Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001540
Date Analyzed: 05/23/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\052310-521\0523.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	1.0	0.92		1.59	1.47	-8	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	1.0	1.2		0.741	0.912	23	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001540
Date Analyzed: 05/23/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\052310-521\0523004.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	10	12		1.59	1.88	18	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	10	11		0.741	0.812	10	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001540

Analysis Run Log
Nitrosamines by EPA 521

Analysis Method: 521

Analysis Lot: KWG1004829
Instrument ID: MS16

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
\0516007.D	GC/MS Tuning - Generic	KWG1004829-1	5/16/2010	18:51		5/16/2010	19:05
\0517009.D	Continuing Calibration Verification	KWG1004829-2	5/17/2010	19:25		5/17/2010	19:39
\0517013.D	Method Blank	KWG1004537-4	5/17/2010	21:06		5/17/2010	21:20
\0517015.D	Lab Control Sample	KWG1004537-3	5/17/2010	21:55		5/17/2010	22:09
\0517018.D	ZZZZZZ	ZZZZZZ	5/17/2010	23:10		5/17/2010	23:24
\0517019.D	MW-13	P1001540-001	5/17/2010	23:35		5/17/2010	23:49
\0517020.D	Batch QC	P1001538-005	5/18/2010	00:00		5/18/2010	00:14
\0517023.D	Continuing Calibration Verification	KWG1004829-3	5/18/2010	01:15		5/18/2010	01:29
\0517025.D	ZZZZZZ	ZZZZZZ	5/18/2010	02:05		5/18/2010	02:19
\0517026.D	ZZZZZZ	ZZZZZZ	5/18/2010	02:30		5/18/2010	02:44
\0517027.D	ZZZZZZ	ZZZZZZ	5/18/2010	02:55		5/18/2010	03:09
\0517029.D	ZZZZZZ	ZZZZZZ	5/18/2010	03:45		5/18/2010	03:59
\0517030.D	ZZZZZZ	ZZZZZZ	5/18/2010	04:10		5/18/2010	04:24
\0517031.D	ZZZZZZ	ZZZZZZ	5/18/2010	04:35		5/18/2010	04:49
\0517032.D	ZZZZZZ	ZZZZZZ	5/18/2010	05:00		5/18/2010	05:14
\0517033.D	Continuing Calibration Verification	KWG1004829-4	5/18/2010	05:25		5/18/2010	05:39
521\0519.D	Continuing Calibration Verification	KWG1004829-5	5/19/2010	13:44		5/19/2010	13:58
\0519003.D	ZZZZZZ	ZZZZZZ	5/19/2010	14:59		5/19/2010	15:13
\0519004.D	Batch QCMS	KWG1004537-1	5/19/2010	15:24		5/19/2010	15:38
\0519006.D	ZZZZZZ	ZZZZZZ	5/19/2010	16:13		5/19/2010	16:27
\0519007.D	Continuing Calibration Verification	KWG1004829-6	5/19/2010	16:38		5/19/2010	16:52
521\0523.D	Continuing Calibration Verification	KWG1004829-7	5/23/2010	15:25		5/23/2010	15:39
\0523003.D	Batch QCDMS	KWG1004537-2	5/23/2010	16:42		5/23/2010	16:56
\0523004.D	Continuing Calibration Verification	KWG1004829-8	5/23/2010	17:07		5/23/2010	17:21

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM
Sample Matrix: Water

Service Request: P1001540
Date Extracted: 05/17/2010

Extraction Prep Log
Nitrosamines by EPA 521

Extraction Method: METHOD
Analysis Method: 521

Extraction Lot: KWG1004537
Level: Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
MW-13	P1001540-001	05/03/10	05/03/10	500ml	1ml	NA	
Method Blank	KWG1004537-4	NA	NA	500ml	1ml	NA	
Batch QCMS	KWG1004537-1	NA	NA	500ml	1ml	NA	
Batch QCDMS	KWG1004537-2	NA	NA	500ml	1ml	NA	
Batch QC	P1001538-005	NA	NA	500ml	1ml	NA	
Lab Control Sample	KWG1004537-3	NA	NA	500ml	1ml	NA	

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

CAS SR #P1001538

Table of Contents

Columbia Analytical Services™ 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805.526.7161 | 805.526.7270 fax | www.caslab.com

LABORATORY REPORT

June 3, 2010

David Conner
Battelle
3990 Old Town Ave., Suite C-205
San Diego, CA 92110

RE: JPL GW Mon. 2Q10 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on May 3, 2010. One of the samples was sent out for partial analysis to our Kelso facility. Please find their report attached. For your reference, these analyses have been assigned our service request number P1001538.

All analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-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. Your report contains 289 pages.

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. 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.

Sue Anderson
Project Manager

Client: Battelle
Project: JPL GW Mon. 2Q10 / G486090

CAS Project No: P1001538

CASE NARRATIVE

The samples were received intact under chain of custody on May 3, 2010 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.

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.

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P1001538-001	MW-4-5	5/3/10	08:21
P1001538-002	MW-4-4	5/3/10	08:53
P1001538-003	MW-4-3	5/3/10	09:43
P1001538-004	MW-4-2	5/3/10	10:13
P1001538-005	MW-4-1	5/3/10	11:00
P1001538-006	DUPE-02-2Q10	5/3/10	00:00
P1001538-007	EB-04-05/03/10	5/3/10	10:33

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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. P1001535

CAS Contact:

Company Name & Address (Reporting Information)	Project Name	Project Manager	P.O. # / Billing Information
BATTELLE 3990 OLD TOWN AVE, C-205 SAN DIEGO CA 92110	JPL GW MON, 2Q10 Project Number G-486090	DAVID CONNER	214319 / BATTELLE ATTN: GERALD TOMPKINS 505 KING AVE COLUMBUS, OH 43201
Phone (619)726 7311	Fax		
Email Address for Result Reporting	Sampler (Print & Sign)		

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)	0 1,4 DIOXANE (8270)	NDMA (1625.0)	Remarks
MW-4-5	1	5/3/10	0821	W	1						X			
MW-4-4	2		0853		1						X			
MW-4-3	3		0943		1						X			
MW-4-2	4		1013		1						X			
MW-4-1	5		1100		4						X	X	X	
DUPE-02-2Q10	6		-"-		1						X			DUPLICATE
EB-04-05/03/10	7		1033		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)

	Date	Time		Date	Time
Relinquished by: (Signature)	05/03/10	1300	Received by: (Signature)	5/3/01	1580
Relinquished by: (Signature)	5/3/10	1719	Received by: (Signature)	5/3/10	1719
Relinquished by: (Signature)			Received by: (Signature)		

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

Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1001538-001.01					
	7196A				
		5/3/10	1449	SMO / MZAMORA	
		5/3/10	1450	P-37 / MZAMORA	
		5/3/10	1451	P-37 / MZAMORA	
		5/3/10	1536	In Lab / SANDERSON	
		5/3/10	1729	P-37 / SANDERSON	
P1001538-002.01					
	7196A				
		5/3/10	1449	SMO / MZAMORA	
		5/3/10	1450	P-37 / MZAMORA	
		5/3/10	1451	P-37 / MZAMORA	
		5/3/10	1536	In Lab / SANDERSON	
		5/3/10	1729	P-37 / SANDERSON	
P1001538-003.01					
	7196A				
		5/3/10	1449	SMO / MZAMORA	
		5/3/10	1450	P-37 / MZAMORA	
		5/3/10	1451	P-37 / MZAMORA	
		5/3/10	1536	In Lab / SANDERSON	
		5/3/10	1729	P-37 / SANDERSON	
P1001538-004.01					
	7196A				
		5/3/10	1449	SMO / MZAMORA	
		5/3/10	1450	P-37 / MZAMORA	
		5/3/10	1451	P-37 / MZAMORA	
		5/3/10	1536	In Lab / SANDERSON	
		5/3/10	1729	P-37 / SANDERSON	
P1001538-005.01					
		5/3/10	1449	SMO / MZAMORA	
		5/3/10	1451	SUBBED-OUT / MZAMORA	
		5/3/10	1536	In Lab / SANDERSON	
		5/3/10	1549	P-16 / ADAVID	
		5/5/10	1205	K-Delilah-34 / BTOBIN	
		5/17/10	0842	In Lab / RHAYES	
		5/18/10	0815	K-Disposed / DMOORE	
					5/18/10
P1001538-005.02					
	521				
		5/3/10	1449	SMO / MZAMORA	
		5/3/10	1451	SUBBED-OUT / MZAMORA	
		5/5/10	1205	K-Delilah-34 / BTOBIN	
		5/13/10	0800	Custodian / DMOORE	
		5/13/10	0800	In Lab / RHAYES	

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Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
		5/13/10	1250	K-Delilah-34 / SDAVIS	
		5/17/10	0841	In Lab / RHAYES	
		5/18/10	0816	K-Delilah-34 / DMOORE	
P1001538-005.03					
	7196A				
		5/3/10	1449	SMO / MZAMORA	
		5/3/10	1451	P-37 / MZAMORA	
		5/3/10	1550	In Lab / SANDERSON	
		5/3/10	1729	P-37 / SANDERSON	
P1001538-005.04					
	8270C SIM				
		5/3/10	1449	SMO / MZAMORA	
		5/3/10	1451	SUBBED-OUT / MZAMORA	
		5/5/10	1205	K-Delilah-34 / BTOBIN	
		5/10/10	0740	In Lab / RHOLDEN	
		5/10/10	0850	K-Delilah-34 / SDAVIS	
P1001538-006.01					
	7196A				
		5/3/10	1449	SMO / MZAMORA	
		5/3/10	1450	P-37 / MZAMORA	
		5/3/10	1451	P-37 / MZAMORA	
		5/3/10	1536	In Lab / SANDERSON	
		5/3/10	1729	P-37 / SANDERSON	
P1001538-007.01					
	7196A				
		5/3/10	1449	SMO / MZAMORA	
		5/3/10	1450	P-37 / MZAMORA	
		5/3/10	1451	P-37 / MZAMORA	
		5/3/10	1536	In Lab / SANDERSON	
		5/3/10	1729	P-37 / SANDERSON	

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Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001538

Project: JPL GW Mon. 2Q10 / G486090

Sample(s) received on: 5/3/2010 Date opened: 5/3/2010 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	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 3 °C			
10	Was a **trip blank** received?	☐	☐	☒
	Trip blank supplied by CAS: _____			
11	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?	☐	☐	☒
12	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?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**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
P1001538-001.01	125mL Plastic NP					
P1001538-002.01	125mL Plastic NP					
P1001538-003.01	125mL Plastic NP					
P1001538-004.01	125mL Plastic NP					
P1001538-005.01	1000ml AG NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001538

Project: JPL GW Mon. 2Q10 / G486090

Sample(s) received on: 5/3/2010 Date opened: 5/3/2010 by: MZAMORA

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1001538-005.02	1000ml AG NP					
P1001538-005.03	125mL Plastic NP					
P1001538-005.04	500mL AG NP					
P1001538-006.01	125mL Plastic NP					
P1001538-007.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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DIVIDER SHEET

ANALYTICAL DATA FOR

Hexavalent Chromium

ANALYSIS

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : Battelle
Project Name : JPL GW Mon. 2Q10
Project Number : G486090
Sample Matrix : WATER

Service Request : P1001538
Date Collected : 05/03/10
Date Received : 05/03/10

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-4-5	P1001538-001	0.010	0.004	1	NA	05/03/10 16:30	ND	
MW-4-4	P1001538-002	0.010	0.004	1	NA	05/03/10 16:30	ND	
MW-4-3	P1001538-003	0.010	0.004	1	NA	05/03/10 16:30	ND	
MW-4-2	P1001538-004	0.010	0.004	1	NA	05/03/10 16:30	ND	
MW-4-1	P1001538-005	0.010	0.004	1	NA	05/03/10 16:30	ND	
DUPE-02-2Q10	P1001538-006	0.010	0.004	1	NA	05/03/10 16:30	ND	
EB-04-05/03/10	P1001538-007	0.010	0.004	1	NA	05/03/10 16:30	ND	
Method Blank	P1001538-MB	0.010	0.004	1	NA	05/03/10 16:30	ND	

Approved By Karen Ryza Date : 5/4/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1001538
Project:	JPL GW Mon. 2Q10 / G486090	**Date Analyzed:**	05/03/10

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: Kam Rya Date: 5/4/10

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon. 2Q10 / G486090

Service Request: P1001538
Date Analyzed: 05/03/10

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	0.0579	0.0568	98	90-110
CCV1	0.0579	0.0547	94	90-110
CCV2	0.0579	0.0558	96	90-110

Approved By: Karen Ryan Date: 5/4/10

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1001538
Project Name :	JPL GW Mon. 2Q10	**Date Collected :**	NA
Project Number :	G486090	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	05/03/10

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1001538-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	0.0382	96	90-109	

Approved By Karen Ryan Date : 5/4/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client : Battelle
Project Name : JPL GW Mon. 2Q10
Project Number : G486090
Sample Matrix : WATER

Service Request : P1001538
Date Collected : 05/03/10
Date Received : 05/03/10
Date Extracted : NA
Date Analyzed : 05/03/10

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name : MW-4-5
Lab Code : P1001538-001MS P1001538-001DMS
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	0.0465	0.0465	93	93	78-112	<1	

Approved By Karen Ryan Date : 5/4/10

Report By:SAnderson

Columbia Analytical Services™ 1317 S. 13th Avenue, Kelso, WA 98626 360.577.7222 360.636.1068 (fax) www.caslab.com

May 28, 2010 Analytical Report for Service Request No: P1001538

Sue Anderson
Columbia Analytical Services
2655 Park Center Drive
Suite A
Simi Valley, CA 93065-6209

RE: JPL GW Mon. 2Q10/G486090

Dear Sue:

Enclosed are the results of the samples submitted to our laboratory on May 03, 2010. For your reference, these analyses have been assigned our service request number P1001538.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.caslab.com. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3376. You may also contact me via Email at GSalata@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.

Gregory Salata, Ph.D.
Project Chemist

GS/ln

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value that was detected outside the quantitation range.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value that was detected outside the quantitation range.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value that was detected outside the quantitation range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Columbia Analytical Services, Inc.
Kelso, WA
State Certifications, Accreditations, and Licenses

Program	Number
Alaska DEC UST	UST-040
Arizona DHS	AZ0339
Arkansas - DEQ	88-0637
California DHS	2286
Colorado DPHE	-
Florida DOH	E87412
Hawaii DOH	-
Idaho DHW	-
Indiana DOH	C-WA-01
Louisiana DEQ	3016
Louisiana DHH	LA050010
Maine DHS	WA0035
Michigan DEQ	9949
Minnesota DOH	053-999-368
Montana DPHHS	CERT0047
Nevada DEP	WA35
New Jersey DEP	WA005
New Mexico ED	-
North Carolina DWQ	605
Oklahoma DEQ	9801
Oregon - DHS	WA200001
South Carolina DHEC	61002
Utah DOH	COLU
Washington DOE	C1203
Wisconsin DNR	998386840
Wyoming (EPA Region 8)	-

Case Narrative

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Battelle	**Service Request No.:**	P1001538
Project:	JPL-GW-2Q10/G005862/JPL GWM	**Date Received:**	05/03/10
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier III validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

One water sample was received for analysis at Columbia Analytical Services on 05/03/10. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

NDMA by EPA Method 521

No anomalies associated with the analysis of these samples were observed.

1,4-Dioxane by EPA Method 8270C

No anomalies associated with the analysis of these samples were observed.

Approved by _____ Date 5/20/10

Chain of Custody Documentation

Intra-Network Chain of Custody

2655 Park Center Drive, Suite A • Simi Valley, CA 93065 • 805-526-7161 • FAX 805-526-7270

CAS Contact: Sue Anderson

Project Name: JPL GW Mon. 2Q10
Project Number: G486090
Project Manager: David Conner
Company: Battelle

Lab Code	Client Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Date Received	Send To	14_DIOXANE 8270C SIM	Nitrosamines 521
P1001538-005	MW-4-1	3	Water	5/3/10	1100	5/3/10	KELSO	IV	IV

Test Comments

Nitrosamines - 521	P1001538-005	NDMA

Folder Comments:

Note: EDF files for client's internal data base;LogCode is BAT, do not have Global ID. EDD & pdf of report sent to Betsy Cutie (cutiee@battelle.org) via file share site https://fx.battelle.org. For EDF unique spike ids (ex: P1000XXX01MS or SD).

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
	____RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 ✓ STANDARD Requested FAX Date: ____ Requested Report Date: 05/20/10	____ I. Results Only ____ II. Results + QC Summaries ____ III. Results + QC and Calibration Summaries ✓ IV. Data Validation Report with Raw Data PQL/MDL/J Y EDD Y	PO# P1001538 Bill to

Relinquished By: [signature] 1405 05/04/10

Received By: [signature] 5-5-10 1020

Airbill Number:

Columbia Analytical Services, Inc.
Cooler Receipt and Preservation Form

PC Greg

Client / Project: CAS - Simi Valley Service Request K10 P1001538

Received: 5-5-10 Opened: 5-5-10 By: Brad

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* ______ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? ______

If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Cooler Temp °C	Temp Blank °C	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
3.5	N/A	244		1Z78905X1341856800	

7. Packing material used. *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Sleeves* *Other* ______
8. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
9. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
10. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
11. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
12. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
13. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
14. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
15. Was Cl2/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: ______

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Page 1 *of* ____

Nitrosamines

Organic Analysis:
Nitrosamines by EPA 521

Summary Package

Sample and QC Results

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538

Cover Page - Organic Analysis Data Package
Nitrosamines by EPA 521

Sample Name	Lab Code	Date Collected	Date Received
MW-4-1MS	KWG1004537-1	05/03/2010	05/03/2010
MW-4-1DMS	KWG1004537-2	05/03/2010	05/03/2010
MW-4-1	P1001538-005	05/03/2010	05/03/2010

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

Signature: Lorna E Dotwood Name: Lorna Dotwood

Date: 5/27/10 Title: Scientist

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090
Sample Matrix: Water

Service Request: P1001538
Date Collected: 05/03/2010
Date Received: 05/03/2010

Nitrosamines by EPA 521

Sample Name: MW-4-1
Lab Code: P1001538-005

Extraction Method: METHOD
Analysis Method: 521

Units: ng/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	0.74	J	2.0	0.32	1	05/17/10	05/18/10	KWG1004537	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
N-Nitrosodimethylamine-d6	111	70-130	05/18/10	Acceptable

Comments:

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090
Sample Matrix: Drinking water

Service Request: P1001538
Date Collected: NA
Date Received: NA

Nitrosamines by EPA 521

Sample Name: Method Blank
Lab Code: KWG1004537-4

Extraction Method: METHOD
Analysis Method: 521

Units: ng/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	0.98	J	2.0	0.32	1	05/17/10	05/17/10	KWG1004537	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
N-Nitrosodimethylamine-d6	105	70-130	05/17/10	Acceptable

Comments:

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090
Sample Matrix: Water

Service Request: P1001538

Surrogate Recovery Summary
Nitrosamines by EPA 521

Extraction Method: METHOD
Analysis Method: 521

Units: ng/L
Level: Low

Sample Name	Lab Code	Sur1
MW-4-1	P1001538-005	111
Method Blank	KWG1004537-4	105
MW-4-1MS	KWG1004537-1	102
MW-4-1DMS	KWG1004537-2	105
Lab Control Sample	KWG1004537-3	110

Surrogate Recovery Control Limits (%)

Sur1 = N-Nitrosodimethylamine-d6 70-130

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1001538
Project:	JPL GW Mon. 2Q10/G486090	**Date Extracted:**	05/17/2010
Sample Matrix:	Water	**Date Analyzed:**	05/19/2010 - 05/23/2010

Matrix Spike/Duplicate Matrix Spike Summary
Nitrosamines by EPA 521

Sample Name:	MW-4-1	**Units:**	ng/L
Lab Code:	P1001538-005	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	521	**Extraction Lot:**	KWG1004537

Analyte Name	Sample Result	MW-4-1MS KWG1004537-1 Matrix Spike			MW-4-1DMS KWG1004537-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
N-Nitrosodimethylamine	0.74	19.3	20.0	93	23.3	20.0	113	70-130	19	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090
Sample Matrix: Drinking water

Service Request: P1001538
Date Extracted: 05/17/2010
Date Analyzed: 05/17/2010

Lab Control Spike Summary
Nitrosamines by EPA 521

Extraction Method: METHOD
Analysis Method: 521

Units: ng/L
Basis: NA
Level: Low
Extraction Lot: KWG1004537

	Lab Control Sample KWG1004537-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
N-Nitrosodimethylamine	2.74	2.00	137	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Battelle	**Service Request:**	P1001538
Project:	JPL GW Mon. 2Q10/G486090	**Date Extracted:**	05/17/2010
Sample Matrix:	Drinking water	**Date Analyzed:**	05/17/2010
		Time Analyzed:	21:06

Method Blank Summary
Nitrosamines by EPA 521

Sample Name:	Method Blank	**File ID:**	J:\MS16\DATA\051710-521\0517013.D
Lab Code:	KWG1004537-4	**Instrument ID:**	MS16
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	521	**Extraction Lot:**	KWG1004537

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1004537-3	J:\MS16\DATA\051710-521\0517015.D	05/17/10	21:55
MW-4-1	P1001538-005	J:\MS16\DATA\051710-521\0517020.D	05/18/10	00:00
MW-4-1MS	KWG1004537-1	J:\MS16\DATA\051910-521\0519004.D	05/19/10	15:24
MW-4-1DMS	KWG1004537-2	J:\MS16\DATA\052310-521\0523003.D	05/23/10	16:42

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090
Sample Matrix: Drinking water

Service Request: P1001538
Date Extracted: 05/17/2010
Date Analyzed: 05/17/2010
Time Analyzed: 21:55

Lab Control Sample Summary
Nitrosamines by EPA 521

Sample Name: Lab Control Sample
Lab Code: KWG1004537-3

Extraction Method: METHOD
Analysis Method: 521

File ID: J:\MS16\DATA\051710-521\0517015.D
Instrument ID: MS16

Level: Low
Extraction Lot: KWG1004537

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1004537-4	J:\MS16\DATA\051710-521\0517013.D	05/17/10	21:06
MW-4-1	P1001538-005	J:\MS16\DATA\051710-521\0517020.D	05/18/10	00:00
MW-4-1MS	KWG1004537-1	J:\MS16\DATA\051910-521\0519004.D	05/19/10	15:24
MW-4-1DMS	KWG1004537-2	J:\MS16\DATA\052310-521\0523003.D	05/23/10	16:42

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538
Calibration Date: 05/16/2010

Initial Calibration Summary
Nitrosamines by EPA 521

Calibration ID: CAL9489
Instrument ID: MS16

Column: MS

Level ID	File ID
A	J:\MS16\DATA\051610-521\0516006.D
B	J:\MS16\DATA\051610-521\0516007.D
C	J:\MS16\DATA\051610-521\0516009.D
D	J:\MS16\DATA\051610-521\0516010.D
E	J:\MS16\DATA\051610-521\0516011.D
F	J:\MS16\DATA\051610-521\0516012.D

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
N-Nitrosodimethylamine-d6	A	1.0	1.44	B	2.0	1.43	C	5.0	1.56	D	10	1.56	E	20	1.83
	F	50	1.70												
N-Nitrosodimethylamine	A	1.0	0.691	B	2.0	0.653	C	5.0	0.677	D	10	0.746	E	20	0.882
	F	50	0.797												

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538
Calibration Date: 05/16/2010

Initial Calibration Summary
Nitrosamines by EPA 521

Calibration ID: CAL9489
Instrument ID: MS16

Column: MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
N-Nitrosodimethylamine-d6	SURR	AverageRF	% RSD	9.8		≤ 30	1.59		
N-Nitrosodimethylamine	MS	AverageRF	% RSD	11.7		≤ 30	0.741		

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538
Calibration Date: 05/16/2010
Date Analyzed: 05/16/2010

Second Source Calibration Verification
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration ID: CAL9489
Units: ug/L

File ID: J:\MS16\DATA\051610-521\0516014.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine	10	10	0.741	0.737	-1	NA	± 30 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538
Date Analyzed: 05/17/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\051710-521\0517009.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	1.0	0.98		1.59	1.56	-2	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	1.0	1.1		0.741	0.815	10	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

+ SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538
Date Analyzed: 05/18/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\051710-521\0517023.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	5.0	5.6		1.59	1.77	11	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	5.0	4.2		0.741	0.625	-16	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538
Date Analyzed: 05/19/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\051910-521\0519.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	1.0	1.0		1.59	1.62	2	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	1.0	1.1		0.741	0.809	9	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538
Date Analyzed: 05/19/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\051910-521\0519007.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	10	12		1.59	1.89	19	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	10	12		0.741	0.915	23	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538
Date Analyzed: 05/23/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\052310-521\0523.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	1.0	0.92		1.59	1.47	-8	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	1.0	1.2		0.741	0.912	23	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538
Date Analyzed: 05/23/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\052310-521\0523004.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	10	12		1.59	1.88	18	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	10	11		0.741	0.812	10	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001538

Analysis Run Log
Nitrosamines by EPA 521

Analysis Method: 521

Analysis Lot: KWG1004829
Instrument ID: MS16

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
\0516007.D	GC/MS Tuning - Generic	KWG1004829-1	5/16/2010	18:51		5/16/2010	19:05
\0517009.D	Continuing Calibration Verification	KWG1004829-2	5/17/2010	19:25		5/17/2010	19:39
\0517013.D	Method Blank	KWG1004537-4	5/17/2010	21:06		5/17/2010	21:20
\0517015.D	Lab Control Sample	KWG1004537-3	5/17/2010	21:55		5/17/2010	22:09
\0517018.D	ZZZZZZ	ZZZZZZ	5/17/2010	23:10		5/17/2010	23:24
\0517019.D	ZZZZZZ	ZZZZZZ	5/17/2010	23:35		5/17/2010	23:49
\0517020.D	MW-4-1	P1001538-005	5/18/2010	00:00		5/18/2010	00:14
\0517023.D	Continuing Calibration Verification	KWG1004829-3	5/18/2010	01:15		5/18/2010	01:29
\0517025.D	ZZZZZZ	ZZZZZZ	5/18/2010	02:05		5/18/2010	02:19
\0517026.D	ZZZZZZ	ZZZZZZ	5/18/2010	02:30		5/18/2010	02:44
\0517027.D	ZZZZZZ	ZZZZZZ	5/18/2010	02:55		5/18/2010	03:09
\0517029.D	ZZZZZZ	ZZZZZZ	5/18/2010	03:45		5/18/2010	03:59
\0517030.D	ZZZZZZ	ZZZZZZ	5/18/2010	04:10		5/18/2010	04:24
\0517031.D	ZZZZZZ	ZZZZZZ	5/18/2010	04:35		5/18/2010	04:49
\0517032.D	ZZZZZZ	ZZZZZZ	5/18/2010	05:00		5/18/2010	05:14
\0517033.D	Continuing Calibration Verification	KWG1004829-4	5/18/2010	05:25		5/18/2010	05:39
521\0519.D	Continuing Calibration Verification	KWG1004829-5	5/19/2010	13:44		5/19/2010	13:58
\0519003.D	ZZZZZZ	ZZZZZZ	5/19/2010	14:59		5/19/2010	15:13
\0519004.D	MW-4-1MS	KWG1004537-1	5/19/2010	15:24		5/19/2010	15:38
\0519006.D	ZZZZZZ	ZZZZZZ	5/19/2010	16:13		5/19/2010	16:27
\0519007.D	Continuing Calibration Verification	KWG1004829-6	5/19/2010	16:38		5/19/2010	16:52
521\0523.D	Continuing Calibration Verification	KWG1004829-7	5/23/2010	15:25		5/23/2010	15:39
\0523003.D	MW-4-1DMS	KWG1004537-2	5/23/2010	16:42		5/23/2010	16:56
\0523004.D	Continuing Calibration Verification	KWG1004829-8	5/23/2010	17:07		5/23/2010	17:21

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090
Sample Matrix: Water

Service Request: P1001538
Date Extracted: 05/17/2010

Extraction Prep Log
Nitrosamines by EPA 521

Extraction Method: METHOD
Analysis Method: 521

Extraction Lot: KWG1004537
Level: Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
MW-4-1	P1001538-005	05/03/10	05/03/10	500ml	1ml	NA	
Method Blank	KWG1004537-4	NA	NA	500ml	1ml	NA	
MW-4-1MS	KWG1004537-1	05/03/10	05/03/10	500ml	1ml	NA	
MW-4-1DMS	KWG1004537-2	05/03/10	05/03/10	500ml	1ml	NA	
Lab Control Sample	KWG1004537-3	NA	NA	500ml	1ml	NA	

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

CAS SR #P1001513

Table of Contents

Columbia Analytical Services™ 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805.526.7161 | 805.526.7270 fax | www.caslab.com

LABORATORY REPORT

May 3, 2010

David Conner
Battelle
3990 Old Town Ave., Suite C-205
San Diego, CA 92110

RE: JPL-GW-2Q10 / G005862/JPL GWM

Dear David:

Enclosed are the results of the samples submitted to our laboratory on April 29, 2010. For your reference, these analyses have been assigned our service request number P1001513.

All analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-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. Your report contains 25 pages.

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. 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.

Sue Anderson
Project Manager

Client: Battelle
Project: JPL-GW-2Q10 / G005862/JPL GWM

CAS Project No: P1001513

CASE NARRATIVE

The samples were received intact under chain of custody on April 29, 2010 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.

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.

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001513

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P1001513-001	MW-8	4/29/10	09:33
P1001513-002	MW-15	4/29/10	11:40

4

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.: P100153

CAS Contact:

Company Name & Address (Reporting Information)	Project Name
Battelle 505 King Ave Columbus OH 43201	JPL-GW-2Q10
	Project Number: 6005862/JPL GWM
Project Manager: David Conner	P.O. # / Billing Information: 214375/Battelle ATTN: Jerry Tomkins 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)	0	Remarks
MW-8	1	4/29/10	0933	AQ	1P							X Hexavalent Cr (7196A)	
MW-15	2	4/29/10	1140	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)

	Date	Time		Date	Time
Relinquished by: (Signature) David L	4/29/10	1220	Received by: (Signature)	4/29/10	1223
Relinquished by: (Signature)	4/29/10	1300	Received by: (Signature)	4/29/10	1302
Relinquished by: (Signature)	4/29/10	1550	Received by: (Signature)	4/29/10	1550

Cooler / Blank / Ice / No Ice

Temperature 3 °C

Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001513

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1001513-001.01					
	7196A				
		4/29/10	1422	SMO / SSTAPLES	
		4/29/10	1429	In Lab / SANDERSON	
		4/29/10	1615	P-37 / SANDERSON	
P1001513-002.01					
	7196A				
		4/29/10	1422	SMO / SSTAPLES	
		4/29/10	1429	In Lab / SANDERSON	
		4/29/10	1615	P-37 / SANDERSON	

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Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001513

Project: JPL-GW-2Q10 / G005862/JPL GWM

Sample(s) received on: 4/29/2010 Date opened: 4/29/2010 by: SSTAPLES

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	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 3 °C			
10	Was a **trip blank** received?	☐	☐	☒
	Trip blank supplied by CAS: _____			
11	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?	☐	☐	☒
12	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?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**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
P1001513-001.01	125mL Plastic NP					
P1001513-002.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

DIVIDER SHEET

ANALYTICAL DATA FOR

Hexavalent Chromium

ANALYSIS

Analytical Report

Client : Battelle
Project Name : JPL-GW-2Q10
Project Number : G005862/JPL GWM
Sample Matrix : WATER

Service Request : P1001513
Date Collected : 04/29/10
Date Received : 04/29/10

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-8	P1001513-001	0.010	0.004	1	NA	04/29/10 15:20	ND	
MW-15	P1001513-002	0.010	0.004	1	NA	04/29/10 15:20	ND	
Method Blank	P1001513-MB	0.010	0.004	1	NA	04/29/10 15:20	ND	

Approved By Karen Ryan Date : 4/30/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL-GW-2Q10 / G005862/JPL GWM

Service Request: P1001513
Date Analyzed: 04/29/10

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	N D

Approved By: Karen Ryan Date: 4/30/10

ICCBMDL/120594

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL-GW-2Q10 / G005862/JPL GWM

Service Request: P1001513
Date Analyzed: 04/29/10

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	0.0579	0.0559	97	90-110
CCV1	0.0579	0.0549	95	90-110
CCV2	0.0579	0.0559	97	90-110

Approved By: Karen Ryan Date: 4/30/10

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1001513
Project Name :	JPL-GW-2Q10	**Date Collected :**	NA
Project Number :	G005862/JPL GWM	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	04/29/10

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1001513-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	0.040	0.0385	96	90-109	

Approved By Karen Ryan Date : 4/30/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1001513
Project Name :	JPL-GW-2Q10	**Date Collected :**	04/29/10
Project Number :	G005862/JPL GWM	**Date Received :**	04/29/10
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	04/29/10

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name :	MW-8		Units :	mg/L (ppm)
Lab Code :	P1001513-001MS	P1001513-001DMS	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	0.0467	0.0467	93	93	78-112	<1	

Approved By Karen Ryan Date : 4/30/10

Report By:SAnderson

CAS SR #P1001512

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Columbia Analytical Services, Inc. 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805 526 7161 | 805 526 7270 fax | www.caslab.com

LABORATORY REPORT

June 2, 2010

David Conner
Battelle
3990 Old Town Ave., Suite C-205
San Diego, CA 92110

RE: JPL GW Mon 2Q10 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on April 29, 2010. One of the samples was sent out for partial analysis to our Kelso facility. Please find their report attached. For your reference, these analyses have been assigned our service request number P1001512.

All analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-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. Your report contains 326 pages.

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. 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.

Sue Anderson
Project Manager

Client: Battelle
Project: JPL GW Mon 2Q10 / G486090

CAS Project No: P1001512

CASE NARRATIVE

The samples were received intact under chain of custody on April 29, 2010 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.

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.

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P1001512-001	MW-24-5	4/29/10	08:29
P1001512-002	MW-24-4	4/29/10	09:08
P1001512-003	MW-24-3	4/29/10	09:38
P1001512-004	MW-24-2	4/29/10	10:21
P1001512-005	MW-24-1	4/29/10	11:12
P1001512-006	EB-3-04/29/10	4/29/10	10:54

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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.: P100512

CAS Contact:

Company Name & Address (Reporting Information)	Project Name
BATTELLE 3990 OLD TOWN AVE, C-205 SAN DIEGO, CA 92110	JPL GW MON. 2Q10
	Project Number: G486090
Project Manager: DAVID CONNER	P.O. # / Billing Information: 214319 / BATTELLE ATTN: GERALD TOMPKINS 505 KING AVE. COLUMBUS, OH 43201
Phone: (619) 726 7311	Fax:
Email Address for Result Reporting	Sampler (Print & Sign)

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)	0 1,4-Dioxane (8270)	0 NDMA (1625.0)	Remarks
MW-24-5	1	4/29/10	0829	W	1							X			
MW-24-4	2	↓	0908	↓	1							X			
MW-24-3	3		0938		1							X			LEVEL IV QC
MW-24-2	4		1021		1							X			
MW-24-1	5		1112		4							X	X	X	
EB-3-04/29/10	6	↓	1054	↓	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:	Time:	Received by: (Signature)	Date:	Time:
	4/29/10	1300		4/29/10	1300
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	4/29/10	1350		04/29/10	1350
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank / Ice / No Ice

Temperature 3 °C

Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1001512-001.01					
	7196A				
		4/29/10	1414	SMO / SSTAPLES	
		4/29/10	1429	In Lab / SANDERSON	
		4/29/10	1615	P-37 / SANDERSON	
P1001512-002.01					
	7196A				
		4/29/10	1414	SMO / SSTAPLES	
		4/29/10	1429	In Lab / SANDERSON	
		4/29/10	1615	P-37 / SANDERSON	
P1001512-003.01					
	7196A				
		4/29/10	1414	SMO / SSTAPLES	
		4/29/10	1429	In Lab / SANDERSON	
		4/29/10	1615	P-37 / SANDERSON	
P1001512-004.01					
	7196A				
		4/29/10	1414	SMO / SSTAPLES	
		4/29/10	1429	In Lab / SANDERSON	
		4/29/10	1615	P-37 / SANDERSON	
P1001512-005.01					
	521				
		4/29/10	1414	SMO / SSTAPLES	
		4/29/10	1430	SUBBED / SSTAPLES	
		4/30/10	1219	K-HERK-A4 / AJUELL	
		5/4/10	0832	Custodian / KSMITH	
		5/4/10	0832	In Lab / RHAYES	
		5/4/10	1834	K-HERK-A4 / RHAYES	
P1001512-005.02					
		4/29/10	1414	SMO / SSTAPLES	
		4/29/10	1430	SUBBED / SSTAPLES	
		4/30/10	1219	K-HERK-A4 / AJUELL	
P1001512-005.03					
	7196A				
		4/29/10	1414	SMO / SSTAPLES	
		4/29/10	1430	SUBBED / SSTAPLES	
P1001512-005.04					
	8270C SIM				
		4/29/10	1414	SMO / SSTAPLES	
		4/29/10	1429	In Lab / SANDERSON	
		4/30/10	1219	K-Delilah-68 / AJUELL	
		5/5/10	1001	Custodian / KSMITH	
		5/5/10	1001	In Lab / CWOOD	

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Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
		5/6/10	1123	K-Delilah-68 / SDAVIS	
P1001512-006.01					
	7196A				
		4/29/10	1414	SMO / SSTAPLES	
		4/29/10	1429	In Lab / SANDERSON	
		4/29/10	1615	P-37 / SANDERSON	

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Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001512

Project: JPL GW Mon 2Q10 / G486090

Sample(s) received on: 4/29/2010 Date opened: 4/29/2010 by: SSTAPLES

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	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 3 °C			
10	Was a **trip blank** received?	☐	☐	☒
	Trip blank supplied by CAS: _____			
11	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?	☐	☐	☒
12	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?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**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
P1001512-001.01	125mL Plastic NP					
P1001512-002.01	125mL Plastic NP					
P1001512-003.01	125mL Plastic NP					
P1001512-004.01	125mL Plastic NP					
P1001512-005.01	1000ml AG NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001512

Project: JPL GW Mon 2Q10 / G486090

Sample(s) received on: 4/29/2010 Date opened: 4/29/2010 by: SSTAPLES

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1001512-005.02	1000ml AG NP					
P1001512-005.03	500mL Plastic NP					
P1001512-005.04	500mL AG NP					
P1001512-006.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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DIVIDER SHEET

ANALYTICAL DATA FOR

Hexavalent Chromium

ANALYSIS

Analytical Report

Client : Battelle
Project Name : JPL GW Mon 2Q10
Project Number : G486090
Sample Matrix : WATER

Service Request : P1001512
Date Collected : 04/29/10
Date Received : 04/29/10

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-24-5	P1001512-001	0.010	0.004	1	NA	04/29/10 15:20	ND	
MW-24-4	P1001512-002	0.010	0.004	1	NA	04/29/10 15:20	ND	
MW-24-3	P1001512-003	0.010	0.004	1	NA	04/29/10 15:20	ND	
MW-24-2	P1001512-004	0.010	0.004	1	NA	04/29/10 15:20	ND	
MW-24-1	P1001512-005	0.010	0.004	1	NA	04/29/10 15:20	ND	
EB-3-04/29/10	P1001512-006	0.010	0.004	1	NA	04/29/10 15:20	ND	
Method Blank	P1001512-MB	0.010	0.004	1	NA	04/29/10 15:20	ND	

Approved By Karen Ryan Date : 4/30/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon 2Q10 / G486090

Service Request: P1001512
Date Analyzed: 04/29/10

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: 4/30/10

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon 2Q10 / G486090

Service Request: P1001512
Date Analyzed: 04/29/10

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	0.0579	0.0559	97	90-110
CCV1	0.0579	0.0549	95	90-110
CCV2	0.0579	0.0559	97	90-110

Approved By: Karen Ryan Date: 4/30/10

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1001512
Project Name :	JPL GW Mon 2Q10	**Date Collected :**	NA
Project Number :	G486090	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	04/29/10

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1001512-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	0.040	0.0385	96	90-109	

Approved By Karen Ryan Date : 4/30/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1001512
Project Name :	JPL GW Mon 2Q10	**Date Collected :**	04/29/10
Project Number :	G486090	**Date Received :**	04/29/10
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	04/29/10

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name : MW-24-5
Lab Code : P1001512-001MS P1001512-001DMS
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	0.0467	0.0477	93	95	78-112	2	

Approved By Karen Ryan Date : 4/30/10

Report By:SAnderson

May 28, 2010 Analytical Report for Service Request No: P1001512

Sue Anderson
Columbia Analytical Services
2655 Park Center Drive
Suite A
Simi Valley, CA 93065-6209

RE: JPL GW Mon 2Q10/G486090

Dear Sue:

Enclosed are the results of the samples submitted to our laboratory on April 29, 2010. For your reference, these analyses have been assigned our service request number P1001512.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.caslab.com. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3376. You may also contact me via Email at GSalata@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.

Gregory Salata, Ph.D.
Project Chemist

GS/ln

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value that was detected outside the quantitation range.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value that was detected outside the quantitation range.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value that was detected outside the quantitation range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

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Columbia Analytical Services, Inc.
Kelso, WA
State Certifications, Accreditations, and Licenses

Program	Number
Alaska DEC UST	UST-040
Arizona DHS	AZ0339
Arkansas - DEQ	88-0637
California DHS	2286
Colorado DPHE	-
Florida DOH	E87412
Hawaii DOH	-
Idaho DHW	-
Indiana DOH	C-WA-01
Louisiana DEQ	3016
Louisiana DHH	LA050010
Maine DHS	WA0035
Michigan DEQ	9949
Minnesota DOH	053-999-368
Montana DPHHS	CERT0047
Nevada DEP	WA35
New Jersey DEP	WA005
New Mexico ED	-
North Carolina DWQ	605
Oklahoma DEQ	9801
Oregon - DHS	WA200001
South Carolina DHEC	61002
Utah DOH	COLU
Washington DOE	C1203
Wisconsin DNR	998386840
Wyoming (EPA Region 8)	-

Case Narrative

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Battelle	**Service Request No.:**	P1001512
Project:	JPL-GW-2Q10/G005862/JPL GWM	**Date Received:**	04/29/10
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier III validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

One water sample was received for analysis at Columbia Analytical Services on 04/29/10. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

NDMA by EPA Method 521

No anomalies associated with the analysis of these samples were observed.

1,4-Dioxane by EPA Method 8270C

Method Blank Exceptions:
The Method Blank KWG1004297-4 contained low levels of 1,4-Dioxane above the Method Reporting Limit (MRL). In accordance with CAS QA/QC policy, all sample results less than twenty times the level found in the Method Blank were flagged as estimated. The samples were not re-extracted and re-analyzed because hold time had expired by the time the problem was noted.

No anomalies associated with the analysis of these samples were observed.

Approved by _____ Date 5/7/10

Chain of Custody Documentation

Intra-Network Chain of Custody

2655 Park Center Drive, Suite A • Simi Valley, CA 93065 • 805-526-7161 • FAX 805-526-7270

CAS Contact: Sue Anderson

Project Name: JPL GW Mon 2Q10
Project Number: G486090
Project Manager: David Conner
Company: Battelle

Lab Code	Client Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Date Received	Send To	14_DIOXANE 8270C SIM	Nitrosamines 521
P1001512-005	MW-24-1	3	Water	4/29/10	1112	4/29/10	KELSO	IV	IV

Test Comments

Nitrosamines - 521	P1001512-005	NDMA

Folder Comments:
Note: EDF files for client's internal data base;LogCode is BAT, do not have Global ID. EDD & pdf of report sent to Betsy Cutie (cutiec@battelle.org) via file share site https://fx.battelle.org. For EDF unique spike ids (ex: P1000XXX01MS or SD).

Special Instructions/Comments	Turnaround Requirements	Report Requirements	Invoice Information
	___ RUSH (Surcharges Apply) PLEASE CIRCLE WORK DAYS 1 2 3 4 5 ✓ STANDARD Requested FAX Date: ___ Requested Report Date: 05/10/10	___ I. Results Only ___ II. Results + QC Summaries ___ III. Results + QC and Calibration Summaries ✓ IV. Data Validation Report with Raw Data PQL/MDL/J Y EDD Y	PO# P1001512 Bill to

Relinquished By: [signature] 4/29/10 1455

Received By: [signature] 4/29/10 1455

Airbill Number:

Columbia Analytical Services, Inc.
Cooler Receipt and Preservation Form

PC Greg

Client / Project: Simi Valley Service Request K16 P1601512

Received: 4/13/16 Opened: 4/20/16 By: AG

1. Samples were received via? *Mail* *Fed Ex* (*UPS*) *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y (N) If yes, how many and where? _____
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Cooler Temp °C	Temp Blank °C	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
2.1	~	241		1Z 739 05R 01 4044 6487	

7. Packing material used. *Inserts* *Baggies* (*Bubble Wrap*) *Gel Packs* *Wet Ice* *Sleeves* *Other* _____
8. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
9. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA (Y) N
10. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
11. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
12. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
13. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
14. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
15. Was Cl2/Res negative? NA Y N

Bottle Lab

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

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Page 1 of _____

Nitrosamines

Organic Analysis:
Nitrosamines by EPA 521

Summary Package

Sample and QC Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512

Cover Page - Organic Analysis Data Package
Nitrosamines by EPA 521

Sample Name	Lab Code	Date Collected	Date Received
MW-24-1	P1001512-005	04/29/2010	04/29/2010

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

Signature: Tom E. Pritchard

Name: Tom D. Pritchard

Date: 5/27/10

Title: Scientist

Client:	Battelle	**Service Request:**	P1001512
Project:	JPL GW Mon 2Q10/G486090	**Date Collected:**	04/29/2010
Sample Matrix:	Water	**Date Received:**	04/29/2010

Nitrosamines by EPA 521

Sample Name:	MW-24-1	**Units:**	ng/L
Lab Code:	P1001512-005	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	521		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	1.6	J	2.0	0.32	1	05/04/10	05/18/10	KWG1004053	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
N-Nitrosodimethylamine-d6	127	70-130	05/18/10	Acceptable

Comments:

Client:	Battelle	**Service Request:**	P1001512
Project:	JPL GW Mon 2Q10/G486090	**Date Collected:**	NA
Sample Matrix:	Drinking water	**Date Received:**	NA

Nitrosamines by EPA 521

Sample Name:	Method Blank	**Units:**	ng/L
Lab Code:	KWG1004053-4	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	521		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	0.94	J	2.0	0.32	1	05/04/10	05/12/10	KWG1004053	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
N-Nitrosodimethylamine-d6	77	70-130	05/12/10	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon 2Q10/G486090
Sample Matrix: Water

Service Request: P1001512

Surrogate Recovery Summary
Nitrosamines by EPA 521

Extraction Method: METHOD
Analysis Method: 521

Units: ng/L
Level: Low

Sample Name	Lab Code	Sur1
MW-24-1	P1001512-005	127
Method Blank	KWG1004053-4	77
Batch QC	K1003954-004	100
Batch QCMS	KWG1004053-1	129
Batch QCDMS	KWG1004053-2	103
Lab Control Sample	KWG1004053-3	83

Surrogate Recovery Control Limits (%)

Sur1 = N-Nitrosodimethylamine-d6 70-130

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1001512
Project:	JPL GW Mon 2Q10/G486090	**Date Extracted:**	05/04/2010
Sample Matrix:	Drinking water	**Date Analyzed:**	05/18/2010 - 05/19/2010

Matrix Spike/Duplicate Matrix Spike Summary
Nitrosamines by EPA 521

Sample Name:	Batch QC	**Units:**	ng/L
Lab Code:	K1003954-004	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	521	**Extraction Lot:**	KWG1004053

Analyte Name	Sample Result	Batch QCMS KWG1004053-1 Matrix Spike Result	Matrix Spike Expected	Matrix Spike %Rec	Batch QCDMS KWG1004053-2 Duplicate Matrix Spike Result	Duplicate Matrix Spike Expected	Duplicate Matrix Spike %Rec	%Rec Limits	RPD	RPD Limit
N-Nitrosodimethylamine	3.2	23.4	20.0	101	25.1	20.0	109	70-130	7	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Battelle	**Service Request:**	P1001512
Project:	JPL GW Mon 2Q10/G486090	**Date Extracted:**	05/04/2010
Sample Matrix:	Drinking water	**Date Analyzed:**	05/12/2010

Lab Control Spike Summary
Nitrosamines by EPA 521

Extraction Method:	METHOD	**Units:**	ng/L
Analysis Method:	521	**Basis:**	NA
		Level:	Low
		Extraction Lot:	KWG1004053

	Lab Control Sample KWG1004053-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
N-Nitrosodimethylamine	2.48	2.00	124	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Battelle	**Service Request:**	P1001512
Project:	JPL GW Mon 2Q10/G486090	**Date Extracted:**	05/04/2010
Sample Matrix:	Drinking water	**Date Analyzed:**	05/12/2010
		Time Analyzed:	08:14

Method Blank Summary
Nitrosamines by EPA 521

Sample Name:	Method Blank	**File ID:**	J:\MS16\DATA\051210-521\0512014.D
Lab Code:	KWG1004053-4	**Instrument ID:**	MS16
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	521	**Extraction Lot:**	KWG1004053

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1004053-3	J:\MS16\DATA\051210-521\0512015.D	05/12/10	08:56
Batch QC	K1003954-004	J:\MS16\DATA\051710-521\0517026.D	05/18/10	02:30
Batch QCMS	KWG1004053-1	J:\MS16\DATA\051710-521\0517027.D	05/18/10	02:55
MW-24-1	P1001512-005	J:\MS16\DATA\051710-521\0517032.D	05/18/10	05:00
Batch QCDMS	KWG1004053-2	J:\MS16\DATA\051910-521\0519006.D	05/19/10	16:13

Client:	Battelle	**Service Request:**	P1001512
Project:	JPL GW Mon 2Q10/G486090	**Date Extracted:**	05/04/2010
Sample Matrix:	Drinking water	**Date Analyzed:**	05/12/2010
		Time Analyzed:	08:56

Lab Control Sample Summary
Nitrosamines by EPA 521

Sample Name:	Lab Control Sample	**File ID:**	J:\MS16\DATA\051210-521\0512015.D
Lab Code:	KWG1004053-3	**Instrument ID:**	MS16
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	521	**Extraction Lot:**	KWG1004053

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1004053-4	J:\MS16\DATA\051210-521\0512014.D	05/12/10	08:14
Batch QC	K1003954-004	J:\MS16\DATA\051710-521\0517026.D	05/18/10	02:30
Batch QCMS	KWG1004053-1	J:\MS16\DATA\051710-521\0517027.D	05/18/10	02:55
MW-24-1	P1001512-005	J:\MS16\DATA\051710-521\0517032.D	05/18/10	05:00
Batch QCDMS	KWG1004053-2	J:\MS16\DATA\051910-521\0519006.D	05/19/10	16:13

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512
Calibration Date: 05/11/2010

Initial Calibration Summary
Nitrosamines by EPA 521

Calibration ID: CAL9460
Instrument ID: MS16

Column: MS

Level ID	File ID
A	J:\MS16\DATA\051210-521\0512001.D
B	J:\MS16\DATA\051210-521\0512004.D
C	J:\MS16\DATA\051210-521\0512005.D
D	J:\MS16\DATA\051210-521\0512006.D
E	J:\MS16\DATA\051210-521\0512007.D
F	J:\MS16\DATA\051210-521\0512008.D

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
N-Nitrosodimethylamine-d6	A	1.0	1.68	B	2.0	1.98	C	5.0	2.11	D	10	1.87	E	20	1.92
	F	50	2.11												
N-Nitrosodimethylamine	A	1.0	0.733	B	2.0	0.589	C	5.0	0.809	D	10	0.765	E	20	0.874
	F	50	0.926												

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512
Calibration Date: 05/11/2010

Initial Calibration Summary
Nitrosamines by EPA 521

Calibration ID: CAL9460
Instrument ID: MS16

Column: MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
N-Nitrosodimethylamine-d6	SURR	AverageRF	% RSD	8.4		≤ 30	1.95		
N-Nitrosodimethylamine	MS	AverageRF	% RSD	15.1		≤ 30	0.783		

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512
Calibration Date: 05/11/2010
Date Analyzed: 05/12/2010

Second Source Calibration Verification
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration ID: CAL9460
Units: ug/L

File ID: J:\MS16\DATA\051210-521\0512009.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine	10	11	0.783	0.849	8	NA	± 30 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512
Calibration Date: 05/16/2010

Initial Calibration Summary
Nitrosamines by EPA 521

Calibration ID: CAL9489
Instrument ID: MS16

Column: MS

Level ID	File ID
A	J:\MS16\DATA\051610-521\0516006.D
B	J:\MS16\DATA\051610-521\0516007.D
C	J:\MS16\DATA\051610-521\0516009.D
D	J:\MS16\DATA\051610-521\0516010.D
E	J:\MS16\DATA\051610-521\0516011.D
F	J:\MS16\DATA\051610-521\0516012.D

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
N-Nitrosodimethylamine-d6	A	1.0	1.44	B	2.0	1.43	C	5.0	1.56	D	10	1.56	E	20	1.83
	F	50	1.70												
N-Nitrosodimethylamine	A	1.0	0.691	B	2.0	0.653	C	5.0	0.677	D	10	0.746	E	20	0.882
	F	50	0.797												

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512
Calibration Date: 05/16/2010

Initial Calibration Summary
Nitrosamines by EPA 521

Calibration ID: CAL9489
Instrument ID: MS16

Column: MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
N-Nitrosodimethylamine-d6	SURR	AverageRF	% RSD	9.8		≤ 30	1.59		
N-Nitrosodimethylamine	MS	AverageRF	% RSD	11.7		≤ 30	0.741		

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512
Calibration Date: 05/16/2010
Date Analyzed: 05/16/2010

Second Source Calibration Verification
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration ID: CAL9489
Units: ug/L

File ID: J:\MS16\DATA\051610-521\0516014.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine	10	10	0.741	0.737	-1	NA	± 30 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512
Date Analyzed: 05/12/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/11/2010
Calibration ID: CAL9460
Analysis Lot: KWG1004715
Units: ug/L

File ID: J:\MS16\DATA\051210-521\0512011.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	1.0	0.69		1.95	1.34	-31	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	1.0	0.78		0.783	0.609	-22	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512
Date Analyzed: 05/12/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/11/2010
Calibration ID: CAL9460
Analysis Lot: KWG1004715
Units: ug/L

File ID: J:\MS16\DATA\051210-521\0512032.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	10	9.1		1.95	1.76	-9	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	10	8.4		0.783	0.659	-16	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512
Date Analyzed: 05/18/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\051710-521\0517023.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	5.0	5.6		1.59	1.77	11	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	5.0	4.2		0.741	0.625	-16	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

‡ SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512
Date Analyzed: 05/18/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\051710-521\0517033.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	10	9.9		1.59	1.57	-1	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	10	9.6		0.741	0.710	-4	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512
Date Analyzed: 05/19/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\051910-521\0519.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	1.0	1.0		1.59	1.62	2	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	1.0	1.1		0.741	0.809	9	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512
Date Analyzed: 05/19/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\051910-521\0519007.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	10	12		1.59	1.89	19	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	10	12		0.741	0.915	23	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Results

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001512

Analysis Run Log
Nitrosamines by EPA 521

Analysis Method: 521

Analysis Lot: KWG1004715
Instrument ID: MS16

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
521\0512.D	GC/MS Tuning - Generic	KWG1004715-1	5/11/2010	22:32		5/11/2010	23:01
\0512011.D	Continuing Calibration Verification	KWG1004715-2	5/12/2010	06:10		5/12/2010	06:39
\0512013.D	ZZZZZZ	ZZZZZZ	5/12/2010	07:33		5/12/2010	08:02
\0512014.D	Method Blank	KWG1004053-4	5/12/2010	08:14		5/12/2010	08:43
\0512015.D	Lab Control Sample	KWG1004053-3	5/12/2010	08:56		5/12/2010	09:25
\0512017.D	ZZZZZZ	ZZZZZZ	5/12/2010	10:20		5/12/2010	10:49
\0512021.D	ZZZZZZ	ZZZZZZ	5/12/2010	15:14		5/12/2010	15:43
\0512032.D	Continuing Calibration Verification	KWG1004715-3	5/12/2010	22:54		5/12/2010	23:23

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Results

Client: Battelle **Service Request:** P1001512
Project: JPL GW Mon 2Q10/G486090

Analysis Run Log
Nitrosamines by EPA 521

Analysis Method: 521 **Analysis Lot:** KWG1004829
Instrument ID: MS16

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
\0516007.D	GC/MS Tuning - Generic	KWG1004829-1	5/16/2010	18:51		5/16/2010	19:05
\0517009.D	Continuing Calibration Verification	KWG1004829-2	5/17/2010	19:25		5/17/2010	19:39
\0517013.D	ZZZZZZ	ZZZZZZ	5/17/2010	21:06		5/17/2010	21:20
\0517015.D	ZZZZZZ	ZZZZZZ	5/17/2010	21:55		5/17/2010	22:09
\0517018.D	ZZZZZZ	ZZZZZZ	5/17/2010	23:10		5/17/2010	23:24
\0517019.D	ZZZZZZ	ZZZZZZ	5/17/2010	23:35		5/17/2010	23:49
\0517020.D	ZZZZZZ	ZZZZZZ	5/18/2010	00:00		5/18/2010	00:14
\0517023.D	Continuing Calibration Verification	KWG1004829-3	5/18/2010	01:15		5/18/2010	01:29
\0517025.D	ZZZZZZ	ZZZZZZ	5/18/2010	02:05		5/18/2010	02:19
\0517026.D	Batch QC	K1003954-004	5/18/2010	02:30		5/18/2010	02:44
\0517027.D	Batch QCMS	KWG1004053-1	5/18/2010	02:55		5/18/2010	03:09
\0517029.D	ZZZZZZ	ZZZZZZ	5/18/2010	03:45		5/18/2010	03:59
\0517030.D	ZZZZZZ	ZZZZZZ	5/18/2010	04:10		5/18/2010	04:24
\0517031.D	ZZZZZZ	ZZZZZZ	5/18/2010	04:35		5/18/2010	04:49
\0517032.D	MW-24-1	P1001512-005	5/18/2010	05:00		5/18/2010	05:14
\0517033.D	Continuing Calibration Verification	KWG1004829-4	5/18/2010	05:25		5/18/2010	05:39
521\0519.D	Continuing Calibration Verification	KWG1004829-5	5/19/2010	13:44		5/19/2010	13:58
\0519003.D	ZZZZZZ	ZZZZZZ	5/19/2010	14:59		5/19/2010	15:13
\0519004.D	ZZZZZZ	ZZZZZZ	5/19/2010	15:24		5/19/2010	15:38
\0519006.D	Batch QCDMS	KWG1004053-2	5/19/2010	16:13		5/19/2010	16:27
\0519007.D	Continuing Calibration Verification	KWG1004829-6	5/19/2010	16:38		5/19/2010	16:52
521\0523.D	Continuing Calibration Verification	KWG1004829-7	5/23/2010	15:25		5/23/2010	15:39
\0523003.D	ZZZZZZ	ZZZZZZ	5/23/2010	16:42		5/23/2010	16:56
\0523004.D	Continuing Calibration Verification	KWG1004829-8	5/23/2010	17:07		5/23/2010	17:21

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

Client: Battelle
Project: JPL GW Mon 2Q10/G486090
Sample Matrix: Water

Service Request: P1001512
Date Extracted: 05/04/2010

Extraction Prep Log
Nitrosamines by EPA 521

Extraction Method: METHOD
Analysis Method: 521

Extraction Lot: KWG1004053
Level: Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
MW-24-1	P1001512-005	04/29/10	04/29/10	500ml	1ml	NA	
Method Blank	KWG1004053-4	NA	NA	500ml	1ml	NA	
Batch QC	K1003954-004	NA	NA	500ml	1ml	NA	
Batch QCMS	KWG1004053-1	NA	NA	500ml	1ml	NA	
Batch QCDMS	KWG1004053-2	NA	NA	500ml	1ml	NA	
Lab Control Sample	KWG1004053-3	NA	NA	500ml	1ml	NA	

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

CAS SR #P1001491

Table of Contents

Columbia Analytical Services, Inc. 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805.526.7161 | 805.526.7270 fax | www.caslab.com

LABORATORY REPORT

June 1, 2010

David Conner
Battelle
3990 Old Town Ave., Suite C-205
San Diego, CA 92110

RE: JPL-GW-2Q10 / G005862/JPL GWM

Dear David:

Enclosed are the results of the sample submitted to our laboratory on April 28, 2010. The sample was sent out for partial analysis to our Kelso facility. Please find their report attached. For your reference, these analyses have been assigned our service request number P1001491.

All analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-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. Your report contains 312 pages.

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. 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.

Sue Anderson
Project Manager

Client: Battelle
Project: JPL-GW-2Q10 / G005862/JPL GWM

CAS Project No: P1001491

CASE NARRATIVE

The sample was received intact under chain of custody on April 28, 2010 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.

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.

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P1001491-001	MW-16	4/28/10	10:28

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. 1001491

CAS Contact:

Company Name & Address (Reporting Information)
Battelle
505 King Ave
Columbus OH 43201

Project Name: JPL-GW-2010

Project Number: 60058621/JPL GWM

Project Manager: David Conner

P.O. # / Billing Information: 214375 / Battelle ATTN: Jerry Tompkins 505 King Ave Columbus OH 43201

Phone: 614-728-7311

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)	0 Hexavalent Cr (71964)	0 NDMA (521)	D 1-4 Dioxane (8270C SIM)	Remarks
MW-16		4/28/10	1028	AQ	1P 2G							X	X	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)	Date:	Time:	Received by: (Signature)	Date:	Time:
David L	4/28/10	1130		4/28/10	1140
	4/28/10	1300		4/28/10	1300
	4/28/10	1345		4/28/10	1345

Cooler / Blank / Ice / No Ice

Temperature 5 °C

Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1001491-001.02					
	521				
		4/28/10	1411	SMO / SSTAPLES	
		4/29/10	1147	SUBBED / SANDERSON	
		4/29/10	1159	K-HERK-A3 / AJUELL	
		5/4/10	0832	Custodian / KSMITH	
		5/4/10	0832	In Lab / RHAYES	
		5/4/10	1834	K-HERK-A3 / RHAYES	
P1001491-001.03					
	7196A				
		4/28/10	1411	SMO / SSTAPLES	
		4/28/10	1427	In Lab / SANDERSON	
		4/28/10	1733	P-37 / SANDERSON	
P1001491-001.04					
	8270C SIM				
		4/28/10	1411	SMO / SSTAPLES	
		4/29/10	1147	SUBBED / SANDERSON	
		4/29/10	1159	K-Delilah-69 / AJUELL	
		5/5/10	1001	Custodian / KSMITH	
		5/5/10	1001	In Lab / CWOOD	
		5/6/10	1123	K-Delilah-69 / SDAVIS	

6

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001491

Project: JPL-GW-2Q10 / G005862/JPL GWM

Sample(s) received on: 4/28/2010 Date opened: 4/28/2010 by: SSTAPLES

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	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 5 °C			
10	Was a **trip blank** received?	☐	☒	☐
	Trip blank supplied by CAS: _____			
11	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?	☐	☐	☒
12	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?	☒	☐	☐
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**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
P1001491-001.02	1000ml AG NP					
P1001491-001.03	125mL Plastic NP					
P1001491-001.04	500mL AG NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

DIVIDER SHEET

ANALYTICAL DATA FOR

Hexavalent Chromium

ANALYSIS

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : Battelle
Project Name : JPL-GW-2Q10
Project Number : G005862/JPL GWM
Sample Matrix : WATER

Service Request : P1001491
Date Collected : 04/28/10
Date Received : 04/28/10

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	P1001491-001	0.010	0.004	1	NA	04/28/10 16:40	0.018	
Method Blank	P1001491-MB	0.010	0.004	1	NA	04/28/10 16:40	ND	

Approved By Karen Ryan Date : 4/29/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1001491
Project:	JPL-GW-2Q10 / G005862/JPL GWM	**Date Analyzed:**	04/28/10

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	N D

Approved By: Karen Ryan Date: 4/29/10

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL-GW-2Q10 / G005862/JPL GWM

Service Request: P1001491
Date Analyzed: 04/28/10

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	0.0579	0.0566	98	90-110
CCV1	0.0579	0.0556	96	90-110
CCV2	0.0579	0.0566	98	90-110

Approved By: Karen Ryan Date: 4/29/10

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1001491
Project Name :	JPL-GW-2Q10	**Date Collected :**	NA
Project Number :	G005862/JPL GWM	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	04/28/10

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1001491-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 : 4/29/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client : Battelle
Project Name : JPL-GW-2Q10
Project Number : G005862/JPL GWM
Sample Matrix : WATER

Service Request : P1001491
Date Collected : 04/28/10
Date Received : 04/28/10
Date Extracted : NA
Date Analyzed : 04/28/10

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name : MW-16
Lab Code : P1001491-001MS P1001491-001DMS
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	0.018	0.0691	0.0681	102	100	78-112	1	

Approved By Karen Ryan Date : 4/29/10

Report By:SAnderson

Columbia Analytical Services, Inc. 1317 S. 13th Avenue, Kelso, WA 98626 360.577.7222 360.636.1068 (fax) www.caslab.com

May 28, 2010 Analytical Report for Service Request No: P1001491

Sue Anderson
Columbia Analytical Services
2655 Park Center Drive
Suite A
Simi Valley, CA 93065-6209

RE: JPL-GW-2Q10/G005862/JPL GWM

Dear Sue:

Enclosed are the results of the sample submitted to our laboratory on April 28, 2010. For your reference, these analyses have been assigned our service request number P1001491.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.caslab.com. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3376. You may also contact me via Email at GSalata@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.

Gregory Salata, Ph.D.
Project Chemist

GS/ln

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value that was detected outside the quantitation range.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value that was detected outside the quantitation range.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value that was detected outside the quantitation range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Columbia Analytical Services, Inc.
Kelso, WA
State Certifications, Accreditations, and Licenses

Program	Number
Alaska DEC UST	UST-040
Arizona DHS	AZ0339
Arkansas - DEQ	88-0637
California DHS	2286
Colorado DPHE	-
Florida DOH	E87412
Hawaii DOH	-
Idaho DHW	-
Indiana DOH	C-WA-01
Louisiana DEQ	3016
Louisiana DHH	LA050010
Maine DHS	WA0035
Michigan DEQ	9949
Minnesota DOH	053-999-368
Montana DPHHS	CERT0047
Nevada DEP	WA35
New Jersey DEP	WA005
New Mexico ED	-
North Carolina DWQ	605
Oklahoma DEQ	9801
Oregon - DHS	WA200001
South Carolina DHEC	61002
Utah DOH	COLU
Washington DOE	C1203
Wisconsin DNR	998386840
Wyoming (EPA Region 8)	-

Case Narrative

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Battelle	**Service Request No.:**	P1001491
Project:	JPL-GW-2Q10/G005862/JPL GWM	**Date Received:**	04/28/10
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier III validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

One water sample was received for analysis at Columbia Analytical Services on 04/28/10. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4°C upon receipt at the laboratory.

NDMA by EPA Method 521

No anomalies associated with the analysis of these samples were observed.

1,4-Dioxane by EPA Method 8270C

Method Blank Exceptions:
The Method Blank KWG1004297-4 contained low levels of 1,4-Dioxane above the Method Reporting Limit (MRL). In accordance with CAS QA/QC policy, all sample results less than twenty times the level found in the Method Blank were flagged as estimated. The samples were not re-extracted and re-analyzed because hold time had expired by the time the problem was noted.

No anomalies associated with the analysis of these samples were observed.

Approved by _____ Date 5/29/10

Chain of Custody Documentation

Intra-Network Chain of Custody

2655 Park Center Drive, Suite A • Simi Valley, CA 93065 • 805-526-7161 • FAX 805-526-7270

CAS Contact: Sue Anderson

Project Name: JPL-GW-2Q10
Project Number: G005862/JPL GWM
Project Manager: David Conner
Company: Battelle

Lab Code	Client Sample ID	# of Cont.	Matrix	Sample Date	Sample Time	Date Received	Send To	14_DIOXANE 8270C SIM	Nitrosamines 521
P1001491-001	MW-16	2	Water	4/28/10	1028	4/28/10	KELSO	IV	IV

Test Comments

Nitrosamines - 521 P1001491-001 NDMA

Folder Comments:

Note: EDF files for client's internal data base;LogCode is BAT, do not have Global ID. EDD & pdf of report sent to Betsy Cutie (cutiee@battelle.org) via file share site https://fx.battelle.org. For EDF unique spike ids (ex: P1000XXX01MS or SD).

Special Instructions/Comments

Turnaround Requirements

____ RUSH (Surcharges Apply)

PLEASE CIRCLE WORK DAYS

1 2 3 4 5

✓ STANDARD

Requested FAX Date: ____

Requested Report Date: 05/14/10

Report Requirements

____ I. Results Only

____ II. Results + QC Summaries

____ III. Results + QC and Calibration Summaries

✓ IV. Data Validation Report with Raw Data

PQL/MDL/J Y

EDD Y

Invoice Information

PO# P1001491

Bill to

Relinquished By: 4/28/10 1537

Received By: 4/29/10 1025

Airbill Number:

33

Columbia Analytical Services, Inc.
Cooler Receipt and Preservation Form

PC Orey

Client / Project: Simi Valley Service Request KYO P1001491

Received: 4/29/10 Opened: 4/29/10 By: AJ

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? _____
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Cooler Temp °C	Temp Blank °C	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
1.9	-	2e1		1Z78905X0142144405	

7. Packing material used. *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Sleeves* *Other* hard ice pks
8. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
9. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
10. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
11. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
12. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
13. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
14. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
15. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

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Nitrosamines

Organic Analysis:
Nitrosamines by EPA 521

Summary Package

Sample and QC Results

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM
Service Request: P1001491

Cover Page - Organic Analysis Data Package
Nitrosamines by EPA 521

Sample Name	Lab Code	Date Collected	Date Received
MW-16	P1001491-001	04/28/2010	04/28/2010

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

Signature: Lorn E. Pentwood
Name: Lorn Pentwood
Date: 5/28/10
Title: Scientist

Client:	Battelle	**Service Request:**	P1001491
Project:	JPL-GW-2Q10/G005862/JPL GWM	**Date Collected:**	04/28/2010
Sample Matrix:	Water	**Date Received:**	04/28/2010

Nitrosamines by EPA 521

Sample Name:	MW-16	**Units:**	ng/L
Lab Code:	P1001491-001	**Basis:**	NA
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	521		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	**1.2**	J	2.0	0.32	1	05/04/10	05/18/10	KWG1004053	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
N-Nitrosodimethylamine-d6	118	70-130	05/18/10	Acceptable

Comments:

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM
Sample Matrix: Drinking water

Service Request: P1001491
Date Collected: NA
Date Received: NA

Nitrosamines by EPA 521

Sample Name: Method Blank
Lab Code: KWG1004053-4

Extraction Method: METHOD
Analysis Method: 521

Units: ng/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
N-Nitrosodimethylamine	0.94	J	2.0	0.32	1	05/04/10	05/12/10	KWG1004053	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
N-Nitrosodimethylamine-d6	77	70-130	05/12/10	Acceptable

Comments:

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM
Sample Matrix: Water

Service Request: P1001491

Surrogate Recovery Summary
Nitrosamines by EPA 521

Extraction Method: METHOD
Analysis Method: 521

Units: ng/L
Level: Low

Sample Name	Lab Code	Sur1
MW-16	P1001491-001	118
Method Blank	KWG1004053-4	77
Batch QC	K1003954-004	100
Batch QCMS	KWG1004053-1	129
Batch QCDMS	KWG1004053-2	103
Lab Control Sample	KWG1004053-3	83

Surrogate Recovery Control Limits (%)

Sur1 =	N-Nitrosodimethylamine-d6	70-130

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM
Sample Matrix: Drinking water

Service Request: P1001491
Date Extracted: 05/04/2010
Date Analyzed: 05/18/2010 - 05/19/2010

Matrix Spike/Duplicate Matrix Spike Summary
Nitrosamines by EPA 521

Sample Name: Batch QC
Lab Code: K1003954-004

Units: ng/L
Basis: NA

Extraction Method: METHOD
Analysis Method: 521

Level: Low
Extraction Lot: KWG1004053

Analyte Name	Sample Result	Batch QCMS KWG1004053-1 Matrix Spike Result	Expected	%Rec	Batch QCDMS KWG1004053-2 Duplicate Matrix Spike Result	Expected	%Rec	%Rec Limits	RPD	RPD Limit
N-Nitrosodimethylamine	3.2	23.4	20.0	101	25.1	20.0	109	70-130	7	30

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.
Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM
Sample Matrix: Drinking water

Service Request: P1001491
Date Extracted: 05/04/2010
Date Analyzed: 05/12/2010

Lab Control Spike Summary
Nitrosamines by EPA 521

Extraction Method: METHOD
Analysis Method: 521

Units: ng/L
Basis: NA
Level: Low
Extraction Lot: KWG1004053

	Lab Control Sample KWG1004053-3 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
N-Nitrosodimethylamine	2.48	2.00	124	50-150

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Battelle	**Service Request:**	P1001491
Project:	JPL-GW-2Q10/G005862/JPL GWM	**Date Extracted:**	05/04/2010
Sample Matrix:	Drinking water	**Date Analyzed:**	05/12/2010
		Time Analyzed:	08:14

Method Blank Summary
Nitrosamines by EPA 521

Sample Name:	Method Blank	**File ID:**	J:\MS16\DATA\051210-521\0512014.D
Lab Code:	KWG1004053-4	**Instrument ID:**	MS16
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	521	**Extraction Lot:**	KWG1004053

This Method Blank applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Lab Control Sample	KWG1004053-3	J:\MS16\DATA\051210-521\0512015.D	05/12/10	08:56
Batch QC	K1003954-004	J:\MS16\DATA\051710-521\0517026.D	05/18/10	02:30
Batch QCMS	KWG1004053-1	J:\MS16\DATA\051710-521\0517027.D	05/18/10	02:55
MW-16	P1001491-001	J:\MS16\DATA\051710-521\0517031.D	05/18/10	04:35
Batch QCDMS	KWG1004053-2	J:\MS16\DATA\051910-521\0519006.D	05/19/10	16:13

Client:	Battelle	**Service Request:**	P1001491
Project:	JPL-GW-2Q10/G005862/JPL GWM	**Date Extracted:**	05/04/2010
Sample Matrix:	Drinking water	**Date Analyzed:**	05/12/2010
		Time Analyzed:	08:56

Lab Control Sample Summary
Nitrosamines by EPA 521

Sample Name:	Lab Control Sample	**File ID:**	J:\MS16\DATA\051210-521\0512015.D
Lab Code:	KWG1004053-3	**Instrument ID:**	MS16
Extraction Method:	METHOD	**Level:**	Low
Analysis Method:	521	**Extraction Lot:**	KWG1004053

This Lab Control Sample applies to the following analyses:

Sample Name	Lab Code	File ID	Date Analyzed	Time Analyzed
Method Blank	KWG1004053-4	J:\MS16\DATA\051210-521\0512014.D	05/12/10	08:14
Batch QC	K1003954-004	J:\MS16\DATA\051710-521\0517026.D	05/18/10	02:30
Batch QCMS	KWG1004053-1	J:\MS16\DATA\051710-521\0517027.D	05/18/10	02:55
MW-16	P1001491-001	J:\MS16\DATA\051710-521\0517031.D	05/18/10	04:35
Batch QCDMS	KWG1004053-2	J:\MS16\DATA\051910-521\0519006.D	05/19/10	16:13

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491
Calibration Date: 05/11/2010

Initial Calibration Summary
Nitrosamines by EPA 521

Calibration ID: CAL9460
Instrument ID: MS16

Column: MS

Level ID	File ID
A	J:\MS16\DATA\051210-521\0512001.D
B	J:\MS16\DATA\051210-521\0512004.D
C	J:\MS16\DATA\051210-521\0512005.D
D	J:\MS16\DATA\051210-521\0512006.D
E	J:\MS16\DATA\051210-521\0512007.D
F	J:\MS16\DATA\051210-521\0512008.D

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
N-Nitrosodimethylamine-d6	A	1.0	1.68	B	2.0	1.98	C	5.0	2.11	D	10	1.87	E	20	1.92
	F	50	2.11												
N-Nitrosodimethylamine	A	1.0	0.733	B	2.0	0.589	C	5.0	0.809	D	10	0.765	E	20	0.874
	F	50	0.926												

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491
Calibration Date: 05/11/2010

Initial Calibration Summary
Nitrosamines by EPA 521

Calibration ID: CAL9460
Instrument ID: MS16

Column: MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
N-Nitrosodimethylamine-d6	SURR	AverageRF	% RSD	8.4		≤ 30	1.95		
N-Nitrosodimethylamine	MS	AverageRF	% RSD	15.1		≤ 30	0.783		

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Results

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491
Calibration Date: 05/11/2010
Date Analyzed: 05/12/2010

Second Source Calibration Verification
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration ID: CAL9460
Units: ug/L

File ID: J:\MS16\DATA\051210-521\0512009.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine	10	11	0.783	0.849	8	NA	± 30 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491
Calibration Date: 05/16/2010

Initial Calibration Summary
Nitrosamines by EPA 521

Calibration ID: CAL9489
Instrument ID: MS16

Column: MS

Level ID	File ID
A	J:\MS16\DATA\051610-521\0516006.D
B	J:\MS16\DATA\051610-521\0516007.D
C	J:\MS16\DATA\051610-521\0516009.D
D	J:\MS16\DATA\051610-521\0516010.D
E	J:\MS16\DATA\051610-521\0516011.D
F	J:\MS16\DATA\051610-521\0516012.D

Analyte Name	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF	Level ID	Amt	RRF
N-Nitrosodimethylamine-d6	A	1.0	1.44	B	2.0	1.43	C	5.0	1.56	D	10	1.56	E	20	1.83
	F	50	1.70												
N-Nitrosodimethylamine	A	1.0	0.691	B	2.0	0.653	C	5.0	0.677	D	10	0.746	E	20	0.882
	F	50	0.797												

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491
Calibration Date: 05/16/2010

Initial Calibration Summary
Nitrosamines by EPA 521

Calibration ID: CAL9489
Instrument ID: MS16

Column: MS

Analyte Name	Compound Type	Calibration Evaluation					RRF Evaluation		
		Fit Type	Eval.	Eval. Result	Q	Control Criteria	Average RRF	Q	Minimum RRF
N-Nitrosodimethylamine-d6	SURR	AverageRF	% RSD	9.8		≤ 30	1.59		
N-Nitrosodimethylamine	MS	AverageRF	% RSD	11.7		≤ 30	0.741		

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Results

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491
Calibration Date: 05/16/2010
Date Analyzed: 05/16/2010

Second Source Calibration Verification
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration ID: CAL9489
Units: ug/L

File ID: J:\MS16\DATA\051610-521\0516014.D

Analyte Name	Expected	Result	Average RF	SSV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine	10	10	0.741	0.737	-1	NA	± 30 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491
Date Analyzed: 05/12/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/11/2010
Calibration ID: CAL9460
Analysis Lot: KWG1004715
Units: ug/L

File ID: J:\MS16\DATA\051210-521\0512011.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	1.0	0.69		1.95	1.34	-31	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	1.0	0.78		0.783	0.609	-22	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491
Date Analyzed: 05/12/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/11/2010
Calibration ID: CAL9460
Analysis Lot: KWG1004715
Units: ug/L

File ID: J:\MS16\DATA\051210-521\0512032.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	10	9.1		1.95	1.76	-9	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	10	8.4		0.783	0.659	-16	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491
Date Analyzed: 05/18/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\051710-521\0517023.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	5.0	5.6		1.59	1.77	11	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	5.0	4.2		0.741	0.625	-16	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491
Date Analyzed: 05/18/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\051710-521\0517033.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	10	9.9		1.59	1.57	-1	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	10	9.6		0.741	0.710	-4	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491
Date Analyzed: 05/19/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\051910-521\0519.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	1.0	1.0		1.59	1.62	2	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	1.0	1.1		0.741	0.809	9	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491
Date Analyzed: 05/19/2010

Continuing Calibration Verification Summary
Nitrosamines by EPA 521

Calibration Type: Internal Standard
Analysis Method: 521

Calibration Date: 05/16/2010
Calibration ID: CAL9489
Analysis Lot: KWG1004829
Units: ug/L

File ID: J:\MS16\DATA\051910-521\0519007.D

Analyte Name	Expected	Result	Min RF	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
N-Nitrosodimethylamine-d6	10	12		1.59	1.89	19	NA	± 50 %	AverageRF
N-Nitrosodimethylamine	10	12		0.741	0.915	23	NA	± 50 %	AverageRF

Results flagged with an asterisk (*) indicate values outside control criteria.

† SPCC Compound ‡ CCC Compound

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491

Analysis Run Log
Nitrosamines by EPA 521

Analysis Method: 521

Analysis Lot: KWG1004715
Instrument ID: MS16

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
521\0512.D	GC/MS Tuning - Generic	KWG1004715-1	5/11/2010	22:32		5/11/2010	23:01
\0512011.D	Continuing Calibration Verification	KWG1004715-2	5/12/2010	06:10		5/12/2010	06:39
\0512013.D	ZZZZZZ	ZZZZZZ	5/12/2010	07:33		5/12/2010	08:02
\0512014.D	Method Blank	KWG1004053-4	5/12/2010	08:14		5/12/2010	08:43
\0512015.D	Lab Control Sample	KWG1004053-3	5/12/2010	08:56		5/12/2010	09:25
\0512017.D	ZZZZZZ	ZZZZZZ	5/12/2010	10:20		5/12/2010	10:49
\0512021.D	ZZZZZZ	ZZZZZZ	5/12/2010	15:14		5/12/2010	15:43
\0512032.D	Continuing Calibration Verification	KWG1004715-3	5/12/2010	22:54		5/12/2010	23:23

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001491

Analysis Run Log
Nitrosamines by EPA 521

Analysis Method: 521

Analysis Lot: KWG1004829
Instrument ID: MS16

File ID	Sample Name	Lab Code	Date Analysis Started	Start Time	Q	Date Analysis Finished	Finish Time
\0516007.D	GC/MS Tuning - Generic	KWG1004829-1	5/16/2010	18:51		5/16/2010	19:05
\0517009.D	Continuing Calibration Verification	KWG1004829-2	5/17/2010	19:25		5/17/2010	19:39
\0517013.D	ZZZZZZ	ZZZZZZ	5/17/2010	21:06		5/17/2010	21:20
\0517015.D	ZZZZZZ	ZZZZZZ	5/17/2010	21:55		5/17/2010	22:09
\0517018.D	ZZZZZZ	ZZZZZZ	5/17/2010	23:10		5/17/2010	23:24
\0517019.D	ZZZZZZ	ZZZZZZ	5/17/2010	23:35		5/17/2010	23:49
\0517020.D	ZZZZZZ	ZZZZZZ	5/18/2010	00:00		5/18/2010	00:14
\0517023.D	Continuing Calibration Verification	KWG1004829-3	5/18/2010	01:15		5/18/2010	01:29
\0517025.D	ZZZZZZ	ZZZZZZ	5/18/2010	02:05		5/18/2010	02:19
\0517026.D	Batch QC	K1003954-004	5/18/2010	02:30		5/18/2010	02:44
\0517027.D	Batch QCMS	KWG1004053-1	5/18/2010	02:55		5/18/2010	03:09
\0517029.D	ZZZZZZ	ZZZZZZ	5/18/2010	03:45		5/18/2010	03:59
\0517030.D	ZZZZZZ	ZZZZZZ	5/18/2010	04:10		5/18/2010	04:24
\0517031.D	MW-16	P1001491-001	5/18/2010	04:35		5/18/2010	04:49
\0517032.D	ZZZZZZ	ZZZZZZ	5/18/2010	05:00		5/18/2010	05:14
\0517033.D	Continuing Calibration Verification	KWG1004829-4	5/18/2010	05:25		5/18/2010	05:39
521\0519.D	Continuing Calibration Verification	KWG1004829-5	5/19/2010	13:44		5/19/2010	13:58
\0519003.D	ZZZZZZ	ZZZZZZ	5/19/2010	14:59		5/19/2010	15:13
\0519004.D	ZZZZZZ	ZZZZZZ	5/19/2010	15:24		5/19/2010	15:38
\0519006.D	Batch QCDMS	KWG1004053-2	5/19/2010	16:13		5/19/2010	16:27
\0519007.D	Continuing Calibration Verification	KWG1004829-6	5/19/2010	16:38		5/19/2010	16:52
521\0523.D	Continuing Calibration Verification	KWG1004829-7	5/23/2010	15:25		5/23/2010	15:39
\0523003.D	ZZZZZZ	ZZZZZZ	5/23/2010	16:42		5/23/2010	16:56
\0523004.D	Continuing Calibration Verification	KWG1004829-8	5/23/2010	17:07		5/23/2010	17:21

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM
Sample Matrix: Water

Service Request: P1001491
Date Extracted: 05/04/2010

Extraction Prep Log
Nitrosamines by EPA 521

Extraction Method: METHOD
Analysis Method: 521

Extraction Lot: KWG1004053
Level: Low

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Volume	% Solids	Note
MW-16	P1001491-001	04/28/10	04/28/10	500ml	1ml	NA	
Method Blank	KWG1004053-4	NA	NA	500ml	1ml	NA	
Batch QC	K1003954-004	NA	NA	500ml	1ml	NA	
Batch QCMS	KWG1004053-1	NA	NA	500ml	1ml	NA	
Batch QCDMS	KWG1004053-2	NA	NA	500ml	1ml	NA	
Lab Control Sample	KWG1004053-3	NA	NA	500ml	1ml	NA	

Results flagged with an asterisk (*) indicate the holding time was exceeded for the analysis

CAS SR #P1001490

Table of Contents

Columbia Analytical Services™ 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805.526.7161 | 805.526.7270 fax | www.caslab.com

LABORATORY REPORT

May 3, 2010

David Conner
Battelle
3990 Old Town Ave., Suite C-205
San Diego, CA 92110

RE: JPL GW Mon 2Q10 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on April 28, 2010. For your reference, these analyses have been assigned our service request number P1001490.

All analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-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. Your report contains 26 pages.

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. 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.

Sue Anderson
Project Manager

Client: Battelle
Project: JPL GW Mon 2Q10 / G486090

CAS Project No: P1001490

CASE NARRATIVE

The samples were received intact under chain of custody on April 28, 2010 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.

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.

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001490

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P1001490-001	MW-22-5	4/28/10	08:03
P1001490-002	MW-22-4	4/28/10	08:42
P1001490-003	MW-22-3	4/28/10	09:19
P1001490-004	MW-22-2	4/28/10	10:20
P1001490-005	MW-22-1	4/28/10	11:00
P1001490-006	EB-02-04/28/10	4/28/10	10:41

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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

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

Page 1 of 1

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. 1001490

CAS Contact:

Company Name & Address (Reporting Information)	Project Name
BATTELLE 3990 OLD TOWN AVE, C-205 SAN DIEGO, CA 92110	JPL GW MON. 2Q10
	Project Number: G486090
Project Manager: DAVID CONNER	P.O. # / Billing Information: 214319 / BATTELLE ATTN: GERALD TOMPKINS 505 KING AVE COLUMBUS, OH 43201
Phone: (619) 726 7311	Fax:
Email Address for Result Reporting:	Sampler (Print & Sign):

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-22-5	1	4/28/10	0803	W	1									
mw-22-4	2		0842		1									
mw-22-3	3		0919		2									MS/MSD
mw-22-2	4		1020		1									LEVEL IV QC
mw-22-1	5		1100		1									
EB-02-04/28/10	6		1041		1									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: 4/28/10	Time: 1300	Received by: (Signature)	Date: 4/28/10	Time: 1302
Relinquished by: (Signature)	Date: 4/28/10	Time: 1345	Received by: (Signature)	Date: 4/29/10	Time: 0545
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank / Ice / No Ice

Temperature 5 °C

Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001490

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1001490-001.01					
	7196A				
		4/28/10	1359	SMO / SSTAPLES	
		4/28/10	1427	In Lab / SANDERSON	
		4/28/10	1733	P-37 / SANDERSON	
P1001490-002.01					
	7196A				
		4/28/10	1359	SMO / SSTAPLES	
		4/28/10	1427	In Lab / SANDERSON	
		4/28/10	1733	P-37 / SANDERSON	
P1001490-003.01					
	7196A				
		4/28/10	1359	SMO / SSTAPLES	
		4/28/10	1427	In Lab / SANDERSON	
		4/28/10	1733	P-37 / SANDERSON	
P1001490-003.02					
		4/28/10	1359	SMO / SSTAPLES	
		4/28/10	1427	In Lab / SANDERSON	
		4/28/10	1733	P-37 / SANDERSON	
P1001490-004.01					
	7196A				
		4/28/10	1359	SMO / SSTAPLES	
		4/28/10	1427	In Lab / SANDERSON	
		4/28/10	1733	P-37 / SANDERSON	
P1001490-005.01					
	7196A				
		4/28/10	1359	SMO / SSTAPLES	
		4/28/10	1427	In Lab / SANDERSON	
		4/28/10	1733	P-37 / SANDERSON	
P1001490-006.01					
	7196A				
		4/28/10	1359	SMO / SSTAPLES	
		4/28/10	1427	In Lab / SANDERSON	
		4/28/10	1733	P-37 / SANDERSON	

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Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001490

Project: JPL GW Mon 2Q10 / G486090

Sample(s) received on: 4/28/2010 Date opened: 4/28/2010 by: SSTAPLES

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	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 5 °C			
10	Was a **trip blank** received?	☐	☐	☒
	Trip blank supplied by CAS: _____			
11	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?	☐	☐	☒
12	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?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**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
P1001490-001.01	125mL Plastic NP					
P1001490-002.01	125mL Plastic NP					
P1001490-003.01	125mL Plastic NP					
P1001490-003.02	125mL Plastic NP					
P1001490-004.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001490

Project: JPL GW Mon 2Q10 / G486090

Sample(s) received on: 4/28/2010 Date opened: 4/28/2010 by: SSTAPLES

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1001490-005.01	125mL Plastic NP					
P1001490-006.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

8

DIVIDER SHEET

ANALYTICAL DATA FOR

Hexavalent Chromium

ANALYSIS

Analytical Report

Client : Battelle
Project Name : JPL GW Mon 2Q10
Project Number : G486090
Sample Matrix : WATER

Service Request : P1001490
Date Collected : 04/28/10
Date Received : 04/28/10

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-22-5	P1001490-001	0.010	0.004	1	NA	04/28/10 16:40	ND	
MW-22-4	P1001490-002	0.010	0.004	1	NA	04/28/10 16:40	ND	
MW-22-3	P1001490-003	0.010	0.004	1	NA	04/28/10 16:40	ND	
MW-22-2	P1001490-004	0.010	0.004	1	NA	04/28/10 16:40	ND	
MW-22-1	P1001490-005	0.010	0.004	1	NA	04/28/10 16:40	ND	
EB-02-04/28/10	P1001490-006	0.010	0.004	1	NA	04/28/10 16:40	ND	
Method Blank	P1001490-MB	0.010	0.004	1	NA	04/28/10 16:40	ND	

Approved By Karen Ryan Date : 4/29/10

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Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon 2Q10 / G486090

Service Request: P1001490
Date Analyzed: 04/28/10

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: 4/29/10

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon 2Q10 / G486090

Service Request: P1001490
Date Analyzed: 04/28/10

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	0.0579	0.0566	98	90-110
CCV1	0.0579	0.0556	96	90-110
CCV2	0.0579	0.0566	98	90-110

Approved By: Karen Ryan Date: 4/29/10

CCV1A/120594

QA/QC Report

Client :	Battelle	**Service Request :**	P1001490
Project Name :	JPL GW Mon 2Q10	**Date Collected :**	NA
Project Number :	G486090	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	04/28/10

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1001490-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 : 4/29/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1001490
Project Name :	JPL GW Mon 2Q10	**Date Collected :**	04/28/10
Project Number :	G486090	**Date Received :**	04/28/10
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	04/28/10

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name :	MW-22-3		Units :	mg/L (ppm)
Lab Code :	P1001490-003MS	P1001490-003DMS	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	0.0483	0.0483	97	97	78-112	<1	

Approved By Karen Ryan Date : 4/29/10

Report By:SAnderson

4/19/10 S24-04191004 0.1N H_2SO_4
5.6ml Conc H_2SO_4 (GMD 47050 EXP: 9/13/10)
→ 2L w/DI
EXP: 9/13/10

4/19/10 S24-04191005 stock Sulfide Sol'n (H_2S radiello)
ADD 20 DROPS S2404191003 (EXP: 10/19/10) to
500ml S19-04191007 (EXP: 4/19/11)
(*) Note: Standardize prior to each use to determine
true Concentration
EXP: 10/19/10

4/19/10 S24-04191006 ICV/CCV Sulfide Sol'n (H_2S radiello)
ADD 20 DROPS S24-04191002 (EXP: 10/19/10) to
500 ml (S19-04191007 (EXP: 4/19/11)
(*)
EXP: 10/19/10

4/19/10 S24-04191007 2N NaOH (see previous page)

4/26/10 S24-~~10~~ 04261001 ICV/CCV Cr 6+ T.V. = 0.579PPM
0.5ml (S19-04090904) (T.V. = 115.8PPM ; EXP: 12/2010) ↑
100 ml w/DI H_2O
EXP: 5/10/10

4/26/10 524-0426/002 Cr^{6+} Coloring REAGENT

0.2500g 1,5-Diphenylcarbohydrazide (EMD 4710372; EXP: 1/30/13) ↑ 50 ml w/ Acetone (EMD 4715-4D; EXP: 9/24/12)

EXP: 5/10/10

4/27/10 524-0427/001 ICO2 Eluent

100ml 519-0904090 (10x conc Eluent; EXP. 9/4/10)

↑ 1L w/ DI. DEGASSED

EXP: 5/11/10

4/27/10 524-0427/002 ICO2 PCR

Dissolve 0.5g 1,5-Diphenylcarbohydrazide (EM 4710372 exp: 1/30/13 in 100 mL Methanol (B&J CW045 exp: 5/7/13. Add to 1 L volumetric flask containing 500 mL DI water + 5.6 mL conc. H_2SO_4 (EMD 4705 exp: 9/13/10). Bring up to volume w/ DI H_2O; mix and degas.

EXP: 5/2/10

CAS SR #P1001470

Table of Contents

Columbia Analytical Services, Inc. 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805.526.7161 | 805.526.7270 fax | www.caslab.com

LABORATORY REPORT

May 3, 2010

David Conner
Battelle
3990 Old Town Ave., Suite C-205
San Diego, CA 92110

RE: JPL-GW-2Q10 / G005862/JPL GWM

Dear David:

Enclosed are the results of the sample submitted to our laboratory on April 27, 2010. For your reference, these analyses have been assigned our service request number P1001470.

All analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-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. Your report contains 26 pages.

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. 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.

Sue Anderson
Project Manager

Client: Battelle
Project: JPL-GW-2Q10 / G005862/JPL GWM

CAS Project No: P1001470

CASE NARRATIVE

The sample was received intact under chain of custody on April 27, 2010 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.

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.

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001470

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P1001470-001	MW-7	4/27/10	10:50

4

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. P1001470

CAS Contact:

Company Name & Address (Reporting Information)	Project Name
Battelle 505 King Ave Columbus OH 43201	JPL-GW-2010
	Project Number 600586Z / JPL GWM
Project Manager David Conner	P.O. # / Billing Information 214375 / Battelle ATTN: Jerry Tompkins 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 (7196A)	Remarks
MW-7	(1)	4/27/10	1050	AQ	1P							X	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 L	Date: 4/27/10	Time: 1230	Received by: (Signature)		Date: 4-27-10	Time: 1233	
Relinquished by: (Signature)	Date: 4/27/10	Time: 1300	Received by: (Signature)		Date: 4/27/10	Time: 1800	Cooler / Blank / Ice / No Ice
Relinquished by: (Signature)	Date: 4/27/10	Time: 1550	Received by: (Signature)		Date: 4/27/10	Time: 1850	Temperature 2°C °C

Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle
Project: JPL-GW-2Q10/G005862/JPL GWM

Service Request: P1001470

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1001470-001.01					
	7196A				
		4/27/10	1403	SMO / MZAMORA	
		4/27/10	1404	P-37 / MZAMORA	
		4/27/10	1429	In Lab / SANDERSON	
		4/27/10	1642	P-37 / SANDERSON	

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Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001470

Project: JPL-GW-2Q10 / G005862/JPL GWM

Sample(s) received on: 4/27/2010 Date opened: 4/27/2010 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	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature 2 °C Blank Temperature _____ °C			
10	Was a **trip blank** received?	☐	☐	☒
	Trip blank supplied by CAS: _____			
11	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?	☐	☐	☒
12	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?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**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
P1001470-001.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12): Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

7

DIVIDER SHEET

ANALYTICAL DATA FOR

Hexavalent Chromium

ANALYSIS

Analytical Report

Client : Battelle
Project Name : JPL-GW-2Q10
Project Number : G005862/JPL GWM
Sample Matrix : WATER

Service Request : P1001470
Date Collected : 04/27/10
Date Received : 04/27/10

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-7	P1001470-001	0.010	0.004	1	NA	04/27/10 15:15	ND	
Method Blank	P1001470-MB	0.010	0.004	1	NA	04/27/10 15:15	ND	

Approved By Karen Ryan Date : 4/28/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL-GW-2Q10 / G005862/JPL GWM

Service Request: P1001470
Date Analyzed: 04/27/10

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: 4/28/10

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL-GW-2Q10 / G005862/JPL GWM

Service Request: P1001470
Date Analyzed: 04/27/10

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	0.0579	0.0547	94	90-110
CCV1	0.0579	0.0547	94	90-110
CCV2	0.0579	0.0537	93	90-110

Approved By: Karen Ryan Date: 4/28/10

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1001470
Project Name :	JPL-GW-2Q10	**Date Collected :**	NA
Project Number :	G005862/JPL GWM	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	04/27/10

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1001470-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	0.0382	96	90-109	

Approved By Karen Ryan Date : 4/28/10

Report By:SAnderson

QA/QC Report

Client :	Battelle	**Service Request :**	P1001470
Project Name :	JPL-GW-2Q10	**Date Collected :**	04/27/10
Project Number :	G005862/JPL GWM	**Date Received :**	04/27/10
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	04/27/10

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name :	MW-7		Units :	mg/L (ppm)
Lab Code :	P1001470-001MS	P1001470-001DMS	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	0.0475	0.0465	95	93	78-112	2	

Approved By Karen Ryan Date : 4/20/10

Report By:SAnderson

CAS SR #P1001468

Table of Contents

Columbia Analytical Services, Inc. 2655 Park Center Drive, Suite A Simi Valley, CA 93065 805.526.7161 805.526.7270 fax www.caslab.com

LABORATORY REPORT

May 3, 2010

David Conner
Battelle
3990 Old Town Ave., Suite C-205
San Diego, CA 92110

RE: JPL GW Mon 2Q10 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on April 27, 2010. For your reference, these analyses have been assigned our service request number P1001468.

All analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-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. Your report contains 27 pages.

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. 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.

Sue Anderson
Project Manager

Client: Battelle
Project: JPL GW Mon 2Q10 / G486090

CAS Project No: P1001468

CASE NARRATIVE

The samples were received intact under chain of custody on April 27, 2010 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.

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.

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001468

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P1001468-001	MW-14-5	4/27/10	08:48
P1001468-002	MW-14-4	4/27/10	09:24
P1001468-003	MW-14-3	4/27/10	10:00
P1001468-004	MW-14-2	4/27/10	11:08
P1001468-005	MW-14-1	4/27/10	11:43
P1001468-006	DUPE-01-2Q10	4/27/10	00:00
P1001468-007	EB-01-04/27/10	4/27/10	11:26

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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. P1001468

CAS Contact:

Company Name & Address (Reporting Information)	Project Name
BATTELLE 3990 OLD TOWN AVE, C-205 SAN DIEGO, CA 92110	JPL GW MON 2Q10
Project Manager	**Project Number**
DAVID CONNER	6486090
Phone / **Fax**	**P.O. # / Billing Information**
(619) 726 7311	219319 / BATTELLE ATTN: GERALD TOMPKINS 505 KING AVE. COLUMBUS, OH 43201
Email Address for Result Reporting	**Sampler (Print & Sign)**

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 C2 II (7196)	Remarks
mw-14-5	1	4/27/10	0848	W	1							X	
mw-14-4	2		0924		1							X	
mw-14-3	3		1000		1							X	
mw-14-2	4		1108		1							X	
mw-14-1	5		1143		1							X	
DUPE-01-2Q10	6		—		1							X	DUPLICATE
EB-01-4/27/10	7		1126		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: 4-27-10	Time: 1300	Received by: (Signature)	Date: 4/27/10	Time: 1300
Relinquished by: (Signature)	Date: 4/27/10	Time: 1350	Received by: (Signature)	Date: 4/27/10	Time: 1350
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank / Ice / No Ice

Temperature 2 °C

Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle
Project: JPL GW Mon 2Q10/G486090

Service Request: P1001468

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1001468-001.01					
	7196A				
		4/27/10	1354	SMO / MZAMORA	
		4/27/10	1354	P-37 / MZAMORA	
		4/27/10	1429	In Lab / SANDERSON	
		4/27/10	1641	P-37 / SANDERSON	
P1001468-002.01					
	7196A				
		4/27/10	1354	SMO / MZAMORA	
		4/27/10	1354	P-37 / MZAMORA	
		4/27/10	1429	In Lab / SANDERSON	
		4/27/10	1641	P-37 / SANDERSON	
P1001468-003.01					
	7196A				
		4/27/10	1354	SMO / MZAMORA	
		4/27/10	1354	P-37 / MZAMORA	
		4/27/10	1429	In Lab / SANDERSON	
		4/27/10	1641	P-37 / SANDERSON	
P1001468-004.01					
	7196A				
		4/27/10	1354	SMO / MZAMORA	
		4/27/10	1354	P-37 / MZAMORA	
		4/27/10	1429	In Lab / SANDERSON	
		4/27/10	1641	P-37 / SANDERSON	
P1001468-005.01					
	7196A				
		4/27/10	1354	SMO / MZAMORA	
		4/27/10	1354	P-37 / MZAMORA	
		4/27/10	1429	In Lab / SANDERSON	
		4/27/10	1641	P-37 / SANDERSON	
P1001468-006.01					
	7196A				
		4/27/10	1354	SMO / MZAMORA	
		4/27/10	1354	P-37 / MZAMORA	
		4/27/10	1429	In Lab / SANDERSON	
		4/27/10	1641	P-37 / SANDERSON	
P1001468-007.01					
	7196A				
		4/27/10	1354	SMO / MZAMORA	
		4/27/10	1354	P-37 / MZAMORA	
		4/27/10	1429	In Lab / SANDERSON	
		4/27/10	1641	P-37 / SANDERSON	

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Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001468

Project: JPL GW Mon 2Q10 / G486090

Sample(s) received on: 4/27/2010 Date opened: 4/27/2010 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	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 2 °C			
10	Was a **trip blank** received?	☐	☐	☒
	Trip blank supplied by CAS: _____			
11	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?	☐	☐	☒
12	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?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**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
P1001468-001.01	125mL Plastic NP					
P1001468-002.01	125mL Plastic NP					
P1001468-003.01	125mL Plastic NP					
P1001468-004.01	125mL Plastic NP					
P1001468-005.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001468

Project: JPL GW Mon 2Q10 / G486090

Sample(s) received on: 4/27/2010 Date opened: 4/27/2010 by: MZAMORA

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1001468-006.01	125mL Plastic NP					
P1001468-007.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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DIVIDER SHEET

ANALYTICAL DATA FOR

Hexavalent Chromium

ANALYSIS

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client :	Battelle	**Service Request :**	P1001468
Project Name :	JPL GW Mon 2Q10	**Date Collected :**	04/27/10
Project Number :	G486090	**Date Received :**	04/27/10
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-14-5	P1001468-001	0.010	0.004	1	NA	04/27/10 15:15	ND	
MW-14-4	P1001468-002	0.010	0.004	1	NA	04/27/10 15:15	ND	
MW-14-3	P1001468-003	0.010	0.004	1	NA	04/27/10 15:15	ND	
MW-14-2	P1001468-004	0.010	0.004	1	NA	04/27/10 15:15	ND	
MW-14-1	P1001468-005	0.010	0.004	1	NA	04/27/10 15:15	ND	
DUPE-01-2Q10	P1001468-006	0.010	0.004	1	NA	04/27/10 15:15	ND	
EB-01-04/27/10	P1001468-007	0.010	0.004	1	NA	04/27/10 15:15	ND	
Method Blank	P1001468-MB	0.010	0.004	1	NA	04/27/10 15:15	ND	

Approved By Karen Ryan Date : 4/28/10

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Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon 2Q10 / G486090

Service Request: P1001468
Date Analyzed: 04/27/10

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: 4/28/10

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon 2Q10 / G486090

Service Request: P1001468
Date Analyzed: 04/27/10

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	0.0579	0.0547	94	90-110
CCV1	0.0579	0.0547	94	90-110
CCV2	0.0579	0.0537	93	90-110

Approved By: Karen Ryan Date: 4/28/10

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1001468
Project Name :	JPL GW Mon 2Q10	**Date Collected :**	NA
Project Number :	G486090	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	04/27/10

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1001468-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	0.0382	96	90-109	

Approved By Karen Ryan Date : 4/28/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1001468
Project Name :	JPL GW Mon 2Q10	**Date Collected :**	04/27/10
Project Number :	G486090	**Date Received :**	04/27/10
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	04/27/10

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name :	MW-14-5		Units :	mg/L (ppm)
Lab Code :	P1001468-001MS	P1001468-001DMS	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	0.0496	0.0496	99	99	78-112	<1	

Approved By: Karen Ryan Date: 4/28/10

Report By:SAnderson

Columbia Analytical Services INC 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805.526.7161 | 805.526.7270 fax | www.caslab.com

CAS SR #P1001572

Table of Contents

Columbia Analytical Services, Inc. 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805.526.7161 | 805.526.7270 fax | www.caslab.com

LABORATORY REPORT

May 10, 2010

David Conner
Battelle
3990 Old Town Ave., Suite C-205
San Diego, CA 92110

RE: JPL GW Mon. 2Q10 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on May 5, 2010. For your reference, these analyses have been assigned our service request number P1001572.

All analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-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. Your report contains 27 pages.

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. 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.

Sue Anderson
Project Manager

Client: Battelle
Project: JPL GW Mon. 2Q10 / G486090

CAS Project No: P1001572

CASE NARRATIVE

The samples were received intact under chain of custody on May 5, 2010 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.

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.

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001572

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P1001572-001	MW-23-5	5/5/10	08:09
P1001572-002	MW-23-4	5/5/10	08:50
P1001572-003	MW-23-3	5/5/10	09:30
P1001572-004	MW-23-2	5/5/10	10:06
P1001572-005	MW-23-1	5/5/10	10:46
P1001572-006	EB-06-05/05/10	5/5/10	10:30

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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. P1001572

CAS Contact:

Company Name & Address (Reporting Information)	Project Name	Project Manager	P.O. # / Billing Information
BATTELLE 3990 OLD TOWN AVE, C-205 SAN DIEGO, CA 92110	JPL GW MON. 2Q10 Project Number G486090	DAVID CONNER Phone (619)726-7311 Fax	214319 / BATTELLE ATTN: GERALD TOMPKINS 505 KING AVE. COLUMBUS, OH 43201

Email Address for Result Reporting

Sampler (Print & Sign)

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-23-5	1	05/05/10	0809	W	1							X	
MW-23-4	2		0850		1							X	
MW-23-3	3		0930		1							X	
MW-23-2	4		1006		1							X	LEVEL IV QC
MW-23-1	5		1046		1							X	
EB-06-05/05/10	6		1030		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)

	Date	Time		Date	Time
Relinquished by: (Signature)	05/05/10	1500	Received by: (Signature)	5/5/10	1500
Relinquished by: (Signature)	5/5/10	1340	Received by: (Signature)	5/5/10	1345
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank / Ice / No Ice

Temperature 3.0 °C

Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001572

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1001572-001.01					
	7196A				
		5/5/10	1407	SMO / MZAMORA	
		5/5/10	1407	P-37 / MZAMORA	
		5/5/10	1428	In Lab / SANDERSON	
		5/5/10	1715	P-37 / SANDERSON	
P1001572-002.01					
	7196A				
		5/5/10	1407	SMO / MZAMORA	
		5/5/10	1407	P-37 / MZAMORA	
		5/5/10	1428	In Lab / SANDERSON	
		5/5/10	1715	P-37 / SANDERSON	
P1001572-003.01					
	7196A				
		5/5/10	1407	SMO / MZAMORA	
		5/5/10	1407	P-37 / MZAMORA	
		5/5/10	1428	In Lab / SANDERSON	
		5/5/10	1715	P-37 / SANDERSON	
P1001572-004.01					
	7196A				
		5/5/10	1407	SMO / MZAMORA	
		5/5/10	1407	P-37 / MZAMORA	
		5/5/10	1428	In Lab / SANDERSON	
		5/5/10	1715	P-37 / SANDERSON	
P1001572-005.01					
	7196A				
		5/5/10	1407	SMO / MZAMORA	
		5/5/10	1407	P-37 / MZAMORA	
		5/5/10	1428	In Lab / SANDERSON	
		5/5/10	1715	P-37 / SANDERSON	
P1001572-006.01					
	7196A				
		5/5/10	1407	SMO / MZAMORA	
		5/5/10	1407	P-37 / MZAMORA	
		5/5/10	1428	In Lab / SANDERSON	
		5/5/10	1715	P-37 / SANDERSON	

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Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001572

Project: JPL GW Mon. 2Q10 / G486090

Sample(s) received on: 5/5/2010 Date opened: 5/5/2010 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	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 3 °C			
10	Was a **trip blank** received?	☐	☐	☒
	Trip blank supplied by CAS: _____			
11	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?	☐	☐	☒
12	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?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**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
P1001572-001.01	125mL Plastic NP					
P1001572-002.01	125mL Plastic NP					
P1001572-003.01	125mL Plastic NP					
P1001572-004.01	125mL Plastic NP					
P1001572-005.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001572

Project: JPL GW Mon. 2Q10 / G486090

Sample(s) received on: 5/5/2010 Date opened: 5/5/2010 by: MZAMORA

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1001572-006.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

8

DIVIDER SHEET

ANALYTICAL DATA FOR

Hexavalent Chromium

ANALYSIS

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : Battelle
Project Name : JPL GW Mon. 2Q10
Project Number : G486090
Sample Matrix : WATER

Service Request : P1001572
Date Collected : 05/05/10
Date Received : 05/05/10

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-23-5	P1001572-001	0.010	0.004	1	NA	05/05/10 16:00	ND	
MW-23-4	P1001572-002	0.010	0.004	1	NA	05/05/10 16:00	ND	
MW-23-3	P1001572-003	0.010	0.004	1	NA	05/05/10 16:00	ND	
MW-23-2	P1001572-004	0.010	0.004	1	NA	05/05/10 16:00	ND	
MW-23-1	P1001572-005	0.010	0.004	1	NA	05/05/10 16:00	ND	
EB-06-05/05/10	P1001572-006	0.010	0.004	1	NA	05/05/10 16:00	ND	
Method Blank	P1001572-MB	0.010	0.004	1	NA	05/05/10 16:00	ND	

Approved By Karen Ryan Date : 5/6/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon. 2Q10 / G486090

Service Request: P1001572
Date Analyzed: 05/05/10

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: 5/6/10

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon. 2Q10 / G486090

Service Request: P1001572
Date Analyzed: 05/05/10

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	0.0579	0.0565	98	90-110
CCV1	0.0579	0.0575	99	90-110
CCV2	0.0579	0.0575	99	90-110

Approved By: Karen Ryan Date: 5/6/10

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1001572
Project Name :	JPL GW Mon. 2Q10	**Date Collected :**	NA
Project Number :	G486090	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	05/05/10

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1001572-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	0.0397	99	90-109	

Approved By Karen Ryan Date : 5/6/10

Report By:SAnderson

Columbia Analytical Services INC 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805.526.7161 | 805.526.7270 fax | www.caslab.com

CAS SR #P1001719

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Columbia Analytical Services INC 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805.526.7161 | 805.526.7270 fax | www.caslab.com

LABORATORY REPORT

May 20, 2010

David Conner
Battelle
3990 Old Town Ave., Suite C-205
San Diego, CA 92110

RE: JPL GW Mon. 2Q10 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on May 17, 2010. For your reference, these analyses have been assigned our service request number P1001719.

All analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-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. Your report contains 25 pages.

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. 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.

Sue Anderson
Project Manager

Client: Battelle
Project: JPL GW Mon. 2Q10 / G486090

CAS Project No: P1001719

CASE NARRATIVE

The samples were received intact under chain of custody on May 17, 2010 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.

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.

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001719

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P1001719-001	MW-18-5	5/17/10	09:48
P1001719-002	MW-18-4	5/17/10	10:25
P1001719-003	MW-18-3	5/17/10	10:59
P1001719-004	MW-18-2	5/17/10	11:31
P1001719-005	MW-18-1	5/17/10	12:17
P1001719-006	EB-12-05/17/10	5/17/10	12:00

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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. R1001719

CAS Contact:

Company Name & Address (Reporting Information)
BATTELLE
3990 OLD TOWN AVE, C205
SAN DIEGO, CA 92110

Project Name
JPL GW MON. 2Q10

Project Number
G486090

Project Manager
DAVID CONNER

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

Phone
(619)726 7311

Fax

Email Address for Result Reporting

Sampler (Print & Sign)

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-18-5	1	5/17/10	0948	W	1							X	
mw-18-4	2		1025		1							X	
mw-18-3	3		1059		1							X	
mw-18-2	4		1131		1							X	
mw-18-1	5		1217		1							X	
EB-12-05/17/10	6		1200		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)

	Date	Time		Date	Time
Relinquished by: (Signature)	5/17/10	1330	Received by: (Signature)	5/17/10	1337
Relinquished by: (Signature)	5/17/10	1417	Received by: (Signature)	5/17/10	1417
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank / Ice / No Ice

Temperature 2°C °C

Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001719

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1001719-001.01					
	7196A				
		5/17/10	1430	SMO / MZAMORA	
		5/17/10	1430	P-37 / MZAMORA	
		5/17/10	1457	In Lab / SANDERSON	
		5/17/10	1558	P-37 / SANDERSON	
P1001719-002.01					
	7196A				
		5/17/10	1430	SMO / MZAMORA	
		5/17/10	1430	P-37 / MZAMORA	
		5/17/10	1457	In Lab / SANDERSON	
		5/17/10	1558	P-37 / SANDERSON	
P1001719-003.01					
	7196A				
		5/17/10	1430	SMO / MZAMORA	
		5/17/10	1430	P-37 / MZAMORA	
		5/17/10	1457	In Lab / SANDERSON	
		5/17/10	1558	P-37 / SANDERSON	
P1001719-004.01					
	7196A				
		5/17/10	1430	SMO / MZAMORA	
		5/17/10	1430	P-37 / MZAMORA	
		5/17/10	1457	In Lab / SANDERSON	
		5/17/10	1558	P-37 / SANDERSON	
P1001719-005.01					
	7196A				
		5/17/10	1430	SMO / MZAMORA	
		5/17/10	1430	P-37 / MZAMORA	
		5/17/10	1457	In Lab / SANDERSON	
		5/17/10	1558	P-37 / SANDERSON	
P1001719-006.01					
	7196A				
		5/17/10	1430	SMO / MZAMORA	
		5/17/10	1430	P-37 / MZAMORA	
		5/17/10	1457	In Lab / SANDERSON	
		5/17/10	1558	P-37 / SANDERSON	

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Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001719

Project: JPL GW Mon. 2Q10 / G486090

Sample(s) received on: 5/17/2010 Date opened: 5/17/2010 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	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 2 °C			
10	Was a **trip blank** received?	☐	☐	☒
	Trip blank supplied by CAS: _____			
11	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?	☐	☐	☒
12	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?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**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
P1001719-001.01	125mL Plastic NP					
P1001719-002.01	125mL Plastic NP					
P1001719-003.01	125mL Plastic NP					
P1001719-004.01	125mL Plastic NP					
P1001719-005.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001719

Project: JPL GW Mon. 2Q10 / G486090

Sample(s) received on: 5/17/2010 Date opened: 5/17/2010 by: MZAMORA

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1001719-006.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

8

DIVIDER SHEET

ANALYTICAL DATA FOR

Hexavalent Chromium

ANALYSIS

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : Battelle
Project Name : JPL GW Mon. 2Q10
Project Number : G486090
Sample Matrix : WATER

Service Request : P1001719
Date Collected : 05/17/10
Date Received : 05/17/10

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-18-5	P1001719-001	0.010	0.004	1	NA	05/17/10 15:25	ND	
MW-18-4	P1001719-002	0.010	0.004	1	NA	05/17/10 15:25	ND	
MW-18-3	P1001719-003	0.010	0.004	1	NA	05/17/10 15:25	ND	
MW-18-2	P1001719-004	0.010	0.004	1	NA	05/17/10 15:25	ND	
MW-18-1	P1001719-005	0.010	0.004	1	NA	05/17/10 15:25	ND	
EB-12-05/17/10	P1001719-006	0.010	0.004	1	NA	05/17/10 15:25	ND	
Method Blank	P1001719-MB	0.010	0.004	1	NA	05/17/10 15:25	ND	

Approved By Widatng Date : 5/18/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon. 2Q10 / G486090

Service Request: P1001719
Date Analyzed: 05/17/10

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: Wida Ang Date: 5/18/10

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon. 2Q10 / G486090

Service Request: P1001719
Date Analyzed: 05/17/10

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	0.0579	0.0573	99	90-110
CCV1	0.0579	0.0573	99	90-110
CCV2	0.0579	0.0573	99	90-110

Approved By: Wida Ang Date: 5/18/10

CCV1A/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Battelle	**Service Request :**	P1001719
Project Name :	JPL GW Mon. 2Q10	**Date Collected :**	NA
Project Number :	G486090	**Date Received :**	NA
Sample Matrix :	WATER	**Date Extracted :**	NA
		Date Analyzed :	05/17/10

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	mg/L (ppm)
Lab Code :	P1001719-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	0.0395	99	90-109	

Approved By Widaang Date : 5/18/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client : Battelle
Project Name : JPL GW Mon. 2Q10
Project Number : G486090
Sample Matrix : WATER

Service Request : P1001719
Date Collected : 05/17/10
Date Received : 05/17/10
Date Extracted : NA
Date Analyzed : 05/17/10

Matrix Spike/Duplicate Matrix Spike Summary

Sample Name : MW-18-5
Lab Code : P1001719-001MS P1001719-001DMS
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	0.0437	0.0437	87	87	78-112	<1	

Approved By Wida Ang Date : 5/18/10

Report By:SAnderson

CAS SR #P1001675

Table of Contents

Columbia Analytical Services™ 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805.526.7161 | 805.526.7270 fax | www.caslab.com

LABORATORY REPORT

May 20, 2010

David Conner
Battelle
3990 Old Town Ave., Suite C-205
San Diego, CA 92110

RE: JPL GW Mon. 2Q10 / G486090

Dear David:

Enclosed are the results of the samples submitted to our laboratory on May 13, 2010. For your reference, these analyses have been assigned our service request number P1001675.

All analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-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. Your report contains 25 pages.

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. 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.

Sue Anderson
Project Manager

Client: Battelle
Project: JPL GW Mon. 2Q10 / G486090

CAS Project No: P1001675

CASE NARRATIVE

The samples were received intact under chain of custody on May 13, 2010 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.

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.

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001675

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P1001675-001	MW-19-5	5/13/10	08:21
P1001675-002	MW-19-4	5/13/10	08:57
P1001675-003	MW-19-3	5/13/10	09:31
P1001675-004	MW-19-2	5/13/10	10:10
P1001675-005	MW-19-1	5/13/10	11:13
P1001675-006	EB-11-05/13/10	5/13/10	10:59

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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. P1001675

CAS Contact:

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

Project Name
JPL GW MON. 2Q10

Project Number
G486090

Project Manager
DAVID CONNER

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

Phone
(619)726 7311

Fax

Email Address for Result Reporting

Sampler (Print & Sign)

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 VII (7196)	Remarks
MW-19-5	1	5/13/10	0821	W	1							X	
MW-19-4	2		0857		1							X	
MW-19-3	3		0931		1							X	
MW-19-2	4		1010		2							X	MS/MSD
MW-19-1	5		1113		1							X	
EB-11-05/13/10	6		1059		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)

	Date	Time		Date	Time
Relinquished by: (Signature)	5/13/10	1200	Received by: (Signature)	5/13/10	1200
Relinquished by: (Signature)	5/13/10	1242	Received by: (Signature)	5/13/10	1442
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank / Ice / No Ice

Temperature 3.0C °C

Columbia Analytical Services, Inc.
Chain of Custody Report

Client: Battelle
Project: JPL GW Mon. 2Q10/G486090

Service Request: P1001675

Bottle ID	Tests	Date	Time	Sample Location / User	Disposed On
P1001675-001.01					
	7196A				
		5/13/10	1255	SMO / MZAMORA	
		5/13/10	1255	P-37 / MZAMORA	
		5/13/10	1350	In Lab / SANDERSON	
		5/18/10	1607	P-37 / SANDERSON	
P1001675-002.01					
	7196A				
		5/13/10	1255	SMO / MZAMORA	
		5/13/10	1255	P-37 / MZAMORA	
		5/13/10	1350	In Lab / SANDERSON	
		5/18/10	1607	P-37 / SANDERSON	
P1001675-003.01					
	7196A				
		5/13/10	1255	SMO / MZAMORA	
		5/13/10	1255	P-37 / MZAMORA	
		5/13/10	1350	In Lab / SANDERSON	
		5/18/10	1607	P-37 / SANDERSON	
P1001675-004.01					
	7196A				
		5/13/10	1255	SMO / MZAMORA	
		5/13/10	1255	P-37 / MZAMORA	
		5/13/10	1350	In Lab / SANDERSON	
		5/18/10	1607	P-37 / SANDERSON	
P1001675-004.02					
		5/13/10	1255	SMO / MZAMORA	
		5/13/10	1255	P-37 / MZAMORA	
		5/13/10	1350	In Lab / SANDERSON	
		5/18/10	1607	P-37 / SANDERSON	
P1001675-005.01					
	7196A				
		5/13/10	1255	SMO / MZAMORA	
		5/13/10	1255	P-37 / MZAMORA	
		5/13/10	1350	In Lab / SANDERSON	
		5/18/10	1607	P-37 / SANDERSON	
P1001675-006.01					
	7196A				
		5/13/10	1255	SMO / MZAMORA	
		5/13/10	1255	P-37 / MZAMORA	
		5/13/10	1350	In Lab / SANDERSON	
		5/18/10	1607	P-37 / SANDERSON	

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Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001675

Project: JPL GW Mon. 2Q10 / G486090

Sample(s) received on: 5/13/2010 Date opened: 5/13/2010 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	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☒	☐	☐
	Cooler Temperature _____ °C Blank Temperature 3 °C			
10	Was a **trip blank** received?	☐	☐	☒
	Trip blank supplied by CAS: _____			
11	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?	☐	☐	☒
12	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?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**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
P1001675-001.01	125mL Plastic NP					
P1001675-002.01	125mL Plastic NP					
P1001675-003.01	125mL Plastic NP					
P1001675-004.01	125mL Plastic NP					
P1001675-004.02	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Battelle Work order: P1001675

Project: JPL GW Mon. 2Q10 / G486090

Sample(s) received on: 5/13/2010 Date opened: 5/13/2010 by: MZAMORA

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1001675-005.01	125mL Plastic NP					
P1001675-006.01	125mL Plastic NP					

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

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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DIVIDER SHEET

ANALYTICAL DATA FOR

Hexavalent Chromium

ANALYSIS

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : Battelle
Project Name : JPL GW Mon. 2Q10
Project Number : G486090
Sample Matrix : WATER

Service Request : P1001675
Date Collected : 05/13/10
Date Received : 05/13/10

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-19-5	P1001675-001	0.010	0.004	1	NA	05/13/10 14:55	ND	
MW-19-4	P1001675-002	0.010	0.004	1	NA	05/13/10 14:55	ND	
MW-19-3	P1001675-003	0.010	0.004	1	NA	05/13/10 14:55	ND	
MW-19-2	P1001675-004	0.010	0.004	1	NA	05/13/10 14:55	ND	
MW-19-1	P1001675-005	0.010	0.004	1	NA	05/13/10 14:55	ND	
EB-11-05/13/10	P1001675-006	0.010	0.004	1	NA	05/13/10 14:55	ND	
Method Blank	P1001675-MB	0.010	0.004	1	NA	05/13/10 14:55	ND	

Approved By Vicki Ang Date : 5/17/10

Report By:SAnderson

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Battelle	**Service Request:**	P1001675
Project:	JPL GW Mon. 2Q10 / G486090	**Date Analyzed:**	05/13/10

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: Wida Ang Date: 5/17/10

ICCBMDL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Battelle
Project: JPL GW Mon. 2Q10 / G486090

Service Request: P1001675
Date Analyzed: 05/13/10

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	0.0579	0.0562	97	90-110
CCV1	0.0579	0.0573	99	90-110
CCV2	0.0579	0.0573	99	90-110

Approved By: Vida Ang Date: 5/17/10

CCV1A/120594