 703613-A04
EXP: 3/1/11

3/2/10 SV — 524-03021001 pH 10.000 buffer
Purchased 500ml Cat # 5655-01
JT Baker LOT H34508
EXP: 9/30/11

10/6/10 524-10061001 25133 ppb Stock for O3

0.05 ml Pyridine-4-carboxaldehyde Alfa Aesar
10146598 ;Exp: 8/11/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

10/6/10 524-10061002 25133ppb ICV/CCV for O3

0.05 ml Pyridine-4-carboxaldehyde TCI
(ICP INC ;Exp: 8/10/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

524-10061003 MBTH 50/17

10/6/10 0.5000 g MBTH (Aldrich 54696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMO 49284; EXP 11/2

EXP: 10/7/10

10/15/10 524-10151001 Cr6+ ICV/CCV Stock
Purchased 100ppm Cr6+
RICCA Chemical Co Cat No 2095-16
500mL Plastic
LOT # 1010177
EXP: 3/30/12

10/15/10 524-10151002 500ppm NO2 Stock
Purchased
RICCA Chemical Co Cat No: 5444-4
LOT# 1010371 120ml amber glass
EXP: 4/2011

10/28/10 S24-10281002 1000 PPM SO_3 ICV/CCV

0.1607 Na_2SO_3 (Mallinckrodt Lot #H25469; Exp: 8/11/14) up to 100 ml w/ DI Water.

EXP: 11/11/10

11/1/10 S24-11011001 ICV/CCV Cr^{6+} T.V = 0.579 ppm

0.5ml S1G-0409004 (T.V = 115.8 mg/L ; EXP: 12/2010)

↑ 100ml W/ DI

EXP: 11/15/10

11/1/10 S24-11011002 Cr^{6+} Coloring Reagent

0.2500g 1,5-Diphenylcarbohydrazide (EMD 47103721; EXP: 1/30/13) ↑ 50ml W/ Acetone (EMD 47154D; EXP: 9/24/12).

EXP: 11/15/10

11/4/10 S24-11041001 A→E pH Filling Soln

PURCHASED (3M KCl)

Thermo Scientific

P/N 702613-A02

LOT Code: QR1

EXP: 11/4/11

11/4/10 S24-11041002 pH 2.000 Buffer

Purchased

BDH CAT NO: 5010-500ml

LOT # 1002199

EXP: 1/2012

11/4/10 SZ

524-1104003 pH 4.000 Buffer
Purchased
J.T. Baker Cat No: 5657-01 500 ml
LOT # J30507
EXP: 8/31/12

11/4/10 SZ

524-1104004 pH 7.000 Buffer
Purchased
J.T. Baker Cat No: 5656-01 500 ml
LOT # J3515
EXP: 9/30/12

11/5/10 SZ

524-1105001 MBTH Std

0.5000 g MBTH (Aldrich 52696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMD 4G3484 EXP: 11/20/14

EXP: 11/6/10

11/8/10 SZ

524-1108001 1000 PPM NH_3

0.3141 g NH_4Cl (EMD 4919893; EXP: 10/19/14) to 100 ml
W/ 524-1021006 EXP: 10/22/11
EXP: 10/22/11

11/12/10 SZ

524-1112001 1000 PPM SO_3 STOCK

0.1591 Na_2SO_3 (JT Baker Lot #H10627; Exp: 8/31/14) up to 100 ml w/ DI Water.

EXP: 11/26/10

524-022111101 1:1 H_2SO_4

2/21/11 SL
250 mL H_2SO_4 (EMD 49284; EXP: 11/20/1
ADDED SLOWLY TO 250 mL DI. COOL
COMPLETELY
EXP: 2/21/12

2/21/11 SL
524-022111102 Cr6+ Coloring Reagent
0.2500 g 1,5-diphenylcarbohydrazide (EMD LOT 471037
EXP: 1/30/13) ↑ 50 mL w/ Acetone (EMD
LOT# 471540; EXP: 9/24/12).
EXP: 3/21/11

2/28/11 SL
524-022811101 0.1 H_2SO_4
5.6 mL Conc H_2SO_4 (EMD 49284 EXP: 11/20/14) ↑ 2
w/ DI H_2O
EXP: 2/28/12

2/28/11 SL
524-022811102 1001 mg/L Cr6+
Purchased
Inorganic Ventures CGCR(6)1-1
125 mL Clear Glass
LOT# D2-CR03040
EXP: 3/1/2012

2/28/11 524-02281103 10ppm Cr6+ Soln
1.0 mL 524-02281102 (1000 ppm Cr6+; Exp: 3/1/12) ↑
100 mL w/ DI H2O
Exp: 2/28/12

Columbia Analytical Services, Inc. 2655 Park Center Drive, Suite A, Simi Valley, CA 93065 | 805.526.7161 | www.caslab.com

LABORATORY REPORT

March 7, 2011

David Conner
Battelle
4800 Oak Grove Dr. M/S 180-801
Pasadena, CA 91109

RE: JPL GW Mon 1Q11 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on March 2, 2011. For your reference, these analyses have been assigned our service request number P1100797.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L10-3; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-09-TX; Minnesota Department of Health, Certificate No. 11495AA; Washington State Department of Ecology, ELAP Lab ID: C946. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Digitally signed by Sue Anderson
Date: 2011.03.07 15:24:57 -08'00'

Sue Anderson
Project Manager

Client: Battelle CAS Project No: P1100797
Project: JPL GW Mon 1Q11 / G486090

CASE NARRATIVE

The samples were received intact under chain of custody on March 2, 2011 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Hexavalent Chromium by EPA Method 7196A

No anomalies were encountered during this analysis.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

DETAIL SUMMARY REPORT

Client: Battelle
Project ID: JPL GW Mon 1Q11 / G486090
Service Request: P1100797

Date Received: 3/2/2011
Time Received: 15:35

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	7196A - Cr6
MW-4-3	P1100797-001	Water	3/2/2011	08:46	X
MW-4-2	P1100797-002	Water	3/2/2011	09:17	X
MW-4-1	P1100797-003	Water	3/2/2011	09:53	X
DUPE-04-1Q11	P1100797-004	Water	3/2/2011	00:00	X
EB-07-03/02/11	P1100797-005	Water	3/2/2011	10:01	X
MW-3-4	P1100797-006	Water	3/2/2011	11:20	X
MW-3-3	P1100797-007	Water	3/2/2011	11:42	X
MW-3-2	P1100797-008	Water	3/2/2011	12:00	X

Acronyms

CA LUFT	California DHS LUFT Metho
ASTM	American Society for Testing and Materials
BTEX	Benzene/Toluene/Ethylbenzene/Xylenes
CAS Number	Chemical Abstract Service Registry Number
CFC	Chlorofluorocarbon
CRDL	Contract Required Detection Limit
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOH or DHS	Department of Health Services
EPA	U.S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified Method
MDL	Method Detection Limit
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl *tert* -Butyl Ether
NA	Not Applicable
NC	Not Calculated
ND	None Detected at or above the Method Reporting/Detection Limit (MRL/MDL)
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	*Standard Methods for the Examination of Water and Wastewater* , 19th Ed., 1995.
SW	*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* , SW-846, Third Edition, 1986 and as amended by Updates I, II, IIA, and IIB.
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)
VOC	Volatile Organic Compound(s)

Qualifiers

U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
J	The result is an estimated concentration that is less than the MRL (PQL), but greater than or equal to the MDL.
B	Analyte detected in the method blank above MRL (PQL).
E	Estimated; result based on response which exceeded the instrument calibration range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
D	The reported result is from a dilution.
X	See case narrative.

Water & Soil - Chain of Custody Record & Analytical Service Request

Columbia Analytical Services INC.
An Employee - Owned Company

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day - Standard

CAS Project No. P1100791

CAS Contact:

Company Name & Address (Reporting Information)
BATTELLE
3990 OLD TOWN AVE. C-205
SAN DIEGO, CA 92110

Project Name: JPL GW. MON. 1Q11

Project Number:

Project Manager: DAVID CONNER

P.O. # / Billing Information: 214319 / BATTELLE ATTN: GERALD TOMPKINS 505 KING AVE COLUMBUS, OH 43201

Phone: (619) 726-7311 Fax: (614) 458-6614

Email Address for Result Reporting:

Sampler (Print & Sign): CHASE BROOKS

Analysis Method and/or Analytes

Preservative Code

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Matrix	Number of Containers	Volatile Organics GC/MS 624 ☐ 8260B ☐ Oxygenates ☐ TPH Gas ☐	TPH Gas 8015B ☐ BTEX 8021B ☐ MTBE 8021B ☐	TPH Diesel 8015B ☐ (Subcontracted)	TPH Diesel Low Level 8015B ☐ (Subcontracted)	TPH FC ☐ 8015M (Subcontracted)	Semi-Volatile Organics GC/MS 625 ☐ 8270C ☐ (Subcontracted)	0	Cr VI (7196)	Remarks
MW-4-3	1	3/2/11	0846	W	1							X		
MW-4-2	2		0917									X		
MW-4-1	3		0953									X		QC LEVEL IV
DUPE-04-1Q11	4		—									X		DUPLICATE
EB-07-03/02/11	5	3/2/11	1001	W	1							X		EQUIP. BLANK
MW-3-4	6	3/2/11	1120	W	1							X		
MW-3-3	7	3/2/11	1142	W	1							X		
MW-3-2	8	3/2/11	1200	W	1							X		

Preservative Key

0	None
1	HCL
2	HNO3
3	H2SO4
4	NaOH
5	Zn Acetate
6	Asc Acid
7	Other

Report Tier Levels - please select

Tier I - (Results/Default if not specified) ____
Tier II - (Results + QC) ____
Tier III - (Data Validation Package) 10% Surcharge ____
Tier V - (client specified) ____

MRL required Yes / No
MDL / PQL / J required Yes / No

EDD required Yes / No
Type: ____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	03/04/11	1500		3/4/11	1500
	3/2/11	1535		3/4/11	1535

Cooler / Blank / Ice / No Ice
Temperature 3.0 °C

Client: Battelle **Service Request:** P1100797
Project: JPL GW Mon 1Q11/G486090

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1100797-001.01					
	7196A				
		3/2/11	1546	SMO / MZAMORA	
		3/2/11	1546	P-37 / MZAMORA	
		3/2/11	1602	In Lab / SANDERSON	
		3/2/11	1702	P-37 / SANDERSON	
P1100797-002.01					
	7196A				
		3/2/11	1546	SMO / MZAMORA	
		3/2/11	1546	P-37 / MZAMORA	
		3/2/11	1602	In Lab / SANDERSON	
		3/2/11	1702	P-37 / SANDERSON	
P1100797-003.01					
	7196A				
		3/2/11	1546	SMO / MZAMORA	
		3/2/11	1546	P-37 / MZAMORA	
		3/2/11	1602	In Lab / SANDERSON	
		3/2/11	1702	P-37 / SANDERSON	
P1100797-004.01					
	7196A				
		3/2/11	1546	SMO / MZAMORA	
		3/2/11	1546	P-37 / MZAMORA	
		3/2/11	1602	In Lab / SANDERSON	
		3/2/11	1702	P-37 / SANDERSON	
P1100797-005.01					
	7196A				
		3/2/11	1546	SMO / MZAMORA	
		3/2/11	1546	P-37 / MZAMORA	
		3/2/11	1602	In Lab / SANDERSON	
		3/2/11	1702	P-37 / SANDERSON	
P1100797-006.01					
	7196A				
		3/2/11	1546	SMO / MZAMORA	
		3/2/11	1546	P-37 / MZAMORA	
		3/2/11	1602	In Lab / SANDERSON	
		3/2/11	1702	P-37 / SANDERSON	
P1100797-007.01					
	7196A				
		3/2/11	1546	SMO / MZAMORA	
		3/2/11	1546	P-37 / MZAMORA	
		3/2/11	1602	In Lab / SANDERSON	
		3/2/11	1702	P-37 / SANDERSON	
P1100797-008.01					

Client: Battelle **Service Request:** P1100797
Project: JPL GW Mon 1Q11/G486090

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
	7196A				
		3/2/11	1546	SMO / MZAMORA	
		3/2/11	1546	P-37 / MZAMORA	
		3/2/11	1602	In Lab / SANDERSON	
		3/2/11	1702	P-37 / SANDERSON	

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Sample Acceptance Check Form

Client: Battelle Work order: P1100797

Project: JPL GW Mon 1Q11 / G486090

Sample(s) received on: 3/2/11 Date opened: 3/2/11 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 3 °C			
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☒	☐	☐
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1100797-001.01	125mL Plastic NP					
P1100797-002.01	125mL Plastic NP					
P1100797-003.01	125mL Plastic NP					
P1100797-004.01	125mL Plastic NP					
P1100797-005.01	125mL Plastic NP					
P1100797-006.01	125mL Plastic NP					
P1100797-007.01	125mL Plastic NP					
P1100797-008.01	125mL Plastic NP					

Explain any discrepancies: (include lab sample ID numbers):

Added project number to login per previous submittals.

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : Battelle
Project Name : JPL GW Mon 1Q11
Project Number : G486090
Sample Matrix : WATER

Service Request : P1100797
Date Collected : 03/02/11
Date Received : 03/02/11

Chromium, Hexavalent

Prep Method : None
Analysis Method : 7196A
Test Notes :

Units : mg/L (ppm)
Basis : NA

Sample Name	Lab Code	PQL	MDL	Dilution Factor	Date Extracted	Date/Time Analyzed	Result	Result Notes
MW-4-3	P1100797-001	0.01	0.004	1	NA	03/02/11 16:45	ND	
MW-4-2	P1100797-002	0.01	0.004	1	NA	03/02/11 16:45	ND	
MW-4-1	P1100797-003	0.01	0.004	1	NA	03/02/11 16:45	ND	
DUPE-04-1Q11	P1100797-004	0.01	0.004	1	NA	03/02/11 16:45	ND	
EB-07-03/02/11	P1100797-005	0.01	0.004	1	NA	03/02/11 16:45	ND	
MW-3-4	P1100797-006	0.01	0.004	1	NA	03/02/11 16:45	ND	
MW-3-3	P1100797-007	0.01	0.004	1	NA	03/02/11 16:45	ND	
MW-3-2	P1100797-008	0.01	0.004	1	NA	03/02/11 16:45	ND	
Method Blank	P1100797-MB	0.01	0.004	1	NA	03/02/11 16:45	ND	

Approved By Karen Ryan Date : 3/3/11

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1100797
Project:	JPL GW Mon. 1Q11 / G486090	**Date Analyzed:**	03/02/11

Title: Initial and Continuing Calibration Blank (ICB and CCB) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	PQL	MDL	Result
ICB	0.010	0.004	ND
CCB1	0.010	0.004	ND
CCB2	0.010	0.004	ND

Approved By: Karen Rya Date: 3/3/11

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon. 1Q11 / G486090

Service Request: P1100797
Date Analyzed: 03/02/11

Title: Initial and Continuing Calibration Verification (ICV and CCV) Summary
Analyte: Chromium, Hexavalent
Method: 7196A
Units: mg/L (ppm)

Sample Name	True Value	Result	Percent Recovery	Acceptance Criteria
ICV	0.0500	0.0509	102	90-110
CCV1	0.0500	0.0491	98	90-110
CCV2	0.0500	0.0509	102	90-110

Approved By: Karen Ryan Date: 3/3/11

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1100797
Project Name :	JPL GW Mon 1Q11	**Date Collected :**	NA
Project Number :	G486090	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	03/02/11

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1100797-LCS	Basis :	NA

Test Notes :

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Chromium, Hexavalent	None	7196A	0.0400	0.0391	98	90-109	

Approved By Karen Ryan Date : 3/3/11

Report By:SAnderson

QA/QC Report

Client :	Battelle	**Service Request :**	P1100797
Project Name :	JPL GW Mon 1Q11	**Date Collected :**	03/02/11
Project Number :	G486090	**Date Received :**	03/02/11
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	03/02/11

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name : Batch QC
Lab Code : P1100790-001MS P1100790-001DMS
Test Notes :

Units : mg/L (ppm)
Basis : NA

Analyte	Prep Method	Analysis Method	PQL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Spike Recovery MS	Spike Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Chromium, Hexavalent	None	7196A	0.01	0.0500	0.0500	0.0273	0.0755	0.0755	96	96	78-112	<1	

Approved By Karen Ryan Date : 3/3/11

Report By:SAnderson

Columbia Analytical Services™

pH Run Log

Service Request #(s): 790 797 798

Time: 0920

Sample	VWR lot #	Exp.
pH 2 Buffer	S24-1104/002	1/2012
pH 4 Buffer	S24-1104/003	8/31/12
pH 7 Buffer	S24-1104/004	9/30/12
pH 10 Buffer	S24-0302/001	9/30/11

Slope	Prep.Run #
99.0%	—
	Run#
	—

pH in liquid: (1) 9040B, (2) 9040C **pH in solid:** (3) 9045C, (4) 9045D (*Note method number in column labeled # below*)

pH adjustment:(5) 7196A,(6) 7199 (Note method # In column labeled #)

Sample	#	pH	Temp. °C
pH 2.000	5	1.996	21.5°
pH 4.000	↓	3.953	21.5°
pH 7.000		6.991	21.5°
pH 10.000		9.999	21.6°
10.646 exp. 11/2012 Ref#: S19-1123/0030		6.364	21.7°
DI		2.061	19.1°
pH 2.000	↓	1.992	21.3°
TIME: 1615		SR	
pH 2.000	5	2.012	22.6°
790-1.01	T	2.026	22.1°
797-1.01		1.960	10.1°
-2.01		1.867	9.7°
-3.01		1.800	10.4°
-4.01		1.996	9.5°
-5.01		1.866	10.6°
-6.01		2.183	11.4°
-7.01	↓	2.093	11.5°

Sample	#	pH	Temp. °C
797-8.01	5	1.990	11.7°
798-1.01	T	2.062	12.1°
pH 2.000		2.008	22.3°
798-2.01		1.883	12.6°
pH 2.000	↓	2.013	22.5°
		Sample not used	

pH Adjustments: ☒ **7196A**: Diluted/Conc H_2SO_4 EMD 442854 EXP: 11/30/14

☐ **7199A**: Diluted NaOH _____ EXP: _____

Comments: _____

* Soil or Solid prep: 1:1(wt:vol) with DI water: ** Samples received past recommended hold time.

Date buffers and filling solution changed: 2/28/11

Note: ATC probe used; therefore, temperature correction calculation is not necessary.

Analyst: SR Date: 3/2/11

Reviewer: KR Date: 3/3/11

pH.XLS

Hexavalent Chromium (Liquids)

Columbia Analytical Services — Method EPA 7196A

proof 10/2 59

Service Request#(s): 790 792 798 — Run#: 237770

Stock#: 524-0228/103 T.V=10PPM EXP: 2/28/12 — Prep Run#: —

CCV/CCV#: 524-1015/1001 T.V=100PPM EXP: 3/12 — Conc. H_2SO_4 Lot#: EMD 49284 EXP: 11/20/14

Coloring Reagent Ref#: 524-0221/1102 EXP: 3/21/11

Working Curve:

Prep Dilution	NA	0.05/50	0.25/50	0.5/50	Corr. Coeff.
Concentration mg/L	0.00	0.01	0.05	0.1	1.000
Absorbance @ 540 nm	0.000	0.011	0.055	0.110	

	Sample #	Sample Vol.(mL)	Dilution	pH ✓	Bkg.	Absorbance @ 540nm	Corrected Abs. (minus bkg.)	Results - mg/L	QA/QC - %R / RPD
1	ICB	10ml	—	✓	0.000	0.000	0.000	0	<0.004
2	ICV 0.0520PPM		—	✓	0.000	0.056	0.056	0.0509	102%
3	MB		—	✓	0.000	0.043	0.043	0.0391	98%
4	LCS 0.040PPM		—	✓	0.000	0.000	0.000	0	<0.004
5	790-1.01 MS 0.05PPM		—	✓	0.000	0.030	0.030	0.0273	
6	-1.01 MSD 0.05PPM		—	✓	0.000	0.083	0.083	0.0755	96% <0.4 RPD
7	-1.01 LCS 0.03PPM		—	✓	0.000	0.083	0.083	0.0755	96% 5 RPD
8	-1.01 MSD LCS 0.03PPM		—	✓	0.000	0.062	0.062	0.0564	97%
9	792-1.01		—	✓	0.003	0.004	0.001	0.000909	<0.004
10	-1.01 LCS 0.03PPM		—	✓	0.003	0.036	0.033	0.030	100%
11	-2.01		—	✓	0.000	0.001	0.001	0.000909	<0.004
12	-3.01		—	✓	0.000	0.000	0.000	0	<0.004
13	CCV1 0.0500 PPM		—	✓	0.000	0.054	0.054	0.0491	98%
14	CCB1		—	✓	0.000	0.000	0.000	0	<0.004
15	798-4.01		—	✓	0.000	0.001	0.001	0.000909	
16	-5.01		—	✓	0.000	0.000	0.000	0	
17	-6.01		—	✓	0.000	0.001	0.001	0.000909	

pH Requirement: Method 7196A (2 ± 0.5) * Samples filtered prior to pH adjustment

ICV/CCV spiked with 0.25 ml of 524-1015/1001@1/10 ↑ 50 ml of pH adjusted DI WATER (T.V.= 0.05 ppm)

MS/MSD spiked with 0.05 ml of 524-0228/103 ↑ 10 ml of pH adjusted sample (T.V.= 0.05 ppm)

LCS spiked with 0.2 ml of — ↑ 50 ml of pH adjusted DI Water (T.V.= 0.04 ppm)

Verification Standard Spiked 0.3 ml of ↓ @1/10 ↑ 10 ml of sample (T.V.= 0.03 ppm)

Comments:

Prepared By: — Date/Time: 3/2/11 @ 1630

Analyzed By: — Date/Time: 3/2/11 @ 1645

Reviewed By: KR — Date: 3/3/11

Cr6LIQ.xls

Hexavalent Chromium (Liquids)

Columbia Analytical Services 8-3/2/11

Method EPA 7196A

60

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Service Request#(s): 798 798B 798S

Run#: 237770

Stock#: 524-0228/103 TV=10ppm EXP: 2/28/12

Prep Run#: —

CV/CCV#: 524-1015/001 TV=100ppm EXP: 3/12

Conc. H_2SO_4 Lot#: EMD 49284 EXP: 11/30/12

Coloring Reagent Ref#: 524-0221/102 EXP: 3/21/11

Working Curve:

Prep Dilution	NA	0.05/50	0.25/50	0.5/50	Corr. Coeff.
Concentration mg/L	0.00	0.01	0.05	0.1	1.000
Absorbance @ 540 nm	0.000	0.011	0.055	0.110	

Sgn 3/2/11

	Sample #	Sample Vol.(mL)	Dilution	pH ✓	Bkg.	Absorbance @ 540nm	Corrected Abs. (minus bkg.)	Results - mg/L	QA/QC - %R / RPD
1	798B-7.01	10ml	—	✓	0.000	0.002	0.002	0.00182	<0.004
2	↓ -8.01		—	✓	0.000	0.000	0.000	0	<0.004
3	798-1.01		—	✓	0.000	0.000	0.000	0	<0.004
4	-1.01 MS 0.05ppm		—	✓	0.000	0.055	0.055	0.0500	100%
5	-1.01 MSD ↓		—	✓	0.000	0.056	0.056	0.089	102% RPD 2%
6	-2.01		—	✓	0.000	0.009	0.009	0.00818	
7	↓ -2.01 MS 0.05ppm		—	✓	0.000	0.064	0064	0.0582	100%
8	CCV2 0.0500ppm		—	✓	0.000	0.056	0.056	0.0509	102%
9	CCB2		—	✓	0.000	0.000	0.000	0	
10	798-2.01 MSD 0.05ppm		—	✓	0.000	0.064	0.064	0.0582	100% RPD 0%
11	CCV3 0.0500ppm		—	✓	0.000	0.056	0.056	0.0509	102%
12	CCB3		—	✓	0.000	0.000	0.000	0	
13									
14									
15									
16									
17									

Spare not used

pH Requirement: Method 7196A (2 ± 0.5) * Samples filtered prior to pH adjustment

ICV/CCV spiked with 0.25 ml of 524-1015/001 @ tc ↑ 50 ml of pH adjusted DI WATER (T.V.= 0.05 ppm)

MS/MSD spiked with 0.05 ml of 524-0228/103 ↑ 10 ml of pH adjusted sample (T.V.= 0.05 ppm)

LCS spiked with 0.2 ml of _____ ↑ 50 ml of pH adjusted DI Water (T.V.= 0.04 ppm)

Verification Standard Spiked 0.3 ml of @ tc ↑ 10 ml of sample (T.V.= 0.03 ppm)

Comments:

Prepared By: _____ Date/Time: 3/2/11 @1650

Analyzed By: _____ Date/Time: 3/2/11 @ 1645

Reviewed By: RR Date: 3/3/11

Cr6LIQ.xls

11/23/09 SIG-1123090B 1000 ppm SO_2 (ICV/CCV)
SV 0.1607g Na_2SO_3 (Mallinckrodt; H25469; EXP 8/11/14
↑ 100ml w/ DI
EXP: 5/23/10

11/23/09 SIG-1123090B A,B,C,D pH REFERENCE
SV PURCHASED
ERA CAT # 977
LOT # 129934
EXP: 1/2012

11/24/09 SIG-1124090I 1000 ppm SO_4 Standard
SV PURCHASED CAT # ICC-006
LOT # K007944
EXP: 9/30/13

SV 11/25/09
11/25/09 SIG-~~H25~~ 1125090I 0.1N H_2SO_4
5~~6~~ml conc H_2SO_4 (EMD 4705D EXP: 9/13/10)
EXP: ~~9/25~~ 9/13/10
SV 11/25/09

11/30/09 SIG-1130090I Cr^{6+} Coloring Reagent
SV 0.2500g diphenylcarbohydrazide (EMD) 4710ZED; EXP: 1/30/13) ↑ 50ml w/ Acetone (EMD 4715UD; EXP: 9/24/12
EXP: 12/30/09

11/30/09 SIG-1130090B 25133 ppb Stock for O_3 in Air
SV 0.05ml Pyridine-4-Carboxaldehyde (Alfa Aesar LOT 10124055B; EXP 5/11/12)
↑ 500ml deionized H_2O
EXP: 12/14/09

11/30/09 SIG-1130090B 25133ppb ICV/CCV for O_3 in Air
SV 0.05ml Pyridine-4-carboxaldehyde (TCI LOT # EGINC; EXP: 8/2012)
↑ 500ml w/ DI H_2O
EXP: 12/14/09

Reviewed And Approved By:
Initial: VL Date: 12/30/09

3/1/10 SV — 524-03011001 pH 4.000 Buffer
Purchased 500 ml CAT # 5657-01
JT BAKER LOT # H31526
EXP 8/31/11

3/1/10 SV — 524-03011002 pH 7.000 Buffer
Purchased 500 ml CAT # 5656-01
JT BAKER LOT # H47531
EXP: 1/31/12

3/1/10 SV — 524-03011003 1000 PPM Cl (LCS)
Purchased 120 ml Cat # 1955-4
RICCA CHEM CO LOT # 1001395
EXP: 7/2011

3/1/10 SV — 524-03011004 NH3 Filling Sol'n
Purchased 60 ml Orion 951202
Thermo Scientific LOT # MT1
P/N. 702613-A04
EXP: 3/1/11

3/2/10 SV — 524-03021001 pH 10.000 buffer
Purchased 500 ml Cat # 5655-01
JT Baker LOT # H34508
EXP: 9/30/11

10/6/10 SH — 524-10061001 — 25133 ppb Stock for O3

0.05 ml Pyridine-4-carboxaldehyde Alfa Aesar 10146598 ;Exp: 8/11/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

10/6/10 SH — 524-10061002 — 25133 ppb ICV/CCV for O3

0.05 ml Pyridine-4-carboxaldehyde TCI (IGI INC ;Exp: 8/10/12) up to 500 ml w/ DI Water.

EXP: 10/20/10

524-10061003 MBTH SD/17

10/6/10 SD — 0.5000 g MBTH (Aldrich 54696EK ;Exp: 8/7/14) up to 100 ml w/ DI Water. Plus 0.5 ml Conc. H_2SO_4 EMO 49384; EXP 11/2

EXP: 10/7/10

10/15/10 SH — 524-10151001 — Cr6+ ICV/CCV Stock

Purchased 100PPM Cr6+

RICCA Chemical Co Cat No 2095-16

500mL Plastic

LOT # 10101771

EXP: 3/30/12

10/15/10 SH — 524-10151002 — 500PPM NO_2 Stock

Purchased

RICCA Chemical Co Cat No: 5444-54

LOT # 10102771 120mL amber glass

EXP: 4/2011

10/28/10 S24-10781002 1000 ppm SO_3 ICV/CCV

0.1607 Na_2SO_3 (Mallinckrodt Lot #H25469; Exp: 8/11/14) up to 100 ml w/ DI Water.

Exp: 11/11/10

11/1/10 S24-11011001 ICV/CCV Cr^{6+} T.V = 0.579 ppm

0.5 ml S19-04090904 (T.V = 115.8 mg/L ; EXP: 12/2010) ↑ 100 ml w/ DI

Exp: 11/15/10

11/1/10 S24-11011002 Cr^{6+} Coloring Reagent

0.2500g 1,5-Diphenylcarbohydrazide (EMD 47103721; EXP: 1/30/13) ↑ 50 ml w/ Acetone (EMD 47154D; EXP: 9/24/12).

EXP: 11/15/10

11/4/10 S24-11041001 A→E pH Filling Sol'n

PURCHASED (3M KCl)

Thermo Scientific P/N 702613-A02

LOT Code: QR1

EXP: 11/4/11

11/4/10 S24-11041002 pH 2.000 Buffer

Purchased

BDH CAT NO: 5010-500ml

LOT # 1002199

EXP: 1/2012