### ATTACHMENT 1: QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

This attachment summarizes the field quality assurance, laboratory quality assurance, data verification and data validation procedures utilized for the JPL groundwater monitoring program. Data validation was performed by an independent contractor, Laboratory Data Consultants, Inc. of Carlsbad, California. Data verification and validation indicated that the all volatile organic carbon (VOC), perchlorate and metal results obtained from the third quarter 2010 sampling event were acceptable for their intended use of characterizing aquifer quality.

### ATTACHMENT 1: QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

Field and laboratory QC samples were collected and analyzed to fulfill quality requirements. Proper sample collection and handling procedures were utilized to ensure the integrity of the analytical results. A comprehensive quality assurance and quality control (QA/QC) plan for groundwater monitoring is described in the *Work Plan for Performing a Remedial Investigation/Feasibility Study* (Ebasco, 1993).

### FIELD QUALITY ASSURANCE/QUALITY CONTROL

The field QA/QC samples collected for JPL groundwater monitoring included field duplicate samples, equipment rinsate blanks and trip blanks. The QC sample results were used for the qualitative evaluation of the data. Table 1-1 summarizes analytical results for the field quality control samples during the third quarter 2010 groundwater sampling event.

Field Duplicate Samples. Duplicate samples were collected to evaluate the precision of the laboratory analyses. Duplicate samples for volatile organic compounds (VOCs), perchlorate, total chromium and hexavalent chromium [Cr(VI)] analyses were collected from monitoring wells MW-4 (Screen 1), MW-8, MW-11 (Screen 3), MW-20 (Screen 3), MW-22 (Screen 2) and MW-24 (Screen 2). Duplicate samples for VOCs and perchlorate analyses were collected from MW-12 (Screen 4). The analytical results for the field duplicate samples were comparable to the results of the original groundwater samples for VOCs (Table 1) and Metals (Table 2).

Equipment Rinsate Blanks. Equipment rinsate blanks were collected each day that non-dedicated sampling equipment was used. The shallow groundwater monitoring wells were sampled with dedicated equipment, therefore equipment rinsate blanks were collected for those wells. The equipment rinsate blanks, consisting of distilled water run through the sampling equipment after decontamination, were analyzed for all contaminants of concern to monitor possible cross-contamination of the samples due to inadequate decontamination. No VOC or metal contaminants were detected in the equipment rinsate blanks as shown in Table 1-1. The tentatively identified compounds (TICs), acetone, tert-butyl alcohol (TBA) and isobutylene were detected in two equipment blanks in varying amounts as shown in Table 1-1. However, acetone, TBA and isobutylene were not detected in any of the groundwater monitoring well samples.

*Trip Blanks.* Trip blanks, which consisted of reagent-grade water in vials transported with the sample bottles to and from the field, were submitted to the laboratory with each shipment of groundwater samples. Trip blanks were used to help identify cross-contamination of groundwater samples during transport and sample handling procedures. No VOC contaminants were detected in the trip blanks as shown in Table 1-1. In addition, no TICs were detected in the trip blanks, as shown in Table 1-1.

*Source Blank.* A source blank which consisted of distilled water used by sampling personnel for equipment decontamination was not collected during this sampling event. However a source blank was collected and analyzed during the fourth quarter of 2009

sampling event. This QC sample serves as a check for any contamination present in the source water. No VOC contaminants or TICs were detected in the source blank.

### LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

Laboratory QC samples included surrogate compounds (for VOC analyses), matrix spike samples, blank spike samples, and method blanks. The results of the laboratory QC samples were used by the laboratory to determine the accuracy and precision of the analytical techniques, and to identify anomalous results due to laboratory contamination or instrument malfunction.

### DATA VERIFICATION AND VALIDATION

The purpose of data verification and validation is to assure that the data collected meet the data quality objectives (DQOs) outlined in the Quality Assurance Project Plan of the Groundwater Monitoring Plan (Ebasco, 1993).

**Data Verification.** Data verification is a review of the analytical data that includes confirming that the sample identification numbers on the laboratory reports match those on the chain-of-custody records. Data verification also includes a review of the analytical data reports to confirm that all samples were analyzed and all required analytes were quantified for each sample.

**Data Validation.** Data validation is a systematic review of the analytical data to determine the compliance with established method performance criteria. Validation of a data package included review of the technical holding time requirements, review of sample preparation, review of the initial and continuing calibration data, review and recalculation of the laboratory QC sample data, review of the equipment performance, reconciliation of the raw data with the reduced results, identification of data anomalies, and qualification of data to identify data usability limitations.

Data validation was performed by an independent contractor, Laboratory Data Consultants, Inc. (LDC) of Carlsbad, CA. All of the data provided by Alpha Analytical, Inc. and Columbia Analytical Services, Inc. (CAS) were validated. Ninety percent of the data were subjected to Level III validation and ten percent of the data were subjected to Level IV validation in accordance with the EPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic and Inorganic Data Review (U.S. EPA, 2008; 2010).

**Data Validation Qualifiers.** Analytical data were qualified based on data validation. Data qualifiers were assigned in accordance with EPA guidelines. All samples were analyzed within the analytical holding times. Data validation indicated that the all of the data from the third quarter 2010 sampling event were acceptable for their intended use of characterizing aquifer quality.

The data validation reports are included in Attachment 2.

### REFERENCES

- Ebasco. 1993. Work Plan for Performing a Remedial Investigation/Feasibility Study. National Aeronautics and Space Administration Jet Propulsion Laboratory, Pasadena, California. December.
- U.S. EPA. 2008. USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review. June.
- U.S. EPA. 2010. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review. January.

## TABLE 1-1 SUMMARY OF CONTAMINANTS DETECTED IN QUALITY CONTROL SAMPLES COLLECTED DURING THE JUL/AUG 2010 SAMPLING EVENT

(All concentrations reported in  $\mu g/L$ .)

Blank Type	Sample ID Number	Sampling Location(s)	Total Chromium	Methylene Chloride	1,2,3- Trichloropropane	2-Butanone	Other Organic Compounds	TICs	
EQUIPMENT BLANK	EB-01-07/26/10	MW-20	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-02-7/27/10	MW-3, MW-5, MW-6	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-03-07/28/10	MW-23	5 U	1 U	1 U	10 U		Acetone	16
EQUITMENT BEANT	EB 03 01/20/10	10100 23	3.0	10	10	100		tert-Butyl alcohol (TBA)	23
EQUIPMENT BLANK	EB-04-07/29/10	MW-11, MW-22	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-05-07/30/10	MW-12, MW-24	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-06-08/02/10	MW-12, MW-24	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-07-8/03/10	MW-25, MW-26	5 U	2 U	2 U	10 U		Isobutylene (2-methyl-1-propene)	2
TRIP BLANK	TB-01-07/26/10	MW-20	NA	1 U	1 U	10 U			
TRIP BLANK	TB-02-7/27/10	MW-3, MW-5, MW-6	NA	1 U	1 U	10 U			
TRIP BLANK	TB-03-07/28/10	MW-23	NA	1 U	1 U	10 U			
TRIP BLANK	TB-04-07/29/10	MW-11, MW-22	NA	1 U	1 U	10 U			T
TRIP BLANK	TB-05-07/30/10	MW-12, MW-24	NA	1 U	1 U	10 U			
TRIP BLANK	TB-06-08/02/10	MW-12, MW-24	NA	1 U	1 U	10 U			
TRIP BLANK	TB-07-8/03/10	MW-25, MW-26	NA	2 U	2 U	10 U			

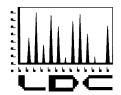
Notes

NA Not Analyzed

U Analyte was analyzed for but not detected at or above the stated limit

### **ATTACHMENT 2: DATA VALIDATION REPORTS (SUMMARY SHEETS)**

This attachment contains the summary sheets from the data validation performed by an independent subcontractor, Laboratory Data Consultants, Inc. (LDC) of Carlsbad, California. Complete data validation reports are available upon request.



### LABORATORY DATA CONSULTANTS, INC.

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Battelle

July 30, 2010

505 King Avenue Room 10-1-170

Columbus, OH 43201 ATTN: Ms. Betsy Cutie

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie.

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on July 26, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

### **LDC Project # 23637:**

SDG#

**Fraction** 

P1002488, P1002504 Hexavalent Chromium

The data validation was performed under EPA Level III & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto

**Operations Manager/Senior Chemist** 

23637ST.wpd

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### NASA JPL Data Validation Reports LDC #23637

Hexavalent Chromium



# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 21, 2010

LDC Report Date:

July 28, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

Validation Level:

EPA Level III & IV

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002504

Sample Identification

MW-10

MW-15\*\*

MW-10MS

MW-10MSD

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

No field duplicates were identified in this SDG.

### X. Field Blanks

No field blanks were identified in this SDG.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002504

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002504

No Sample Data Qualified in this SDG

SDG#	:: 23637B6 #: P1002504 atory: Columbia Ana				PLETE evel II		SS WORKSHE	ET	Date: 1) 12 Page:(_of) Reviewer:
The sa	IOD: Hexavalent Chi amples listed below tion findings workshe	were revie					lidation areas. Val	idation findi	ngs are noted in attache
	Validat	ion Area				***************************************	C	omments	
1.	Technical holding times			A	Sampli	ing da	ates: 7/21/10		
IIa.	Initial calibration			A					
IIb.	Calibration verification			Α					
111.	Blanks			A					
IV	Matrix Spike/Matrix Spi	ike Duplicate	es	A		me	Msn		
V	Duplicates			N	3				
VI.	Laboratory control sam	ples		A	Le	 >			
VII.	Sample result verificati	on		A.	Not re	viewe	ed for Level III validatio	n.	
VIII.	Overall assessment of			A					
IX.	Field duplicates		N						
X	X. Field duplicates  X. Field blanks								
Note: Validate	A = Acceptable N = Not provided/appli SW = See worksheet ed Samples: ** Indicates		R = Rins FB = Fie	ld blank		ted	D = Duplicate TB = Trip blank EB = Equipmer	nt blank	
1	MVV-10	11	MB			21		31	
	MW-15**	12				22		32	
3	MW-10MS	13				23		33	
	MW-10MSD	14				24	-	34	
5		15				25		35	
6		16				26		36	
7		17				27		37	
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Notes:

### VALIDATION FINDINGS CHECKLIST

Page: \_\_(\_of\_\\_\_ Reviewer: \_\_\_\_\_ 2nd Reviewer: \_\_\_\_\_\_\_

Method:Inorganics (EPA Method 7196 )

Method:Inorganics (EPA Method 7/1/1/4)			,	
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	1			
Cooler temperature criteria was met.				
II. Calibration				
Were all instruments calibrated daily, each set-up time?	1			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients > 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)			/	
III. Blanks				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	/			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	1			
VI. Regional Quality Assurance and Quality Control				
Nere performance evaluation (PE) samples performed?		1		
Were the performance evaluation (PE) samples within the acceptance limits?			7	

LDC #:_	
SDG #:_	Ju com

### VALIDATION FINDINGS CHECKLIST

Page: \_\_\_of \_\_\_ Reviewer: \_\_\_\_\_ 2nd Reviewer: \_\_\_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification			<del></del>	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1			
Were detection limits < RL?	/			
VIII. Overall assessment of data			·	
Overall assessment of data was found to be acceptable.	/			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		/		
Target analytes were detected in the field duplicates.			1	
X. Field blanks		A	L	
Field blanks were identified in this SDG.		7		
Target analytes were detected in the field blanks.			7	

LDC #: \\\ \sigma \sigma \rangle \rang

# Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: of L

Method: Inorganics, Method

hod 7196 A

The correlation coefficient (r) for the calibration of  $\frac{\sqrt{b}T}{\sqrt{b}}$  was recalculated.Calibration date:  $\frac{\eta |\nu|/l}{b}$ 

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100

True

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

		The second secon			Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (mg/L)	Abs.	r or r²	r or r²	(V/N)
Initial calibration		81	0.00	0			
	Cr (VI)	s2	0.01	0.011	0.999953	0.999953	
		83	0.05	0.055			
2000	and the second s	84	0.10	0.108			
$\mathcal{L}\mathcal{U}$ Calibration verification	$\omega^{67}$	0.20	61900		(0)	(0)	<u></u>
Calibration verification							
Calibration verification					1		

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# VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Reviewer: 2nd Reviewer: Page:

METHOD: Inorganics, Method \_\_

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

Where %R = Found x 100 True

Found \*

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result). concentration of each analyte in the source.

True m

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = 15-D! × 100 Where, (S+D)/2

# # 0 0

Original sample concentration Duplicate sample concentration

					Receiptained	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (unita)	SR/RPD	×R / RPD	Acceptable (Y/N)
	Laboratory control sample	7)		_			•
27		ر می	かけつつ	cofied	60)	<i>ት «</i> )	7
	Matrix spike sample		(\$\$R-\$R)				
~			54700	૦ થઈ • ઉ	16	16	
-	Duplicate sample	+					
7	-		0.05	8500	7	Y	7

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#	: 3863 1 B b 4: <u>Ju com</u>	VALIDATION FINDINGS WO Sample Calculation Verif		Reviewer	:lol :MM
METH	OD: Inorganics, Method	1 9196A			1
Please Y N Y N Ø N	see qualifications belo  N/A Have results  N/A Are results wi	w for all questions answered "N". Not app been reported and calculated correctly? thin the calibrated range of the instrumen ion limits below the CRQL?	ts?	re Identified as "f ted with a positiv	
recalc	ulated and verified usin	g the following equation:			
Concer	ntration =	Recalculation:			
	Samuel 10	Analyte	Reported Concentration ( )	Calculated Concentration	Acceptable (V/N)
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### **Laboratory Data Consultants, Inc. Data Validation Report**

Project/Site Name:

NASA JPL

**Collection Date:** 

July 20, 2010

**LDC Report Date:** 

July 29, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

Validation Level:

EPA Level III

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002488

Sample Identification

MW-13

MW-8

**DUPE-1-3Q10** 

MW-13MS

MW-13MSD

### Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### V. Duplicates

Duplicate sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

Raw data were not reviewed for this SDG.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

Samples MW-8 and DUPE-1-3Q10 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

### X. Field Blanks

No field blanks were identified in this SDG.

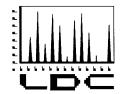
NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002488

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002488

No Sample Data Qualified in this SDG

SDG	#: 23637A6 #: P1002488 atory: Columbia Analytica	_			PLETENESS Level III	S WORKSHEET	Date: 기년() Page: Lof L Reviewer: 2nd Reviewer:
METH	HOD: Hexavalent Chromi	um (E	PA SW846	3 Method	7196A)		•
	amples listed below were tion findings worksheets.		wed for ea	ch of the f	ollowing valida	ition areas. Validation fi	ndings are noted in attached
	Validation	Aroa				Commen	e
		Alea		٨	Sampling dates:		
1.	Technical holding times  Initial calibration			4	Sampling dates.	7   1   1   2	
IIa. IIb.	Calibration verification			<u> </u>			
111.	Blanks			<u> </u>			
IV	Matrix Spike/Matrix Spike D	uplicate	·s	A	> 10 6 /1	120	
V V	Duplicates	<u> </u>		N	3 ms/m	<i>7-Y</i>	
VI	Laboratory control samples			A	Les		
VII.	Sample result verification			N			
VIII:	Overall assessment of data		-	A			
IX.	Field duplicates			ND	(2,3	)	
Lx_	Field blanks	<del></del>	<del></del>	N		/	
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet	<b>;</b>	R = Rir	o compound sate eld blank	is detected	D = Duplicate TB = Trip blank EB = Equipment blank	
Validat	ed Samples:						
1	MW-13	11	MR		21	31	
2	MW-8	12			22	32	
3	DUPE-1-3Q10	13			23	33	
4	MW-13MS	14		<del></del>	24	34	
5	MW-13MSD	15			25	35	
6		16	***************************************		26	36	
7		17			27	37	
8		18			28	38	
9	· · · · · · · · · · · · · · · · · · ·	19			29	39	
10		20			30	40	
Notes:							



### LABORATORY DATA CONSULTANTS, INC.

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Battelle 505 King Avenue Room 10-1-170

Columbus, OH 43201 ATTN: Ms. Betsy Cutie

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on August 5, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

### **LDC Project # 23711:**

### SDG#

### Fraction

P1002561, P1002562, P1002594 P1002595, P1002609, P1002649

P1002712

**Hexavalent Chromium** 

The data validation was performed under EPA Level III & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto

**Operations Manager/Senior Chemist** 

August 16, 2010

23711ST.wpd

	90/10 (client select)	ct)						ı	LDC #237	#23	711		atte	)  -	-Sa	(Battelle-San Diego / NASA JPL)	<u>ieg</u>	-	ğ	SA	H	<b>^</b>													
ГРС	*SDG	DATE REC'D	(3) DATE DUE	7.5	Cr(VI) (7196A)																														
Matrix:	Water/Soil			≥	S	≥	S	≥	S	>	S	3	S	3	<u>ہ</u>	8	S W	8	8	တ	≶	S	3	S	3	S	≥	5	3	8	S >	≥	တ	≥	S
4	P1002561	08/05/10	08/26/10	∞	٥		_																									$\dashv$	4		
∢	P1002561	08/05/10	08/26/10	Υ-	0										$\dashv$	_	$\dashv$	_	$\dashv$							$\dashv$					_	4	_		
В	P1002562	08/05/10	08/26/10	4	٥										$\dashv$	$\dashv$	$\dashv$	_		_						_					-	_	_		
ပ	P1002594	08/05/10	08/26/10	6	0											-																	_		
၁	P1002594	08/02/10	08/26/10		0	a grant or																				$\vdash$						_			
D	P1002595	08/05/10	08/05/10 08/26/10	4	0																														
Е	P1002609	08/02/10	08/05/10 08/26/10	7	0									H		$\vdash$		$\vdash$								$\Box$									
ш	P1002649	08/05/10	08/05/10 08/26/10	10	0																								_						
щ	P1002649	08/05/10	08/05/10 08/26/10	-	0	gg com																													
g	P1002712	08/05/10	08/05/10 08/26/10	9	0											-																_	$\dashv$		
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Total	T/LR			51	0	٥	0	0	0	0	0	0	0	0	0	0	0	0 0	0	-	0	0	0	0	0	0	0	0	0	0	0 0	0	0	0	51

Attachment 1

0 pages

### NASA JPL Data Validation Reports LDC #23711

Hexavalent Chromium



# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 26, 2010

**LDC Report Date:** 

August 11, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

Validation Level:

EPA Level III & IV

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002561

### Sample Identification

MW-20-5

MW-20-4\*\*

MW-20-3

MW-20-2

MW-20-1

DUPE-02-3Q10

EB-01-7/26/10

MW-20-5MS

MW-20-5MSD

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

Samples MW-20-3 and DUPE-02-3Q10 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

### X. Field Blanks

Sample EB-01-7/26/10 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002561

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002561

No Sample Data Qualified in this SDG

SDG # Labora  METH	:P1002561 tory:_Columbia Analytical Services OD: Hexavalent Chromium (EPA SV	Le V846 Method 7	LETENESS WORKSHEET evel III/IV 7196A) ollowing validation areas. Validation find	Date: 8/9/1 ~ Page:
	Validation Area		Comments	
1.	Technical holding times	4	Sampling dates: 7/7//2	
lia.	Initial calibration	A	·	
IIb.	Calibration verification	Α		
III.	Blanks	A		
IV	Matrix Spike/Matrix Spike Duplicates	4	1 h > 6n 52	
V	Duplicates	N		
VI.	Laboratory control samples	A	Ly	
VII.	Sample result verification	<b>→</b>	Not reviewed for Level III validation.	
VIII.	Overall assessment of data	A		
IX.	Field duplicates	M	(3,6)	
x	Field blanks	M	3B=7	
Note:	N = Not provided/applicable R	D = No compound = Rinsate 3 = Field blank	s detected D = Duplicate TB = Trip blank EB = Equipment blank	

Validated Samples: \*\* Indicates sample underwent Level IV validation

1	MW-20-5	11	Mrs	21	31	
2	MVV-20-4**	12	,	22	32	
3	MW-20-3	13		23	33	
4	MVV-20-2	14		24	34	
5	MVV-20-1	15		25	35	
6	DUPE-02-3Q10	16		26	36	
7	EB-01-7/26/10	17		27	37	
8	MW-20-5MS	18		28	38	
9	MW-20-5MSD	19		29	39	
		00		100	40	

Notes:	
	•

### **VALIDATION FINDINGS CHECKLIST**

Page: 1 of 2 Reviewer: 2nd Reviewer: 4

Method:Inorganics (EPA Method 1196 A )

	T		T					
Validation Area	Yes	No	NA	Findings/Comments				
I. Technical holding times								
All technical holding times were met.	/							
Cooler temperature criteria was met.								
II. Calibration								
Were all instruments calibrated daily, each set-up time?	1							
Were the proper number of standards used?								
Were all initial calibration correlation coefficients > 0.995?	/							
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/							
Were titrant checks performed as required? (Level IV only)			/					
Were balance checks performed as required? (Level IV only)		,						
III. Blanks								
Was a method blank associated with every sample in this SDG?	V							
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/						
IV. Matrix spike/Matrix spike duplicates and Duplicates								
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	Ş							
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	J							
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	/							
V. Laboratory control samples								
Was an LCS anaylzed for this SDG?								
Was an LCS analyzed per extraction batch?	/							
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?								
VI. Regional Quality Assurance and Quality Control								
Were performance evaluation (PE) samples performed?		_						
Were the performance evaluation (PE) samples within the acceptance limits?								

LDC #:	23711 MG
SDG #:_	ger wier

### **VALIDATION FINDINGS CHECKLIST**

Page: Lof Lof Reviewer: 2nd Reviewer: Log

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
Were detection limits < RL?				
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.		<b>V</b>		
X. Field blanks				
Field blanks were identified in this SDG.		,		
Target analytes were detected in the field blanks.				

LDC #: 23 71 1 AL SDG #: \_ CAL CO

# Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: of Reviewer: 4

Method: Inorganics, Method \_\_\_

71964

4011

The correlation coefficient (r) for the calibration of  $\frac{4}{2}$  was recalculated.Calibration date:  $\frac{7/36/\sqrt{2}}{2}$ 

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

True

%R = Found X 100

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (mg/L)	Abs.	r or r²	r or r²	(Y/N)
Initial calibration		s1	0.00	0			·
	Cr (VI)	s2	0.01	0.01	0.9999668	0.9999668	>
		83	0.05	0.054			_
		84	0.10	0.109			
Calibration verification	t 1	6,0579	c \$50°0		70)	٧٠)	7
$ abla_{\mathcal{U}}$ Calibration verification	$\omega$ 6 $t$	fisro	9850.0		<b>{</b> • }	<b>₹</b> ¢)	7
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 7371/PC

# VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page: Reviewer:\_\_\_ 2nd Reviewer:

METHOD: Inorganics, Method

79616

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

Where, %R = Found × 100 True

Found =

concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result). concentration of each analyte in the source.

True ==

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = <u>iS-Di</u> × 100 Where, (S+D)/2

# # Ø Q

Original sample concentration Duplicate sample concentration

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	%R / RPD	*R / RPD	Acceptable (Y/N)
	Laboratory control sample						•
2		£3	9/4000	o opolo	<b>†</b> • 1	اه ل	7
	Matrix spike sample		(SSR-SR)				-
۵			0.0434	००४०७	(8	68	
	Dupiloate sample	<u> </u>		I Oliv			
8/9			·	e, t	0	1	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. ....

LDC # SDG #	: 13/11/16 : ser cur	VALIDATION FINDINGS WO Sample Calculation Veri		Page Reviewei 2nd reviewei	:ot
Please	see qualifications belo	ow for all questions answered "N". Not apple been reported and calculated correctly?	•		ry
Y) N Compo	N/A Are all detection ound (analyte) results for			rted with a positiv	e detect were
Concent		ng the following equation:			
#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)

			Reported	Calculated	
			Concentration	Concentration	Acceptable
#	Sample ID	Analyte	( )	( )	Acceptable (Y/N)
			.,		
l					
R					
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:					
<u> </u>					1
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	<del> </del>				
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Note:	
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# Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** 

NASA JPL

**Collection Date:** 

July 26, 2010

**LDC Report Date:** 

August 11, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

Validation Level:

EPA Level III

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002562

Sample Identification

MW-7

MW-16

MW-7MS

MW-7MSD

### Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

Raw data were not reviewed for this SDG.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

No field duplicates were identified in this SDG.

### X. Field Blanks

No field blanks were identified in this SDG.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002562

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002562

No Sample Data Qualified in this SDG

SDG :	#:23711B6 #:P1002562 atory:_Columbia Analytic:	_			PLETENES Level III	S WORKSHEET	F	Date: 8/9/10 Page: 1 of 1 iewer: 4
METH	HOD: Hexavalent Chromi	ium (E	EPA SW846	6 Method	7196A)			V
	amples listed below were		ewed for ea	ch of the f	ollowing valida	ation areas. Validatio	n findings are not	ed in attached
valida	tion findings worksheets.							
	Validation	Area				Comm	ents	
1.	Technical holding times			A	Sampling dates	1/26/10		
lla.	Initial calibration			4		•	•	
IIb.	Calibration verification			A				
111.	Blanks	<del></del>		A			<del> </del>	
IV	Matrix Spike/Matrix Spike D	uplicate	es	A	2 M5/1	459		
V	Duplicates			N	)			
VI.	Laboratory control samples			A	res			
VII	Sample result verification			N		****		
VIII.	Overall assessment of data			A_				
IX.	Field duplicates			ν,				
L_X_	Field blanks			M				
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet	<b>;</b>	R = Rin	lo compound sate eld blank	is detected	D = Duplicate TB = Trip blank EB = Equipment blant	k	
Validati	ed Samples: AA							
1	MVV-7	11	MB		21		31	
2	MVV-16	12 .			22		32	
3	MVV-7MS	13			23		33	
4	MW-7MSD	14			24		34	
5	,	15			25		35	
6		16			26		36	
7		17			27		37	
8		18			28		38	
9		19			29		39	
10		20			30		40	

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 27, 2010

LDC Report Date:

August 11, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

Validation Level:

EPA Level III & IV

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002594

### Sample Identification

MW-4-3

MW-4-2

MW-4-1

DUPE-03-3Q10

EB-02-7/27/10

MW-3-4

MW-3-3

MW-3-2\*\*

MW-4-3MS

MW-4-3MSD

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

Samples MW-4-1 and DUPE-03-3Q10 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

### X. Field Blanks

Sample EB-02-7/27/10 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002594

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002594

No Sample Data Qualified in this SDG

### VALIDATION COMPLETENESS WORKSHEET LDC #: 23711C6 SDG #: P1002594

Laboratory: Columbia Analytical Services

Level III/IV

2nd Reviewer

METHOD: Hexavalent Chromium (EPA SW846 Method 7196A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: カノンケル 🤛
lla.	Initial calibration	A	,
IIb.	Calibration verification	A	
III.	Blanks	K	
IV_	Matrix Spike/Matrix Spike Duplicates	A	7 hs/ms0
V	Duplicates	<i>N</i>	) /
VI.	Laboratory control samples	A .	Les
VII.	Sample result verification	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	L/o	(3.4)
X	Field blanks	Nb	TB=5

Note:

A = Acceptable

ND = No compounds detected

D = Duplicate TB = Trip blank

N = Not provided/applicable SW = See worksheet

R = Rinsate FB = Field blank

EB = Equipment blank

Validated Samples: \*\* Indicates sample underwent Level IV validation

	M_					
1	MW-4-3	11	MB	21	31	
2	MW-4-2	12		22	32	
3	MVV-4-1	13		23	33	
4 .	DUPE-03-3Q10	14		24	34	
5	EB-02-7/27/10	15		25	35	
6	MVV-3-4	16		26	36	
7	MW-3-3	17		27	37	
8	MW-3-2**	18		28	38	
9	MVV-4-3MS	19		29	39	
10	MW-4-3MSD	20		30	40	

Notes:		 

### **VALIDATION FINDINGS CHECKLIST**

Page: \_\_l of \_\_\_ Reviewer: \_\_\_\_\_ 2nd Reviewer: \_\_\_\_\_\_

**Method:**Inorganics (EPA Method 719612)

Method:Inorganics (EPA Method η ή ή (δ /λ )	<del></del>	<del></del>		7
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	1			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	_			
Were the proper number of standards used?	1			
Were all initial calibration correlation coefficients ≥ 0.995?	_			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)			/	1
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		1		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	1			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	/			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	1			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			1	

LDC #: <u>y371106</u> SDG #: <u>yel</u> un

### VALIDATION FINDINGS CHECKLIST

Page: Lof Lof Reviewer: 2nd Reviewer: 4

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1			
Were detection limits < RL?		7		
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	7			
IX. Field duplicates	<del></del>			
Field duplicate pairs were identified in this SDG.	$\checkmark$			
Target analytes were detected in the field duplicates.		V		
X. Field blanks		L	1	
Field blanks were identified in this SDG.	1	. ,		
Target analytes were detected in the field blanks.		7		

LDC #: 3341166 SDG #: 544 ...

# Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: of Reviewer: 2nd Reviewer:

Method: Inorganics, Method

1196A

The correlation coefficient (r) for the calibration of  $\frac{\zeta \sqrt{1-\zeta}}{\zeta}$  was recalculated.Calibration date:  $\frac{1}{2}\sqrt{1-\zeta}$ 

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100 True

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (mg/L)	Abs.	r or r²	r orr²	(Y/N)
Initial calibration		s1	0.00	0	·		
	Cr (VI)	s2	0.01	0.012	0.9995255	0.9995255	>
		83	0.05	0.054			_
		s4	0.10	0.114			
$\mathcal{T}\omega/$ Calibration verification	C/O	6,0519	2000		88	85	}
$c\omega $ Calibration verification	7	64500	96500		66	oc)	->
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

3

100 #: >34 11 c6

# **VALIDATION FINDINGS WORKSHEET** Level IV Recalculation Worksheet

Page: Reviewer: 2nd Reviewer:\_

METHOD: Inorganics, Method

Percent recoveries (%4) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

Where, %R = <u>Found</u> x 100 True

Found .

True =

concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result). concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = 15-D1 × 100 Where, (S+D)/2

Original sample concentration Duplicate sample concentration

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Control of						Receipulated	Reported	
1.   Laboratory control sample	Sample ID	Type of Analyzia	Element	Found / S (units)	True / D (unita)	*R/RPD	%R / RPD	Acceptable (Y/N)
4 ο ο φορο θο ο ο φορο ο ο φορο ο ο ο φορο ο ο ο ο ο		Laboratory control sample						
Autities partice sample (SSR-SR)  Outilizate sample  Outilizate sample  Outilizate sample  Outilizate sample	3		E	60000	0.000	25	<u>(c)</u>	7
9 00000 2450,0 0,050 0,0		Matrix spike sample		(SSR-SR)				
Duplicate sample  6,05/2  10	6			90500	n ase'o	(0)	(0)	
0.50°0 (15°0)	_	Duplicate sample	7	\ \ \ \	5			
				5/52/2	Q'2\Se\0	٦	٦	`

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10,0% of the recalculated results.

	: Yz 1 1 cb : Yu cumo OD: Inorganics, Methor	VALIDATION FINDINGS WO Sample Calculation Verifi		Page Reviewer 2nd reviewer	:ot :mm
Please (Y) N	see qualifications belo N/A Have results with the control of the	w for all questions answered "N". Not app been reported and calculated correctly? ithin the calibrated range of the instrumen-	ts?		
Compo	ound (analyte) results for alated and verified using the control of the control	or 8 (NO)	repor	ted with a positiv	e detect were
Concent		Recalculation:			
			Reported Concentration	Calculated Concentration	Acceptable
-	Sample ID	Analyte	( )	( )	(Y/N)
-					
		-			
-					
				<u> </u>	<u> </u>

Note:

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 27, 2010

**LDC Report Date:** 

August 11, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

**Validation Level:** 

EPA Level III

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002595

Sample Identification

MW-5

MW-6

MW-6MS

MW-6MSD

### Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

Raw data were not reviewed for this SDG.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

No field duplicates were identified in this SDG.

### X. Field Blanks

No field blanks were identified in this SDG.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002595

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002595

No Sample Data Qualified in this SDG

SDG	#: 23711D6 #: P1002595 ratory: Columbia Analytic				LETEN Level III	ESS WORKS	SHEET	Date: 8/9/rg Page: lof Reviewer: 2nd Reviewer: 4
The s		e revie				validation areas.	Validation findir	ngs are noted in attached
valida	ation findings worksheets			T			Comments	
	Validation	Area		6		alsn	Comments	
1.	Technical holding times			A	Sampling	dates: // ٢/	110 .	
lla.	Initial calibration			A				
Ilb.	Calibration verification			A		miratur	the statement .	
111.	Blanks			A		. 1	<del></del>	
IV	Matrix Spike/Matrix Spike [	Duplicat	es	A-	> N	ng Anso		
<u> </u>	Duplicates			\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1.04-			
VI.	Laboratory control samples	<u> </u>		A	Ley			
VII.	Sample result verification			N				
VIII.	Overall assessment of data	3		4	<u> </u>			
IX.	Field duplicates			<u>                                    </u>				
L_X_	Field blanks		- Control - Anna Agrana	1 <i>N</i>	<u> </u>		<del></del>	
Note:	A = Acceptable N = Not provided/applicabl SW = See worksheet	e	R = Rin	o compound sate eld blank	s detected	D = Duplic TB = Trip EB = Equi		
Valida	ted Samples:							7
1	MVV-5	11	MB		21		31	
2	MVV-6	12			22		32	
3	MVV-6MS	13			23		33	
4	MW-6MSD	14			24		34	
5		15			25		35	
6		16			26		36	
7		17			27		37	
8		18			28		38	
9		19			29		39	
10		20			30		40	

## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 28, 2010

**LDC Report Date:** 

August 11, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

Validation Level:

EPA Level III

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002609

### Sample Identification

MW-23-4

MW-23-3

MW-23-2

MW-23-1

EB-03-07/28/10

MW-23-1MS

MW-23-1MSD

### Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

Raw data were not reviewed for this SDG.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

No field duplicates were identified in this SDG.

### X. Field Blanks

Sample EB-03-07/28/10 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002609

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002609

No Sample Data Qualified in this SDG

LDC #: 23711E6	VALIDATION COMPLETENESS WORKSHEET
SDG #: P1002609	Level III
Laboratory: Columbia Analytica	l Services

	Date: 8/9/1 v
	Page: <u> </u>
	Reviewer:
2nd	Reviewer: 1
	7

METHOD: Hexavalent Chromium (EPA SW846 Method 7196A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 1 18 0
lla.	Initial calibration	A	
IIb.	Calibration verification	A	
111.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	3 ms/14 50
V	Duplicates	N	<i>J</i> / !
VI.	Laboratory control samples	A	Les
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	V	
_x	Field blanks	N/p	ZB25

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected R = Rinsate

FB = Field blank

D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples:

	M2				
1	MVV-23-4	11 MB	21	31	
2	MVV-23-3	12	22	32	
3	MW-23-2	13	23	33	
4	MVV-23-1	14	24	34	
5	EB-03-07/28/10	15	25	35	
6	MVV-23-1MS	16	26	36	
7	MW-23-1MSD	17	27	37	
8		18	28	38 -	
9		19	29	39	
10		20	30	40	

Votes:		

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 29, 2010

LDC Report Date:

August 11, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

Validation Level:

EPA Level III & IV

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002649

### Sample Identification

MW-22-3

MW-22-2

MW-22-1

DUPE-04-3Q10

EB-04-07/29/10

MW-11-3

MW-11-2

MW-11-1\*\*

DUPE-05-3Q10

MW-22-3MS

MW-22-3MSD

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

Samples MW-22-2 and DUPE-04-3Q10 and samples MW-11-3 and DUPE-05-3Q10 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

### X. Field Blanks

Sample EB-04-07/29/10 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002649

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002649

No Sample Data Qualified in this SDG

### LDC #: 23711F6 VALIDATION COMPLETENESS WORKSHEET

SDG #: P1002649

Level III/IV

Laboratory: Columbia Analytical Services

Date: 8/9/10	
Page: Lof Reviewer:	
2nd Reviewer: <b>y</b> //_	
7	

METHOD: Hexavalent Chromium (EPA SW846 Method 7196A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 1/19/10
IIa.	Initial calibration	A	'', '
IIb.	Calibration verification	A	
111.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	3mg/mgm
V	Duplicates	N	
VI.	Laboratory control samples	A	Les
VII.	Sample result verification	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
lX.	Field duplicates	M	(2,4)(6,5)
X	Field blanks	Mp	EB-5

Note:

A = Acceptable

ND = No compounds detected

D = Duplicate

N = Not provided/applicable SW = See worksheet R = Rinsate FB = Field blank TB = Trip blank EB = Equipment blank

Validated Samples: \*\* Indicates sample underwent Level IV validation

	- AX						
1	MVV-22-3	11	MW-22-3MSD	21	My	31	
2	MW-22-2	12		22		32	
3	MW-22-1	13		23		33	
4	DUPE-04-3Q10	14		24		34	
5	EB-04-07/29/10	15		25		35	
6	MW-11-3	16		26		36	
7	MW-11-2	17		27		37	
8	MVV-11-1**	18		28		38	
9	DUPE-05-3Q10	19		29		39	
10	MVV-22-3MS	20		30		40	

Notes:		

### VALIDATION FINDINGS CHECKLIST

Page: 1 of 1 Reviewer: 2nd Reviewer: 2

**Method:**Inorganics (EPA Method 1196 A)

Method:Inorganics (EPA Method 1/96 Δ)	<del> </del>			
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	,		<b>,</b>	
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients ≥ 0.995?	(			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			_	
Were balance checks performed as required? (Level IV only)				<u> </u>
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	/			
V. Laboratory control samples				
Was an LCS anayized for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?			/	

LDC #: >3/1/F6 SDG #: Lel Lower

### VALIDATION FINDINGS CHECKLIST

Page: Lof Lof Reviewer: 2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1			
Were detection limits < RL?				
VIII. Overall assessment of data	•			
Overall assessment of data was found to be acceptable.				
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		-		
Target analytes were detected in the field duplicates.		7		
X. Field blanks				
Field blanks were identified in this SDG.	V	,		
Target analytes were detected in the field blanks.		7		

LDC #: \\\ \sigma\_2\rangle \cdots \\\ \sigma\_2\r

# Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: of Reviewer: 2nd Reviewer:

Method: Inorganics, Method \_\_\_

7186A

The correlation coefficient (r) for the calibration of  $-\alpha mas$  recalculated.Calibration date: 1/3/10

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

			7,7,000,000		Recalculated	Reported	Accentable
Type of analysis	Analyte	Standard	Conc. (mg/L)	Abs.	r or r²	r or r²	(Y/N)
Initial calibration		s1	0.00	0			
	Cr (VI)	s2	0.01	0.011	0.999998447	0.999998447	>
		83	0.05	0.056			_
		84	0.10	0.112			
Calibration verification	CA	busero	esso o		> )	70)	*
$\mathcal{C}$ Calibration verification	<b>→</b>	$\rightarrow$	86500		(0)	<b>۲۰۱</b>	
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 3311176 SDG #: Set con

### VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

2nd Reviewer: Reviewer: Page:

METHOD: Inorganics, Method 11964

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

Where. %R = Found x 100

Found .

concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result), concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula: True m

RPD = 18-D! × 100 Where, (S+D)/2

() () () ()

Original sample concentration Duplicate sample concentration

	-				Recalculated	Reported	
Sample 1D	Type of Analysis	Element	Found / S (unite)	True / D (units)	%R / RPD	%R / RPD	Acceptable (Y/N)
	Laboratory control sample	``					
57		5	11/00	0,0	(دع	<··	<b>&gt;</b>
	Matrix spike sample	-	(\$\$R-&R)				
٥)			رم. دماه، ه	ه ماه که	28	S	
1	Duplicate semple					,	>
100			くらつ	200	9	7	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

METHO Please Y N Y N O N	see qualifications belo  N/A Have results  N/A Are results w  N/A Are all detect  Dund (analyte) results f	VALIDATION FINDINGS We Sample Calculation Verified	flication  plicable questions a	Reviewe 2nd reviewe are Identified as "I	va
Concent	tration =	Recalculation:			
			Reported	Calculated	
	Sample ID	Analyt•	Concentration (	Concentration ( )	Acceptable (Y/N)
		-			
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Note:

### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 30, 2010

**LDC Report Date:** 

August 11, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

Validation Level:

**EPA Level III** 

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002712

Sample Identification

MW-12-3

MW-12-2

MW-12-1

EB-05-07/30/10

MW-12-2MS

MW-12-2MSD

### Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

Raw data were not reviewed for this SDG.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

No field duplicates were identified in this SDG.

### X. Field Blanks

Sample EB-05-07/30/10 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002712

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002712

No Sample Data Qualified in this SDG

SDG #	:23711G6 #:P1002712 atory:_Columbia Analytica	_			PLETE Level		s worksh	EET	Date: 8/9/16 Page: 1 of 1 Reviewer: 44 2nd Reviewer: 44
МЕТН	OD: Hexavalent Chromi	um (E	EPA SW846	Method 7	7196A)				U
	amples listed below were ion findings worksheets.		ewed for ead	ch of the fo	ollowing	g valid	lation areas. Va	alidation fin	dings are noted in attached
	Validation	Area						Comments	
1.	Technical holding times			· A	Samplin	ng date	s: 7/30/10		
lla.	Initial calibration			A					
IIb.	Calibration verification			A					
111.	Blanks			A					
IV	Matrix Spike/Matrix Spike D	uplicate	es	A	2	M5/N	140		
V	Duplicates			N		-/ •			
VI.	Laboratory control samples			A	Les				
VII.	Sample result verification			N					
VIII.	Overall assessment of data			A					
IX.	Field duplicates			N					
x	Field blanks			CA (	5	B=4	•		
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet ed Samples:	;	R = Rin	o compound sate eld blank	is detecte	ed	D = Duplicate TB = Trip blan EB = Equipme	nk	
	A.	1	I w		<del></del>	T			<u> </u>
1 1	MVV-12-3	11	MB		2	:1		31	
2	MW-12-2	12			2	2		32	

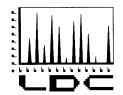
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10	20		30	
Notes:				

MW-12-1

E.B-05-07/30/10

MW-12-2MS

MW-12-2MSD



### LABORATORY DATA CONSULTANTS, INC.

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Battelle 505 King Avenue Room 10-1-170 Columbus, OH 43201

ATTN: Ms. Betsy Cutie

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on August 8, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

### **LDC Project # 23739:**

SDG#

**Fraction** 

P1002749, P1002772

**Hexavalent Chromium** 

The data validation was performed under EPA Level III & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto

**Operations Manager/Senior Chemist** 

August 16, 2010

23739ST.wpd

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### NASA JPL Data Validation Reports LDC #23739

**Hexavalent Chromium** 



### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 2, 2010

**LDC Report Date:** 

August 12, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

**Validation Level:** 

EPA Level III & IV

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002749

Sample Identification

MW-24-4

MW-24-3

MW-24-2

MW-24-1\*\*

DUPE-07-3Q10

EB-06-08/02/10

MW-24-4MS

MW-24-4MSD

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

Samples MW-24-2 and DUPE-07-3Q10 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

### X. Field Blanks

Sample EB-06-08/02/10 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002749

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002749

No Sample Data Qualified in this SDG

DC #: 23739A6 <b>\$</b>	VALIDATION COMPLETENESS WORKSHEET	Date: 8/17/v=
SDG #. P1002749	_ Level III/IV	Page: <u>l</u> of_/
_aboratory: <u>Columbia Analytic</u>	al Services	Reviewer:
		2nd Reviewer: NC
METHOD: Hexavalent Chrom	ium (EPA SW846 Method 7196A)	1

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 8/2/10
IIa.	Initial calibration	A	
llb.	Calibration verification	A	
	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	7 M3/M57
V	Duplicates	N	, ,
VI.	Laboratory control samples	4	Les
VII.	Sample result verification	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	Ny	(3.5)
x	Eield blanks	No	7B=6

٨	lat	0		

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples: \*\* Indicates sample underwent Level IV validation

,	M				
1	MW-24-4	11 14	<b>b</b> 21	31	
2	MW-24-3	12	22	32	
3 9	MW-24-2	13	23	33	
4	MW-24-1**	14	24	34	
5 9	DUPE-07-3Q10	15	25	35	
6	EB-06-08/02/10	16	26	36	
7	MW-24-4MS	17	27	37	
8	MW-24-4MSD	18	28	38	
9		19	29	39	
10		20	30	40	

Notes:		

### VALIDATION FINDINGS CHECKLIST

Page: \_\_of\_\_ Reviewer: \_\_\_\_ 2nd Reviewer: \_\_\_\_

Method: Inorganics (EPA Method 7196 A)

Method:Inorganics (EPA Method プロック)			T	
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times			гТ	
All technical holding times were met.	<b>√</b>			
Cooler temperature criteria was met.		L		
II. Calibration		·		
Were all instruments calibrated daily, each set-up time?	-			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients > 0.995?	1			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	1			
Were titrant checks performed as required? (Level IV only)		<u> </u>	/	
Were balance checks performed as required? (Level IV only)	<u> </u>	L	/	
III. Blanks		,	ı	
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates	1	· T	T	
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	1			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	/			·
V. Laboratory control samples	,		1	
Was an LCS anaylzed for this SDG?	1			
Was an LCS analyzed per extraction batch?	/	<del> </del>	-	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/		<u></u>	
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		_	<u> </u>	
Were the performance evaluation (PE) samples within the acceptance limits?			<u> </u>	

LDC# >3739 Kb

### VALIDATION FINDINGS CHECKLIST

Page: \_\_of \_\_ Reviewer: \_\_\_\_ 2nd Reviewer: \_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
Valluation Alea	l		L	
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1			
Were detection limits < RL?	1			
VIII. Overall assessment of data		r		1
Overall assessment of data was found to be acceptable.	J			
IX. Field duplicates	·			
Field duplicate pairs were identified in this SDG.	V			
Target analytes were detected in the field duplicates.				
X. Field blanks	1		<del></del>	
Field blanks were identified in this SDG.	V	<del> </del>	_	
Target analytes were detected in the field blanks.			<u> </u>	

LDC#: 23739 N6

# Initial and Continuing Calibration Calculation Verification Validatin Findings Worksheet

2nd Reviewer: 14 Page:\_\_(\_of\_/

Method: Inorganics, Method

The correlation coefficient (r) for the calibration of  $-\frac{6+}{4}$  was recalculated.Calibration date:  $-\frac{8/\sqrt{t^{.0}}}{2}$ 

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100 True

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable	
Type of analysis	Analyte	Standard	Conc. (mg/L)	Abs.	r or r <sup>2</sup>	r or r²	(Y/N)	
Initial calibration		s1	0.00	0				
	Cr (VI)	s2	0.01	0.01	0.999818	0.999818	<u> </u>	
		83	0.05	0.053				
		s4	0.10	0.11				The state of the s
$\mathcal{T}_{\mathcal{N}}$ Calibration verification	5	SUDOTO	y o go d		201	\$0)	>	
$\iota\omega$ Calibration verification	_	6.0279	0.0591)		(0)	501	->	
Calibration verification								

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. LDC#: 73/13/ PA

## VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: / of / 2nd Reviewer:\_ Reviewer.

METHOD: Inorganics, Method \_\_

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

Where, %R = Found × 100

Found =

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Frue = concentration of each analyte in the source.

RPD =  $\frac{|S-D|}{(S+D)/2} \times 100$ 

" " "

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

Original sample concentration Duplicate sample concentration

Where,

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	%R / RPD	%R/RPD	Acceptable (Y/N)
	Laboratory control sample						7
557		Cat	9140.0	c.) 970°	7.)	ナ・ハ	
6	Matrix spike sample		(SSR-SR)	o aforo	8	180	
8/6	Duplicate sample		91400	le to o	4	٨	3

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #. >3939 fr

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	1_of
Reviewer:	n
2nd reviewer:	U

METHOD: Inor	ganics, Method	7196A	•
Please see qua N N/A N N/A N N/A	alifications below for all Have results been rep Are results within the Are all detection limits	Calibrated range of the motioner.	ole questions are identified as "N/A".
Compound (an	nalyte) results for nd verified using the foll	lowing equation:	reported with a positive detect were
Concentration =		Recalculation:	

	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
#	Sample 10				
		·			<u></u>

Note:		

### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 3, 2010

**LDC Report Date:** 

August 12, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

**Validation Level:** 

EPA Level III & IV

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002772

### Sample Identification

MW-25-5

MW-25-4

MW-25-3

MW-25-2\*\*

MW-25-1

EB-07-08/03/10

MW-26-2

MW-26-1

MW-25-5MS

MW-25-5MSD

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

No field duplicates were identified in this SDG.

### X. Field Blanks

Sample EB-07-08/03/10 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002772

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002772

No Sample Data Qualified in this SDG

SDG:	#:23739B6 VALIDATION #:P1002772 ratory: Columbia Analytical Services		PLETENESS WORKSHEET evel III/IV	Date: 8/12/12 Page:of Reviewer: 2nd Reviewer:
METH	HOD: Hexavalent Chromium (EPA SW8	346 Method 7	7196A)	
	amples listed below were reviewed for ention findings worksheets.	each of the fo	ollowing validation areas. Validation fi	ndings are noted in attached
	Validation Area		Comment	s
l.	Technical holding times	A	Sampling dates: 8/3/10	
lla.	Initial calibration	A		
Uh	Calibration verification	A		

3 m5/145D

Not reviewed for Level III validation.

Note:

Ш.

IV

V

VI.

VII.

VIII.

IX.

Blanks

Duplicates

Field duplicates Field blanks

Matrix Spike/Matrix Spike Duplicates

A = Acceptable
N = Not provided/applicable
SW = See worksheet

Laboratory control samples

Sample result verification

Overall assessment of data

ND = No compounds detected

A

A

R = Rinsate FB = Field blank D = Duplicate

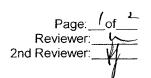
TB = Trip blank

EB = Equipment blank

Validated Samples: \*\* Indicates sample underwent Level IV validation

	A/A					
1	MW-25-5	11	mB	21	31	
2	MW-25-4	12		22	32	
3	MW-25-3	13		23	33	
4	MW-25-2**	14		24	34	
5	MVV-25-1	15		25	35	
6	EB-07-08/03/10	16		26	. 36	
7	MW-26-2	17		27	37	
8	MW-26-1	18		28	38	
9	MW-25-5MS	19		29	39	
10	MW-25-5MSD	20		30	40	

Notes:		



Method:Inorganics (EPA Method 196 λ)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	1			
Cooler temperature criteria was met.	<b>/</b>			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	7			
Were the proper number of standards used?	1			
Were all initial calibration correlation coefficients ≥ 0.995?	1			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			1	
Were balance checks performed as required? (Level IV only)			/	
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		$\sqrt{}$		
IV. Matrix spike/Matrix spike duplicates and Duplicates		·····	<b>,</b>	
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	s			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	/			
V. Laboratory control samples	-			
Was an LCS anaylzed for this SDG?	1			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?			/	

LDC#: >373 98 \

### **VALIDATION FINDINGS CHECKLIST**

Page: \_\_of \_\_ Reviewer: \_\_\_\_ 2nd Reviewer: \_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1			
Were detection limits < RL?	/	_		
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
IX. Field duplicates	-			
Field duplicate pairs were identified in this SDG.		V		
Target analytes were detected in the field duplicates.			1	
X. Field blanks				
Field blanks were identified in this SDG.	V	-		
Target analytes were detected in the field blanks.		/		

LDC#: 27/3 P B.b. SDG#: CEN COM

# Validatin Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: L of A Reviewer: L

Method: Inorganics, Method

71961

The correlation coefficient (r) for the calibration of \_\_\_\_\_\_ was recalculated.Calibration date:\_\_

01/8/8 10

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

A Comment of the Comm					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (mg/L)	Abs.	r or r²	r or r²	(Y/N)
Initial calibration		s1	0.00	Ô			•
	Cr (VI)	s2	0.01	0.011	0.9999885	0.9999885	<u> </u>
		83	0.05	0.055			`
		s4	0.10	0.109			
78	19/4)	00700	110100		7 %	70	7
Calibration verification	5	1 1 250	1000		5		
Ced	<b>→</b>	>	51900		9.)	90)	)
Calibration verification			2		,	•	
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 73/35/86

# VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: ( of / Reviewer: 2nd Reviewer:

METHOD: Inorganics, Method

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

Where, %R = Found × 100

Found =

concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD =  $\frac{|S-D|}{(S+D)/2} \times 100$ 

Where,

S 0

Original sample concentration Duplicate sample concentration

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	%R/RPD	%R / RPD	Acceptable (Y/N)
	Laboratory control sample						
1.65		Cat	7,00	0.0400	50	50)	>
ō	Matrix spike sample		(SSR-SR)	an Je'o	ps .	128	
2/6	Duplicate sample	-3	Meso	12400	0	7	7

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC # >3739 Bb

# **VALIDATION FINDINGS WORKSHEET**

Sample Calculation Verification

Page:_	of_ <i>_</i> _
Reviewer:_	<u>~</u>
2nd reviewer:_	W

METHOD: Inorga	anics, Method	y
AN N/A	fications below for all questions answered "N". Not applicable questions are identified as "N/A". Have results been reported and calculated correctly?  Are results within the calibrated range of the instruments?  Are all detection limits below the CRQL?	
Compound (anal recalculated and	lyte) results for	ot were
Concentration =	Recalculation:	

#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
		·		·	
				:	
-					

Note:	



# LABORATORY DATA CONSULTANTS, INC.

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Battelle 505 King Avenue Room 10-1-170 Columbus, OH 43201

ATTN: Ms. Betsy Cutie

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on August 16, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

# **LDC Project # 23761:**

# SDG#

# <u>Fraction</u>

P1002822, P1002835, P1002866

**Hexavalent Chromium** 

The data validation was performed under EPA Level III & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto

**Operations Manager/Senior Chemist** 

August 23, 2010

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Attachment 1

0 pages

# NASA JPL Data Validation Reports LDC #23739

Hexavalent Chromium



# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 5, 2010

**LDC Report Date:** 

August 20, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

Validation Level:

EPA Level III & IV

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002822

# Sample Identification

MW-17-4

MW-17-3\*\*

MW-17-2

EB-09-08/05/10

MW-18-4

MW-18-3

MW-18-2

MW-18-4MS

**MW-18-4MSD** 

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

# Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

# I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Calibration

# a. Initial Calibration

All criteria for the initial calibration of each method were met.

# b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

# IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

# V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

# VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

# VII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

# VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

# IX. Field Duplicates

No field duplicates were identified in this SDG.

# X. Field Blanks

Sample EB-09-08/05/10 was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL** 

Hexavalent Chromium - Data Qualification Summary - SDG P1002822

No Sample Data Qualified in this SDG

**NASA JPL** 

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002822

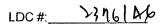
No Sample Data Qualified in this SDG

LDC	#: <u>23761A6</u>	_ VAI	LIDATIO			S WORKSHEET	Date: ¥/16
	#: P1002822			L	evel III/IV		Page: <u> </u> of <u> </u> ↓
abo	ratory: <u>Columbia Analyt</u>	ical Ser	vices			•	Reviewer: 4
							2nd Reviewer: 4
ИЕТ	HOD: Hexavalent Chro	mium (E	PA SW84	6 Method	7196A)		/
		•					
	samples listed below we ation findings workshee		wed for ea	ich of the f	following valida	ation areas. Validation fin	ndings are noted in attache
allu	ation indings workshee	ιο.					
	Validatio	n Araa				Comments	
		шли		A	Sampling dates	1. 1	
<u> </u>	Technical holding times			1 .	Sampling dates	. 6/5/1/0	
lla.	Initial calibration			A			
IIb.	Calibration verification			A			
- 111.	Blanks			A			
IV	Matrix Spike/Matrix Spike	Duplicate	es	A	3/195/193	ν <sub>0</sub>	
V	Duplicates			h			
VI.	Laboratory control sample	es		A	LL		
VII.	Sample result verification			A	Not reviewed for	or Level III validation.	
VIII	. Overall assessment of da	ıta		A			
IX.	Field duplicates			N			
Х	Field blanks			MO	6B=4	•	
Vote:	A = Acceptable N = Not provided/applica	hle	ND = N R = Ri	No compound	ds detected	D = Duplicate TB = Trip blank	
	SW = See worksheet	DIC		ield blank		EB = Equipment blank	
/alida	ted Samples: ** Indicates sa	ample und	lerwent Level	IV validation	1		
	AQ.		MB			24	
1	MW-17-4	11	עיש		21	31	
2	MW-17-3**	12			22	32	
3	MW-17-2	13			23	33	
4	EB-09-08/05/10	14			24	34	
5	MW-18-4	15		····	25	35	
6	MW-18-3	16	,		26	36	
7	MW-18-2	17	,		27	37	
8	MW-18-4MS	18			28	38	
9	MW-18-4MSD	19			29	39	
9	· · · · · · · · · · · · · · · · · · ·						

Page: \_\_of\_\_ Reviewer: \_\_\_\_\_ 2nd Reviewer: \_\_\_\_\_\_

Method:Inorganics (EPA Method 7196A)

Wethod: Horganies (El Almethod   100)				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.				
Cooler temperature criteria was met.				
II. Calibration				
Were all instruments calibrated daily, each set-up time?	1			
Were the proper number of standards used?	1			
Were all initial calibration correlation coefficients > 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			_	
Were balance checks performed as required? (Level IV only)			/	
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates			<b></b>	
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	/			·
V. Laboratory control samples	•		<b>,</b>	
Was an LCS anaylzed for this SDG?	_			
Was an LCS analyzed per extraction batch?	_			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	



# **VALIDATION FINDINGS CHECKLIST**

Page: \_\_of \_\_ Reviewer: \_\_\_\_ 2nd Reviewer: \_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1			
Were detection limits < RL?	/			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		<b>V</b>		
Target analytes were detected in the field duplicates.			<b>√</b>	
X. Field blanks				
Field blanks were identified in this SDG.	<b>V</b>			
Target analytes were detected in the field blanks.		1		

LDC #: 3376 1826

# Initial and Continuing Calibration Calculation Verification Validatin Findings Worksheet

Page: of	Reviewer:	2nd Reviewer:
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Method: Inorganics, Method \_

4196 A

The correlation coefficient (r) for the calibration of  $\mathcal{L}^{G}$  was recalculated.Calibration date:

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (mg/L)	Abs.	r or r²	r or r²	(Y/N)
Initial calibration		s1	0.00	0			
	Cr (VI)	s2	0.01	0.012	0.9999880	0.9999880	ァ
		83	0.05	0.059			
		s4	0.10	0.119			
IN	ty	4	1 10 %		7.	Ļ	7
Calibration verification		66500	۹ <b>و</b> و و و و		\ <sub>2</sub>	2	
CC	+9/17		7.70		\_	Ļ	
Calibration verification	<b>&gt;</b>	>	2623		5.1	۲ )	
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC # 2376 | A

# VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: / of / Reviewer.\_\_ 2nd Reviewer:\_

METHOD: Inorganics, Method

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

Where, %R = Found × 100

Found = concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

Where, RPD =  $\frac{|S-D|}{(S+D)/2} \times 100$ 

" " "

Original sample concentration Duplicate sample concentration

					Recalculated	Reported	
Sample 1D	Type of Analysis	Element	Found / S (units)	True / D (units)	%R/RPD	%R/RPD	Acceptable (Y/N)
57	Laboratory control sample	cot.	1400	o sporo	7	(25	<b>b</b>
છ	Matrix spike sample		(SSR-SR)	0.000	88	J.s	
819	Duplicate sample	->	0.0438	8 th w	G	[7	>

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

# LDC # V376 M VALIDATION FINDINGS WORKSHEET

Page:_	of
Reviewer:_	<u>~</u>
2nd reviewer:	Λ
	4

		Sample Calculation Veri	fication	Reviev 2nd reviev	ver:
METH	OD: Inorganics, Metho	d 7196A			7
CA N	N/A Have results N/A Are results w	ow for all questions answered "N". Not appl been reported and calculated correctly? ithin the calibrated range of the instrument tion limits below the CRQL?		e identified as "N/	A".
Comp recalc	ound (analyte) results fullated and verified using	g the following equation:	repo	orted with a positiv	ve detect were
	tration =	Recalculation:			
F				1	<del>                                     </del>
#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
#	Sample ID	Analyte		1	
#	Sample ID	Analyte		1	
#	Sample ID	Analyte		1	
#	Sample ID	Analyte		1	
#	Sample ID	Analyte		1	
#	Sample ID	Analyte		1	
#	Sample ID	Analyte		1	

Note:	

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 6, 2010

**LDC Report** Date:

August 20, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

Validation Level:

EPA Level III

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002835

# Sample Identification

MW-21-5

MW-21-4

MW-21-3

MW-21-2

MW-21-1

EB-10-08/06/10

MW-21-3MS

MW-21-3MSD

# Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

# I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

# II. Calibration

# a. Initial Calibration

All criteria for the initial calibration of each method were met.

# b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

# IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

# V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

# VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

# VII. Sample Result Verification

Raw data were not reviewed for this SDG.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

# IX. Field Duplicates

No field duplicates were identified in this SDG.

# X. Field Blanks

Sample EB-10-08/06/10 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002835

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002835

No Sample Data Qualified in this SDG

SDG#	: 23761B6 #: P1002835 atory: Columbia Ana		L	LETENESS Level III	S WORKSHEET	Date: 8/16/1 Page:
METH	OD: Hexavalent Ch	romium (EPA	A SW846 Method 7	7196A)		
The savalida	amples listed below tion findings worksh	were reviewe eets.	ed for each of the fo	ollowing valida	ation areas. Validation fir	ndings are noted in attached
	Valida	tion Area			Comments	<b>3</b>
1.	Technical holding time	es	A	Sampling dates	8/6/10	
lla.	Initial calibration		A			
IIb.	Calibration verification	1	A			
III.	Blanks		A			
IV	Matrix Spike/Matrix Sp	oike Duplicates	A	3 hs/p	150	
V	Duplicates		N	,		
VI.	Laboratory control sar	mples	A_	Lcg		
VII.	Sample result verifica	tion	N			
VIII.	Overall assessment of	f data				
IX.	Field duplicates		N			
x	Field blanks			EB=6		
Note: Validat	A = Acceptable N = Not provided/app SW = See worksheet ed Samples:		ND = No compound R = Rinsate FB = Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blank	
[ <del>-</del>	As_					
1	MW-21-5	11		21	31	
2	MVV-21-4	12		22	33	
3	MVV-21-3	13		23	33	
4	MVV-21-2	14		24	35	
5	MW-21-1	15		25 26	36	
6	EB-10-08/06/10	16		27	37	
7	MVV-21-3MS	18		28	38	
8	MW-21-3MSD	19		29	39	
10		20		30	40	

Notes:\_

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection** Date:

August 9, 2010

**LDC Report Date:** 

August 20, 2010

Matrix:

Water

Parameters:

Hexavalent Chromium

Validation Level:

**EPA Level III** 

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1002866

Sample Identification

MW-14-3

MW-14-2

MW-14-1

EB-11-08/09/10

MW-14-3MS

MW-14-3MSD

# Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

# I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

# II. Calibration

# a. Initial Calibration

All criteria for the initial calibration of each method were met.

# b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

# III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

# IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

# V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

# VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

# VII. Sample Result Verification

Raw data were not reviewed for this SDG.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

# IX. Field Duplicates

No field duplicates were identified in this SDG.

# X. Field Blanks

Sample EB-11-08/09/10 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1002866

No Sample Data Qualified in this SDG

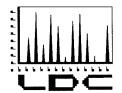
NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1002866

No Sample Data Qualified in this SDG

SDG#	: 23761C6 t: P1002866 atory: Columbia Analyt				PLETENES Level III	S WORKSHEE		Date: 8/16/L Page:lofl Reviewer: 2nd Reviewer:
METH	OD: Hexavalent Chro	mium (E	PA SW846	6 Method	7196A)			/
The sa	amples listed below we tion findings workshee	ere revie ets.	wed for ea	ch of the f	ollowing valid	ation areas. Valida	ation findings	are noted in attached
	Validatio	on Area				Con	nments	
1.	Technical holding times			A	Sampling dates	s: 8/9/10		
lla.	Initial calibration		·	A				
IIb.	Calibration verification			A				
III.	Blanks			A				
IV	Matrix Spike/Matrix Spike	e Duplicate	es.	A	7145/	mso		
V	Duplicates			N	) /			
VI.	Laboratory control samp	les		A	Log			
VII.	Sample result verification	n		N				
VIII.	Overall assessment of d	ata		A,				
IX.	Field duplicates			N				
L <sub>X</sub>	Field blanks			Mo	Bry			
Note: Validat	A = Acceptable N = Not provided/applica SW = See worksheet ed Samples:	able	R = Rir	lo compound nsate ield blank	ds detected	D = Duplicate TB = Trip blank EB = Equipment b	plank	
1	MW-14-3	11	MRS		21		31	
2	MVV-14-2	12			22		32	
3	MW-14-1	13			23		33	

	No.					
1	MVV-14-3	11	MR	21	31	
2	MW-14-2	12		22	. 32	
3	MW-14-1	13		23	33	
4	EB-11-08/09/10	14		24	34	
5	MW-14-3MS	15		25	35	
6	MW-14-3MSD	16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:	



# LABORATORY DATA CONSULTANTS, INC.

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Battelle 505 King Avenue Room 10-1-170 Columbus, OH 43201 ATTN: Ms. Betsy Cutie August 26, 2010

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on August 20, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

# **LDC Project # 23807:**

SDG#

**Fraction** 

BMI10072121, BMI10072246

Volatiles, Metals, Wet Chemistry

The data validation was performed under EPA Level III & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto

Operations Manager/Senior Chemist

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# NASA JPL Data Validation Reports LDC #23807

Volatiles



# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 20, 2010

**LDC Report Date:** 

August 25, 2010

Matrix:

Water

Parameters:

Volatiles

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072121

Sample Identification

MW-13

8-WM

DUPE-1-3Q10

# Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

# I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

# II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

# III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r<sup>2</sup>) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

# IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

# V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

# VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

# VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were not within QC limits. Since there were no associated samples, no data were qualified.

# VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

# IX. Regional Quality Assurance and Quality Control

Not applicable.

# X. Internal Standards

All internal standard areas and retention times were within QC limits.

# XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

# XII. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

# XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

# XIV. System Performance

Raw data were not reviewed for this SDG.

### XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

# XVI. Field Duplicates

Samples MW-8 and DUPE-1-3Q10 were identified as field duplicates. No volatiles were detected in any of the samples.

# XVII. Field Blanks

No field blanks were identified in this SDG.

NASA JPL Volatiles - Data Qualification Summary - SDG BMI10072121

No Sample Data Qualified in this SDG

NASA JPL Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI10072121

No Sample Data Qualified in this SDG

LDC #: 23807A1	VALIDATION COMPLETENESS WORKSHEET
SDG #: BMI10072121	Level III
Laboratory: <u>Alpha Analytical, In</u>	c. 524.2

2nd Reviewer

METHOD: GC/MS Volatiles (EPA SW846 Method-8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
1.	Technical holding times	<b>A</b>	Sampling dates: 7/20/10
11.	GC/MS Instrument performance check	A	/
III.	Initial calibration	$\triangle$	0/0 PSD ≤ 20 , r <sup>2</sup> ccr ≤ 30
IV.	Continuing calibration/	A	CC1 = 30
V.	Bianks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	MW-10 Ms/D m Ass. sample
VIII.	Laboratory control samples	A	ies
IX.	Regional Quality Assurance and Quality Control	· N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentitatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	4	
XVI.	Field duplicates	ND	D=2,3
XVII	Field blanks	Ν	

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples: water

	7					
1	MW-13	11	MBLK MS07WO	712	3 M	31
2	MW-8	12		22		32
3	DUPE-1-3Q10	13		23		33
4		14		24		34
5		15		25		35
6		16		26		36
7		17		27		37
8		18		28		38
9		19		29		39
10		20		30		40

### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 21, 2010

LDC Report Date:

August 25, 2010

Matrix:

Water

Parameters:

Volatiles

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072246

Sample Identification

MW-10

MW-10MS

MW-10MSD

### Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r<sup>2</sup>) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

### V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

### VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

### VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-10MS/MSD (MW-10)	Bromomethane	-	-	31.4 (≤20)	J (all detects)	А

### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

All internal standard areas and retention times were within QC limits.

### XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

### XII. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

### XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

### XIV. System Performance

Raw data were not reviewed for this SDG.

### XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### XVI. Field Duplicates

No field duplicates were identified in this SDG.

### XVII. Field Blanks

No field blanks were identified in this SDG.

### NASA JPL Volatiles - Data Qualification Summary - SDG BMI10072246

SDG	Sample	Compound	Flag	A or P	Reason
BMI10072246	MW-10	Bromomethane	J (all detects)	А	Matrix spike/Matrix spike duplicates (RPD)

**NASA JPL** 

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI10072246

No Sample Data Qualified in this SDG

LDC #:	23807B1	VALIDATION COMPLETENESS WORKSHEET
SDG #:	BMI10072246	Level III
Laborator	y: Alpha Analytical, In	524-2
METHOD	: GC/MS Volatiles (El	PA SW846 Method <del>8260B)*</del>

Date: 8/24/1C
Page: 1/of
Reviewer: 2nd Reviewer: 17

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
l.	Technical holding times	Δ	Sampling dates: 7/2 1/10
11.	GC/MS Instrument performance check	Δ	/
III.	Initial calibration	4	% psD ≤ 20, 12 CW ≤ 3 U
IV.	Continuing calibration/I <del>CV</del>	$\wedge$	CUL3U
V.	Blanks	Δ	
VI.	Surrogate spikes	A	· .
VII	Matrix spike/Matrix spike duplicates	2	
VIII.	Laboratory control samples	A	Les
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	,
XIII.	Tentitatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

Note: A =

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

d

D = Duplicate
TB = Trip blank

R = Rinsate FB = Field blank

EB = Equipment blank

Validated Samples:

	wates		- Parker - P				
1	MW-10	11	MBLK MSO7WO7	2-13	M	31	
2	mw-10ms	12		22		32	
3	MW-10MS17	. 13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		. 17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

# TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method 524.2)

A. Chloromethane	Q. 1,2-Dichloropropene	QG. Xylenes, total	WW. Bromobenzene	MMM. Naphthalene
B. Bromomethane	R. cis-1,3-Dichloropropens	HH. Vinyi acetate	XX. 1,2,3-Trichioropropane	NNN. 1,2,3-Trichlorobenzene
C. Vinyi choride	S. Trichloroethene	ii. 2-Chioroethyivinyi ether	YY. n-Propylbenzene	000. 1,3,5-Trichiorobenzene
D. Chloroethane	T. Dibromochioromethane	JJ. Dichlorodifluoromethane	ZZ. 2-Chlorotoluene	PPP. trans-1,2-Dichloroethene
E. Methylene chloride	U. 1,1,2-Trichloroethane	KK. Trichlorofluoromethane	AAA. 1,3,5-Trimethylbenzene	QQQ. cis-1,2-Dichloroethens
F. Acetone	V. Benzene	LL. Methyl-tert-butyl ether	BBB. 4-Chlorotoluene	RRR. m,p-Xylenes
G. Carbon disuifide	W. trans-1,3-Dichloropropens	MM. 1,2-Dibromo-3-chloropropane	CCC. tert-Butylbenzene	SSS. o-Xylene
H. 1,1-Dichloroethene	X. Bromoform	NN. Diethyl ether	DDD. 1,2,4-Trimethylbenzene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane
1. 1,1-Dichloroethane	Y. 4-Methyl-2-pentanone	00, 2,2-Dichloropropane	EEE. sec-Butylbenzene	UUU. Benzyl chloride
J. 1,2-Dichloroethene, total	Z. 2-Hexanone	PP. Bromochloromethane	FFF, 1,3-Dichlorobenzene	VVV. 4-Ethyltoluene
K. Chloraform	AA. Tetrachloroethene	QQ. 1,1-Dichloropropene	GGG. p-Isopropyltoluene	WWW. Ethanol
L. 1,2-Dichloroethane	BB. 1,1,2,2-Tetrachloroethane	RR. Dibromomethane	HHH. 1,4-Dichlorobenzene	XXX. Ethyl ether
M. 2-Butanone	CC. Toluene	SS. 1,3-Dichloropropane	III. n-Butylbenzene	
N. 1,1,1-Trichioroethane	DD. Chiorobenzene	TT. 1,2-Dibromoethane	JJJ. 1,2-Dichlorobenzene	
O. Carbon tetrachioride	EE. Ethylbenzene	UU. 1,1,1,2-Tetrachloroethane	KKK. 1,2,4-Trichlorobenzene	
P. Bromodichioromethane	FF. Styrene	W. Isopropylbenzene	LLL. Hexachiorobutadiene	

SS	
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	COMPNDL 185

LDC #: 23 807B SDG #:

## Matrix Spike/Matrix Spike Duplicates VALIDATION FINDINGS WORKSHEET

Page: Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

YN N/A

Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG? (Not required)

YN N/A

Were a MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

) ,				MS	-	MSD			
#	Date	Ms/msD ID	Compouna	AK (LIMITS)		%K (LIMITS)	HPD (LIMITS)	Associated Samples	Qualifications
		2+3	8	)	î	( )	3/4 ( 20)		1/4 at
		-		•	^	)	)		
				)	_		•		
				)	(	( )	( )		
				J	_	)	)		
				•	H	(	( )		
				)	<u> </u>	( )	( )		
				)	^	)			
				)	<b>1</b>	)	)	·	
				)	<u> </u>	)	( )		
				)	$\overline{}$	( )	( )		
				)	^	(	( )		
				)	<u> </u>	)	( )		
				)	^	)	( )		
				)	^	)	( )		
				)	^	)	( )		
				)	^	)	( ) (		
				)	^	)	( )		
		Compound	ac Lim	QC Limits (Water)	RPD	RPD (Water)	Compound	QC Limits (Water)	RPD (Water)
Ö	Vinyi chloride	de	8	70-130%		<30 V	Benzene	70-130%	<30
ľ	1,2-Dichloroethane	oethane	8	70-130%	-	<30 R	cis-1,3-Dichloropropene	70-130%	<30
o.	Carbon tetrachloride	achloride	2	70-130%	-	<30 ×	Bromoform	70-130%	<30
Ö	1,2-Dichloropropane	opropane	2	70-130%		<30 AA	Tetrachloroethene	70-130%	<30
o,	Trichloroethene	hene	22	70-130%		<30	1,2-Dibromoethane	70-130%	<30
j.	1,1,2-Trichloroethane	oroethane	20	70-130%		<30 ННН	1,4-Dichlorobenzene	70-130%	<30

### NASA JPL Data Validation Reports LDC #23807

Metals



### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 20, 2010

**LDC Report Date:** 

August 25, 2010

Matrix:

Water

Parameters:

Chromium

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072121

Sample Identification

MW-13

MW-8

**DUPE-1-3Q10** 

### Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

### III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

### IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium was found in the initial, continuing and preparation blanks.

### V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

### VI. Matrix Spike Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### IX. Internal Standards (ICP-MS)

Raw data were not reviewed for this SDG.

### X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

### XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

### XII. Sample Result Verification

Raw data were not reviewed for this SDG.

### XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### XIV. Field Duplicates

Samples MW-8 and DUPE-1-3Q10 were identified as field duplicates. No chromium was detected in any of the samples.

### XV. Field Blanks

No field blanks were identified in this SDG.

NASA JPL Metals - Data Qualification Summary - SDG BMI10072121

No Sample Data Qualified in this SDG

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI10072121

No Sample Data Qualified in this SDG

SDG #	#:23807A4 #:BMI10072121 atory:_Alpha_Analyti			PLETENESS _evel	WORKSHEET	Date: 8 Page: 1 Reviewer: 4 2nd Reviewer: 4	-24-10 of 1 MG
METH	IOD: Cr (EPA Meth	od 200.8)				Zha Neviewen	
	amples listed below tion findings worksh		each of the f	ollowing valida	tion areas. Validation	findings are noted in atta	ached
	Valida	ition Area			Comme	nts	
1.	Technical holding tim	es	A	Sampling dates:	7-20-10		
11.	ICP/MS Tune		A				
J11.	Calibration		A				
IV.	Blanks		À				-
٧.	ICP Interference Che	ck Sample (ICS) Analys	sis A				
VI.	Matrix Spike Analysis		N	client	specified		
VII.	Duplicate Sample An	alysis	N	iı	li		
VIII.	Laboratory Control Sa	amples (LCS)	A	LCS			
IX.	Internal Standard (ICI	P-MS)	N N	not ver	riewed		
Χ.	Furnace Atomic Abso	rption QC	N	not ut	lized		
XI.	ICP Serial Dilution		N	not per	formed		
XII	Sample Result Verific	ation	N	,			
XIII.	Overall Assessment	of Data	Α				
XIV.	Field Duplicates		ND	D=2+3	3		
ΧV	Field Blanks		N				,
Note: /alidate	A = Acceptable N = Not provided/app SW = See worksheet ed Samples: All Water	licable R =	= No compound Rinsate = Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blank		
1	MW-13	11		21		31	
2	MW-8	12		22		32	
3	DUPE-1-3Q10	13	, , , , , , , , , , , , , , , , , , , ,	23		33	
4	PBW	14		24		34	
5		15		25		35	
6		16		26		36	
7	•	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 21, 2010

**LDC Report Date:** 

August 25, 2010

Matrix:

Water

Parameters:

Chromium

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072246

Sample Identification

MW-10 MW-15\*\*

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

### III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

### IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium was found in the initial, continuing and preparation blanks.

### V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

### VI. Matrix Spike Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

### XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

### XII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### XIV. Field Duplicates

No field duplicates were identified in this SDG.

### XV. Field Blanks

No field blanks were identified in this SDG.

NASA JPL Metals - Data Qualification Summary - SDG BMI10072246

No Sample Data Qualified in this SDG

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI10072246

No Sample Data Qualified in this SDG

SDG : Labor	#: 23807B4 #: BMI10072246 atory: Alpha Analy	6 rtical, Inc.	DATION		PLETEN evel III/I		KSHEET	Date: 8-24-10 Page: 1 of 1 Reviewer: MG 2nd Reviewer:
The s		w were reviewe	ed for eac	h of the f	following	validation area	as. Validation fin	dings are noted in attached
	Valid	dation Area					Comments	
1.	Technical holding ti			A	Sampling	dates: 7-	21-10	
11.	ICP/MS Tune			A	1			
	Calibration			A				
IV.	Blanks			A				
V.	ICP Interference Ch	neck Sample (ICS)	Analysis	A				
VI.	Matrix Spike Analys			7	CI	ient spec	ified	
VII.	Duplicate Sample A			N	1		(1	
VIII.	Laboratory Control	Samples (LCS)		Α	LCS			
IX.	Internal Standard (I	CP-MS)		Α	not	veriewed	l for level	Щ
X.	Furnace Atomic Ab	sorption QC		N	not	utilized		
XI.	ICP Serial Dilution			N	not	perform	ed	
XII.	Sample Result Veri	fication		A	Not revie	wed for Level III v	/alidation.	
XIII.	Overall Assessmen	t of Data		Α				
XIV.	Field Duplicates			N				
XV	Field Blanks			7				
Note: Validat	A = Acceptable N = Not provided/ap SVV = See workshe ed Samples: ** Indica	et	R = Rins FB = Fie	ld blank			olicate ip blank quipment blank	
1	MW-10	11			21		24	
2	MW-15**	12			22		31	
3	PBW	13			23		33	
4	1900	14	······································		24	•	33	
5		15			25		35	
6		16	••••		26		36	
7		17			. 27		37	
8		18			28		38	
9	-	19			29		39	·
10		20			30		40	

LDC #: 2380784

### VALIDATION FINDINGS CHECKLIST

Page: \_\_\_of\_2 Reviewer: \_\_\_\_\_\_ 2nd Reviewer: \_\_\_\_\_

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Method: Metals (EPA SVV 846 Method 60 106/1000/0020)								
Validation Area	Yes	No	NA	Findings/Comments				
I. Technical holding times			· · ·					
All technical holding times were met.	$\checkmark$							
Cooler temperature criteria was met.	V							
II. ICP/MS Tune			<del></del>					
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/							
Were %RSD of isotopes in the tuning solution ≤5%?	/							
III. Calibration			,					
Were all instruments calibrated daily, each set-up time?	/							
Were the proper number of standards used?	/							
Were all initial and continuing calibration verification %Rs within the 90-110% (80- 120% for mercury) QC limits?	/							
Were all initial calibration correlation coefficients > 0.995?	/							
IV. Blanks								
Was a method blank associated with every sample in this SDG?								
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/						
V. ICP Interference Check Sample								
Were ICP interference check samples performed daily?	/							
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	1							
VI. Matrix spike/Matrix spike duplicates								
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil /(Water)		/						
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/					
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.			/					
VII. Laboratory control samples	,	·	·					
Was an LCS anaylzed for this SDG?	V	ļ	<u> </u>					
Was an LCS analyzed per extraction batch?	/		-					
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/							

LDC#: 23807B4

### VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			<b>V</b>	
Do all applicable analysies have duplicate injections? (Level IV only)			<b>/</b>	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			<b>V</b>	
Were analytical spike recoveries within the 85-115% QC limits?			V	
IX. ICP Serial Dilution		<u> </u>		
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?		/		
Were all percent differences (%Ds) < 10%?			/	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			V	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)	,	т .	T	
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?	<u> </u>		V	
XI. Regional Quality Assurance and Quality Control		T /	<del></del>	T
Were performance evaluation (PE) samples performed?		/	ļ ,	
Were the performance evaluation (PE) samples within the acceptance limits?	<u> </u>		V	
XII. Sample Result Verification	1	1	Т	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/		<u> </u>	
XIII. Overall assessment of data		· · · · · · · · · · · · · · · · · · ·	<del></del>	
Overall assessment of data was found to be acceptable.	/	<u> </u>		
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		/		,
Target analytes were detected in the field duplicates.			1	1
XV. Field blanks			/	
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.			<u>ر</u>	1

23807B4 LDC #:

## Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 2nd Reviewer: Reviewer:\_

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 True

W.

Where, Found = concentration (in ug/L) of each analyte <u>measured</u> in the analysis of the ICV or CCV solution True = concentration (in ug/L) of each analyte in the ICV or CCV source

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
A91	ICP (Initial calibration)						
914.1 TOV	ICP/MS (Initial calibration)	Cr	51.48	50.00	103	not reported	>
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
138e	ICP/MS (Continuing calibration)	Š	104.50	100.001	h01	105	>
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation):						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC# 2380784

### VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: | of |

2nd Reviewer: Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found × 100 True

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

Concentration of each analyte in the source. True ==

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$ (S+D)/2

S = Original sample concentration D = Duplicate sample concentration Where,

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

%D = [I-SDR] × 100

Where, I = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading  $\times$  5)

Element (units) %R / RPD / %D
0
Cr 0.0461 (7/L) 0.05 (m3/L) (SSR-SR)
1

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

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LDC # SDG #	·	807B4 		INDINGS WORKSHE	Reviewer: MG
			•		2nd reviewer:
METH	OD: Tra	ce Metals (EPA SW 846	Method 6010/7000	)	
Please YN N N N	N/A N/A	Have results been repo	orted and calculated alibrated range of t	d correctly?	tions are identified as "N/A".  the linear range of the ICP?
	ed analy ng equal	te results for <u>leve</u> ion:	1 IV sample	= N.D.	_ were recalculated and verified using the
Concent	ration =	(RD)(FV)(Dil) (In. Vol.)(%S)	Re	ecalculation:	
RD	=	Raw data concentration		,	
FV	=	Final volume (ml)			
in. Vol.	<b>=</b> .	initial volume (ml) or weight	G)		
Dil	=	Dilution factor			
D/ C		Desimal margaret policle			

Sample ID	Analyte	Reported Concentration	Calculated Concentration	Acceptable (Y/N)
Valingino 12	Zalanja.	<del>  `                                   </del>	<u> </u>	(Y/N)
				· · · · · · · · · · · · · · · · · · ·
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### NASA JPL Data Validation Reports LDC #23807

Wet Chemistry



### Laboratory Data Consultants, Inc. **Data Validation Report**

Project/Site Name:

NASA JPL

**Collection Date:** 

July 20, 2010

**LDC Report Date:** 

August 25, 2010

Matrix:

Water

Parameters:

Wet Chemistry

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072121

Sample Identification

MW-13

8-WM

**DUPE-1-3Q10** 

### Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate, and EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations was found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-10MS/MSD (All samples in SDG BMI10072121)	Perchlorate	134 (80-120)	133 (80-120)	-	J (all detects)	A

### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

Raw data were not reviewed for this SDG.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

Samples MW-8 and DUPE-1-3Q10 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

	Concentra		
Analyte	MW-8	DUPE-1-3Q10	RPD
Chloride	6.8	6.1	11
Nitrate as N	0.80	0.70	13
Sulfate	24	24	0

### X. Field Blanks

No field blanks were identified in this SDG.

### NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI10072121

SDG	Sample	Analyte	Flag	A or P	Reason
BMI10072121	MW-13 MW-8 DUPE-1-3Q10	Perchlorate	J (all detects)	А	Matrix spike/Matrix spike duplicates (%R)

NASA JPL
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI10072121

No Sample Data Qualified in this SDG

	#: <u>23807A6</u> #: BMI10072121	VALIDA		PLETENES Level III	SS W	ORKSHEET		Date: <b>8 - 24 -</b> 1 Page: <u>I</u> of <u>I</u>
	atory: <u>Alpha Analytical, In</u>	C						Reviewer: M(s 2nd Reviewer:
	HOD: Chloride, Nitrate-N,							
	amples listed below were tion findings worksheets.	reviewed f	or each of the f	following valid	datior	areas. Validatio	n findin	ngs are noted in attached
	Validation	Area				Comm	ents	
١.	Technical holding times		A	Sampling date	s:	7-20-10		
IIa.	Initial calibration		A			- <del></del>		
IIb.	Calibration verification		A					
Ш.	Blanks		A					
IV	Matrix Spike/Matrix Spike Du	plicates	SW	MS/M	e D	(SDG: BM	I100	72246)
V	Duplicates		N				,	
VI.	Laboratory control samples		Α	LCS				
VII.	Sample result verification		N					
VIII.	Overall assessment of data		A					
IX.	Field duplicates		SW	D=2+	3			
- 1/X. - Y	Field blanks		N					
ote:	A = Acceptable N = Not provided/applicable SW = See worksheet	F	ID = No compound R = Rinsate B = Field blank	ds detected	Τ	) = Duplicate B = Trip blank B = Equipment blank	ζ	
===	all water							٦
1	MW-13	11		21			31	
2	MW-8	12		22			32	
3	DUPE-1-3Q10	13		23			33	
- 1	PBW	14		24			34	

	yll water				
1	MW-13	11	21	31	
2	MW-8	12	22	32	
3	DUPE-1-3Q10	13	23	33	
4	PBW	14	24	34	
5		15	25	35	
6		16	26	36	
7		17	27	. 37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

Notes:	

LDC #: 23807A6

### VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page:_	<u>l of l</u>
Reviewer:	. 1 /
2nd reviewer:	

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1->3	W	PH TOS COF NO NO SO PO ALK CN NH3 TKN TOC CR CO
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		ph TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		ph tds ci f no3 no2 so4 po4 alk cn nh3 tkn toc cr6+ cio4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		ph tds ci f NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
·		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CLE NO, NO, SO, PO, ALK CN NH, TKN TOC CR6+ CIO,

Comments:				

LDC #: 33807A6 SDG #:

### Matrix Spike/Matrix Spike Duplicates VALIDATION FINDINGS WORKSHEET

Page: 2nd Reviewer: Reviewer:

> Cover METHOD: Inorganics, EPA Method See

Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

| N N/A | Was a matrix spike analyzed for each matrix in this SDG? Y (N) N/A

Were all duplicate sample relative percent differences (RPD) < 20% for water samples and <35% for soil samples? of 4 or more, no action was taken. LEVEL IV ONLY: (Y)N N/A

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations. Y N N/A

ı		***************************************						
*	ai asw/sw	Matrix	Analyte	MS MSD %Recovery %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
_	3 V	water	5104	134. (80-120)	133. (80-120)		a11	Johns /A
1 "								
<b>.</b>								
								100000000000000000000000000000000000000
Π								
Г								
П								
П								
1 6	omments:							
5								
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#### LDC#\_23807A6\_

#### **VALIDATION FINDINGS WORKSHEET**

#### **Field Duplicates**

	Page:_	of_/_
	Reviewer:	MG
2nd	Reviewer.	1~

Inorganics, Method See Cover

Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Concentrat	tion (mg/L)		
Analyte	2	3	RPD -(≤50) か付	
Chloride	6.8	6.1	11	
Nitrate as N	0.80	0.70	13	
Sulfate	24	24	0	

V:\FIELD DUPLICATES\FD\_inorganic\23807A6.WPD

### Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** 

NASA JPL

**Collection Date:** 

July 21, 2010

**LDC Report Date:** 

August 25, 2010

Matrix:

Water

Parameters:

Perchlorate

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072246

Sample Identification

MW-10

MW-10MS

MW-10MSD

#### Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

#### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. Calibration

#### a. Initial Calibration

All criteria for the initial calibration of each method were met.

#### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

#### III. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the initial, continuing and preparation blanks.

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-10MS/MSD (All samples in SDG BMI10072246)	Perchlorate	134 (80-120)	133 (80-120)	•	J (all detects)	A

#### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

#### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

#### VII. Sample Result Verification

Raw data were not reviewed for this SDG.

#### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Field Blanks

No field blanks were identified in this SDG.

NASA JPL Perchlorate - Data Qualification Summary - SDG BMI10072246

SDG	Sample	Analyte	Flag	A or P	Reason
BMI10072246	MW-10	Perchlorate	J (all detects)	A	Matrix spike/Matrix spike duplicates (%R)

NASA JPL Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI10072246

No Sample Data Qualified in this SDG

SDG#	t: 23807B6 #: BMI10072246 atory: Alpha Analytical		IDATIO	N COM	PLETENES Level III	S WORKSI	HEET	Date: $\theta$ - $24$ - $1$ Page: $1$ of $1$ Reviewer: $M$ 2nd Reviewer:
	IOD: Perchlorate (EPA		·					
	amples listed below workshee		ved for ea	ch of the	following valid	ation areas. V	alidation finding	gs are noted in attached
	Validatio	on Area				<b>V</b>	Comments	
1.	Technical holding times		-	A	Sampling dates	s: 7-21	-10	
lla.	Initial calibration			Α				
IIb.	Calibration verification			A				
111.	Blanks			A				
IV	Matrix Spike/Matrix Spike	e Duplicates	5	sw	MS/MS	D		
V	Duplicates			N				,
VI.	Laboratory control sample	es		A	LCS			
VII.	Sample result verification	1		N		,		
VIII.	Overall assessment of da	ata		A			<u> </u>	
IX.	Field duplicates			N				
Lx_	Field blanks			N				
Note:	A = Acceptable N = Not provided/applica SW = See worksheet	able	R = Rin		ds detected	D = Duplicate TB = Trip bla EB = Equipm	nk	
Validate	ed Samples: Water							
1	MVV-10	11	<u></u>		21		31	
2	MW-10MS	12			22		32	
3	MW-10MSD	13			23		33	
4	PBW	14			24		34	
5		15			25		35	

1	MW-10	11	21	31
2	MW-10MS	12	. 22	32
3	MW-10MSD	13	23	33
4	PBW	14	24	34
5		15	25	35
6		16	26	36
7		17	27	37
8		18	28	38
9		19	29	39
10		20	. 30	40

LDC #: 33807B6

# VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: of Reviewer: MC

METHOD: Inorganics, EPA Method 314・〇

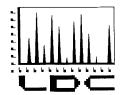
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  $|Y|_{N}$  N/A Was a matrix spike analyzed for each matrix in this SDG?

Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor (N/N/A

Were all duplicate sample relative percent differences (RPD) < 20% for water samples and <35% for soil samples? of 4 or more, no action was taken. (Y)N N/A W.

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations. ΑN N

*	DI DSW/SW	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
<u>:L:</u>		Water	COH	134. (80-120) 133. (80-120)	133. (80-120)		a1(	J dets/A
1	6							
L								
L								
<u>L</u>								
ຮື	Comments:							
1								



#### LABORATORY DATA CONSULTANTS, INC.

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Battelle 505 King Avenue Room 10-1-170 Columbus, OH 43201 ATTN: Ms. Betsy Cutie

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on August 23, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

#### **LDC Project # 23813:**

SDG#

**Fraction** 

BMI10072743, BMI10072744

Volatiles, Metals, Wet Chemistry

August 31, 2010

The data validation was performed under EPA Level III & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto

**Operations Manager/Senior Chemist** 

N-SON
DATE VOA Cr CI,SO <sub>4</sub> NO <sub>2</sub> -N O-PO <sub>4</sub> DUE (8260B) (200.8) (300.0) (300.0)
M S W S W S W S W S W S W S W S W
0 9 0 2
4 0 1 0 -

#### NASA JPL Data Validation Reports LDC #23813

Volatiles



### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 26, 2010

LDC Report Date:

August 31, 2010

Matrix:

Water

Parameters:

Volatiles

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072743

Sample Identification

MW-7

MW-16

MW-7MS

MW-7MSD

#### Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

#### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

#### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination  $(r^2)$  were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
7/28/10	Bromomethane	53.2	All samples in SDG BMI10072743	J (all detects) UJ (all non-detects)	P

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

#### V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

#### VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

#### VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-7MS/MSD (MW-7)	Bromomethane	- :	<del>-</del>	45.2 (≤20)	J (all detects)	, <b>A</b>

#### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

					- N
LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS MS07W0728M	Bromomethane	47 (70-130)	All samples in SDG BMI10072743	J (all detects) UJ (all non-detects)	Р

#### IX. Regional Quality Assurance and Quality Control

Not applicable.

#### X. Internal Standards

All internal standard areas and retention times were within QC limits.

#### XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

#### XII. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

#### XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

#### XIV. System Performance

Raw data were not reviewed for this SDG.

#### XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

#### XVI. Field Duplicates

No field duplicates were identified in this SDG.

#### XVII. Field Blanks

No field blanks were identified in this SDG.

NASA JPL Volatiles - Data Qualification Summary - SDG BMI10072743

SDG	Sample	Compound	Flag	A or P	Reason
BMI10072743	MW-7 MW-16	Bromomethane	J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)
BMI10072743	MW-7	Bromomethane	J (all detects)	А	Matrix spike/Matrix spike duplicates (RPD)
BMI10072743	MW-7 MW-16	Bromomethane	J (all detects) UJ (all non-detects)	Р	Laboratory control samples (%R)

**NASA JPL** 

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI10072743

No Sample Data Qualified in this SDG

	:: 23813A1 #: BMI10072743 atory: Alpha Analytical,		LIDATIO		evel III	ESS WORK	SHEET	Date: 4/32 Page: of / Reviewer: 7-1
The sa	IOD: GC/MS Volatiles amples listed below we tion findings workshee	ere revie		nod <del>8260B</del> )		alidation areas.	Validation findi	2nd Reviewer: V—  ngs are noted in attached
	Validatio	n Area					Comments	
	Technical holding times			A	Sampling d	ates: 1/2	6/10	
<del></del>	GC/MS Instrument perfor	mance ch	eck	4	- Camping a			
III.	Initial calibration	manoc or	io Cit	A	0/2	POD = 20	) 12	
IV.	Continuing calibration#C	<del>7</del>	<del> </del>	SW		LW = 3L		
V.	Blanks			A	1-/-			
VI.	Surrogate spikes			Δ				
VII	Matrix spike/Matrix spike	duplicates	3	SW	-			
VIII.	Laboratory control sample			SVA	ve	>		
IX.	Regional Quality Assurar		uality Control	N ·		······································	The state of the s	
Χ.	Internal standards			$\overline{V}$				
XI.	Target compound identifi	cation		N				
XII.	Compound quantitation/C		·, , , ,	N				
XIII.	Tentitatively identified co		(TICs)	N				
XIV.	System performance			N			W-14-7-7-12-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	
		<del></del>		- Δ	ž:			
XV.	Overall assessment of da	ata 		$\frac{1}{N}$				
XVI.	Field duplicates							
XVII.	Field blanks			$\sim$			·	
Note: Validat	A = Acceptable N = Not provided/applica SW = See worksheet ed Samples:	ble	R = Rir	lo compounds nsate ield blank	s detected	D = Dupli TB = Trip EB = Equ		
1+	MW-7.	11	MBLK	MSOTWE	2728M		31	
2	MW-16	12	1		22		32	
3	MW-7MS	13			23		33	
4	MW-7MSD	14			24		34	· ·
5	<u> </u>	15			25		35	
6		16			26		36	
7		17			27		37	

. 

# VALIDATION FINDINGS WORNSHEET Continuing Calibration

raye. 2nd Reviewer: Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

-UC#: 1 /01/1 SDG #: Au cours Alease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? N N N

Were all percent differences (%D) < 30% ?

Date	Standard ID	Compound	Finding %D (Limit: <30.0%)	Associated Samples	Qualifications
	C0821001	В	53.2	A//	JWJ #0
-					
$\vdash$					
Н					
$\vdash$					
				•	

# Matrix Spike/Matrix Spike Duplicates VALIDATION I TIDINGO TO COLONIA

METHOD: GC/MS VOA (EPA Method 524.2)

1011

DG #: ... DC #:

Pease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y. N. N/A. Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG? (Not required) X X X X

Were a MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

	<b>\</b> *	Date	OI OSW/SW	Compound	MS %R (Limits)		MSD %R (Limits)	- G	RPD (Limits)		Associated Samples	Qualfications
Compound	$\  \cdot \ $		244	22	•	_	)		_	( (	#	J/A del
Compound					_	(	)	)	)	^		
Carbon strachlaride					•	^	)	^	)	^		
		·			•	^	)	(	)	1		
					•	<u> </u>	<b>~</b>	(	)	)		
Compound					, )	7	<b>,</b>		•	7		
Carbon lettrachlorostherne					)	_	)		)	î		
Compound C					)	^	_	^	)	^		
Compound   Compound					_	^	)	(	)	^	-	
Compound   Compound					_	^	)	(	)	)		
Carbon tetrachloredtene   T70-130%   Trichloresthene   T70-130%   Trichloresthene   T70-130%   Trichloresthene   T70-130%   Trichloresthene   T70-130%   T10-130%					•	^	)	^	)	^		
Compound   Compound					•	^	)	(	)	^		
Campound					)	Û	)		)	î		
Compound   Compound					J	~	)	(	)	(		
Carbon tetrachloraethane   Carbon					_	^	)	^	)	(		
Compound   Compound					•	^	)		)	^		
Compound         QC Limits (Water)         RPD (Water)         N         Compound         QC Limits (Water)           Vinyl chloride         70-130%         <30					J	^	)	^	)			
Compound         QC Limits (Water)         RPD (Water)         N         Compound         QC Limits (Water)           Vinyl chloride         70-130%         <30         V         Berzene         70-130%         C-130%         70-130%         70-130%         70-130%         X         Bromdorm         70-130%         70-130%         X         Bromdorm         70-130%         X         AA         Tetrachloroethene         70-130%         X         1.2-Dibrioroethene         70-130%         X         1.1-2-Dibrioroethene         70-130%         X         X         1.1-2-Dibrioroethene         70-130%         X         X         1.1-2-Dibrioroethene         70-130%         X         X         1.1-2-Dibrioroethene         70-130%         X         X         X         X         X         X         X         X         X         X         X					)	î	)		)			
Vinyl chloride         70-130%         <30			Compound	ac Lin	nita (Water)	RPD	(Water)		Compoun	ַם	QC Limits (Water)	RPD (Water)
1,2-Dichloroethane         70-130%         <30         X         Bromoform         70-130%         70-130%           Carbon tetrachloride         70-130%         <30	Ö	╂	ride	F	2-130%		<30	>	Benzene		70-130%	<30
Carbon tetrachloride         70-130%         ×30         X         Bromoform         70-130%         70-130%           1,2-Dichloroptopane         70-130%         <30	نــــــــــــــــــــــــــــــــــــــ	╁	roethane	K	2-130%		<30	Ж	cis-1,3-Dichloropr	obene	70-130%	<30
1,2-Dichloroptopane         70-130%         <30         AA         Tetrachloroethene         70-130%           Trichloroethene         70-130%         <30	O	╀╌	trachloride	-	0-130%		<30	×	Bromoform		70-130%	<30
Trichloroethene         70-130%         <30         TT         1,2-Dibromoethene         70-130%           1.1.2-Trichloroethene         70-130%         <30	ø	╀	ropropane	_	0-130%		<30	AA	Tetrachloroethene		70-130%	<30
1.1.2-Trichloroethane 70-130% <30 HHH 1,4-Dichlorobenzene 70-130%	တ်	┼	thene	7	0-130%		<30	F	1,2-Dibromoether	9	70-130%	<30
	j	╫	hloroethane	7	70-130%		<30	뚶	1,4-Dichlorobenz	ene	70-130%	<30

# VALIDATION FINDINGS WORNSHEET Laboratory Control Samples (LCS)

rage: Reviewer: 2nd Reviewer:

, # OUT SDG #:

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS analyzed every 20 samples?

Y N N/A Was a LCS analyzed every 20 samples?

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

*	Date	LCS/LCSD ID	Compound	LCS %R (⊔mits)	(ts)	LCSD %R (Limits)		RPD (Limits)	Associated Samples	Qualifications
		MENTOWFORM SOI	ઈ)	47 (70-13C	( ०हा	)	)	( )	H	J/57/5
				)	(	)	(	( )		
				)	,	)	) (	( )		
				)	(	)	. (	( )		
				)	(	)	(	( )		
				)	^	)	1	( )		
				J	-	)	_	( )		
				)	`	)	<u> </u>	<u> </u>		
				)	)	)	)	( )		
				)	(	)	) (	( )		
				)	(	)	) (	( )		
				)	(	)	)	( )		
				)	(	)	)	( )		
				)	(	)	^	) (		
				)	(	)	^	^ ·		
	-			)	(	)	(	( )		
				)	(	)	-	( )		
				)	(	)	) [	( )		
		Compound	OC LIMIT	QC Limits (Water)	RPD (	RPD (Water)		Compound	QC Limits (Water)	RPD (Water)
Ö	Vinyi chloride	ride	5	70-130%	V	<30 V.	Benzene	91	70-130%	<30
نـ	1,2-Dichloroethane	roethane	હૃ	70-130%	٧	<30 R.	cis-1,3	cis-1,3-Dichloropropene	70-130%	<30
Ö	Carbon te	Carbon tetrachloride	ફ	70-130%	V	× × ×	Bromoform	form	70-130%	<30
ợ	1,2-Dichlo	1,2-Dichloropropane	26	70-136%	٧	<30 AA.	Tetraci	Tetrachloroethene	70-130%	<30
ø.	Trichloroethene	thene	767	70-130%	<b>v</b>	<30 TT.	1,2-Dib	1,2-Dibromoethane	70-130%	<30
j)	1,1,2-Trick	1,1,2-Trichioroethane	70-1	70-130%	<b>&gt;</b>	<30 ННН.	$\vdash$	1,4-Dichlorobenzene	70-130%	<30

### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 26, 2010

LDC Report Date:

August 31, 2010

Matrix:

Water

Parameters:

Volatiles

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072744

#### Sample Identification

MW-20-5

MW-20-4\*\*

MW-20-3

MW-20-2

MW-20-1

DUPE-02-3Q10

EB-01-07/26/10

TB-01-07/26/10

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

#### Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

#### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

#### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination  $(r^2)$  were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
7/28/10	Bromomethane	53.2	All samples in SDG BMI10072744	J (all detects) UJ (all non-detects)	Р

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

#### V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

#### VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

#### VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were not within QC limits. Since there were no associated samples, no data were qualified.

#### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS MS07W0728M	Bromomethane	47 (70-130)	All samples in SDG BMI10072744	J (all detects) UJ (all non-detects)	Р

#### IX. Regional Quality Assurance and Quality Control

Not applicable.

#### X. Internal Standards

All internal standard areas and retention times were within QC limits.

#### XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

#### XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

#### XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory. Raw data were not evaluated for the samples reviewed by Level III criteria.

#### XIV. System Performance

The system performance was within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

#### XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

#### XVI. Field Duplicates

Samples MW-20-3 and DUPE-02-3Q10 were identified as field duplicates. No volatiles were detected in any of the samples.

#### XVII. Field Blanks

Sample TB-01-07/26/10 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-01-07/26/10 was identified as an equipment blank. No volatile contaminants was found in this blank.

NASA JPL Volatiles - Data Qualification Summary - SDG BMI10072744

SDG	Sample	Compound	Flag	A or P	Reason
BMI10072744	MW-20-5 MW-20-4** MW-20-3 MW-20-2 MW-20-1 DUPE-02-3Q10 EB-01-07/26/10 TB-01-07/26/10	Bromomethane	J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)
BMI10072744	MW-20-5 MW-20-4** MW-20-3 MW-20-2 MW-20-1 DUPE-02-3Q10 EB-01-07/26/10 TB-01-07/26/10	Bromomethane	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)

NASA JPL Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI10072744

No Sample Data Qualified in this SDG

ETH e sa	BMI10072744  atory: Alpha Analytica  OD: GC/MS Volatile  amples listed below vilon findings workshe	es (EPA S\ were revie		5> √ od <del>8260B</del>	<del>)</del>	llidation area	s. Validatio	n findir	Reviev 2nd Reviev	wer:
	Validat	ion Area					Comm	ents		
i.	Technical holding times			Δ	Sampling da	ates: 7	126/10			
11.	GC/MS Instrument per		eck	Δ	,	. 1	<del> </del>		,	
III.	Initial calibration			A	% p.	SP 4 20	D y 2	7		
IV.	Continuing calibration/l	ICV		5W		100/ cc	N = 3 (	)		
V.	Blanks			Δ		- /				
VI.	Surrogate spikes			Δ				4		
<u>√II.</u>	Matrix spike/Matrix spil	ke duplicates	·	SW	Chieni	1 spec	· fuel v	W	1 MS/D "	Sample
/III.	Laboratory control sam			5 W	LUS	1	l l			1
IX.	Regional Quality Assur	rance and Q	uality Control	N						
Х.	Internal standards			Δ						
XI.	Target compound iden	itification		Δ	Not review	ed for Level III v	alidation.			
XII.	Compound quantitation			A	Not review	ed for Level III v	validation.			
XIII.	Tentitatively identified	compounds	(TICs)	V	Not review	ed for Level III v	validation.			
ΧίV,	System performance			Δ	Not review	ed for Level III v	validation.			
XV.	Overall assessment of	f data		A						
		Udla		מע	0 -	= 3,6				
XVI.	Field duplicates				10-	- 7, 0	TB = 8	/	· · · · · · · · · · · · · · · · · · ·	
CVII.	Field blanks			ND	<u> </u> E15		10-0	د 		
ote: . ilidate	A = Acceptable N = Not provided/appl SW = See worksheet ed Samples: ** Indicates		R = Rin FB = Fi	eld blank			olicate ip blank quipment bla	nk		
-	MW-20-5	11	NBLK	MSO	1~ 62] 2	& M		31		
-	MW-20-4**	12			22			32	· · · · · · · · · · · · · · · · · · ·	
-	MW-20-3	13			23			33		
- †	MW-20-2	14		4 11. 1 WF 1	24	·		34		
	MW-20-1	15			25			35		
	DUPE-02-3Q10	16			26			36		
	EB-01-07/26/10	17			27			37		

EB-01-07/26/10

TB-01-07/26/10

)C #:	23	813 B	<u> </u>
)G #:			

Page: / of 2
Reviewer: \_ f
2nd Reviewer: \_ \_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
Technical holding fimes				
technical holding times were met.				
poler temperature criteria was met.		-		
GC/MS Instrument performance check				
ere the BFB performance results reviewed and found to be within the specified teria?				
ere all samples analyzed within the 12 hour clock criteria?				
Initial calibration				
d the laboratory perform a 5 point calibration prior to sample analysis?	_			
ere all percent relative standard deviations (%RSD) < 20%?				
Continuing calibration				T
as a continuing calibration standard analyzed at least once every 12 hours for ach instrument?				
/ere all percent differences (%D) ≤ 30%?			<u>t                                    </u>	
Biaraks			т	T .
as a method blank associated with every sample in this SDG?				
as a method blank analyzed at least once every 12 hours for each matrix and oncentration?			_	
Vas there contamination in the method blanks? If yes, please see the Blanks alidation completeness worksheet.			1	
: Surrogala spikes	T	于	Τ	
Vere all surrogate %R within QC limits?	1	-	<del> </del>	
the percent recovery (%R) for one or more surrogates was out of QC limits, was reanalysis performed to confirm samples with %R outside of criteria?			سه	ł
a milestor				
Vas a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this				
Nere the MS/MSD percent recoveries (%R) and the relative percent differences			-	
RPD) within the QC limits? /III: Laboratory control samples	Т	1	T	T
Vas an LCS analyzed for this SDG?	+-	1-	+-	
Vas an LCS analyzed per analytical batch?	+-	<del>1</del> —	+	
Were the LCS percent recoveries (%R) and relative percent difference (RPD)			1	

)C #:	2381381
)G #:	

#### **VALIDATION FINDINGS CHECKLIST**

Page: 2of 2
Reviewer: 62
2nd Reviewer: 62

Validation Area	Yes	No	NA	Findings/Comments
IX Regional Cuality Assurance and Quality Control		-		1
Were performance evaluation (PE) samples performed?			1	
Were the performance evaluation (PE) samples within the acceptance limits?				
X Internal standards				
Were internal standard area counts within +/-40% from the associated calibration standard?				
Were retention times within - 30% of the last continuing calibration or +/- 50% of the initial calibration?				
XI. Target compound identification			·	7
Were relative retention times (RRT's) within $\pm$ 0.06 RRT units of the standard?	M			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?				
Kli. Compound quantitation/CRGtai				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?			_	
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		-		
XIII Tertalizely identified compounds (TICs)			Т	
Were the major ions (> 25 percent relative intensity) in the reference spectrum evaluated in sample spectrum?	_	_	_	
Were relative intensities of the major ions within $\pm$ 20% between the sample and the reference spectra?	-			
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?	_			
XIV. System performance		L		
System performance was found to be acceptable.				
XV. Everall assessment of data				T ·
Overall assessment of data was found to be acceptable.				
XVI. Field chiplicates			Т	
Field duplicate pairs were identified in this SDG.		<b> </b>	_	
Target compounds were detected in the field duplicates.			<u> </u>	
XVII. Field blanks			-	
Field blanks were identified in this SDG.		<u> </u>		
Target compounds were detected in the field blanks.				

METHOD: VOA (EPA Method 524.2)

A. Chioromethane	Q. 1,2-Dichloropropene	GG. Xylenes, total	WW. Bromobenzene	MMM. Naphthalene
B. Bromomethane	R. cle-i,3-Dichloropropene	HH. Vinyl acetate	XX. 1,2,3-Trichloropropane	NNN. 1,2,3-Trichiorobenzene
C. Vinyl choride	S. Trichioroethene	II. 2-Chloroethylvinyl ether	YY. n-Propylbenzene	OOO, 1,3,5-Trichlorobenzene
D. Chloroethane	T. Dibromochioromethene	JJ. Dichlorodifluoromethane	ZZ. 2-Chiorotoluene	PPP, trans-1,2-Dichloroethene
E. Methylene chloride	U. 1,1,2-Trichloroethane	KK. Trichlorofluoromethane	AAA. 1,3,5-Trimethylbenzene	QQQ. cis-1,2-Dichloroethene
F. Acetone	V. Benzene	LL. Methyl-tert-butyl ether	BBB, 4-Chlorotoluene	RRR. m,p-Xylenes
G. Carbon disulfide	W. trans-1,3-Dichloropropene	MM. 1,2-Dibromo-3-chloropropane	CCC. tert-Butylbenzene	SSS. o-Xylene
H. 1,1-Dichloroethene	X. Bromoform	NN. Diethyl ether	DDD. 1,2,4-Trimethylbenzene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane
1. 1,1-Dichloroethane	Y. 4-Methyl-2-pentanone	00. 2,2-Dichloropropane	EEE, sec-Butylbenzene	UUU. Benzyl chloride
J. 1,2-Dichloroethene, total	Z. 2-Hexanone	PP. Bromochioromethane	FFF. 1,3-Dichlorobenzene	VVV. 4-Ethyltoluene
K. Chloroform	AA. Tatrachioroethene	QQ. 1,1-Dichloropropene	GGG. p-Isopropyltoluene	WWW. Ethanol
L. 1,2-Dichloroethane	BB. 1,1,2,2-Tetrachloroethane	RR. Dibromomethane	HHH. 1,4-Dichlorobenzene	XXX. Ethyl ether
M. 2-Butanone	CC. Toluene	SS. 1,3-Dichloropropane	III. n-Butylbenzene	
N. 1,1,1-Trichioroethane	DD, Chiorobenzene	TT. 1,2-Dibromoethane	JJJ. 1,2-Dichlorobenzene	
O. Carbon tetrachloride	EE. Ethylbenzene	UU. 1,1,1,2-Tetrachioroethane	KKK 1,2,4-Trichlorobenzene	
P. Bromodichioromethane	FF. Styrene	W. isopropylbenzene	LLL. Hexachlorobutadiene	

Notes:

# VALIDATION FINDINGS IVORNOTEE Continuing Calibration

r ayr. 2nd Reviewer: Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

SDG #: 1 ا ا

Rease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Were all percent differences (%D) < 30% ? Y N N/A

) **	l i	Standard ID	Compound	Finding %D (Limit: <30.0%)	Associated Samples	Qualifications
	C1/8/L	E0812a01	B	53.2	4//	Ø/h//
	1					
				-		

VALIDATION FINDINGS WORNSHEET

rage: / or /

2nd Reviewer: Reviewer:

Laboratory Control Samples (LCS)

METHOD: GC/MS VOA (EPA Method 524.2)

SDG #: ALD COULT LUC #: / / ...

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Y N N/A Was a LCS analyzed for this SDG? 

Was a LCS analyzed every 20 samples?

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

*	Date	a cs/rcsb ib	Compound	LCS %R (Limits)	s nits)	LCSD %R (Limits)		RPD (Umits)	Associated Samples	Qualifications
		Mactor Losw sol	J B	97 (7C	(10-130)	)	H	( )	AII	1/WJ /P
				•	(	)	^	( )	-	1
				~	^		ㅣ	( )		
				)	(	)	^	( )		
	·			)	(	. )	_	^		
					^		뒴	(		
				)	(	)	<u> </u>	( )		
			ľ	)	(	)	-	(		
				)	(	)	_	( )		
				)	(	)	^	( )		
				)	(	)	1	(		
				)	(	)	1	( )		
				)	(	)	<u> </u>	( )		
				)	(	)	^	( )		
				)	(	)	(	( )		
				)	(	)	^	( )		
				)	(	)	<u> </u>	( )		
				)	)	)		( )		
		Compound	OC LIMI	QC Limits (Water)		RPD (Water)		Compound	QC Limits (Water)	RPD (Water)
Ö	Vinyl chloride	ride	70	70-130%	V	<30 V.	Be	Benzene	70-130%	<30
انـ	1,2-Dichloroethane	roethane	5	70-130%	•	<30 R.	cis	cis-1,3-Dichloropropene	70-130%	<30
o	Carbon te	Carbon tetrachloride	ģ	70-130%	_	× × 08>	Æ	Bromoform	70-130%	<30
ợ	1,2-Dichle	1,2-Dichloropropane	-07	70-130%	•	<30 AA.		Tetrachloroethene	70-130%	<30
ø.	Trichloroethene	thene	70-	70-130%	•	<30 TT.		1,2-Dibromoethane	70-130%	<30
j	1,1,2-Trick	1,1,2-Trichloroethane	-02	70-130%	v	<30 HHH.	Н	1,4-Dichlorobenzene	70-130%	<30

125 22 12 Book # 5001 A Court

# VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = (A\_\(C\_{b})/(A\_{b})(C\_{c})
sverage RRF = sum of the RRFs/number of standards
%RSD = 100 \* (S/X)

A<sub>k</sub> = Area of compound,
C<sub>k</sub> = Concentration of compound,
C<sub>k</sub> = Con
S = Standard deviation of the RRFs
X = Mean of the RRFs

A<sub>k</sub> = Area of associated internal standard C<sub>k</sub> = Concentration of internal standard

				Reported	Recalculated	Raportad	Recalculated	Reported	Recalculated
#	Standard ID	Callbration Date	Compound (Reference Internal Standard)	RRF ( し std)	RRF (1 ( std)	Average RRF (initial)	Average RRF (initial)	%RSD	%RSD
-	1C#1	2/14/10	ndard)	0	5244.0	0.314	p16-0	5-9	5.9
			じこ (2nd internal standard)	3.20	3.560	3,296	3.296	4.9	7.9
			(3rd internal standard)	1.81	1-87	1.789	1.789	7.5	7.5
2			(1st internal standard)				-		_
			(2nd internal standard)						
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
1			(3rd laternal standard)						
4			(1st internal standard)						
T		d	(2nd internal standard)		·				
			(3rd loternal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results,

LDC #: 23 8/3B SDG #:

## Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

2nd Reviewer: Page: Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF RRF = (A<sub>3</sub>)(C<sub>4</sub>)/(A<sub>4</sub>)(C<sub>3</sub>)

Where: ave. RRF = Initial calibration average RRF RRF - continuing calibration RRF

A<sub>x</sub> = Area of compound, C<sub>x</sub> = Concentration of compound,

 $A_{\rm b}$  = Area of associated internal standard  $C_{\rm b}$  = Concentration of internal standard

		,			Reported	Recalculated	Reported	Recalculated
*	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	RRF (CC)	RRF (CC)	a*	<b>Q%</b>
	ceV	01/20/L	Methylene chloride (1st Internal Standard)	418.0	0.266	2266	6-51	15.3
	10072803		Trichlorethene (2nd internal standard)	3.296	2-765	2-765	001	0.01
			ال ال ال ال ال ال ال ال ال ال ال ال ال ا	6821	1.6m	1-6x	2.6	2.6
N			Methylene chloride (1st Internal Standard)					
			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					
က			Methylene chloride (1st Internal Standard)					
			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					
4			Methylene chloride (1st Internal Standard)					
	·		Trichlorethene (2nd internal standard)					
			Bromoform (3rd Internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. LDC #: 238/3/3) SDG #: pu comes

## VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

Page:	/_of/_
Reviewer:	F7
2nd reviewer:	~~

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

#2 Sample ID:

sample iD:	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8	10	9.76	98	98	O
Bromofluorobenzene		9.35	94	94	1
1,2-Dichlorobenzene-d4		10.8/	10%	10%	

Semple ID:

sample iv:	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8				. "	
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

Sample ID:

sample iv	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4				•	

Sample ID:

sample iu:	Surrogate Surrogate Spiked Found		Percent Recovery	Percent Recovery	Percent Difference	
			Reported	Recalculated		
Toluene-d8						
Bromofluorobenzene						
1,2-Dichlorobenzene-d4				<u> </u>		

# Laboratory Control Sample Results Verification

Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* SSC/SA

Where: SSC = Spiked sample concentration SA = Spike added

RPD = | LCS - LCSD | \* 2/(LCS + LCSD)

LCS - Laboractry control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS ID: US> MSO7~0728 M

-Recalculated TCS/LCSD RPD Reported Recalc. Percent Recovery CSD Reported 3 Recalo. 20 9 5 5 Percent Recovery g ဍ Reported 9 0 9 0 9 CSD 42 Spiked Sample Concentration 6W) 9.39 20,00 **8**2 4:17 o, Ġ CSD √
2 Added Spike 2 2 807 0.0 Compound 1,1-Dichloroethene Chlorobenzene Trichloroethene Benzene Toluene

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results

LDC #:_	2	3	81	3	B	/
SDG #:_			c	w	4	/

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	/_of <u>/</u>
Reviewer:	<i>P</i>
2nd reviewer:	

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

	_		2					
Conce	ntration	$A_{\bullet} = \frac{(A_{\bullet})(I_{\bullet})(DF)}{(A_{\bullet})(RRF)(V_{\bullet})(\%S)}$		Example:				
A <sub>x</sub>	=	Area of the characteristic ion (EICP) for the compound to be measured	a.	Sample I.D.		·i		
A <u>.</u>	=	Area of the characteristic ion (EICP) for the specific internal standard						
L.	=	Amount of internal standard added in nanograms		Conc. = (	) (			
•		(ng)		(	) (	) (	: )(:	, )
RRF	=	Relative response factor of the calibration standard.			111			
V.	=	Volume or weight of sample pruged in milliliters (ml) or grams (g).		<b>=</b>				
Df		Dilution factor.			:	:		
<b>%</b> S	=	Percent solids, applicable to soils and solid metrices only.				·		

	matrices only.				
#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
-	Outlipe to				
	<u> </u>				
			<i>;</i>		
					_
			·		
-		·			

## NASA JPL Data Validation Reports LDC #23813

Metals



## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 26, 2010

LDC Report Date:

August 26, 2010

Matrix:

Water

Parameters:

Chromium

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072743

Sample Identification

MW-7 MW-16

## Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

## III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium was found in the initial, continuing and preparation blanks.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Internal Standards (ICP-MS)

Raw data were not reviewed for this SDG.

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

## XII. Sample Result Verification

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

No field duplicates were identified in this SDG.

## XV. Field Blanks

No field blanks were identified in this SDG.

NASA JPL Metals - Data Qualification Summary - SDG BMI10072743

No Sample Data Qualified in this SDG

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI10072743

No Sample Data Qualified in this SDG

G #	: 23813A4 : BMI10072743 atory: Alpha Analytic		DATION		LETEN _evel	ESS WORKS	HEET	Date: 8-23 Page: <u>I</u> of <u>I</u> Reviewer: <u>MG</u> 2nd Reviewer: <b>V</b> ∽	
TH	OD: Cr (EPA Metho	od 200.8)						Zila itaviawai.	
	imples listed below ion findings worksh		d for eac	h of the fo	ollowing v	alidation areas.	Validation find	ings are noted in attache	
	Valida	tion Area					Comments		
1	Technical holding time	es		A	Sampling	dates: 7-2	6-10		
l	ICP/MS Tune			A					
l	Calibration			A					
/ <sub>.</sub>	Blanks			A				***	
	ICP Interference Chec	k Sample (ICS)	Analysis	A				,	
	Matrix Spike Analysis			N	clie	nt specific	ed		
l	Duplicate Sample Ana	llysis		N	n	er			
11.	Laboratory Control Sa	mples (LCS)		Α	LCS				
	Internal Standard (ICF	P-MS)		N	not	reviewed	· · · · · · · · · · · · · · · · · · ·		
	Furnace Atomic Abso	rption QC		N	not i	utilized		·	
	ICP Serial Dilution			N	not performed				
1.	Sample Result Verific	ation		N					
11	Overall Assessment of	f Data		Δ_					
<b>V</b> .	Field Duplicates			N					
<b>/</b>	Field Blanks	ı		7					
ate	A = Acceptable N = Not provided/app SW = See worksheet ad Samples:  A[] Water		ND = No R = Rins FB = Fie		s detected	D = Duplica TB = Trip b EB = Equip			
T	mv/-7	11			21		31		
ľ	MW-16	12			22		32		
1	PBW	13			23		33	,	
		14			24		34		
		15			25		35		
		16			26		36		
		17			27		37		
		18			28		38		
		19			29		39		
		20	. —		30		40		

## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 26, 2010

LDC Report Date:

August 26, 2010

Matrix:

Water

Parameters:

Chromium

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072744

Sample Identification

MW-20-5

MW-20-4\*\*

MW-20-3

MW-20-2

MW-20-1

DUPE-02-3Q10

EB-01-07/26/10

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

## III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium was found in the initial, continuing and preparation blanks.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

## XII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

Samples MW-20-3 and DUPE-02-3Q10 were identified as field duplicates. No chromium was detected in any of the samples.

## XV. Field Blanks

Sample EB-01-07/26/10 was identified as an equipment blank. No chromium were found in this blank.

NASA JPL Metals - Data Qualification Summary - SDG BMI10072744

No Sample Data Qualified in this SDG

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI10072744

No Sample Data Qualified in this SDG

)G#	: 23813B4 t: BMI10072744 atory: Alpha Analytica			PLETENESS WOR evel III/IV		Date: 8-95- Page: 1_of 1 Reviewer: MG 2nd Reviewer:		
	OD: Cr (EPA Metho		or each of the t	following validation area				
	tion findings workshe		of edolf of the	onowing validation area	vandation intamig			
	Validat	ion Area			Comments			
1.	Technical holding times		A	Sampling dates: 7 -	26-10			
11.	ICP/MS Tune		A					
HI.	Calibration		A	:				
IV.	Blanks		A					
V.	ICP Interference Check	Sample (ICS) Ana	lysis A					
V1.	Matrix Spike Analysis		N	client specifi	ed			
√II.	Duplicate Sample Anal	ysis	. 2	u h				
/III.	Laboratory Control Sar	nples (LCS)	A	LCS				
IX.	Internal Standard (ICP-	·MS)	A	not reviewed	for level 111			
Х.	Furnace Atomic Absorp		N	not utilized				
 ХІ.	ICP Serial Dilution		N	not performe	<b>A</b>			
XII.	Sample Result Verifica	tion	A	Not reviewed for Level III validation.				
! \.</td <td>Overall Assessment of</td> <td></td> <td>A</td> <td></td> <td></td> <td></td>	Overall Assessment of		A					
(IV.	Field Duplicates		ND	D=3+6				
XV	Field Blanks		ND	EB = 7				
te: lid <b>a</b> te	A = Acceptable N = Not provided/appli SW = See worksheet ed Samples: ** Indicates	cable R	ID = No compoun R = Rinsate B = Field blank Level IV validatio	ds detected D = Dt TB = 1 EB = E	iplicate rip blank Equipment blank			
	MW-20-5	11		21	31			
	MW-20-4**	12		22	32			
	MW-20-3	13		23	33			
	MW-20-2	14	, y, , , , , , , , , , , , , , , , , ,	24	34			
	MW-20-1	15		25	35 -			
	DUPE-02-3Q10	16		26	36			
	EB-01-07/26/10	17		27	37			
	PBW	18		28	38			
		19		29	39			
		20		30	40			

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				·
All technical holding times were met.	/			
Cooler temperature criteria was met.				
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/			
Were %RSD of isotopes in the tuning solution ≤5%?				
III. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients > 0.995?				
IV. Blanks				`
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
VI. Matrix spike/Matrix spike duplicates			,	
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil (Water)		1		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.			1	
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?				
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

## **VALIDATION FINDINGS CHECKLIST**

Page: 2\_of\_2 Reviewer: \_\_\_\_\_\_ 2nd Reviewer: \_\_\_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			V	
Do all applicable analysies have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			1	
Were analytical spike recoveries within the 85-115% QC limits?			<u> </u>	
IX. ICP Serial Dilution			,	
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?		/		· .
Were all percent differences (%Ds) < 10%?			/	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			/	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)		· · · · · · · · · · · · · · · · · · ·	·	
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?			/	
XI. Regional Quality Assurance and Quality Control			- <del></del>	
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
XII. Sample Result Verification		<u> </u>	<del></del>	·
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Overall assessment of data			4:	
Overall assessment of data was found to be acceptable.	/			
XIV. Field duplicates	<del>-</del>			
Field duplicate pairs were identified in this SDG.	1			
Target analytes were detected in the field duplicates.				
XV. Field blanks				
Field blanks were identified in this SDG.	V	<u> </u>	4	
Target analytes were detected in the field blanks.		/		

LDC#: 33813 B4

# Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: Lof 1 Reviewer: 2nd Reviewer.\_

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

 $%R = Found \times 100$ True

Where, Found = concentration (in ug/L) of each analyte  $\underline{\text{measured}}$  in the analysis of the ICV or CCV solution True = concentration (in ug/L) of each analyte in the ICV or CCV source

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
2245 ICV	ICP/MS (Initial calibration)	S	50.30	50.00	001	001	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
1121 CCV	ICP/MS (Continuing calibration)	C.	91.11	20.00	901	901	
	CVAA (Continuing calibration)						·
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC# 33813 B4

## VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: \_\_of\_ Reviewer: H 2nd Reviewer:\_\_

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

 $%R = Found \times 100$ True

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD =  $\frac{|S-D|}{(S+D)/2} \times 100$ 

S = Original sample concentration D = Duplicate sample concentration Where,

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

%D = [I-SDR] × 100

Where, I = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	s) %R / RPD / %D	%R/RPD/%D	Acceptable (Y/N)
3302 ICSAB	ICP interference check	Š	203.50 (mg	303.50 (mg/L) 300.000 (mg/L)	102	not reported	>
0916	Laboratory control sample	Cr	0.0508 (mg/	0.0508 (mg/L) 0.05 (mg/L)	103	d0)	->
	Matrix spike		(SSR-SR)		.		1
	Duplicate	١					
	ICP serial dilution			•	•	١	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23813B4

Y)N N/A

ŶN N/A

Y)N N/A

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Are results within the calibrated range of the instruments and within the linear range of the ICP?

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Page:_	of
Reviewer:_	MG
2nd reviewer:	

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Are all detection limits below the CRDL?

Have results been reported and calculated correctly?

Detecto	ed analyte results for _ on:-	level IV sample = N.D.	were recalcu	lated and verified u	sin <del>g the followi</del> ng
Concent	ration = $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$	Recalculation:			
RD =V n. Vol. Dil	= Raw data conce = Final volume (mi = Initial volume (mi = Dilution factor	<b>i</b> )			
#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
		·			
	<del></del>				
<u> </u>					
	<u> </u>				
					,
	<u></u>				
				·	
					·
Note:_					

## NASA JPL Data Validation Reports LDC #23813

Wet Chemistry



## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 26, 2010

**LDC Report Date:** 

August 26, 2010

Matrix:

Water

Parameters:

Wet Chemistry

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072743

Sample Identification

MW-7

MW-16

MW-7MS

MW-7MSD

## Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate, and EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Calibration

## a. Initial Calibration

All criteria for the initial calibration of each method were met.

## b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

## III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations was found in the initial, continuing and preparation blanks.

## IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VII. Sample Result Verification

Raw data were not reviewed for this SDG.

## VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## IX. Field Duplicates

No field duplicates were identified in this SDG.

## X. Field Blanks

No field blanks were identified in this SDG.

NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI10072743

No Sample Data Qualified in this SDG

NASA JPL Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI10072743

No Sample Data Qualified in this SDG

SDG	#:23813A6 #:BMI10072743 atory:_Alpha Analyti			LETENESS _evel	WORKSHEET		
METH	HOD: Chloride, Nitra	ate-N, Nitrite-N, 0	Orthophosphate-	-P, Sulfate (EP	A Method 300.0), Per	rchlorate (EPA Method	d 314.0),
	amples listed below tion findings worksh		for each of the fo	ollowing validat	ion areas. Validation	findings are noted in	attached
	Valida	ation Area			Comme	nts	
1.	Technical holding tim	es	A	Sampling dates:	7-26-10		
lla.	Initial calibration		A				
llb.	Calibration verificatio	n	A			**************************************	
111.	Bianks		A	·			
IV	Matrix Spike/Matrix S	pike Duplicates	A	MS/MSD			
	Duplicates -		N				
VI.	Laboratory control sa	mples	A	LCS			
VII.	Sample result verifica	ation	8				
Vill.	Overall assessment	of data	A				
IX.	Field duplicates		7				
x	Field blanks		N				
Note: Valida	A = Acceptable N = Not provided/app SW = See workshee ted Samples: All WAY	olicable t	ND = No compound R = Rinsate FB = Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blank		
1	MW-7	11		21		31	
2	MW-16	12		22	ļ	32	
3	MW-7 <b>M</b> S	13		23		33	
4	MW-7MSD	14		24		34	
5	PBW	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	

Notes:		

LDC#: 23013A6

## VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page:_	1 of 1
Reviewer:	MC
2nd reviewer:	ام

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter — — — — — — — — — — — — — — — — — — —
1,2	٧	pH TDS (CI)F (NO3 (NO3 (SO4 (PO4) ALK CN NH3 TKN TOC CR8+ (CIO4)
ac 3,4	1	PH TDS (CI) F(NO) (NO) (SO) (PO) ALK CN' NH3 TKN TOC CR6+ (CIO4)
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		ph TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		ph TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		ph TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		ph TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		ph TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
-		PH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
·		PH TDS CLE NO, NO, SO, PO, ALK CN NH, TKN TOC CR6+ CIO,

Comments:	

## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 26, 2010

**LDC Report Date:** 

August 26, 2010

Matrix:

Water

Parameters:

Perchlorate

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072744

Sample Identification

MW-20-5

MW-20-4\*\*

MW-20-3

MW-20-2

MW-20-1

DUPE-02-3Q10

EB-01-07/26/10

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Calibration

## a. Initial Calibration

All criteria for the initial calibration of each method were met.

## b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

## III. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the initial, continuing and preparation blanks.

## IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## IX. Field Duplicates

Samples MW-20-3 and DUPE-02-3Q10 were identified as field duplicates. No perchlorate were detected in any of the samples.

## X. Field Blanks

Sample EB-01-07/26/10 was identified as an equipment blank. No perchlorate was found in this blank.

**NASA JPL** 

Perchlorate - Data Qualification Summary - SDG BMI10072744

No Sample Data Qualified in this SDG

NASA JPL

Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI10072744

No Sample Data Qualified in this SDG

LDC #: 23813B6	VALIDATION COMPLETENESS WORKSHEET	Date: 8-25-10
SDG #: BMI10072744	Level III/IV	Page:   of
Laboratory: Alpha Analytical, Ir	nc.	Page:of Reviewer: _ <i>MG</i>
		2nd Reviewer:

METHOD: Perchlorate (EPA Method 314.0)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
1	Technical holding times	A	Sampling dates: 7-26-10
lla.	Initial calibration	A	
IIb.	Calibration verification	Α	
[1].	Blanks	Α	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD (SDG: BMI10072743)
V	Duplicates	N	
VI.	Laboratory control samples	Α	LCS
VII.	Sample result verification	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	Α	
IX.	Field duplicates	DN	D=3+6
Х	Eleid blanks	NP	EB=7

Note: A = A

A = Acceptable N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples: \*\* Indicates sample underwent Level IV validation

-	all water	s sample underwent Level i	valuation		
1	MW-20-5	11	21	31	
2	MW-20-4**	12	22	32	
3	MW-20-3	13	23	33	
4	MW-20-2	14	24	34	
5	MW-20-1	15	25	35	
6	DUPE-02-3Q10	16	26	36	
7	EB-01-07/26/10	17	27	37	
8	PBW	18	28	38	
9		19	29	39	
10		20	30	40	

Notes:				

## **VALIDATION FINDINGS CHECKLIST**

Page: Lof\_ Reviewer: M 2nd Reviewer:

Wetnod:Inorganics (EPA Method 314.0 )				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	r		· -	
All technical holding times were met.	/			
Cooler temperature criteria was met.				
II. Calibration			·	
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	1			
Were all initial calibration correlation coefficients ≥ 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)	<u> </u>		V	
Were balance checks performed as required? (Level IV only)	<u></u>			
III. Blanks			····	
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates		<b>,</b>	· <del>y</del> -	
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	<b>√</b>			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	/			
V. Laboratory control samples	<del> , .</del>	· · · · · ·	T	
Was an LCS anaylzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/	ļ		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control	<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>	<del> </del>	<u>,</u>	
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			V	

LDC#: 23813 B6

## **VALIDATION FINDINGS CHECKLIST**

Page: 2 of 2
Reviewer: MG
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1			
Were detection limits < RL?	/		<u> </u>	
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	1			
Target analytes were detected in the field duplicates.		/		
X. Field blanks				
Field blanks were identified in this SDG.	1			
Target analytes were detected in the field blanks.				

LDC# 33813B6

## Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 1 of 1 2nd Reviewer: Reviewer:

> 314.0 METHOD: Inorganics, Method\_

was recalculated. Calibration date: The correlation coefficient (r) for the calibration of  $\frac{CIOH}{}$ 

3-24-10

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

Where,  $%R = Found \times 100$ True

Found = concentration of each analyte  $\underline{\text{measured}}$  in the analysis of the ICV or CCV solution True = concentration of each analyte in the ICV or CCV source

				<	Recalculated	Reported	
Type of Analysis	Analyte	Standard ID	Found (units)	ط ۲۰۶۷. True (units)	ror%R	r or %B	Acceptable (Y/N)
Initial calibration		Blank	(7) Em) 5.0	0			
		Standard 1	( 1 ) 0.1	0.00283			
		Standard 2	( ) 0.6	0.00511		•	
	·	Standard 3	5.0 ( )	0.01467	r=0.999 838	V-0 99928	>
	CIOT	Standard 4	( ) 0.01				<b>&gt;</b>
		Standard 5	25.0 ( )	917200			
		Standard 6	50.0 ( )	0.13868			-
		Standard 7	100.00	0.28248			
Calibration verification		8191					
	010 y	CCV	49.809 (mg/L)	49.809 (mg/L) 50.00 (mg/L)	99.6	9.66	
Calibration verification	1	)	١				. (
Calibration verification						1	

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 73813B6

## VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

2nd Reviewer: Reviewer. MG Page: \_\_of\_

METHOD: Inorganics, Method \_\_

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

Where, %R = Found × 100

Found =

concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

Where, RPD =  $\frac{|S-D|}{(S+D)/2} \times 100$ 

S 0

Duplicate sample concentration Original sample concentration

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	%R/RPD	%R/RPD	Acceptable (Y/N)
1(55	Laboratory control sample						
LCS		C104	34.845 (mg/) 35. (mg/)	25. (mg/)	99	66	>
1346	Matrix spike sample		(SSR-SR)				
MW-7 MS		Cloy	1 36.93 (mg/) 35. (mg/)	25. (mg/L)	80/	80)	
hoh1/9h81	Duplicate sample						
QSW/SW L-MW		$ClO_{m{\eta}}$	36.968 (mg/L) 37.730 (mg/L)	37.730 (mg/L)	2.0	2.0	>

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23813B6

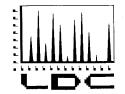
## **VALIDATION FINDINGS WORKSHEET**

## Sample Calculation Verification

Page:_	of(_
Reviewer:	MG
2nd reviewer:	$\sim$

METHOD: Inorganics, Metho				,
YN N/A Have results w YN N/A Are results w Are all detect	ow for all questions answered "N". Not appl been reported and calculated correctly? vithin the calibrated range of the instrument tion limits below the CRQL?	s?	e identified as "N//	<b>4</b> ".
Compound (analyte) results f recalculated and verified usin	for <u>level IV sample = N.D.</u>	·repo	<del>rted with a positiv</del>	re detect were
Concentration =	Recalculation:			
00//00//18 8.50//				
# Sample ID	Analyte	Reported Concentration	Calculated Concentration	Acceptable (Y/N)
# Sample ID	Analyse			
		·		

Note:	



## LABORATORY DATA CONSULTANTS, INC.

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Battelle 505 King Avenue Room 10-1-170 Columbus, OH 43201 ATTN: Ms. Betsy Cutie

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on August 25, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

## **LDC Project # 23831:**

SDG#

**Fraction** 

BMI10072804, BMI10072901

Volatiles, Chromium, Perchlorate

September 8, 2010

The data validation was performed under EPA Level III & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto

**Operations Manager/Senior Chemist** 

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LDC #23831		<i>α</i>																					,
LDC	CLO <sub>4</sub> (314.0)	<i>γ</i>	11 0	1 0	0																		,
	Cr (200.8)	ς Α	11 0	0 1	7 0																		,
	VOA (524.2)	s M	12 0	1	7 0																		3
	(3) DATE DUE		09/16/10	09/16/10	09/16/10																		
	DATE REC'D	71) - 12 -	08/25/10	08/25/10	08/25/10																		
90/10 (client select)	*SDG#	Matrix: Water/Soil	BMI10072804	BMI10072804	BMI10072901	·														-		-	
	TDC	Matrix	4	4	В																		

## NASA JPL Data Validation Reports LDC #23831

Volatiles



## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 26 through July 27, 2010

LDC Report Date:

September 7, 2010

Matrix:

Water

**Parameters:** 

**Volatiles** 

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072804

## Sample Identification

MW-3-4

MW-3-3

MW-3-2\*\*

MW-4-3

MW-4-2

MW-4-1

DUPE-03-3Q10

EB-02-7/27/10

TB-02-7/27/10

MW-6

MW-5

MW-6MS

MW-6MSD

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 13 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r<sup>2</sup>) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
8/4/10	Chloromethane	34.1	All samples in SDG BMI10072804	J (all detects) UJ (all non-detects)	P

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-6MS/MSD (MW-6)	Bromomethane		-	32.8 (≤20)	J (all detects)	А

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS MS07W0804M	Chloromethane	66 (70-130)	All samples in SDG BMI10072804	J (all detects) UJ (all non-detects)	P

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## XIII. Tentatively Identified Compounds (TICs)

All tentatively identified compounds were within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## XIV. System Performance

The system performance was within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

Samples MW-4-1 and DUPE-03-3Q10 were identified as field duplicates. No volatiles were detected in any of the samples.

### XVII. Field Blanks

Sample TB-02-7/27/10 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-02-7/27/10 was identified as an equipment blank. No volatile contaminants was found in this blank.

NASA JPL Volatiles - Data Qualification Summary - SDG BMI10072804

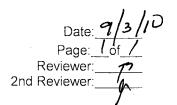
SDG	Sample	Compound	Flag	A or P	Reason
BMI10072804	MW-3-4 MW-3-3 MW-3-2** MW-4-3 MW-4-2 MW-4-1 DUPE-03-3Q10 EB-02-7/27/10 TB-02-7/27/10 MW-6 MW-5	Chloromethane	J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)
BMI10072804	MW-6	Bromomethane	J (all detects)	А	Matrix spike/Matrix spike duplicates (RPD)
BMI10072804	MW-3-4 MW-3-3 MW-3-2** MW-4-3 MW-4-2 MW-4-1 DUPE-03-3Q10 EB-02-7/27/10 TB-02-7/27/10 MW-6 MW-5	Chloromethane	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)

## NASA JPL

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI10072804

No Sample Data Qualified in this SDG

LDC # 23831A1	VALIDATION COMPLETENESS WORKSHEET
SDG #: BMI10072804	Level III/IV
Laboratory: Alpha Analytical, Inc	524.2
METHOD: GC/MS Volatiles (EP	A SW846 Method <del>8260B) -</del>



The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
l.	Technical holding times	Δ	Sampling dates: 7 26 - 7 27 10
11.	GC/MS Instrument performance check	A	
111.	Initial calibration	$\nabla$	% PSD = 20, 12
IV.	Continuing calibration/ICV	SW	1 CV   CCV = 30
V.	Blanks	Δ	
VI.	Surrogate spikes	A,	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII	Laboratory control samples	SW	LOS
įX.	Regional Quality Assurance and Quality Control	N	3
X.	Internal standards	Δ	
XI.	Target compound identification	Δ	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	Δ	Not reviewed for Level III validation.
XIV.	System performance	Δ	Not reviewed for Level III validation.
XV	Overall assessment of data	A	
"XVI.	Field duplicates	NN	D= 647
XVII.	Field blanks	ND	EB=8 TB=9

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples: \*\* Indicates sample underwent Level IV validation

	water						
1	MW-3-4	11	MVV-5	21	MBLK MSOTU	300 E	304M
2	MW-3-3	12	MW-6MS	22		32	
3	MW-3-2**	13	MW-6MSD	23		33	
4	MW-4-3	14		24		34	
5	MVV-4-2	15		25		35	
6	MW-4-1	16		26		36	
7	DUPE-03-3Q10	17		27		37	
8	EB-02-7/27/10	18		28		38	
5	TB-02-7/27/10	19		29		39	
10	MW-6	20		30		40	

Page: / of 2
Reviewer: F
2nd Reviewer: 4

Method: Volatiles (EPA Method 524.2)	,		,	
Validation Area	Yes	No	NA	Findings/Comments
Tachracel holding times				
Il technical holding times were met.				
Cooler temperature criteria was met.				
GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified citiera?	_			
Were all samples analyzed within the 12 hour clock criteria?				
Initial calibration	I		· · · ·	
Did the laboratory perform a 5 point calibration prior to sample analysis?	/			
Nere all percent relative standard deviations (%RSD) $\leq$ 20%?				
V Continuing calibration	l .		l	
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	_			
Were all percent differences (%D) ≤ 30%?				
/ Blanks			T	
Was a method blank associated with every sample in this SDG?	-		<del> </del>	
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?			ļ	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.			<u> </u>	
vi. Surrogata spikes	  -	F	Π	
Were all surrogate %R within QC limits?  If the percent recovery (%R) for one or more surrogates was out of QC limits, was		1		
a reanalysis performed to confirm samples with vert duside of critical		1		2 2
VIII: Metrix spike/Metrix spike duplicates  Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this				
SDG? Were the MS/MSD percent recoveries (%R) and the relative percent differences	-			
(RPD) within the QC limits?	1			
VIII Laboratory cerritrol samples		T	T	
Was an LCS analyzed for this SDG?	+	-	+-	
Was an LCS analyzed per analytical batch?  Were the LCS percent recoveries (%R) and relative percent difference (RPD)	f		+	
Were the LCS percent recoveries (%H) and relative percent unit of the percent units?	<u> </u>	<u></u>	<u></u>	

)C #:	2383/A	_\
)G #:	u cours	
	7	

## VALIDATION FINDINGS CHECKLIST

	Yes	No	NA	Findings/Comments
Validation Area	163	140	165	
X Regional Cuellity Assurance and Quality Control				7
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Internet standards	1			
Were internal standard area counts within +/-40% from the associated calibration standard?	/			
Were retention times within - 30% of the last continuing calibration or +/- 50% of the initial calibration?				
XL Target compound identification				
Were relative retention times (RRT's) within $\pm$ 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?			<u> </u>	
Were chromatogram peaks verified and accounted for?				
III. Compound quartitation/CHQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	/			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Tertimively identified compounds (TICs)		· · · · · ·	·	T
Were the majoritons (> 25 percent relative intensity) in the reference spectrum evaluated in sample spectrum?		,		:
Were relative intensities of the major ions within $\pm$ 20% between the sample and the reference spectra?				
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?				
XIV. System performance				
System performance was found to be acceptable.	./	<u> </u>		
XV Cyclel Basessmerk of Colo				
Overall assessment of data was found to be acceptable.	~	1		
W/: Fleid duplicates				
		1	T	
Field duplicate pairs were identified in this SDG.	+		1	
Target compounds were detected in the field duplicates.		1_		
XVII. Field blanks	т	1	<del>-</del>	T
Field blanks were identified in this SDG.	1_	<u> </u>	<u> </u>	
Target compounds were detected in the field blanks.	1	1		

METHOD: VOA (EPA Method 524.2)

A. Chioromethane	Q. 1,2-Dichloropropane	GG. Xylenes, total	WW. Bromobenzene	MMM. Naphthalene
B. Bromomethane	R. cis-1,3-Dichloropropens	HH. Vinyl acetate	XX. 1,2,3-Trichioropropane	NNN. 1,2,3-Trichlorobenzene
C. Vinyl choride	S. Trichloroethene	II. 2-Chloroethylvinyl ether	YY. n-Propylbenzene	000. 1,3,5-Trichiorobenzene
D. Chioroethane	T. Dibromochloromethane	JJ. Dichlorodifluoromethane	ZZ. 2-Chiorotoluene	PPP. trans-1,2-Dichloroethene
E. Methylene chloride	U. 1,1,2-Trichloroethane	KK. Trichiorofluoromethane	AAA. 1,3,5-Trimethylbenzene	QQQ. cis-1,2-Dichloroethene
F. Acetone	V. Benzene	LL. Methyl-tert-butyl ether	BBB, 4-Chlorotoluene	RRR. m.p-Xylenes
G. Carbon disulfide	W. trans-1,3-Dichloropropens	MM. 1,2-Dibromo-3-chloropropane	CCC, tert-Butylbenzene	SSS, o-Xylene
H. 1,1-Dichloroethene	X. Bromoform	NN. Diethyl ether	DDD. 1,2,4-Trimethylbenzene	TTT. 1,1,2-Trichioro-1,2,2-trifluoroethane
1. 1,1-Dichioroethane	Y. 4-Methyl-2-pentanone	00. 2,2-Dichloropropane	EEE. sec-Butylbenzens	UUU. Benzyl chloride
J. 1,2-Dichloroethene, total	Z. 2-Hexanone	PP. Bromochloromethane	FFF. 1,3-Dichlorobenzene	WV. 4-Ethyltoluene
K. Chloroform	AA. Tetrachloroethene	QQ. 1,1-Dichloropropene	GGG. p-isopropyltoluene	WWW. Ethanol
L. 1,2-Dichlorosthane	BB. 1,1,2,2-Tetrachloroethane	RR. Dibromomethane	HHH. 1,4-Dichlorobenzene	XXX. Ethyl ether
M. 2-Butanone	CC. Toluene	SS. 1,3-Dichloropropane	ili. n-Butylbenzene	
N. 1,1,1-Trichioroethane	DD. Chlorobenzene	TT. 1,2-Dibromoethane	JJJ. 1,2-Dichlorobenzene	
O. Carbon tetrachloride	EE. Ethylbenzene	UU. 1,1,1,2-Tetrachioroethane	KKK. 1,2,4-Trichlorobenzene	
P. Bromodichioromethane	FF. Styrene	W. Isopropylbenzene	LLL. Hexachlorobutadiene	

Notes:\_

COMPNDL 1S5

# VALIDATION FINDINGS WORNSHEET

Continuing Calibration

rage: ○ 01∠ Reviewer: 2nd Reviewer.

SDG #: 14 Cours

SDG #:

**METHOD:** GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? Y/N/N/A

Were all percent differences (%D) ≤ 30% ?

•	į	G Parkers	- Fundamen	Finding %D	Associated Samples	Qualifications
	0117	C040x041	4	7.7.	A()	1/43/P
				-		
$\coprod$						
				-		

Matrix Spike/Matrix Spike Duplicates VALIDATION PINDINGS WORNSHEET

Reviewer: 1.) Ry -2nd Reviewer:

IETHOD: GC/MS VOA (EPA Method 524.2)

00#: 25851だ

DG #:

lease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". N N N

Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG? (Not required)

Were a MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

				MS		OSW		/ C00	Associated Semiles	OralMostlons
*	Date	MS/MSD ID	Compound	STIMICS)		Ar (Lillins)		Arv (Lilling)	roduno permonero	
		12+13	B	)	_	•		31/8 (20)	01	2/A du
T				v	(	)	^	( )		
T				)	$\neg$	)	~	( )		
				)	^	)	( ,	`		
				)	( '	)	(	( )		
T				)	7	<u> </u>		( )		
Γ				)	<u> </u>	-	^	( )		
T				_	_	)	^	( )		
Τ				)	^	)	^	( )		
Π				•	_	•	^	( )		
T				)	_	)	^	( )	-	
Γ				)	^	J	^	( )		
					·	)	^	( )		
Π					^	)		( )		
				J	^	)	^	( )		
				)	^	)	^	)		
					^	)	^	( )		
					$\overline{}$	)	^	( )		
		Compound	ac Un	QC Limite (Water)	RPD	RPD (Water)		Compound	QC Limits (Water)	RPD (Water)
ن	Vinyi chloride	ride	7	70-130%		<30	>	Benzene	70-130%	<30
ند	1,2-Dichloroethane	roethane	2	70-130%		<30	œ	cis-1,3-Dichloropropene	70-130%	<30
o	Carbon te	Carbon tetrachloride	۲ 	70-130%		<30	×	Bromoform	70-130%	<30
ď	1,2-Dichlo	1.2-Dichloropropane	7	70-130%		<30	<b>*</b>	Tetrachloroethene	70-130%	<30
oj.	Trichloroethene	athene	×	70-130%		<30	щ	1,2-Dibromoethane	70-130%	<30
Þ	╫	1.1.2-Trichloroethane	K	70-130%		<30	壬	1,4-Dichlorobenzene	70-130%	<30
	-1									

VALIDATION FINDINGS WORNSHEET

rage: Reviewer: 2nd Reviewer:

Laboratory Control Samples (LCS)

METHOD: GC/MS VOA (EPA Method 524.2)

3DG #: 420 cours DC#: 128214

Plaase see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A

Was a LCS analyzed every 20 samples?

Y N N/A

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

) *	Date	OI OSOTI/SOTI	Compound	*	LCS %R (Umits)	LCSD %R (Umits)	-	RPD (Limits)	Associated Samples	Qualifications
		V				, ,				0/11/1
	22	LCS MSOJWOBOHN	٥	કુ	00-10-10	_			= (	3/47/F
				_		<b>-</b>	^	· )		-
					(	>	î	( )		
			, ,			•	^	( )		
						)	^	( )		
					(	<b>`</b>	7	(		
					( )	)	_	( )		
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			-		)	)	(	( )		
					( )	)	(	( )		
					(	)	^	( )		
		Compound	OC LIMI	QC Limite (Water)		RPD (Water)		Compound	QC Limits (Water)	RPD (Water)
Ċ.	Vinyi chloride	ride	\$2 	70-130%		<30	۷.	Benzene	70-130%	<30
Ļ	1,2-Dichloroethane	yoethane	202	70-130%		<30	R.	cis-1,3-Dichloropropene	70-130%	<30
О.	Carbon te	Carbon tetrachloride	5	70-130%		<30	×	Bromoform	70-130%	<30
ợ	1,2-Dichlo	1,2-Dichloropropane	52	70-130%		<30 A	AA.	Tetrachloroethene	70-130%	<30
Ġ.	Trichloroethene	ithene	\$	70-130%		<30 1	±	1,2-Dibromoethane	70-130%	<30
Ċ.	1,1,2-Trick	1,1,2-Trichloroethane	δ.	70-130%		<30 HI	HH.	1,4-Dichlorobenzene	70-130%	<30

とる	cont
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*	 #:
2	Ö

## Initial Calibration Calculation Verification VALIDATION FINDINGS MOTIVATION

Reviewer:

2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

A<sub>x</sub> = Area of compound,
C<sub>x</sub> = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

RRF =  $(A_{\nu})(C_{\nu})/(A_{\nu})(C_{\nu})$ average RRF = sum of the RRFs/number of standards %RSD = 100 \* (S/X)

 $A_{\mu}$  = Area of associated internal standard  $-C_{\mu}$  = Concentration of internal standard

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
. :	!	Calibration	O Sendard	RRF	RRF	Average RRF	Average RRF	QSH%	%RSD
*	Standard ID	Cate			) <u> </u>	<b>-1</b> }	~	,	
-	3	1 <u>2</u>   <u>5</u>	Methylene chloride (1st Internal Standard)	3.365 10 3.363 NO	3.36.5 ND	3.138410'	3.138410,	6.5	6.5
	, ,	-	Idohlerethene (2nd internal standard)	3.500	3-560	3.296	3.296	- h-9	6.4
			9-emotorm (3rd internal standard)	1.871	1-8-1	[ bxL·1	1-189	h.5	5.4
74			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd Internal standard)						
			Methylene chloride (fat Internal Standard)						
			Trichlorethene (2nd Internal standard)						
			Bromoform (3rd internal standard)						
4			Methylene chloride (1st Internal Standard)						
		-	Trichlorethene (2nd internal standard)			·			
			Bromoform (3rd Internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23 83 A

# VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Page: of / Reviewer: 27

METHOD: GC/MS VOA (EPA Method 524.2)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF RRF = (A<sub>2</sub>)(C<sub>2</sub>)/(A<sub>4</sub>)(C<sub>2</sub>)

Where: ave. RRF - initial calibration average RRF

RRF = continuing calibration RRF
A<sub>x</sub> = Area of compound,
C<sub>x</sub> = Concentration of compound,

A<sub>k</sub> = Area of associated internal standard C<sub>k</sub> = Concentration of internal standard

-					Reported	Recalculated	Reported	Recalculated
*	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	RRF (CC)	RRF (CC)	ZD.	<b>0%</b>
Ŀ	Eahosaal	01/11/8	Methylene chloride (1st Internal Standard)	0.314	0.285	0.WS	7.6	1.6
		-	Fichlorethene (2nd internal standard)	3.296	3.599	3.599	2.6	4.6
			나고 그 Bremoform (3rd internal standard)	1-789	1.882	1-882	2.5	2.5
N			Methylene chloride (1st Internal Standard)					
			Trichlorethene (2nd Internal standard)					
			Bromoform (3rd Internal standard)					
က			Methylene chloride (1st Internal Standard)					
			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					
. 4			Methylene chloride (1st Internal Standard)					
			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. 2383 A)

## VALIDATION FINDINGS WORKSHEET <u>Surrogate Results Verification</u>

Page:	
Reviewer:	F7
2nd reviewer:	<u></u>
<del></del>	

): GC/MS VOA (EPA Method 524.2)

t recoveries (%R) of surrogates were recalculated for the compounds	identified	below t	using t	the following	calculation
---	------------	---------	---------	---------------	-------------

r: SF/SS \* 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
8	10	10.17	102	102	0
probenzene	1	9.35	93	93	
robenzene-d4	V	10.50	105	105	1

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
3					
obenzene					
obenzene-d4					

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
8					
robenzene					
robenzene-d4					

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
8					
robenzene					
robenzene-d4	N.				

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
3					
robenzene					
robenzene-d4					

A 15852 LDC #: SDG #:

## Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

Page: 2nd Reviewer:\_ Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SSC - SC)/SA

SSC = Spiked sample concentration Where:

SC - Sample concentration

SA = Spike added

MSDC = Matrix spike duplicate percent recovery

RPD = I MSC - MSDC I \* 2/(MSC + MSDC)

MSC - Matrix spike percent recovery

4 MS/MSD sample:

	Š	Spike	Sample	Spiked Sample	ample	Matrbx Spike	spike	Matrix Spike Duplicate	Duplicate	MS	MS/MSD
Compound	` <b>&amp;</b> 3 ∵	Added Veg L)	Concentration ( Mg   L)	Concentration ( Mg/L)	ration	Percent Recovery	scovery	Percent Recovery	scovery	14.	RPD
	MS	MSD	<b>)</b>	O SW	MSD	Reported	Recalc.	Reported	Recatc.	Reported	Recalculated
1,1-Dichloroethene	ટ્ર	Ç	02	1-1-5 B	इप.३	401	103	109	Pol	h.2	5.4
Trichloroethene	_		3:73	- 5% eV	59:1	49	hol	711	,211	1.9	ļ.9
Benzene			ΔA	59.1	8.3	tio 1	hal	111	=	6.9	65
Toluene				8.0	यः ८	701	701	109	109	7.7	7.
Chlorobenzene				52.7	83	Sal	201	113	611	6.7	6.7

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10,0% of the recalculated results. Laboratory Control Sample Results Verification

Reviewer:

2nd Reviewer:\_

METHOD: GC/MS VOA (EPA Method 524.2)

SDG #: こうの

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* SSC/SA

SSC = Spiked sample concentration SA = Spike added Where:

LCS = Laboractry control sample percent recovery

APD = ILCS - LCSD I \* 2/(LCS + LCSD)

LCSD = Laboratory control sample duplicate percent recovery

LCS ID:

	ds	ik	Spiked 8	ampte	<b>801</b>		GSOT	Q	TCS/ITCSD	CSD
Compound	Added (NG)	<b>Dep</b>	Concentration ( Mg )	ration   )	Percent Recovery	ecovery	Percent Recovery	•covery	RPD	0
	) ()	LCSD	801	CSD	Reported	Recalo.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	01	42	8.01	ΑM	801	801				
Trichloroethene			10.91	_	bol	109				\
Benzene			0.0		<b>6</b> 01	109				
Toluene			10.0		601	109				
Chlorobenzene		->	7 =		711	7	42			
										·
							·			

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. LDC #: 23831 A ) SDG #: su comes

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	/ of /
Reviewer:_	19
2nd reviewer:	0
	7

WIFTHOD: GC/MS VOA (EPA Method 524
------------------------------------

Y N N/A

Were all reported results recalculated and verified for all level IV samples?

Were all reported results for detected target compounds agree within 10.0% of the reported results?

(A.)(L.)(DF) Concentration = (A\_)(RRF)(V\_)(%S) Area of the characteristic ion (EICP) for the compound to be measured Area of the characteristic ion (EICP) for the specific internal standard Amount of internal standard added in nanograms (ng) Relative response factor of the calibration standard. RRF Volume or weight of sample pruged in milliliters (ml) ٧. or grams (g). Dilution factor. Df Percent solids, applicable to soils and solid %S

Example:

Sample I.D.  $\frac{#3}{}$ . K:

Conc. = (51176)(10)(10) (444732)(0.5064(1))(1)=

2.3 ug/L

	matrices only.					
#	Sample ID	Compound		Reported Concentration ( )	Calculated Concentration ( )	Qualification
#	Sample ID			·		
· .						
				:		
	·					
				ž.		
٠.						
			<u> </u>			

## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 28, 2010

LDC Report Date:

September 7, 2010

Matrix:

Water

Parameters:

Volatiles

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072901

## Sample Identification

MW-23-3

MW-23-2

MW-23-1

EB-03-07/28/10

TB-03-07/28/10

MW-23-1MS

MW-23-1MSD

## Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r²) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
8/2/10	Chloromethane Bromomethane 2-Butanone	34.0 41.3 33.8	All samples in SDG BMI10072901	J (all detects) UJ (all non-detects)	Р

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS MS07W0802M	Chloromethane	66 (70-130)	All samples in SDG BMI10072901	J (all detects) UJ (all non-detects)	Р
	Bromomethane	59 (70-130)		J (all detects) UJ (all non-detects)	

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

## XII. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

## XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

## XIV. System Performance

Raw data were not reviewed for this SDG.

## XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

## XVII. Field Blanks

Sample TB-03-07/28/10 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-03-07/28/10 was identified as an equipment blank. No volatile contaminants was found in this blank.

NASA JPL Volatiles - Data Qualification Summary - SDG BMI10072901

SDG	Sample	Compound	Flag	A or P	Reason
BMI10072901	MW-23-3 MW-23-2 MW-23-1 EB-03-07/28/10 TB-03-07/28/10	Chloromethane Bromomethane 2-Butanone	J (all detects) UJ (all non-detects)	Р	Continuing calibration (%D)
BMI10072901	MW-23-3 MW-23-2 MW-23-1 EB-03-07/28/10 TB-03-07/28/10	Chloromethane Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Р	Laboratory control samples (%R)

NASA JPL

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI10072901

No Sample Data Qualified in this SDG

LDC #:	23831B1	VALIDATION COMPLETENESS WORKSHEET
SDG#:_	BMI10072901	Level III
Laborato	ry: Alpha Analytical,	S24.2
METHOI	D. GC/MS Volatiles /	EPA SW846 Method 8960BT

Reviewer: 2nd Reviewer

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
l.	Technical holding times	Δ	Sampling dates: 7/28/10
11.	GC/MS Instrument performance check	Δ	
111.	Initial calibration	Δ	% PSD = 20 12
IV.	Continuing calibration/ <del>ICV</del> IC√	رسي	10V/ccu =30
V.	Blanks	Δ	
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	4	
VIII.	Laboratory control samples	SW	LCT
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards	V	
X1	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentitatively identified compounds (TICs)	N	
XIV	System performance	N	
XV.	Overall assessment of data	Δ	
XVI.	Field duplicates	N	
XVII.	Field blanks	NO	EB = 4 TB = 5

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

,	water					·
1	MW-23-3	11	MBLK MSOTU	108262 M	31	
2+	MW-23-2	12		22	32	
3+	MW-23-1	13		23	33	
4	EB-03-07/28/10	14		24	34	
<b>5</b>	TB-03-07/28/10	15		25	35	
6	MW-23-1MS	16		26	36	
7	MW-23-1MSD	17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

METHOD: VOA (EPA Method 524.2)

A. Chioromethane	Q. 1,2-Dichloropropane	GG. Xylenes, total	WW. Bromobenzene	MMM. Naphthalene
B. Bromomethane	R. cle-1,3-Dichioropropene	HH. Vinyl acetate	XX. 1,2,3-Trichloropropane	NNN. 1,2,3-Trichlorobenzene
C. Vinyl choride	S. Trichioroethene	II. 2-Chloroethylvinyl ether	YY. n-Propylbenzene	000. 1,3,5-Trichlorobenzene
D. Chioroethane	T. Dibromochioromethane	JJ. Dichlorodifluoromethane	ZZ. 2-Chiorotoluene	PPP. trans-1,2-Dichloroethene
E. Methylene chloride	U. 1,1,2-Trichloroethane	KK Trichlorofluoromethane	AAA. 1,3,5-Trimethylbenzene	QQQ. cis-1,2-Dichloroethene
F. Acetone	V. Benzene	LL. Methyl-tert-butyl ether	BBB. 4-Chlorotoluene	RRR. m,p-Xylenes
G. Carbon disulfide	W. trans-1,3-Dichloropropens	MM. 1,2-Dibromo-3-chloropropane	CCC, tert-Butylbenzene	SSS. o-Xylene
H. 1,1-Dichloroethene	X. Bromoform	NN. Diethyl ether	DDD. 1,2,4-Trimethylbenzene	TTT. 1,1,2-Trichioro-1,2,2-trifiuoroethane
1. 1,1-Dichloroethane	Y. 4-Methyl-2-pentanone	00. 2,2-Dichloropropane	EEE. sec-Butylbenzene	UUU. Benzyl chloride
J. 1,2-Dichloroethene, total	Z. 2-Hexanone	PP. Bromochloromethane	FFF. 1,3-Dichlorobenzene	VVV. 4-Ethytloluene
K. Chloroform	AA. Tetrachioroethene	QQ. 1,1-Dichloropropene	GGG. p-isopropyltoluene	WWW. Ethanol
L. 1,2-Dichloroethane	BB. 1,1,2,2-Tetrachioroethane	RR. Dibromomethane	HHH. 1,4-Dichlorobenzene	XXX. Ethyl ether
M. 2-Butanone	CC. Toluene	SS. 1,3-Dichloropropane	III. n-Butylbenzene	-
N. 1,1,1-Trichloroethane	DD. Chlorobenzene	TT. 1,2-Dibromoethane	JJJ. 1,2-Dichlorobenzene	
O. Carbon tetrachioride	EE. Ethylbenzene	UU. 1,1,1,2-Tetrachioroethane	KKK 1,2,4-Trichlorobenzene	
P. Bromodichioromethane	FF. Styrene	W. Isopropylbenzene	LLL. Hexachlorobutadiene	

## VALIDATION FINDINGS WORNSTILL

Continuing Calibration

2nd Reviewer: ayr. Reviewer:

SDG #: Au cours

. . . .

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y /N N/A Were all percent differences (%D) ≤ 30%?

Standard ID Compound   COCBO2O S A B B B B B B B B B B B B B B B B B B	Eladina %D		
10080203	nd (Limit: <30.0%)	Associated Samples	Qualifications
		AI)	J W /2 P
		,	2
		À	->
		-	

## VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Reviewer: Page:

2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

\* SDG #:

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was a LCS analyzed for this SDG?
Was a LCS analyzed every 20 samples?
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

*	Date	QI QSOT/SOT	Compound	LCS %R (Limits)	<b>3</b>	LCSD %R (Limits)	RPD (Limits)		Associated Samples	Qualifications
		Les MSOTWOBERM	PM A	051-07 ) 29	-130)	)		1		9/ cm//
			8	36 ( 76	10-130)	•	)	^		
				~	^	)	) (	_		
				•	•	•	) (	^		
				)	r	)	) (	^		
				)	7	)	) (	\ ^		
				j	) [	)	) (	<u> </u>		
				)	^	)	) (	^		
				)	(	)	) (	(		
				)	(	)	) (	(		
				)	ſ	)	) (	<u> </u>		
				)	<u> </u>	)	) (	î		
				)	Î	)	) (	1		
				)	^	•	) (	<u> </u>		
		-		)	^	•	) (	^		
				)	_	•	) (	^		
				)	(	)	) (	^		
				)	) [	)	) (	î		
	-	Compound	ac Lim	QC Limits (Water)	) GAR	PD (Water)	Compound		QC Limits (Water)	RPD (Water)
Ö	Vinyi chloride	oride	8	70-130%	Ÿ	<30 V.	Benzene		70-130%	<30
نـ	1,2-Dichk	1,2-Dichloroethane	92	70-130%	V	<30 R.	cis-1,3-Dichloropropene	911	70-130%	<30
o	Carbon to	Carbon tetrachloride	52	70-130%	V	× 06>	Bromoform		70-130%	<30
ợ	-	1,2-Dichloropropane	5	70-130%	V	<30 AA.	Tetrachloroethene		70-130%	<30
σ,	Trichloroethene	ethene	70	70-130%	V	<30 TT.	1,2-Dibromoethane		70-130%	06>
э	_	1,1,2-Trichloroethane	2	70-130%	V	<30 HHH.	1,4-Dichlorobenzene	-	70-130%	<30

## NASA JPL Data Validation Reports LDC #23831

Chromium



## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 26 through July 27, 2010

LDC Report Date:

August 27, 2010

**Matrix:** 

Water

Parameters:

Chromium

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072804

## Sample Identification

MW-3-4

MW-3-3

MW-3-2\*\*

MW-4-3

MW-4-2

MW-4-1

DUPE-03-3Q10

EB-02-7/27/10

MW-6

MW-5

MW-6MS

MW-6MSD

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

## III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium was found in the initial, continuing and preparation blanks.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

## XII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

Samples MW-4-1 and DUPE-03-3Q10 were identified as field duplicates. No chromium was detected in any of the samples.

## XV. Field Blanks

Sample EB-02-7/27/10 was identified as an equipment blank. No chromium were found in this blank.

NASA JPL Metals - Data Qualification Summary - SDG BMI10072804

No Sample Data Qualified in this SDG

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI10072804

No Sample Data Qualified in this SDG

	#:BMI10072804 atory: <u>Alpha Analytica</u>	ıl, Inc.	·	Le	evel III/I	V		Page:of_! Reviewer:
ТН	IOD: Cr (EPA Method	200.8)						
0.01	amples listed below w	.oro rovio	wod for eac	sh of the f	following v	validation areas Valid	ation finding	s are noted in attache
	tion findings workshe		wed for eac		ollowing .	randation areas. Valid	ation inding	3 are noted in attache
	1		· · · · · · · · · · · · · · · · · · ·		·			
	Validati	on Area				Cal	nments	
Ί,	Technical holding times			A	Sampling	dates: 7-26-10	throug (	1 7-27-10
11.	ICP/MS Tune			A			U	
III.	Calibration		, , , , , , , , , , , , , , , , , , , ,	A				
IV.	Bianks			Α				
V.	ICP Interference Check	Sample (III	CS) Analysis	A				,
VI.	Matrix Spike Analysis		_ 5, , , , , , , , , , , , , , , , , , ,	Α	M5/	MSS		
VII.	Duplicate Sample Analy	reie		N			······································	
<u>∨II.</u> √III.	Laboratory Control Sam			A	LCS	?		
		<u>. ( </u>		A	not	reviewed for	level III	
IX.	Internal Standard (ICP-I			N		utilized		
<u>X.</u>	Furnace Atomic Absorp	tion QC		7	no i	performed	,	
XI.	ICP Serial Dilution			A		•		
XII.	Sample Result Verificat		<u> </u>	Not revie	wed for Level III validation.			
XIII.	Overall Assessment of I		A	<del> </del>	1.7		, , , , , , , , , , , , , , , , , , , ,	
XIV.	Field Duplicates		ND		6+7			
XV	Field Blanks		ND	<u> </u> EB	= 8			
ite	A = Acceptable N = Not provided/applic SW = See worksheet		R = Rins		ds detected	D = Duplicate TB = Trip blank EB = Equipment	blank	
	ed Samples: ** Indicates	sample un	derwent Level I	V validation	ı			
	all water					T		<del> </del>
	MW-3-4	11	MVV-6MS		21		31	
	MW-3-3	12	MW-6MSD		22		32	· · · · · · · · · · · · · · · · · · ·
	MW-3-2**	13	PBW		23		33	
	MW-4-3	14	ļ .		24		34	
	MW-4-2	15			25		35	•
	MW-4-1	16			26		36	
	DUPE-03-3Q10	17			27		37	
.	FR-02-7/27/10	18			28		38	

Notes:			

MW-6

MW-5

## **VALIDATION FINDINGS CHECKLIST**

Page: 1 of 2 Reviewer: MG 2nd Reviewer: W

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Metriod interas (Li A 600 646 Metriod 6676B/1666/6525)				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times			r	
All technical holding times were met.				
Cooler temperature criteria was met.	<b>V</b>		<u> </u>	
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	$\checkmark$		ļ	,
Were %RSD of isotopes in the tuning solution ≤5%?	V			
III. Calibration		,		
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/	,		
Were all initial calibration correlation coefficients ≥ 0.995?	/		<u> </u>	
IV. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
V. ICP Interference Check Sample		,		
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
VI. Matrix spike/Matrix spike duplicates	*******			
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.	/			
VII. Laboratory control samples	· · · · · · · · · · · · · · · · · · ·		·	
Was an LCS anaylzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	1			

## VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: MG 2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC			,,	<u> </u>
If MSA was performed, was the correlation coefficients > 0.995?			/	
Do all applicable analysies have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			/	
Were analytical spike recoveries within the 85-115% QC limits?			/	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?		/		
Were all percent differences (%Ds) < 10%?			/	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			/	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)			<del>,</del>	
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	<b>/</b>			
If the %Rs were outside the criteria, was a reanalysis performed?	<u> </u>		<b>✓</b>	
XI. Regional Quality Assurance and Quality Control	·	1	- <del></del>	
Were performance evaluation (PE) samples performed?		/	ļ.,	
Were the performance evaluation (PE) samples within the acceptance limits?	<u></u>		V	
XII. Sample Result Verification	,	<del></del>	<del>,</del>	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/		<u></u>	
XIII. Overall assessment of data			1	
Overall assessment of data was found to be acceptable.	/		<u> </u>	
XIV. Field duplicates	_			
Field duplicate pairs were identified in this SDG.	/	<b></b>		
Target analytes were detected in the field duplicates.		V		
XV. Field blanks		4		
Field blanks were identified in this SDG.	/		1	
Target analytes were detected in the field blanks.		1		

LDC#: 23831 A4

# VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: Lof Reviewer: MG/

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 True

Where,

Found = concentration (in ug/L) of each analyte <u>measured</u> in the analysis of the ICV or CCV solution True = concentration (in ug/L) of each analyte in the ICV or CCV source

Acceptable (Y/N) reported Reported 105 % 20+ Recalculated 401 103 % R 100.00 True (ug/L) 50.00 02.401 Found (ug/L) 51.48 Element Š Ş ICP/MS (Continuing calibration) CVAA (Continuing calibration) GFAA (Continuing calibation) ICP (Continuing calibration) ICP/MS (Initial calibration) Type of Analysis GFAA (Initial calibration) CVAA (Initial calibration) ICP (Initial calibration) Standard ID 1386 CCV . Н

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC# 23&31A4

## VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: \_\_of\_\_ Reviewer: 2nd Reviewer:\_\_\_

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found x 100

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD =  $|S-D|_{X} \times 100$ (S+D)/2

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

Where, I = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

%D = [I-SDR] × 100

Found / S / I Element (units)
CV 167.10 (Mg/L) 200.00 (Mg/L)
Cr 0.0461 (mg/L) 0.05 (mg/L)
Cr (SSR-SR) (mg/L) 0.05
Cr 0.0465 (mg/L) 0.0458 (mg/L)

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23831 A4

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of
Reviewer:	MG
2nd reviewer:	<b>У</b>

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

(Ŷ) N (Ŷ) N	N/A Are results w	been report ithin the cal	ted and calculate	ed cor	rectiv?		e identified as "N/A	
Detect	ted analyte results for _	level	IV sample	=	N.D.	were recalcu	lated and verified	using the following
	tration = $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$			Recald	culation:			
RD FV In. Vol. Dil	= Raw data conce = Final volume (m = Initial volume (m = Dilution factor	i)	3)					
#	Sample ID		Analyte			Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
				<del></del>				
				<del></del>				
	Marie de la companya de la companya de la companya de la companya de la companya de la companya de la companya							
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<u> </u>								
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<u> </u>								
Note:								
		-						

## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 28, 2010

LDC Report Date:

August 27, 2010

Matrix:

Water

Parameters:

Chromium

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072901

Sample Identification

MW-23-4

MW-23-3

MW-23-2

MW-23-1

EB-03-07/28/10

MW-23-1MS

MW-23-1MSD

## Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

## III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium was found in the initial, continuing and preparation blanks.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-23-1MS/MSD (All samples in SDG BMI10072901)	Chromium	-	168 (70-130)	29.9 (≤20)	J (all detects) UJ (all non-detects)	Α

## VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Internal Standards (ICP-MS)

Raw data were not reviewed for this SDG.

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

## XII. Sample Result Verification

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

No field duplicates were identified in this SDG.

## XV. Field Blanks

Sample EB-03-07/28/10 was identified as an equipment blank . No chromium was found in this blank.

NASA JPL Metals - Data Qualification Summary - SDG BMI10072901

SDG	Sample	Analyte	Flag	A or P	Reason
BMI10072901	MW-23-4 MW-23-3 MW-23-2 MW-23-1 EB-03-07/28/10	Chromium	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)(RPD)

## NASA JPL

Metals - Laboratory Blank Data Qualification Summary - SDG BMI10072901

No Sample Data Qualified in this SDG

SDG#	::23831B4 #:BMI10072901 atory: Alpha Analytical,			LETENESS WORKSHEET  Level III  Page:l of Reviewer:M C 2nd Reviewer:
	IOD: Cr (EPA Method			
	amples listed below we tion findings workshee		ch of the f	ollowing validation areas. Validation findings are noted in attache
	Validatio	n Area		Comments
I.	Technical holding times		A	Sampling dates: 7- 28-10
II.	ICP/MS Tune		Α	
111,	Calibration		A	
IV.	Banks		A	
V.	ICP Interference Check S	Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis		SW	MS/MSD
VII.	Duplicate Sample Analys	is	7	
VIII.	Laboratory Control Samp		A	LCS
IX.	Internal Standard (ICP-M	S)	7	not reviewed
Х.	Furnace Atomic Absorption		7	
XI.	ICP Serial Dilution		7	not utilized not performed
XII.	Sample Result Verification	on	Ν	•
XIII.	Overall Assessment of D	ata	Α	
XIV.	Field Duplicates		7	
XV	Field Blanks	,	ND	EB=5
Vote: √alidate	A = Acceptable N = Not provided/applica SW = See worksheet ed Samples: All water	ble R = Rins	o compound sate eld blank	
1	MW-23-4	11		21 31
	MW-23-3	12		22 32
	MW-23-2	13		23 33
	MW-23-1	14		24 34
	EB-03-07/28/10	15		25 35
	MW-23-1MS	16		26 36
	MW-23-1MSD	17		27 37
	PBW	18		28 38
9		19	-	29 39
10		20		30 40

LDC# 2383184

## VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: \_( 2nd Reviewer. Reviewer:

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A"

Was a matrix spike analyzed for each matrix in this SDG?

Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor Y (N) N/A

Were all duplicate sample relative percent differences (RPD) < 20% for water samples and <35% for soil samples? of 4 or more, no action was taken. Y (ON/A

LEVEL IV ONLY:

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

Y N N/A

Oualifications らら Associated Samples <u>\_\_</u> 168. (70-130) ag. 9 (520) RPD (Limits) "Recovery MSD %Recovery SE Analyte  $\frac{2}{0}$ water Matrix **MS/MSD ID** ા

MSD.4SW

Comments:

## NASA JPL Data Validation Reports LDC #23831

Perchlorate



## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 26 through July 27, 2010

LDC Report Date:

August 27, 2010

Matrix:

Water

Parameters:

Perchlorate

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072804

## Sample Identification

MW-3-4

MW-3-3

MW-3-2\*\*

MW-4-3

MW-4-2

MW-4-1

DUPE-03-3Q10

EB-02-7/27/10

MW-6

MW-5

MW-6MS

MW-6MSD

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

## b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the initial, continuing and preparation blanks.

## IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## IX. Field Duplicates

Samples MW-4-1 and DUPE-03-3Q10 were identified as field duplicates. No perchlorate were detected in any of the samples.

## X. Field Blanks

Sample EB-02-7/27/10 was identified as an equipment blank. No perchlorate was found in this blank.

NASA JPL

Perchlorate - Data Qualification Summary - SDG BMI10072804

No Sample Data Qualified in this SDG

**NASA JPL** 

Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI10072804

No Sample Data Qualified in this SDG

LDC #: 23831A6	VALIDATION COMPLETENESS WORKSHEET	Date: 8 - 27 - 10
SDG #: BMI10072804	Level III/IV	Page: Lof 1
Laboratory: Alpha Analytical,	nc.	Reviewer: MG
		2nd Reviewer:
METHOD: Perchlorate (EPA	Method 314 0)	

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 7-26-10 through 7-27-10
IIa.	Initial calibration	A	Ų .
IIb.	Calibration verification	A	
111.	Blanks	Ą	
IV	Matrix Spike/Matrix Spike Duplicates	Α	MS/MSD (SDG: BMI10072901)
	Duplicates	7	
. VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D=6+7
x	Field blanks	ND	EB = 8

Note: A = Acceptable

N = Not provided/applicable

ND = No compounds detected R = Rinsate

D = Duplicate

SW = See worksheet FB = Field blank TB = Trip blank
EB = Equipment blank

Validated Samples: \*\* Indicates sample underwent Level IV validation

v a ilu	all water	s sample un	derwerit Level IV Valida	ion	
1	MW-3-4	11	MW-6MS	21	31
2	MW-3-3	12	MW-6MSD	22	32
3	MW-3-2**	13	PBW	23	33
4	MW-4-3	14		24	34
5	MW-4-2	15		25	35
6	MW-4-1	.16		26	36
7	DUPE-03-3Q10	17		27	37
8	EB-02-7/27/10	18		28	38
9	MW-6	19		29	39
10	MW-5	20		30	40

Notes:		

**Method:**Inorganics (EPA Method 314.0)

Method:Inorganics (EPA Method 314.0 )				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	· · · · · · · ·			
All technical holding times were met.	/			
Cooler temperature criteria was met.	V			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	V			
Were all initial calibration correlation coefficients ≥ 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?				
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)			/	
III. Blanks				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	1			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	/	·		
V. Laboratory control samples				1.
Was an LCS anaylzed for this SDG?	1/			
Was an LCS analyzed per extraction batch?	1			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			i .
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		/	<u> </u>	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

LDC#: 23831A6

## **VALIDATION FINDINGS CHECKLIST**

Page: 2 of 2
Reviewer: MG
2nd Reviewer: \_\_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
Were detection limits < RL?			<u> </u>	
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.				
X. Field blanks				
Field blanks were identified in this SDG.				
Target analytes were detected in the field blanks.				

2383146 LDC#:

## Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: Lof L 2nd Reviewer: Reviewer.\_\_

> 314.0 METHOD: Inorganics, Method\_

3-24-10 was recalculated. Calibration date:\_ C104 The correlation coefficient (r) for the calibration of An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

 $%R = Found \times 100$ True

Where, Found = concentration of each analyte  $\underline{\text{measured}}$  in the analysis of the ICV or CCV solution True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	
Type of Analysis	Analyte	Standard ID	ے 600 ر Found (units)	A V GA True (units)	r or %R	r or %R	Acceptable (Y/N)
Initial calibration		Blank	(1) 8m) 5.0	0.00115			THE PARTY OF THE P
		Standard 1	1.0 (1)	0.00283			
		Standard 2	9.0	0.00511			
		Standard 3	5.0 (	0.01467		00000	`,
	C104	Standard 4	(0.01	0.02665	V=0.999838	17030	<b>&gt;</b> -
		Standard 5	35.0 (	0.07416			
		Standard 6	50.0 (	0.13868			•
	-	Standard 7	100.00	0.38348			
Calibration verification		1113				not	
	C104	IPC	25.332 (4g/L)	J/82) 0.50	10)	reported	
Calibration verification		96 91					
	C104	CC V	44.134 (486)	4.134 (496) 50.0 (491)	88	>	>
Calibration verification	1	)			4	-	

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC# 23831A6

## VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

2nd Reviewer: Reviewer. MG Page: Lof (

**METHOD:** Inorganics, Method 314.0

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found x 100

Where,

Found =

concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

Where, RPD =  $|S-D|_{X} \times 100$ (S+D)/2

Original sample concentration Duplicate sample concentration

	3				Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	%R/RPD	%R/RPD	Acceptable (Y/N)
1338	Laboratory control sample						
527		C104	34.661 (mg/L) 35. (mg/L)	35. (mg/)	66	66	>
1322	Matrix spike sample		(SSR-SR)				
MW-33-1 MS		C104	38.400 (mg/L) 25. (mg/L)	25. (mg/)	911	911	
0481 / 8881	Duplicate sample						
MW-23-( MS/MSB		C104	57.330 (mg/L) 58.144 (mg/L)	58.144 (M8/)	9.7	9.7	<b>→</b>

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23831 A6

## **VALIDATION FINDINGS WORKSHEET**

## Sample Calculation Verification

Page:_	( of 1
Reviewer:_	
2nd reviewer:_	

METHOD: Inorg	rganics, Method <u>314.0</u>	
YN N/A YN N/A YN N/A	Alifications below for all questions answered "N". Not applicable questions Have results been reported and calculated correctly? Are results within the calibrated range of the instruments? Are all detection limits below the CRQL?  The property of the pro	are identified as "N/A". eported with a positive detect were
recalculated an		
Concentration =	Recalculation:	
ve $CF = 0$ $dil = 5x$	$C(0_{\mu})$ $H_{\mu} = 1$	= 163.70

#	Sample ID	Analyte	Reported Concentration (パタ/上)	Calculated Concentration	Acceptable (Y/N)
	3	C10 4	164.	164.	Y
				, , , , , , , , , , , , , , , , , , , ,	
		,			

Note:	The state of the s

## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 28, 2010

**LDC Report Date:** 

August 27, 2010

Matrix:

Water

Parameters:

Perchlorate

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10072901

Sample Identification

MW-23-3

MW-23-2

MW-23-1

EB-03-07/28/10

MW-23-1MS

MW-23-1MSD

## Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

## a. Initial Calibration

All criteria for the initial calibration of each method were met.

## b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

## III. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the initial, continuing and preparation blanks.

## IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VII. Sample Result Verification

Raw data were not reviewed for this SDG.

## VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## IX. Field Duplicates

No field duplicates were identified in this SDG.

## X. Field Blanks

Sample EB-03-07/28/10 was identified as an equipment blank. No perchlorate was found in this blank.

NASA JPL

Perchlorate - Data Qualification Summary - SDG BMI10072901

No Sample Data Qualified in this SDG

**NASA JPL** 

Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI10072901

No Sample Data Qualified in this SDG

DG#	23831B6 BMI10072901 story: Alpha Analytica			PLETENE Level III	SS	WORKSHEET		Date: <u>0 - 97-</u> Page: <u>Lof L</u> Reviewer: <u>M</u>
IETH	OD: Perchlorate (EP	A Method 31	4.0),					
	imples listed below with the state of the st		for each of the	following va	lidatio	on areas. Validatio	n find	dings are noted in attached
	Validati	on Area				Comm	ents	
1.	Technical holding times		A	Sampling da	ites:	7-28-10		
∥a.	Initial calibration		A					
llb.	Calibration verification		A					
III.	Blanks		Α					
IV	Matrix Spike/Matrix Spik	e Duplicates	A	M5/ M	15D			
٧	Duplicates		N					
VI.	Laboratory control samp	oles	Α	LCS				
VII.	Sample result verification		N					
VIII.	Overall assessment of c	lata	A					
IX.	Field duplicates		7					
Χ	Field blanks		ND	EB=	4			
ote: alidate	A = Acceptable N = Not provided/applic SW = See worksheet  ad Samples  A   Water	able	ND = No compoun R = Rinsate FB = Field blank	ds detected		D = Duplicate TB = Trip blank EB = Equipment blank	k	
1	MW-23-3	11		21			31	
2	MW-23-2	12		22			32	
	MW-2 <b>3-</b> 1	13		23			33	
	EB-03-07/28/10	14		24			34	
,	MW-23-1MS	15		. 25			35	
5	MW-23-1MSD	16		26			36	
-	PBW	17		27			37	
3		18	· · · · · · · · · · · · · · · · · · ·	28		·	38	
₃		19		29			39	

Notes:



# LABORATORY DATA CONSULTANTS, INC.

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Battelle 505 King Avenue Room 10-1-170 Columbus, OH 43201 ATTN: Ms. Betsy Cutie

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on September 2, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

# **LDC Project # 23896:**

SDG#

**Fraction** 

BMI10073001

Volatiles, Chromium, Wet Chemistry

September 13, 2010

The data validation was performed under EPA Level III & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto

**Operations Manager/Senior Chemist** 

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# NASA JPL Data Validation Reports LDC #23896

Volatiles



# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 29, 2010

**LDC Report Date:** 

September 10, 2010

Matrix:

Water

Parameters:

Volatiles

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10073001

# Sample Identification

MW-11-4

MW-11-3

MW-11-2

MW-11-1\*\*

DUPE-05-3Q10

MW-22-3

MW-22-2

MW-22-1

DUPE-04-3Q10

EB-04-07/29/10

TB-04-07/29/10

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

# I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

# II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r<sup>2</sup>) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

# IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

# VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

# VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

# VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

# IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

All internal standard areas and retention times were within QC limits.

# XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

# XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

# XIII. Tentatively Identified Compounds (TICs)

All tentatively identified compounds were within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

# XIV. System Performance

The system performance was within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

# XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

# XVI. Field Duplicates

Samples MW-11-3 and DUPE-05-3Q10 and samples MW-22-2 and DUPE-04-3Q10 were identified as field duplicates. No volatiles were detected in any of the samples.

# XVII. Field Blanks

Sample TB-04-07/29/10 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-04-07/29/10 was identified as an equipment blank. No volatile contaminants was found in this blank.

NASA JPL

Volatiles - Data Qualification Summary - SDG BMI10073001

No Sample Data Qualified in this SDG

**NASA JPL** 

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI10073001

No Sample Data Qualified in this SDG

LDC #: 23896A1	VALIDATION COMPLETENESS WORKSHEET	ſ
SDG #: BMI100730	01 Level III/IV	Pa
Laboratory: Alpha Ana	E 211 2	Revie 2nd Revie
METHOD: GC/MS Vo	atiles (FPA SW846 Method 8280B)	

Date:<u>9-10-1</u>0

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 7 - 29 - 10
II.	GC/MS Instrument performance check	A	·
III.	Initial calibration	A	7, RSD ≤ 20, r <sup>2</sup> ICV/CCV ≤ 30
IV.	Continuing calibration/ICV	Ą	ICV/CCV = 30
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	Ŋ	client specified not required front
VIII.	Laboratory control samples	Α	LCS
IX.	Regional Quality Assurance and Quality Control	N N	
Χ.	Internal standards	A	
XI.	Target compound identification	<u> </u>	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	Α	Not reviewed for Level III validation.
XIV.	System performance	Α	Not reviewed for Level III validation.
XV.	Overall assessment of data	A.	
XVI.	Field duplicates	ND	D= 2+5 , D=7+9
XVII.	Field blanks	ND	EB=10 TB=11

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples: \*\* Indicates sample underwent Level IV validation

	all water				
1	MW-11-4	11	TB-04-07/29/10	21	31
2	MVV-11-3	12	MBLK MSOTWOSOGM	22	32
3	MVV-11-2	13		23	33
4	MVV-11-1**	14		24	34
5	DUPE-05-3Q10	15		25	35
6	MVV-22-3	16		26	36
7	MVV-22-2	17		27	37
8	MVV-22-1	18		28	38
9	DUPE-04-3Q10	19		29	39
10	EB-04-07/29/10	20		30	40

# VALIDATION FINDINGS CHECKLIST

Page:_	1_of_2_
Reviewer:	MG
Reviewer:	

Method: Volatiles (EPA Method 524.2)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	,			
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. GC/MS Instrument performance check			,	
Were the BFB performance results reviewed and found to be within the specified criteria?	/			
Were all samples analyzed within the 12 hour clock criteria?	/			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	1			
Were all percent relative standard deviations (%RSD) ≤ 20%?	/			
IV. Continuing celibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	/			
Were all percent differences (%D) < 30%?	/			
V. Blanks				
Was a method blank associated with every sample in this SDG?	/	***************************************		
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	1			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			/	
VII. Matri≭ spike/Matrix spike duplicates				
Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG?		<b>/</b>		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			<b>/</b>	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per analytical batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			

# VALIDATION FINDINGS CHECKLIST

Page: 2 of 3
Reviewer: 46
2nd Reviewer:

			<del></del>	
Validation Area	Yes	No	NA	Findings/Comments
IX. Regional Guality Assurance and Guality Control				
Were performance evaluation (PE) samples performed?		1		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
X Internal standards			,	
Were internal standard area counts within +/-40% from the associated calibration standard?	/			
Were retention times within - 30% of the last continuing calibration or $\pm$ -50% of the initial calibration?	1			
XI. Target compound identification				
Were relative retention times (RRT's) within $\pm$ 0.06 RRT units of the standard?			1	
Did compound spectra meet specified EPA "Functional Guidelines" criteria?			/	
Were chromatogram peaks verified and accounted for?	1			
XII Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?			/	
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Tentatively identified compounds (TIOs)				
Were the major ions (> 25 percent relative intensity) in the reference spectrum evaluated in sample spectrum?	/			
Were relative intensities of the major ions within $\pm$ 20% between the sample and the reference spectra?			/	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?			/	-
XIV: System performance				
System performance was found to be acceptable.	/			
XV. Overall assessment of data:				
Overall assessment of data was found to be acceptable.				
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	/			
Target compounds were detected in the field duplicates.				
XVII. Field blanks				
Field blanks were identified in this SDG.				
Target compounds were detected in the field blanks.				

# TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method 524.2)

A. Chloromethane	Q. 1,2-Dichloropropane	GG. Xylenes, total	WW. Bromobenzene	MMM. Naphthalene
B. Bromomethane	R. cis-1,3-Dichloropropene	HH. Vinyl acetate	XX. 1,2,3-Trichloropropane	NNN. 1,2,3-Trichlorobenzene
C. Vinyl choride	S. Trichloroethene	II. 2-Chloroethylvinyl ether	YY, n-Propylbenzene	OOO. 1,3,5-Trichlorobenzene
D. Chloroethane	T. Dibromochloromethane	JJ. Dichlorodifluoromethane	ZZ. 2-Chlorotoluene	PPP, trans-1,2-Dichloroethene
E. Methylene chloride	U. 1,1,2-Trichioroethane	KK. Trichlorofluoromethane	AAA. 1,3,5-Trimethylbenzene	QQQ. cis-1,2-Dichloroethene
F. Acetone	V. Benzene	LL. Methyl-tert-butyl ether	BBB. 4-Chlorotoluene	RRR. m,p-Xylenes
G. Carbon disulfide	W. trans-1,3-Dichloropropene	MM. 1,2-Dibromo-3-chloropropane	CCC. tert-Butylbenzene	SSS. o-Xylene
H. 1,1-Dichloroethene	X. Bromoform	NN. Diethyl ether	DDD. 1,2,4-Trimethylbenzene	TTT. 1,1,2-Trichloro-1,2,2-triffuoroethane
I. 1,1-Dichloroethane	Y. 4-Methyl-2-pentanone	00. 2,2-Dichloropropane	EEE. sec-Butylbenzene	UUU. Benzyl chloride
J. 1,2-Dichloroethene, total	Z. 2-Hexanone	PP. Bromochloromethane	FFF. 1,3-Dichlorobenzene	VVV. 4-Ethyltoluene
K, Chloroform	AA. Tetrachloroethene	QQ. 1,1-Dichloropropene	GGG. p-Isopropyltoluene	WWW. Ethanol
L. 1,2-Dichloroethane	BB. 1,1,2,2-Tetrachloroethane	RR. Dibromomethane	HHH. 1,4-Dichlorobenzene	XXX. Ethyl ether
M. 2-Butanone	CC. Toluene	SS. 1,3-Dichloropropane	III. n-Butylbenzene	
N. 1,1,1-Trichloroethane	DD. Chlorobenzene	TT. 1,2-Dibromoethane	JJJ. 1,2-Dichlorobenzene	
O. Carbon tetrachloride	EE. Ethylbenzene	UU. 1,1,1,2-Tetrachloroethane	KKK. 1,2,4-Trichlorobenzene	
P. Bromodichloromethane	FF. Styrene	VV. Isopropylbenzene	LLL. Hexachlorobutadiene	

	1	
Notes.		

23896 A	l
! #	#
20	SDG

# Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

jo	<b>D</b>
Page:	Reviewer:

2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the

following calculations:

 $RRF = \langle A_{\lambda} | \langle C_{a} \rangle / \langle A_{k} \rangle \langle C_{\lambda} \rangle$  average RRF = sum of the RRFs/number of standards %RSD = 100 \* (S/X)

 $A_{\rm s}=$  Area of associated internal standard  $C_{\rm s}=$  Concentration of internal standard

 $A_{\rm x}$  = Area of compound,  $C_{\rm x}$  = Concentration of compound, S = Standard deviation of the RRFs X = Mean of the RRFs

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
*	Standard ID	Calibration Date	Compound (Reference Internal Standard)	RRF ( / ら std)	RRF ( IG std)	Average RRF (initial)	Average RRF (initial)	%RSD	%RSD
-			C Methylene chloride (1st Internal Standard)	0.3365	0.3365	0.3138	0.3138	6.5	6.5
	ICAL	01-6-)	Fichlerathene (2nd internal standard)	3.560	3.560	3. 946	3.296	6.4	h´9
			J J J J Bromeferm (3rd internal standard)	118.1	11.8.1	1.789	1.789	5.4	5.4
2			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)						
က			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)						
4			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

23896 A1 LDC #: SDG #:

# Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

Page: | of | Reviewer:\_ 2nd Reviewer:\_

METHOD: GC/MS VOA (EPA Method 524.2)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF  $RRF = (A_{\omega})(C_{is})/(A_{is})(C_{\omega})$ 

Where: ave. RRF = initial calibration average RRF RRF = continuing calibration RRF  $A_k = A_k =$ 

 $A_{\mathtt{k}} = Area$  of associated internal standard  $C_{\mathtt{k}} = \mathsf{Concentration}$  of internal standard

HRF %D (CC) 3,660 -11.0						Reported	Becalculated	Reported	Recalculated
Standard ID         Calibration         Compound (Reference Internal Standard)         Average RHF         RRF         RRF         %D           CCCV         8 - C - 10         Methylene Chloride (1st Internal Standard)         3 - 394C         3 - 6CO         - 11 - O         10           IOO 8 U CO         Triabilenethene (2nd Internal Standard)         1 - 789         1 - 973         1 - 973         - 7.5         15           Methylene chloride (1st Internal Standard)         Inchlorethene (2nd					<u></u>				
CCCV         8 - G - 10         MadriyerE-chloride (1st Internal Standard)         0.314         0.397         5.4           100806         TickbleseNesine (2nd internal standard)         1.789         1.993         -11.0         -11.5           Recondiging internal standard)         I.789         I.933         -7.5        11.5           Methylene chloride (1st Internal Standard)         Inichlorethene (2nd internal standard)	*	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	RRF (CC)	RRF (CC)	Ω%	<b>0%</b>
100@06.09   Tricklierethene (2nd internal standard)   3.946   3.660   -11.0     B.comdomn (3rd internal standard)   1.789   1.993   1.993   -7.5     Methylene chloride (1st Internal Standard)   Eromotorm (3rd internal Standard)   Eromotorm (3rd internal Standard)   Eromotorm (3rd internal Standard)   Eromotorm (3rd internal Standard)   Eromotorm (3rd internal Standard)   Eromotorm (3rd internal Standard)   Eromotorm (3rd internal Standard)   Eromotorm (3rd internal Standard)   Eromotorm (3rd internal Standard)   Eromotorm (3rd internal Standard)   Eromotorm (3rd internal Standard)   Eromotorm (3rd internal standard)   Eromotorm (3rd	_	700	01-9-8	C Methylene chloride (1st Internal Standard)	0.314	166.0	7-66.0	5.4	5.4
Recomposition   Recomposition   1.789   1.933   1.933   1.55   1.933		10080609		C.C. T <del>richlereths</del> ne (2nd internal standard)	3.396	3.660	3,660	-11.0	0:11-
				ਹੁੰ ਹੁੰ ਹੈ Bromoform (3rd internal standard)	1. 789	1.933	1.933	-7.5	7.5
	2			Methylene chloride (1st Internal Standard)					
				Trichlorethene (2nd internal standard)					
				Bromoform (3rd internal standard)					
	က			Methylene chloride (1st Internal Standard)					
				Trichlorethene (2nd internal standard)					
				Bromoform (3rd internal standard)					
Trichlorethene (2nd internal standard)  Bromoform (3rd internal standard)	4			Methylene chloride (1st Internal Standard)					
Bromoform (3rd internal standard)				Trichlorethene (2nd internal standard)					
				Bromoform (3rd internal standard)					-

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

SDG	#:.	

# **Surrogate Results Verification**

, age	
Reviewer:	MG
2nd reviewer:	-

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sam

nple ID: <u>닉</u>
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	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8	10	10.01	100	100	0
Bromofluorobenzene		9.49	95	95	
1,2 Dichlorobenzene d4 1,2-DCE	Į.	10.66	107	107	<b>V</b>

9M &

# Sample ID:\_

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

# Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

# Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

# Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
	·		Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

4	
9	
9	,
389	1
4	
91	
0	
- 1	
*	*
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# Laboratory Control Sample Results Verification VALIDATION FINDINGS WORKSHEET

Page: Reviewer: 2nd Reviewer:\_

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* SSC/SA

SSC = Spiked sample concentration SA = Spike added Where:

LCS = Laboractry control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS ID: LCS MS07W0806M

RPD = ILCS - LCSD I \* 2/(LCS + LCSD)

Compound		S	pike	Spiked S	ample	รวา	Ş	CSD	QS	/SOT	rcs/rcsp
	Compound	Ac (Adg	Jded ( )	Concent (49)	tration ( )	Percent F	{ecovery	Percent F	{ecovery	8	RPD
10 NA 11.41 NA 114 NA NA NA NA 11.43   114		SOT	CSD	SOT	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
	1,1-Dichloroethene	0)	A Z	11.41		<u> </u>	114	ΝΑ	42	۷ ۷	ΝΑ
	Trichloroethene			11.56		91)	०।।	-			
11.11   11.11	Benzene			11.43		114	114				
hll 수 11-43 수 11년	Toluene			11.11		ij					
	Chlorobenzene	<b>→</b>	>	11.42		)।न	hH	<b>&gt;</b>	>	->	>
										-	

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

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LDC #:_	23896 A1
SDG #:	

# VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	of
Reviewer:	MG
2nd reviewer:	

MET	AOH.	GC/MS	VOA	/FPA	Method	524 2	١
	TUES.	GC/MS	VUA	ICEA	พยแบน	JZ4.Z	J

Υ	N	(N/A)
Υ	N	N/A/
		$\overline{}$

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concen	tration	=	Example:	
$A_{x}$	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D;	
A <sub>is</sub>	=	Area of the characteristic ion (EICP) for the specific internal standard		
I <sub>s</sub>	==	Amount of internal standard added in nanograms (ng)	Conc. = ( ) ( )	
			( )( )( )(	)
RRF	=	Relative response factor of the calibration standard.		
V <sub>o</sub>	=	Volume or weight of sample pruged in milliliters (ml) or grams (g).	= ND	
Df	***	Dilution factor.		
%S	222	Percent solids, applicable to soils and solid matrices only.		

Г	mances only.				I
#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
				:	·
					·
					*

# NASA JPL Data Validation Reports LDC #23896

Chromium



# Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** 

NASA JPL

**Collection Date:** 

July 29, 2010

LDC Report Date:

September 9, 2010

Matrix:

Water

Parameters:

Chromium

**Validation Level:** 

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10073001

# Sample Identification

MW-11-3

MW-11-2

MW-11-1\*\*

DUPE-05-3Q10

MW-22-3

MW-22-2

MW-22-1

DUPE-04-3Q10

EB-04-07/29/10

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

# I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

### III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium was found in the initial, continuing and preparation blanks.

# V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

# VI. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-23-1MS/MSD (All samples in SDG BMI10073001)	Chromium	-	168 (70-130)	29.9 (≤20)	J (all detects) UJ (all non-detects)	А

# VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

# VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

# IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples on which an EPA Level IV review was performed with the following exceptions:

Sample	Internal Standard	%R (Limits)	Analyte	Flag	A or P
MW-11-1**	Lithium-6	39 (60-125)	Chromium	J (all detects) UJ (all non-detects)	P

Raw data were not evaluated for the samples reviewed by Level III criteria.

# X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

# XII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

# XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

# XIV. Field Duplicates

Samples MW-11-3 and DUPE-05-3Q10 and samples MW-22-2 and DUPE-04-3Q10 were identified as field duplicates. No chromium was detected in any of the samples.

## XV. Field Blanks

Sample EB-04-07/29/10 was identified as an equipment blank. No chromium were found in this blank.

NASA JPL Metals - Data Qualification Summary - SDG BMI10073001

SDG	Sample	Analyte	Flag	A or P	Reason
BMI10073001	MW-11-3 MW-11-2 MW-11-1** DUPE-05-3Q10 MW-22-3 MW-22-2 MW-22-1 DUPE-04-3Q10 EB-04-07/29/10	Chromium	J (all detects) UJ (all non-detects)	Α	Matrix spike/Matrix spike duplicates (%R)(RPD)
BMI10073001	MW-11-1**	Chromium	J (all detects) UJ (all non-detects)	Р	Internal standards

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI10073001

No Sample Data Qualified in this SDG

SDG#	C#: 23896A4									of
METH	atory: <u>Alpha Analytical, Ir</u> OD: Cr (EPA Method 20	0.8)	<del></del>						Reviewer: 2nd Reviewer:	<u>~</u>
	amples listed below were ion findings worksheets.		ewed for ead	ch of the fo	ollowing	validat	ion areas. Validatio	n findin	gs are noted in a	attached
	Validation	Area					Comm	ents		
I.	Technical holding times			A	Sampling	dates:	7-29-10			
11.	ICP/MS Tune			Α		-				
III.	Calibration			A						
IV.	Bianks			Α						
V.	ICP Interference Check Sar	nple (I0	CS) Analysis	A		-				
VI.	Matrix Spike Analysis			5W	MS,	MSI	O (SDG: BI	1I 10	072901)	
VII.	Duplicate Sample Analysis			N						
VIII.	Laboratory Control Samples	(LCS)		Α	LCS					
IX.	Internal Standard (ICP-MS)			sw	not	revi	iewed for le	iel 1	U	
X	Furnace Atomic Absorption	QC		N	not	util	ized			
XI.	ICP Serial Dilution			N	not	per	formed			
XII.	Sample Result Verification	A	Not reviewed for Level III validation.							
XIII.	Overall Assessment of Data	Α								
XIV.	Field Duplicates			ND D=1+4 D=6+8						
ΧV	Field Blanks			ND	, , , , ,					
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet	)	R = Rin	o compound sate eld blank	s detected		D = Duplicate TB = Trip blank EB = Equipment blan	k		
Validate	ed Samples: ** Indicates sam all woter	ple und	lerwent Level	IV validation						
1	MVV-11-3	11			21		· · · · · · · · · · · · · · · · · · ·	31		
2	MW-11-2	12	·		22			32		
3	MVV-11-1**	13			23	1		33		
4	DUPE-05-3Q10	14			24			34		
5	MW-22-3	15			25	_		35		
6	MVV-22-2	16			26			36		
7	MW-22-1	17			27			37		
8	DUPE-04-3Q10	18		-	28			38		
9	EB-04-07/29/10	19			29	<b>.</b>		39		
10	PBW	20			30			40		

Notes:\_

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
			L	
I. Technical holding times				
All technical holding times were met.				
Cooler temperature criteria was met.				
II. ICP/MS Tune			<u> </u>	
Were all isotopes in the tuning solution mass resolution within 0.1 amu?				
Were %RSD of isotopes in the tuning solution ≤5%?			<u> </u>	
III. Calibration	<del>,</del>	,		
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/		<u> </u>	
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients > 0.995?			<u> </u>	
IV. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
VI. Matrix spike/Matrix spike duplicates			<u> </u>	
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		/		
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.		/		
VII. Laboratory control samples	<del></del>		· · · ·	
Was an LCS anaylzed for this SDG?	/			
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

# **VALIDATION FINDINGS CHECKLIST**

Page: 2 of 2
Reviewer: MG
2nd Reviewer: \_\_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC		·		
If MSA was performed, was the correlation coefficients > 0.995?			/	
Do all applicable analysies have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			/	
Were analytical spike recoveries within the 85-115% QC limits?		i	<u>/</u>	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?		/		/
Were all percent differences (%Ds) < 10%?			1	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			/	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)		<b></b>	·	
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?		V		
If the %Rs were outside the criteria, was a reanalysis performed?	<u> </u>	/		
XI. Regional Quality Assurance and Quality Control		y		
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?	L		/	1
XII. Sample Result Verification	<b>,</b>	<del></del>		
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1		<u> </u>	
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
XIV. Field duplicates		·		
Field duplicate pairs were identified in this SDG.	/		<u> </u>	
Target analytes were detected in the field duplicates.	<u> </u>	/		
XV. Field blanks	<b></b>	,	<del>,</del>	·
Field blanks were identified in this SDG.	/			
Target analytes were detected in the field blanks.		<u> </u>	<u></u>	

LDC#: 73896A4

# Matrix Spike/Matrix Spike Duplicates VALIDATION FINDINGS WORKSHEET

2nd Reviewer. Page: [ of ] Reviewer: MG

**METHOD**: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A" Y)N N/A

Was a matrix spike analyzed for each matrix in this SDG?

Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor Y (N)N/A

of 4 or more, no action was taken.

Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples? Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations. LEVEL IV ONLY: Y (N/A Y N N/A

	1	T	T		7		7	1	- T	I	T	$\neg$							
Qualifications	J/U5/A																		
Associated Samples	29.9 (≤20) all																		
RPD (Limits)	29.9 (=30)																		
MSD %Recovery	168 (70-130)	,															·		
MS %Recovery																			
Analyte	Cr													e una					,
Matrix	Water																		
OS/WSD ID	MW-33-1	USM/SM		\$		-								-					
#									<u> </u>		L		<u> </u>	<u> </u>	<u></u>	<u> </u>	<u> </u>	<u> </u>	L

Comments:

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LDC #: 7	

SDG #:

VALIDATION FINDINGS WORKSHEET Internal Standards (ICP-MS)

Page: Reviewer:\_\_ 2nd Reviewer:\_

METHOD: Metals (EPA Method 200.8)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N/A

Were all internal standard percent recoveries within 60-125% of the internal standard in the initial calibration standard?

If the response to the above question is no, were the samples reanalyzed as required? Y (N) N/A

1 Li - $G$ Cr 39 (60-195) 33 J/UJ/P	4						
	-	0.00		Associated Metals	- 11	Associated Samples	Auaimications
	-		2	)		7	3/03/8
		-					

LDC#: 23896 A4

# Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Reviewer: MG 2nd Reviewer. Page: Lof (

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

 $%R = Found \times 100$ True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution True = concentration (in ug/L) of each analyte in the ICV or CCV source

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
1750 ICV	ICP/MS (Initial calibration)	Cr	45.14	50.00	90	90	X
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
2033	ICP/MS (Continuing calibration)	Cr	74.16	20.00	101	107	>
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC# 23896A4

# VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: \_\_of\_\_\_ Reviewer: 2nd Reviewer.

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found x 100 True

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD =  $|S-D|_X \times 100$ (S+D)/2

S = Original sample concentration D = Duplicate sample concentration Where,

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

Where, I = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5) %D = [I-SDR] × 100

							Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S / I (units)	_	True / D / SDR (units)	(units)	%R / RPD / %D	%R/RPD/%D	Acceptable (Y/N)
1812 ICSAB	ICP interference check	Ş	191.50	(7) bm)	(mg/) 200.00 (mg/)	(7/ Em)	26	reported	<b>&gt;</b>
1834 LCS	Laboratory control sample	ې	0.0483	(7/ bm)	7/bm) 50.0 (7/bm)	(7/ bm)	9-7	47	
1908 MW-23-1 MS	Matrix spike	Cv	(SSR-SR) (mg/L) 0.05 (mg/L)	(7/8m)	50.0	(7/8m)	767	hc)	
1908/1914 Duplicate	Duplicate	Š	0.0632 (mg/L) 0.0840 (mg/L)	(mg/L)	0.0840	(mg/L)	39.8	29.9	>
l	ICP serial dilution	1	)		- Andrews		l	1	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 23896A4

# VALIDATION FINDINGS WORKSHEET <u>Sample Calculation Verification</u>

Page:	<u>/of_/</u>
Reviewer:	MG
2nd reviewer:	V

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

N N N N	N/A N/A N/A	Have results ke Are results with Are all detection	peen reporte thin the calil on limits be	ed an orated low th	d calculated co d range of the ne CRDL?	orrectly? instrument	icable questions are s and within the line	ear range of the IC	CP?
Detec equati	ted analyi i <del>on:</del>	te results for	level	IV	sample =	N.D.	were recalcu	<del>lated and verified</del>	-using the following
Concer	tration =	(RD)(FV)(Dil) (In. Vol.)			Reca	alculation:			
RD FV In. Vol. Dil	= = = =	Raw data concen Final volume (ml) Initial volume (ml Dilution factor							
#	Sa	ample ID			Analyte		Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
									-
	<u> </u>		*******						
				•					
			at about a state of the state o	, ,					
Note:_	· · · · · · · · · · · · · · · · · · ·								

# NASA JPL Data Validation Reports LDC #23896

Wet Chemistry



# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 29, 2010

LDC Report Date:

September 9, 2010

Matrix:

Water

Parameters:

Wet Chemistry

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10073001

# Sample Identification

MW-11-4

MW-11-3

MW-11-2

MW-11-1\*\*

DUPE-05-3Q10

MW-22-3

MW-22-2

MW-22-1

DUPE-04-3Q10

EB-04-07/29/10

MW-11-1MS

MW-11-1MSD

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous and Sulfate, and EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### VII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### IX. Field Duplicates

Samples MW-11-3 and DUPE-05-3Q10 and samples MW-22-2 and DUPE-04-3Q10 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

	Concent	ration (ug/L)	
Analyte	MW-22-2	DUPE-04-3Q10	RPD
Perchlorate	2.38	2.27	5

### X. Field Blanks

Sample EB-04-07/29/10 was identified as an equipment blank. No contaminant concentrations were found in this blank.

NASA JPL
Wet Chemistry - Data Qualification Summary - SDG BMI10073001

No Sample Data Qualified in this SDG

NASA JPL Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI10073001

No Sample Data Qualified in this SDG

	:23896A6 :BMI10073001	_ <b>VA</b>	LIDATION		PLETENI evel III/I\		WORKSHEET		Date: <u></u> 9 - 9 - 10 Page: <u>l</u> of <u>l</u>
_abora	atory: Alpha Analytical,	Inc.							Reviewer: MG
									2nd Reviewer:
METH	OD: Chloride, Nitrate-N	I, Nitrit	e-N, Orthop	hosphate	-P, Sulfate	(EPA	Method 300.0), F	erchlo	rate (EPA Method 314.0),
			•	•		•	·		•
	amples listed below wer ion findings worksheets		ewed for eac	h of the f	following va	alidatio	on areas. Validation	on findi	ngs are noted in attached
vanuat	ion mangs worksheet	J.							
	Validation	. A roo					Comm	onto	
		LAIEA	· · · · · · · · · · · · · · · · · · ·	^				IEIIIZ	
<u> </u>	Technical holding times	<del></del> -			Sampling d	ates:	7-29-10		
IIa.	Initial calibration			_ <u>A</u>		<del></del>			
IIb.	Calibration verification	٠		Ą	ļ				
111.	Blanks			<u> </u>					
IV	Matrix Spike/Matrix Spike I	Duplicat	es	A	MS/	MSD			
V	Duplicates			N					
VI.	Laboratory control samples	s		A	LCS				
VII.				A		od for L	evel III validation.		
	Sample result verification	_		$\overline{A}$	Not leview	ed lot Li	ever iii validatiori.		·
VIII.				SW	T	*- 5	* D= 7+9		
IX.	ND ED = 10				, D= 1 · 1				
X	Field blanks			ND	EB =	10			
Note: Validate	A = Acceptable N = Not provided/applicab SW = See worksheet ed Samples: ** Inc.		X = ND = No R = Rins FB = Fie	sate eld blank			D = Duplicate TB = Trip blank EB = Equipment blar	nk	
	all water	1	l			T		ТТ	
1	MW-11-4	11	MW-11-	······································	21	<u> </u>		31	
2	MW-11-3	12	MW-11-	1 WLD	22	<u> </u>	· · · · · · · · · · · · · · · · · · ·	32	
3	MW-11-2	13	PBW		23	<u> </u>		33	
4	MW-11-1**	14			24			34	
5	DUPE-05-3Q10	15			25			35	
6	MW-22-3	16			26			36	
	MVV-22-2	17			27			37	
	MW-22-1	18		•	28			38	
	DI IDE-04-3010	10			20			30	

30

40

20

EB-04-07/29/10

10

### **VALIDATION FINDINGS CHECKLIST**

Page: 1 of 2
Reviewer: MG
2nd Reviewer: \_\_\_\_\_

Method:Inorganics (EPA Method see cover )

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	V			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial calibration correlation coefficients > 0.995?	./			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)			/	
III. Blanks			····	
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates		,	<b></b>	
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/		-	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	<b>/</b>			
V. Laboratory control samples		<del>,</del>	<del>,</del>	
Was an LCS anaylzed for this SDG?	1		ļ	
Was an LCS analyzed per extraction batch?	1		ļ	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/		L	
VI. Regional Quality Assurance and Quality Control	<del></del>	•		
Were performance evaluation (PE) samples performed?		/	ļ.,	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

### **VALIDATION FINDINGS CHECKLIST**

Page: 2 of 2
Reviewer: MG
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification			<u>,</u>	ent of the second of the secon
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
Were detection limits < RL?	<b>V</b>			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.	/			
X. Field blanks				
Field blanks were identified in this SDG.	/			
Target analytes were detected in the field blanks.		/		

LDC#: 23896A6

### VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: \_\_l\_of \_\_ Reviewer: \_\_MG\_ 2nd reviewer: \_\_\_\_

All circled methods are applicable to each sample.

	1	
Commis ID	Matrix	Parameter
Sample ID 1 → 3,		
5→10	W	pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> (CIO <sub>4</sub> )
4		PH TDS CI F (NO3) NO3 SO4 PO2 ALK CN NH3 TKN TOC CR6+ CIO4
oc 11, 12		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4)
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		ph tds cif NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
	-	pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		ph TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
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		pH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ ClO4
		pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR6+ CIO4
		PH TDS CLE NO, NO, SO, PO, ALK CN NH, TKN TOC CR6+ CIO,

Comments:	

### LDC#<u>23896A6</u>

### **VALIDATION FINDINGS WORKSHEET**

### Field Duplicates

Page:_	of
Reviewer:_	MG
2nd Reviewer:	W

Inorganics, Method See Cover

Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Concentra	ition (μg/L)		
Analyte	7	9 .	RPD	
Perchlorate	2.38	2.27	5	

V:\FIELD DUPLICATES\FD\_inorganic\23896A6.WPD

LDC#: 33896A6

## Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: Lof L Reviewer: MG

cover See METHOD: Inorganics, Method

was recalculated. Calibration date:\_ The correlation coefficient (r) for the calibration of NO2-N

7-24-10

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source %R = Found × 100 True

					Recalculated	Reported	
Type of Analysis	Analyte	Standard ID	Found (units)	True (units)	ror%R	ror%R	Acceptable (Y/N)
Initial calibration		Blank	(~) Bun) SE1.0	10,000.0			
		Standard 1	0.25 (1)	0,01839			
		Standard 2	0.50 ( )	0.03767		•	
·		Standard 3	(   ) 00.1	0.07778			
	2	Standard 4	5.00 (   )	0.40796	V=0.999781	V = 0. 49978(	>-
		Standard 5	( ) 0.01	0.84063			
		Standard 6	( ) ( )	1. 29100			
		Standard 7	30.0 ( ↓ )	1.75502			
Calibration verification		6003				not	
	C (	CCV	(7/8m) 165.6	9.591 (mg/L) 10.0 (mg/L)	96	reported	
Calibration verification		h ト つ l					
	C104	CCV	56.991 (M3/L)	56.991 (Mg/L) 50.00 (mg/L)	114.0	0.4.0	
Calibration verification		t00)	( ) way			40#	
	NC3-N	CCV	0.908 (7)	0.908 ("314 1.0 (mg/L)	16	reported	->

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23896A6

### VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: Lot / 2nd Reviewer. Reviewer.\_

> 00700 METHOD: Inorganics, Method Sec

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found × 100

Where,

Found =

concentration of each analyte  $\frac{\text{measured}}{\text{meanulysis}}$  in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD =  $|S-D|_{X} \times 100$ (S+D)/2

" " "

Duplicate sample concentration Original sample concentration

Where,

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	%R/RPD	%R/RPD	Acceptable (Y/N)
H081	Laboratory control sample						
577		Po4-P	5.447 (mg/L) 5. (mg/L)	5. (mg/L)	60/	601	>
9181	Matrix spike sample		(SSR-SR)				
11		C104	23.859 (Mg/) 35. (Mg/)	25. (mg/L)	95	36	
१८६/१८३८	Duplicate sample						
11/12		C104	23.859 (mg/L) 26.544 (mg/L)	26.544 (mg/L)	10.7	10.7	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23 69 6A6

### VALIDATION FINDINGS WORKSHEET

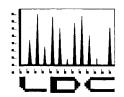
### Sample Calculation Verification

Page:_	_of
Reviewer:	MG
2nd reviewer:	1

METHOD: Inorgan	nics, Method <i>see</i> _	cover		
YN N/A Ha	ave results been rep	questions answered "N". No orted and calculated correct calibrated range of the instrubelow the CRQL?	ly?	are identified as "N/A".
Compound (analytrecalculated and v	e) results for # erified using the follo	y CI owing equation:	re	eported with a positive detect were
Concentration =		Recalculation:		
Ave CF=	0.0389	CI = 0.97572	- 15 002	ma /
dil=	l×	$C1 = \frac{0.97572}{0.0389}$	- 75.005	0 / _

#	Sample ID	Analyte	Reported Concentration ( Mg/L)	Calculated Concentration ( L )	Acceptable (Y/N)
	4	CI	25.	25.	Y
		NO3-N	0.91	0.91	
		C1 NO3-N S04	57.	57.	<b>J</b>
		·			
			·		
			·		

Note:	



### LABORATORY DATA CONSULTANTS, INC.

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Battelle 505 King Avenue Room 10-1-170 Columbus, OH 43201 ATTN: Ms. Betsy Cutie September 16, 2010

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 7, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

### **LDC Project # 23907:**

### SDG#

### **Fraction**

BMI10080401, BMI10080402 BMI10080501, BMI10080641 Volatiles, Chromium, Wet Chemistry

The data validation was performed under EPA Level III & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto

**Operations Manager/Senior Chemist** 

Attachment 1

0 pages

PATE DATE (1872) (1870)	90/10 (client select)	sec	Q.						LDC #2390	<b>]</b>	#2390	77 (Battelle-San Diego / NASA JPL)	3att		S.		leg	70	Ž	NS.	5	1														
06028910   10   10   10   10   10   10   10	DATE SDG# REC'D	DATE	1	(3) DATE DUE	VO (524		[ 29 C		CI,SC (300.(	S	00 4 00 4 00 6 00 6	<u> </u>	0.6 0.0	[ 유 (314 년		100 mm																				
0028910 (5 0 11 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Matrix: Water/Soil				≥	တ	≥	$\vdash$	$\vdash$	-	_	≥	S	$\vdash \vdash \vdash$	<del>                                     </del>	$\vdash$	1	⊢⊢	-	Н	$\vdash$	┝╾┼	$\vdash$	⊢	$\vdash$	⊢	<del>                                     </del>	$\vdash$	$\vdash$	$\vdash$	8	S	≥	$\vdash$	3	S
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0628/10 1 1 0 9 0 1 0 0 0 0 0 0 0 0 0 0		0/60	7/10		_	0	7	0		$\dashv$	ᅱ	'	'		0			$\dashv$	-		$\dashv$	$\dashv$	-	_		-		_	$\dashv$	_						
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### NASA JPL Data Validation Reports LDC #23907

Volatiles



### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 30 through August 2, 2010

LDC Report Date:

September 15, 2010

Matrix:

Water

Parameters:

Volatiles

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10080401

### Sample Identification

MW-12-5

MW-12-4

MW-12-3

MW-12-2

MW-12-1

DUPE-06-3Q10

EB-05-07/30/10

TB-05-07/30/10

MW-24-3

MW-24-2

MW-24-1\*\*

DUPE-07-3Q10

EB-06-08/2/10

TB-06-08/02/10

MW-12-2MS

MW-12-2MSD

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent a EPA Level IV review. A EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r<sup>2</sup>) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
8/7/10	Bromomethane	51.0	All samples in SDG BMI10080401	J (all detects) UJ (all non-detects)	А

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

### V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

### VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

### VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-12-2MS/MSD (MW-12-2)	Bromomethane	-	-	47.3 (≤20)	J (all detects) UJ (all non-detects)	A

### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS MS07W0806N	Bromomethane	49 (70-130)	All samples in SDG BMi10080401	J (all detects) UJ (all non-detects)	P

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

All internal standard areas and retention times were within QC limits.

### XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

### XIV. System Performance

The system performance was acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### XVI. Field Duplicates

Samples MW-12-4 and DUPE-06-3Q10 and samples MW-24-2 and DUPE-07-3Q10 were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

	Concentra	tion (ug/L)	
Compound	MW-12-4	DUPE-06-3Q10	RPD
Chloroform	0.62	0.57	8
Carbon tetrachloride	0.82	0.78	5

### XVII. Field Blanks

Samples TB-05-07/30/10 and TB-06-08/02/10 were identified as trip blanks. No volatile contaminants were found in these blanks.

Samples EB-05-07/30/10 and EB-06-08/2/10 were identified as equipment blanks. No volatile contaminants was found in these blanks.

NASA JPL Volatiles - Data Qualification Summary - SDG BMI10080401

SDG	Sample	Compound	Flag	A or P	Reason
BMI10080401	MW-12-5 MW-12-4 MW-12-3 MW-12-2 MW-12-1 DUPE-06-3Q10 EB-05-07/30/10 TB-05-07/30/10 MW-24-3 MW-24-2 MW-24-1** DUPE-07-3Q10 EB-06-08/2/10 TB-06-08/02/10	Bromomethane	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
BMI10080401	MW-12-2	Bromomethane	J (all detects) UJ (all non-detects)	А	Matrix spike/Matrix spike duplicates (RPD)
BMI10080401	MW-12-5 MW-12-4 MW-12-3 MW-12-2 MW-12-1 DUPE-06-3Q10 EB-05-07/30/10 TB-05-07/30/10 MW-24-3 MW-24-2 MW-24-1** DUPE-07-3Q10 EB-06-08/2/10 TB-06-08/02/10	Bromomethane	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)

### **NASA JPL**

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI10080401

No Sample Data Qualified in this SDG

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BMI10080401	VA	LIDATION		evel I		WOI	MONEE	,		
ry: <u>Alpha Analytical, Ir</u>	nc.									_page:of_ Reviewer: <u>M</u> (
D: GC/MS Volatiles (E	DA S	Meth	594.		u. A				2nd I	Reviewer:
·					n ()					/
ples listed below were n findings worksheets.		wed for eac	h of the fo	ollowin	ıg validati	on are	eas. Validat	ion find	dings are	noted in attach
Validation	Area						Com	ments		
echnical holding times	··········		A	Sampli	ing dates:	7-	30-10	th.	rough	8-2-10
C/MS Instrument performa	nce ch	eck	A							
nitial calibration			A	7	RSD	€ %	20, r2			
ontinuing calibration/ICV			SW		CV/co					
lanks			A		:					
Surrogate spikes			Α							
natrix spike/Matrix spike du	plicate	s	SW	М	S/M5	D				
aboratory control samples			SW	L	C 5					
tegional Quality Assurance	and Q	uality Control	N							
nternal standards			Д			-				
arget compound identificat	ion		A	Not re	eviewed for	Level II	I validation.			
Compound quantitation/CR			A	Not re	eviewed for	Level II	I validation.			
entitatively identified comp		(TICs)	Α	Not re	eviewed for	Level II	I validation.			
System performance			A	Not re	eviewed for	Level II	II validation.			
	<del> </del>							-	•	
Overall assessment of data			A	-			*	_ <b>X</b>		
ield duplicates			SW	+	= 2+6		D = 10*+1			
ield blanks			ND	E	B= 7	13	TB=	8, 14	<u>t</u>	
A = Acceptable N = Not provided/applicable SW = See worksheet Samples: ** Indicates sam			sate eld blank		ted	TB =	Ouplicate Trip blank Equipment bl	ank		
V-12-5	11	MW-24-1**		Ţ.	21	:		31		
V-12-3	12	DUPE-07-3Q1	10		22			32		······································
V-12-4 V-12-3	13	EB-06(08/2/10		au A	23	**		33		
V-12-3	14	TB-06-08/02/1	,		24		<del> </del>	34		
					25		<u> </u>	35		
V-12-1	15	MW-12-2MS	`							
PE-06-3Q10	16	MW-12-2MSD		· · · · · · · · · · · · · · · · · · ·	26			36		
-05-07/30/10	17				27		· · · · · · · · · · · · · · · · · · ·	37	<u> </u>	<del></del>

ID #13: EB-06-08/2/10

MBLK MS07W0806N 30

39

40

3-05-07/30/10

W-24-3

W-24-2

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### VALIDATION FINDINGS CHECKLIST

	Page:_	l of a
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Method: Volatiles (EPA Method 524.2)

V-BL-NA		T	T	
Validation Area	Ye	s N	o N	A Findings/Comments
L. Technical holding times	<del>-</del>	т-		
All technical holding times were met.	- 4		_	
Cooler temperature criteria was met.	_/_			
II. GC/MS Instrument performance check	1	Т-		
Were the BFB performance results reviewed and found to be within the specified criteria?	'   1			
Were all samples analyzed within the 12 hour clock criteria?	1			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	1	T		
Were all percent relative standard deviations (%RSD) ≤ 20%?	1			
W. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	1			
Were all percent differences (%D) ≤ 30%?		1	$\top$	
V. Blanks				
Was a method blank associated with every sample in this SDG?	/			1
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
/I. Surrogate spikes			1	
Vere all surrogate %R within QC limits?	/			
f the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			1	
II. Matrix spike/Matrix spike duplicates				
Vas a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this	/			
Vere the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	,	/		
III. Laboratory control samples				
as an LCS analyzed for this SDG?	/			
as an LCS analyzed per analytical batch?	1			
ere the LCS percent recoveries (%R) and relative percent difference (RPD)		/		

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SDG a	#:				

### VALIDATION FINDINGS CHECKLIST

Page: 2 of ;
Reviewer: MG
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Validation Area	Yes	No	NA	Findings/Comments
IX Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			Ĺ.,	
Were the performance evaluation (PE) samples within the acceptance limits?			/	
X. Internal standards	<u>,</u>			
Were internal standard area counts within +/-40% from the associated calibration standard?	/			
Were retention times within - 30% of the last continuing calibration or $\pm$ - 50% of the initial calibration?	/			
XI. Target compound identification				
Were relative retention times (RRT's) within $\pm$ 0.06 RRT units of the standard?	/			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	/			
Were chromatogram peaks verified and accounted for?				
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) ased to quantitate the compound?	/			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1			
XIII: Tentativ y Identified compounds (TICs)	11			
Were the major lons (> 25 percent relative intensity) in the reference spectrum evaluated in sanople spectrum?			/	
Were relative intensities of the major ions within $\pm$ 20% between the sample and the reference spectra?				
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?	/			
XIV. System performance		1		
System performance was found to be acceptable.	1			
CV. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
VI Field duplicates				
ield duplicate pairs were identified in this SDG.	/			
arget compounds were detected in the field duplicates.	1			
VII. Field blanks				
ield blanks were identified in this SDG.	/	T	T	
arget compounds were detected in the field blanks.	+		_	

# TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method 524.2)

A. Chioromethane	Q. 1,2-Dichloropropane	GG. Xylenes, total	WW. Bromobenzene	MMM. Naphthalene
B. Bromomethane	R. cis-1,3-Dichloropropene	HH. Vinyl acetate	XX. 1,2,3-Trichloropropane	NNN. 1,2,3-Trichlorobenzene
C. Vinyl choride	S. Trichloroethene	II. 2-Chloroethylvinyl ether	YY. n-Propylbenzene	000. 1,3,5-Trichlorobenzene
D. Chloroethane	T. Dibromochloromethane	JJ. Dichlorodifluoromethane	ZZ. 2-Chlorotoluene	PPP. trans-1.2-Dichloroethene
E. Methylene chloride	U. 1,1,2-Trichloroethane	KK. Trichlorofluoromethane	AAA. 1,3,5-Trimethylbenzene	QQQ. cis-1.2-Dichloroethene
F. Acetone	V. Benzene	LL. Methyl-tert-butyl ether	BBB. 4-Chlorotoluene	RRR. m,p-Xylenes
G. Carbon disulfide	W. trans-1,3-Dichloropropene	MM. 1,2-Dibromo-3-chloropropane	CCC. tert-Butylbenzene	SSS. o-Xylene
H. 1,1-Dichloroethene	X. Bromoform	NN. Diethyl ether	DDD. 1,2,4-Trimethylbenzene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane
I. 1,1-Dichloroethane	Y. 4-Methyl-2-pentanone	00. 2,2-Dichloropropane	EEE. sec-Butylbenzene	UUU. Benzyl chloride
J. 1,2-Dichloroethene, total	Z. 2-Hexanone	PP. Bromochloromethane	FFF. 1,3-Dichlorobenzene	VVV. 4-Ethyltoluene
K. Chioroform	AA. Tetrachioroethene	QQ. 1,1-Dichloropropene	GGG. p-Isopropyltoluene	WWW. Ethanol
L. 1,2-Dichloroethane	BB. 1,1,2,2-Tetrachloroethane	RR. Dibromomethane	HHH. 1,4-Dichlorobenzene	XXX. Ethyl ether
M. 2-Butanone	CC. Toluene	SS. 1,3-Dichloropropane	III. n-Butylbenzene	
N. 1,1,1-Trichloroethane	DD. Chlorobenzene	П. 1,2-Dibromoethane	JJJ. 1,2-Dichlorobenzene	
O. Carbon tetrachloride	EE. Ethylbenzene	UU. 1,1,1,2-Tetrachloroethane	KKK. 1,2,4-Trichlorobenzene	
P. Bromodichloromethane	FF. Styrene	W. Isopropylbenzene	LLL. Hexachlorobutadiene	

Notes:\_

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# VALIDATION FINDINGS WORKSHEET

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Continuing Calibration

METHOD: GC/MS VOA (EPA Method 524.2)

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Y NA NA NA

Were all percent differences (%D)  $\leq$  30% ?

Qualifications	5/US/A														
Associated Samples	all and	MBLK MSO7W0806N													
Finding %D (Limit: ≤30.0%)	51.0														
Compound	B														
Standard ID	10080637 (ccv)														
Date	8-7-10														
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### VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Nor applicable questions are identified as "N/A".

(Y) N/A Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG? (Not required)

Y(N) N/A Were a MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

	-				I					ſ
*	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	D mits)	RPD (Limits)	Associated Samples	Qualifications	
	8-7-10	15/16	В	)	) (	(	173(530)	t	5/05/4	7
				)	) (	•	( )			T
				)	) (		( )			T
				)	) (	(	( )			7
				)	) (	^	( )			Ť
				<u> </u>	(		( )			T
				)	) (		( )			1
				)	) (	(	(			Т
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				)	) (	(	( )			Т
				)	) (	(	(			T
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				)	) (	(	( )			7
				•	) (	(	( )			T
				)	) (	(				T
				)	) (	(	( )			Т
				)	) (	(	( )			T
				)	) (	(	( )			
		Compound	QC Limit	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Water)	RPD (Water)	
O.	Vinyi chloride	an and	70-1	70-130%	<30	^	Benzene	70-130%	<30	ī —
نـ	1,2-Dichloroethane	ithane	70-1	70-130%	<30	В	cis-1,3-Dichloropropene	70-130%	<30	Т.
o	Carbon tetrachloride	chloride	70-1	70-130%	<30	×	Bromoform	70-130%	<30	<del>-</del>
ø	1,2-Dichloropropane	ropane	70-1	70-130%	<30	₩	Tetrachloroethene	70-130%	<30	ī
οj	Trichloroethene	ne	70-1	70-130%	<30	F	1,2-Dibromoethane	70-130%	<30	T
ъ	1,1,2-Trichloroethane	oethane	70-1	70-130%	<30	HH	1,4-Dichlorobenzene	70-130%	<30	<del></del>

LDC #: 23907A1

### VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: | of 2nd Reviewer: Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

Was a LCS analyzed for this SDG? Was a LCS analyzed every 20 samples? V N N/A

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

*	Date	TCS/TCSD ID	Compound	LCS %R (Limits)	(s	LCSD %R (Limits)		RPD (Limits)	Associated Samples	Qualifications
	01-2-8	LCS MSOTWOBUGN	ଅ	61-01 ) 64	(30)	)	Û	(	all and	J/117/P
				)	^	)	(	( )	MS	
				)	(	)	^	( )		
		18. de// 2/ 4 A. A.		)	(	)	^	( )		
				)	^	<u> </u>	^	( )		
				)	<u> </u>	<b>\</b>	^	( )		
				)	Û	<u> </u>	^	( )		
				)	(	)	^	( )		
				)	(	)	^	( )		
				_	<u> </u>	)	(	( )		
				)	(	J	^	( )		
				)	(	)	_	( )		
				)	) (	)	r	( )		
				)	^	)	^	( )		
				)	(	)	^	( )		
				)	)	)	^	( )		
				)	<u> </u>	)	<u> </u>	( )		
				)	-	)	_	( )		
		Compound	QC Limits (Water)	s (Water)	RPD (Water)	ter)		Compound	QC Limits (Water)	RPD (Water)
ن	Vinyl chloride	de	70-1	70-130%	<30	γ.	8	Benzene	70-130%	<30
انـ	1,2-Dichloroethane	ethane	70-1	70-130%	<30	я.	0	cis-1,3-Dichloropropene	70-130%	<30
o	Carbon tetrachloride	achloride	70-1	70-130%	<30	×	80	Bromoform	70-130%	<30
σ	1,2-Dichloropropane	propane	70-1	70-130%	<30	AA.		Tetrachloroethene	70-130%	<30
တ	Trichloroethene	ene	70-1	70-130%	<30	Ë		1,2-Dibromoethane	70-130%	<30
o.	1,1,2-Trichloroethane	roethane	70-130%	30%	<30	HHH	<del>                                     </del>	1,4-Dichlorobenzene	70-130%	<30

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### **VALIDATION FINDINGS WORKSHEET** Field Duplicates

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METHOD: GC/MS VOA (EPA Method 524.2)

$\bigcirc$ N	N/A
(V)N	N/A

Were field duplicate pairs identified in this SDG2

	Concentration	1(Mg/L)		
Compound	2	6	RPD	
K	0.62	0.57	8	
0	0.82	0.78	5	
•				
	Concentration	1 ( )	=	
Compound			RPD	
WENTER THE SECTION OF				
onesses of the method states of the state of				
and a statement of the				
	Concentration	)		
Compound			RPD	
	·			

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### Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

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Page:	Reviewer:	2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the ollowing calculations:

 $\label{eq:RF} RF = (A_{\omega})(C_{\kappa})/(A_{ls})(C_{\omega})$  werage RRF = sum of the RRFs/number of standards %RSD = 100 \* (S/X)

 $A_{\rm g}=$  Area of associated internal standard  $C_{\rm g}=$  Concentration of internal standard

 $\begin{aligned} A_x &= \text{Area of compound,} \\ C_x &= \text{Concentration of compound,} \\ S &= \text{Standard deviation of the RRFs} \\ X &= \text{Mean of the RRFs} \end{aligned}$ 

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	RRF (/6 std)	RRF ( <b>/</b> 6 std)	Average RRF (initial)	Average RRF (initial)	%RSD	%RSD
-	ICAL	7.9.7	Methylene chloride (1st Internal Standard)	0.3664	0.3664	0.3478	0. 2478	5.6	5.6
	}	0 - 1 - 1	Hicklorethene (2nd internal standard)	71917	0.7917	0.7387	7867.0	١(٠5	11.5
			EEE Bremeform (3rd internal standard)	1.020	1.0198	0.894	0.8939	14.3	14.3
~			Methylene chloride (1st Internal Standard)	·					
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)					·	
3			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)						
4			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)				·		

omments. Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the scalculated results.

LDC #: 33907 AI SDG #: \_\_\_

# VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Page: Lof L Reviewer: HG

METHOD: GC/MS VOA (EPA Method 524.2)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF RRF =  $(A_{\nu})(C_{k})/(A_{k})(C_{\nu})$ 

Where: ave. RRF ≈ initial calibration average RRF RFF ≈ continuing calibration RRF

A<sub>x</sub> = Area of compound, C<sub>x</sub> = Concentration of compound,

 $A_{\rm k}=$  Area of associated internal standard  $C_{\rm k}=$  Concentration of internal standard

					Reported	Becalculated	Reported	Doctoring	
		Calibration		L C				politinos	T
*	Standard ID	Date	Compound (Reference internal Standard)	Average KKF (initial)	RRF (CC)	RRF (CC)	Q%	<b>0</b> %	
-[	10080037	8-7-10	Methylene ekloride (1st Internal Standard)	0.348	6.949	6.949	1.0.	h.o	7
			Tricklerethane (2nd internal standard)	0.739	0.734	0.734	-0.7	-0.7	т=
			E E E Bromoferm (3rd internal standard)	0.894	0 - 86 1	0.861	3.7	3.7	T
Ŋ			Methylene chloride (1st Internal Standard)						T
			Trichlorethene (2nd internal standard)						<del>                                     </del>
			Bromoform (3rd internal standard)						<del>-</del>
ო			Methylene chloride (1st Internal Standard)						7
			Trichlorethene (2nd internal standard)						<del>_</del>
			Bromoform (3rd internal standard)						<del>T</del>
4			Methylene chloride (1st Internal Standard)						<del></del>
			Trichlorethene (2nd internal standard)						<del></del>
			Bromoform (3rd internal standard)						_

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC	#.	23907A	1
SDG			

### VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	of
Reviewer:	MG
2nd reviewer:	
	ya

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID:\_\_\_ / /

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8	10.0	9.88	99	99	
Bromofluorobenzene	1	9.46	95	ar	<del></del>
1,2-Dichlorobenzene-d4 DCA		10.80	108	108	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
Toluene-d8		l I	Reported	Recalculated	
Bromofluorobenzene					
1,2-Dichloroben ane-d4					

Sample ID:\_\_

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
Toluene-d8			Reported	Recalculated	
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

Sample ID:\_

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
Toluene-d8			Reported	Recalculated	
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
Toluene-d8			Reported	Recalculated	
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

23907A SDG #: LDC #:

## Matrix Spike/Matrix Spike Duplicates Results Verification WALIDATION FINDINGS WORKSHEET

of	I P	0
Page:	Reviewer:	2nd Reviewer

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified

% Recovery = 100 \* (SSC - SC)/SA

SSC = Spiked sample concentration SA = Spike added Where:

MSC = Matrix spike percent recovery

SC = Sample concentration

RPD = I MSC - MSDC ; \* 2/(MSC + MSDC)

MSDC = Matrix spike duplicate percent recovery

MS/MSD sample:

	Spike Added	<b>4.</b> TS	Sample Concentration	Spiked Sample	sample	Matríx Spike	Spike	Matrix Spike Duplicate	Duplicate	MS	MS/MSD
Compound	/(GW)	( )	( mg/r)	(mgh)	رح)	Percent Recovery	lecovery	Percent Recovery	ecoverv		000
	2								,		
	CIM	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc	Renorted	December
1,1-Dichloroethene	50	50	0	12 77	46 51 49 117	92	00	G	6	na india	necalculated
T. 10 10 10 10 10 10 10 10 10 10 10 10 10					07.7		2	Ы	-	6	9
incilloroethene				50.80	50.80 51.30	( )	100	(	3		
Воизово				,	70.10	10 4	٧)	(03	103		9 -
				51.30 51.53	91.53	102	101	(	, 00	, ,	
Toluene				)	2		5	(03	(5)	5.0	C . C
		-		49.03 49.65	49 65	2	o o	9	g	,	,
Chlorobenzene					,	2	2			1,5	(, 3
	>	<b>→</b>	_>	50.95	50.05   50.96 101	- 0	001	100	- ()	, ,	
						-	- ) -	_ _ _	70		_

Somments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within

LDC # 75707A1 SDG #

## Laboratory Control Sample Results Verification VALIDATION FINDINGS WORKSHEET

Page: 1 of Reviewer: 2nd Reviewer:\_

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD of Boundatory control sample duplicate (if applicable) were

% Recovery = 100 \* SSC/SA

SSC = Spiked sample concentration SA = Spike added Where:

LCS = Laboraotry control sample percent recovery

LCS ID: LCS MS07W0806N

RPD = 1 LCS - LCSD 1 \* 2/(LCS + LCSD)

LCSD = Laboratory control sample duplicate percent recovery

	ω¥	Spike Added	Spiked	Sample	) T	SOT	LCSD	-		
Compound	7/611)	( 7)	( mg/L)	rtration /c )	Percent	Percent Recovery	Derocat		/son	rcs/rcsp
	rcs	CSD	90				i elcent necovery	scovery	RPD	۵
			1123	GSOT	Reported	Recalc.	Reported	Recalc.	Donottod	
1,1-Uchioroethene	0	AN	9.46	ママ	25	36	٧	V I	ballode:	Hecalculated
Irichloroethene			10 35				27	ZZ	NA	NA
Benzene			56.5		104	70 <i>)</i>	-			_
			9.80		φ	99				
loluene			9 57		1					
Chlorobenzene			, C		75	15				
	~	→	9.79		90	9				
				78	10	ρ	7	→	->	<del></del>
				•						
	1									
	·									
uniments: Heter to Laboratory Control Sample finding wastered	Control Sa	mnle finding	A second conference of							

ory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10,0% the recalculated results.

LCSCLC,185

LDC	#:	23907A1
SDG	#:	

N N/A

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of_)
Reviewer:	MG
2nd reviewer:_	

METHOD: GC/MS VOA (EPA Method 524.2)

Y) N N/A

Were all reported results reca

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration =  $(A_*)(I_*)(DF)$ (A<sub>k</sub>)(RRF)(V<sub>o</sub>)(%S)  $A_{x}$ Area of the characteristic ion (EICP) for the compound to be measured Area of the characteristic ion (EICP) for the specific internal standard Amount of internal standard added in nanograms (ng) Relative response factor of the calibration standard. RRF Volume or weight of sample pruged in milliliters (ml) V. or grams (g). Df Dilution factor. %S Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. # 11 , K :

Conc. = (115202)(10) (423756) (0.5064)( )( )

reported: 5.4 mg/L V Reported Calculated Concentration # Concentration ≲∷mple ID Compound Qualification

### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 3, 2010

LDC Report Date:

September 15, 2010

Matrix:

Water

Parameters:

Volatiles

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10080402

### Sample Identification

MW-26-2

MW-26-1

MW-25-5

MW-25-4

MW-25-3

MW-25-2\*\*

MW-25-1

EB-07-8/3/10

TB-07-8/3/10

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent a EPA Level IV review. A EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r<sup>2</sup>) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
8/7/10	Bromomethane	51.0	MW-25-2** MW-25-1 EB-07-8/3/10 TB-07-8/3/10 MBLK MS07W0806N	J (all detects) UJ (all non-detects)	A

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

### V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

### VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

### VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were not within QC limits. Since there were no associated samples, no data were qualified.

### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS MS07W0806N	Bromomethane	49 (70-130)	MW-25-2** MW-25-1 EB-07-8/3/10 TB-07-8/3/10 MBLK MS07W0806N	J (all detects) UJ (all non-detects)	₽

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

All internal standard areas and retention times were within QC limits.

### XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

### XIV. System Performance

The system performance was acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### XVI. Field Duplicates

No field duplicates were identified in this SDG.

### XVII. Field Blanks

Sample TB-07-8/3/10 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-07-8/3/10 was identified as an equipment blank. No volatile contaminants was found in this blank with the following exceptions:

Equipment Blank ID	Compound	Concentration (ug/L)
EB-07-8/3/10	2-Methyl-1-propene	2.0

NASA JPL Volatiles - Data Qualification Summary - SDG BMI10080402

SDG	Sample	Compound	Flag	A or P	Reason
BMI10080402	MW-25-2** MW-25-1 EB-07-8/3/10 TB-07-8/3/10	Bromomethane	J (all detects) UJ (all non-detects)	А	Continuing calibration (%D)
BMI10080402	MW-25-2** MW-25-1 EB-07-8/3/10 TB-07-8/3/10	Bromomethane	J (all detects) UJ (all non-detects)	Р	Laboratory control samples (%R)

NASA JPL

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI10080402

No Sample Data Qualified in this SDG

LDC #: 23907B1	VALIDATION COMPLETENESS WORKSHEET	Date: 9-14-10
SDG #: BMI10080402	Level III/IV	Page:of
Laboratory: Alpha Analytical,	Inc	Reviewer: MG
•	594.2	2nd Reviewer:
METHOD: GC/MS Volatiles	(EPA <del>SW84</del> 6 Method <del>8260B</del> )	/
*	an M	/

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8 - 3 - 10
II.	GC/MS Instrument performance check	Α	
III.	Initial calibration	A	% RSD ≤ 20 r <sup>2</sup> ICV/CCV ≤ 30
IV.	Continuing calibration/ICV	SW	Icv/ ccv ≤ 30
V.	Blanks	A	
VI.	Surrogate spikes	Α	
VII.	Matrix spike/Matrix spike duplicates	SW	MS/MSD (SDG: BMI10080401)
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	Α	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	A	Not reviewed for Level III validation.
XIV.	System performance	Ą	Not reviewed for Level III validation.
XV.	Overall assessment of data	_ A	
XVI.	Field duplicates	2	
XVII.	Field blanks	SW	EB=8 TB=9*

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

X = ND = No compounds detected

R = Rinsate

FB = Field blank

D ≃ Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples: \*\* Indicates sample underwent Level IV validation

1 1	MW-26-2	11 (	MBLK MS07W0806M	21	31	
2 1	MVV-26-1		MBLK MS07W0806N	22	32	
3	MW-25-5	13		23	33	
4 1	MW-25-4	14		24	34	
5 1	MW-25-3	15		25	35	
6 Z	MW-25-2**	16		26	36	
7 2	MW-25-1	17		27	37	
8 2	EB-07-8/3/10	18		28	38	
9 2	TB-07-8/3/10	19		29	39	
10		20_		30	40	

LDC #:_	23907B1	
SDG#:		

### VALIDATION FINDINGS CHECKLIST

	Page:_	L of a
	Reviewer:	MG
2nd	Reviewer:_	٩

Method: Volatiles (EPA Method 524.2)

Validation Area	Ye	s N	0	NA	Findings/Comments
I. Technical holding times		,			Comments
All technical holding times were met.	T	7			
Cooler temperature criteria was met.	17		$\dashv$	•	
II: GC/MS Instrument performance check					I
Were the BFB performance results reviewed and found to be within the specified criteria?	/				
Were all samples analyzed within the 12 hour clock criteria?	17		$\top$		
III. Initial calibration		1			
Did the laboratory perform a 5 point calibration prior to sample analysis?	17		T		
Were all percent relative standard deviations (%RSD) ≤ 20%?	1		$\dagger$		
V. Continuing calibration				l	
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	/		T		
Vere all percent differences (%D) ≤ 30%?			+	$\top$	
Blanks					
Vas a method blank associated with every sample in this SDG?	/		T	T	
Vas a method blank analyzed at least once every 12 hours for each matrix and oncentration?	/		T		
as there contamination in the method blanks? If yes, please see the Blanks alidation completeness worksheet.		/	T		
. Surrogate spikes			1		
ere all surrogate %R within QC limits?	./		T	T	
the percent recovery (%R) for one or more surrogates was out of QC limits, was reanalysis performed to confirm samples with %R outside of criteria?			1	才	
Matrix spike/Matrix spike duplicates	<u> </u>				
as a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this OG?	/				
ere the MS/MSD percent recoveries (%R) and the relative percent differences PD) within the QC limits?		/			
Laboratory control samples					
s an LCS analyzed for this SDG?	7			T	
s an LCS analyzed per analytical batch?	7			+	
re the LCS percent recoveries (%R) and relative percent difference (RPD)			<b></b>		

LDC	#:	23907	BI
SDG	#:	-	

### VALIDATION FINDINGS CHECKLIST

Page: 2 of Reviewer: M(2nd Reviewer: 4

Validation Area	Yes	No	NA	Findings/Comments
IX Regional Quality Assurance and Quality Control		<del></del>		
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			1/	
X. Internal standards				
Were internal standard area counts within +/-40% from the associated calibration standard?	/			
Were retention times within - 30% of the last continuing calibration or $\pm$ -50% of the initial calibration?	1			
XI. Target compound identification		1	1	
Were relative retention times (RRT's) within $\pm$ 0.06 RRT units of the standard?	1		Π	
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	1			
Were chromatogram peaks verified and accounted for?	1			
XII: Compound quantitation/CRQLs			,	
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) sised to quantitate the compound?	/			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Tentativ- y-identified compounds (TICs)				
Were the major ions (> 25 percent relative intensity) in the reference spectrum evaluated in parciple spectrum?				· · · · · · · · · · · · · · · · · · ·
Were relative intensities of the major ions within $\pm$ 20% between the sample and the reference spectra?				
Did the raw data indicate that the laboratory performed a library search for all equired peaks in the chromatograms (samples and blanks)?				
(IV. System performance				
System performance was found to be acceptable.	71		Т	
V. Overall assessment of data	<u> </u>			
Overall assessment of data was found to be acceptable.	7		П	
VI. Field duplicates	-			
eld duplicate pairs were identified in this SDG.	T	7.		
arget compounds were detected in the field duplicates.		4	_	
/II: Field blanks			4	
eld blanks were identified in this SDG.	<del>-, 1</del>	<del>- 1</del> -		
· · · · · · · · · · · · · · · · · · ·	/			
rget compounds were detected in the field blanks.				

# TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method 524.2)

A. Chioromethane	Q. 1,2-Dichloropropane	GG. Xylenes, total	WW. Bromobenzene	MMM Nanhthalane
B. Bromomethane	R. cis-1,3-Dichloropropene	HH. Vinyl acetate	XX. 1,2,3-Trichloropropane	NNN 1 0 3-Trichlord
C. Vinyl choride	S. Trichloroethene	II. 2-Chloroethylvinyl ether	YY. n-Propylbenzene	
D. Chloroethane	T. Dibromochloromethene	1 0 1 1		CCC: 1,5,5-1 Tremorabenzene
		JJ. Dichlorodifluoromethane	ZZ. 2-Chlorotoluene	PPP. trans-1,2-Dichloroethene
E. Methylene chloride	U. 1,1,2-Trichforoethane	KK. Trichlorofluoromethane	AAA. 1,3,5-Trimethylbenzene	QQQ. cis-1.2-Dichloroethene
F. Acetone	V. Benzene	LL. Methyl-tert-butyl ether	BBB. 4-Chlorotoluene	BRB m n-Vidence
G. Carbon disulfide	W. trans-1,3-Dichloropropene	MM. 1.2-Dibromo-3-chloropropane	Control by the Control	Solida Ajimisa
H. 1,1-Dichloroethene	X. Bromoform	NN Diethyl other	aliearinannina	SSS. o-Xylene
			DDD. 1,2,4-Trimethylbenzene	TT. 1,1,2-Trichloro-1,2,2-trifluoroethane
i. 1,1-Dichloroethane	Y. 4-Methyl-2-pentanone	00. 2,2-Dichloropropane	EEE. sec-Butylbenzene	UUU. Benzyl chloride
J. 1,2-Dichloroethene, total	Z. 2-Hexanone	PP. Bromochloromethane	FFF. 1,3-Dichlorobenzene	WW. 4-Ethytholicano
K. Chloroform	AA. Tetrachloroethene	QO 11-Dichloronronon		
			ddd. p-isopropyltoluene	WWW. Ethanol
L. 1,Z-Dichioroethane	BB. 1,1,2,2-Tetrachloroethane	RR. Dibromomethane	HHH. 1,4-Dichlorobenzene	XXX. Ethyl ether
M. 2-Butanone	CC, Toluene	SS. 1,3-Dichloropropane	III. n-Butylbenzene	
N. 1,1,1-Trichloroethane	DD. Chlorobenzene	П. 1,2-Dibromoethane	JJJ. 1,2-Dichlorobenzene	
O. Carbon tetrachloride	EE. Ethylbenzene	UU. 1,1,1,2-Tetrachloroethane	KKK. 1,2,4-Trichlorobenzene	
P. Bromodichloromethane	FF. Styrene		LLL. Hexachlorobutadiene	

COMPNDL1S5

181	
4370	)
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J D	S S

# VALIDATION FINDINGS WORKSHEET

2nd Reviewer:

Page Reviewer:

Continuing Calibration

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". METHOD: GC/MS VOA (EPA Method 524.2)

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? Y (N/A

Were all percent differences (%D) < 30% ?

Qualifications	5/05/A															
Associated Samples	6 -> 9 and	MBLK MSOTWOEOGN														
ing %D ≤30.0%)		MBL														
Find (Limit:	51.0															
Compound	3															
ard ID	37 (@v)				-											
Standard ID	10080637 (001															
Date	8-7-10															
*																

.DC #. 23907B1

### VASSOATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: 2nd Reviewer:\_ Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". NA Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG? (Not required) V (N) N/A

Were a MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

								,			
#	Date	MS/MSD ID	Compound	MS %R (Limits)		MSD %R (Limits)	its)	RPD (Limits)		Associated Samples	Qualifications
	01-2-6	8-7-10 MW-12-2	3	)	) (	)	(	47.3 ( £ 20	<u> </u>	None	No Qual
		MS/MSD		)	^	<u> </u>		V	_		
				)	(	)	^	_	_		
				. )	(	•	^	J	_		
				_	_	_	^	J	<u> </u>		
				J	^	_		)	^		
				)	)	)	_	)	_		
				)	(	)	^	)	_		
				J	^	`	^	)	<u> </u>		
				)	(	)	(	)	)		
				`	(	)	(	)	(		
				)	)	)	(	)	(		
				)	(	)	(	)	_		
				)	(	)	^		_		
				)	<u> </u>	<u> </u>	^	<u> </u>	_		
				)	<u> </u>	<b>.</b>		_	_		
				)	(	)	(	)	^		
				)	(	}	(	)	<b>^</b>		
		Compound	QC Limits (Water)		RPD (Water)	Vater)		Compound		QC Limits (Water)	RPD (Water)
Ö	Vinyl chloride	e.	70-130%	30%	<30	01	^	Benzene		70-130%	<30
	1,2-Dichloroethane	ethane	70-130%	30%	<30	0	В	cis-1,3-Dichloropropene	ane.	70-130%	<30
o	Carbon tetrachloride	achloride	70-1;	70-130%	<30	Q	×	Bromoform		70-130%	<30
o	1,2-Dichloropropane	propane	70-130%	30%	<30	0	₹	Tetrachloroethene		70-130%	<30
οj	Trichloroethene	ene	70-130%	30%	<30	0	F	1,2-Dibromoethane		70-130%	<30
j.	1,1,2-Trichloroethane	roethane	70-130%	30%	<30	0	王	1,4-Dichlorobenzene		70-130%	<30

.DC #: 3390781

VALIDATION FINDINGS WORKSHEET aboratory Confroi Samples (LCS)

Page: Reviewer: 2nd Reviewer:

METHOD: GUMS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questors ৰাভ identified as "N/A". CON N/A Y (N) N/A

Was a LCS analyzed for this SDG?

Was a LCS analyzed every 20 samples? Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

						Total Control of the				
*	Date	TCS/ICSD ID	Compound	LCS %R (Limits)		LCSD %R (Limits)	iD nits)	RPD (Limits)	Associated Samples	Qualifications
	0-2-10	LCS MS07W0806N	В	149 (70-13	30)	)	•	( )	6 29 and	J/01/P
				)	_	_	•	( )	3	
				)	_			( )		
				)	^	Ų		)		
				)	_	_		)		
				<u> </u>	<u> </u>	_		( )		
				)	<u> </u>	)		( )		
				)	<u> </u>	-				
				)	(	)	^	( )		
				)	(	)	(	( )		
				)	<u> </u>	_				
				)	(	_		)		
				)	_	)	^	( )		
				)	<u> </u>	_	^	)		
				)	_	)				
				)	<u> </u>	<u> </u>		)		
Ì				)	<u> </u>	)	( -	( )		
				.)		)	(	( )		
		Compound	QC Limit	QC Limits (Water)	RPD (Water)	(ater)		Compound	QC Limits (Water)	RPD (Water)
o.	Vinyl chloride	le.	70-	70-130%	<30	0	>	Benzene	70-130%	<30
انہ	1,2-Dichloroethane	ethane	-02	70-130%	<30	C	ď	cis-1,3-Dichloropropene	70-130%	<30
o	Carbon tetrachloride	achloride	70-1	70-130%	<30	0	×	Bromoform	70-130%	<30
ø	1,2-Dichloropropane	propane	70-1	70-130%	<30	0	AA.	Tetrachloroethene	70-130%	<30
တ	Trichloraethene	ene	70-1	70-130%	<30	0	Ë	1,2-Dibromoethane	70-130%	06>
j	1,1,2-Trichloroethane	roethane	70-1	70-130%	<30	0	포	1,4-Dichlorobenzene	70-130%	<30

LDC #: 23907B1 SDG #:	VALIDATION FINDINGS WORKSHEET Field Blanks	Page:(_of Reviewer: 2nd reviewer:
METHOD: GC/MS VOA (EPA M	lethod 524.2)	
	Method 524.2)  ks identified in this SDG?  mpounds detected in the field blanks?  Field Blank / Trip Blank (Rinsate (circle one))	
Sample: 8	Field Blank / Trip Blank (Rinsate (circle one)	
	Compound	Concentration Units (ぬなん)
2 -	Methyl-1- propene	2.0
Sample:	Field Blank / Trip Blank / Rinsate (circle one)	
	Compound	Concentration Units ( )
Sample:	Field Blank / Trip Blank / Rinsate (circle one)	· · · · · · · · · · · · · · · · · · ·
	Compound	Concentration Units ( )

23907B	)
;· #	*
DC	SDG

## Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

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Page:	Reviewer:	2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF =  $(A_{\omega})(C_{\omega})/(A_{\omega})(C_{\omega})$  average RRF = sum of the RRFs/number of standards %RSD = 100 \* (S/X)

 $A_x = Area of compound,$   $C_x = Concentration of compound,$  S = Standard deviation of the RRFs X = Mean of the RRFs

 $A_{\rm s}=$  Area of associated internal standard  $C_{\rm s}=$  Concentration of internal standard

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	RRF (/& std)	RRF (	Average RRF (initial)	Average RRF (initial)	%RSD	%RSD
-	ICAL	7.9.7	Methydane chloride (1st Internal Standard)	0.3664	0.3664	0.3478	0.9478	5.6	5.6
	•	2	Tricklorathane (2nd internal standard)	71917	7161.0	0.7387	780	15.	11.5
			EEE Bromoform (3rd internal standard)	1.020	8610.1	0.894	0.8939	14.3	14.3
2			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)	·					
ဗ			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)						
4			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)						

comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the ecalculated results.

LDC #: 23907B| SDG #:

# VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Page: Lof L Reviewer: MG 2nd Reviewer: Q

METHOD: GC/MS VOA (EPA Method 524.2)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF =  $(A_{\lambda}(C_{k})/(A_{k})(C_{\lambda})$ 

Where: ave. RRF = initial calibration average RRF RRF = continuing calibration RRF

 $A_x$  = Area of compound,  $C_x$  = Concentration of compound,

 $A_{\rm is}=$  Area of associated internal standard  $C_{\rm is}=$  Concentration of internal standard

					Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	RRF (CC)	RRF (CC)	Q%	Q%
-	1008001	8-7-10	Methylene ekloride (1st Internal Standard)	0.348	6) bhe . 0	6.949	7.0.	h.o.4
			Trichlsrethane (2nd internal standard)	0.739	0.734	0.734	-0.7	-0.7
			E.E.E. Bromoferm (3rd internal standard)	0.894	0 - 86 (	0.861	3.7	3.7
0			Methylene chioride (1st Internal Standard)					
			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					
ю	·		Methylene chloride (1st Internal Standard)		·			
			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					
4			Methylene chloride (1st Internal Standard)					
1			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					

comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the ecalculated results.

LDC#	23907B	1
SDG #:_	_	

### VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:	L of I
Reviewer:	MG
2nd reviewer:	1.

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID:\_

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
Talum			Reported	Recalculated	
Toluene-d8	10	9.99	100	100	
Bromofluorobenzene		9.36	94	94	0
1,2-Dichlorobenzene-d4 DCA		10.70	107	107	<del> </del>

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
Toluene-d8			Reported	Recalculated	
Bromofluorobenzene					
1,2-Dichloroben ane-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
Toluene-d8			Reported	Recalculated	
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

Sample ID:\_

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
Toluene-d8			Reported	Recalculated	
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
Toluene-d8			Reported	Recalculated	
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

.DC #: 33907B

# WALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1 Reviewer: 46

METHOD: GC/MS VOA (EPA Method 524.2)

he percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SSC - SC)/SA

Where: SSC = Spiked sample concentration SA = Spike added

SC = Sample concentration

ND = I MSC - MSDC 1 \* 2/(MSC + MSDC)

MSC = Matrix spike percent recovery

MSDC = Matrix spike duplicate percent recovery

AS/MSD sample: MW-12-3 MS/MJ0

	S	pike	Sample	Spiked Sample	ample	Matrix Spike	Spike	Matrix Spike Duplicate	Duplicate	MS	MS/MSD
Compound	₹₹)	Added (A)	Concentration ( 49 (L)	Concentration (mg h.)	ration (L.)	Percent Recovery	ecovery	Percent Recovery	scovery	judes	RPD
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	50	50	0	46.51 49.43	49.43	93	93	66	49	6.1	9
Trichloroethene				50.80	50.80 51:29 102	102	701	(03	103	0,1	0
Benzene				51.30 51.53	51.53	103	103	(03	103	7.0	p.0
Toluene				49.03 49.65	49.65	98	98	66	99	1.3	(,3
Chlorobenzene	<b>→</b>	<b>→</b>	_>	50.05	50.25   50.96   101	101	100	101	(02	1.4	<u>.</u>

comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 0.0% of the recalculated results.

LDC # 73907B

## Laboratory Control Sample Results Verification VALIDATION FINDINGS WORKSHEET

Page: 2nd Reviewer: Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) and another and laboratory control sample duplicate (if applicable) were

% Recovery = 100 \* SSC/SA

Where: SSC = Spiked sample concentration SA = Spike added

LCS = Laboraotry control sample percent recovery

LCS ID: LCS MSO7W0806N

RPD = ILCS - LCSD | \* 2/(LCS + LCSD)

LCSD = Laboratory control sample duplicate percent recovery

						į				
		Spike	Spiked	Sample	<u> </u>	SO1	490	9		
Compound	3	(d) (e)	Concer	Concentration				00	SOI	LCS/LCSD
				(5.7)	Percent	Percent Recovery	Percent Recovery	<b>lecovery</b>	ă	Coa
	SOT	TCSD	SOT	rcsp	Reported	Recalc.	Renorted	.,	11	
1,1-Dichloroethene		AM	77 6	V   V			perioden	Hecalc.	Reported	Recalculated
Trichioroethene			9	17.	45	95	Ž Ž	۸Z	NA	A . A
			10.35		104	70/				17
Benzene			900							
Toluene			1.00		78	78				
	1		9.52		95	26				
Chlorobenzene			0 7.0							
	*	∌	1. (9		8	0,00	- 2			
								>	>	₹
Immonie: Dofor to Late	. (								*******	Printers of the Printers of th

omments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0%

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SDG	#:	-	

### **VALIDATION FINDINGS WORKSHEET Sample Calculation Verification**

Page:_	of_)
Reviewer:	MG
2nd reviewer:_	
	7

METHOD: GC/MS VOA (EPA Method 524.2)

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results? (Y) N N/A

Conce	entratio	$n = \underline{(A_{\bullet})(I_{\circ})(DF)}$ $(A_{\bullet})(RRF)(V_{\circ})(\%S)$	Example:
$A_{x}$	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D
A <sub>is</sub>	=	Area of the characteristic ion (EICP) for the specific internal standard	
l <sub>s</sub>	=	Amount of internal standard added in nanograms (ng)	Conc. = () ()
RRF	<u>=</u>	Relative response factor of the calibration standard.	)( )( )( )
٧.	<b>1</b> 2	Volume or weight of sample pruged in milliliters (ml) or grams (g).	= '
Df	=	Dilution factor.	level IV sample = N.D.
%\$	=	Percent solids, applicable to soils and solid matrices only.	icici iv sample = N.Is.

#	ತ∷mple ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
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### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 4, 2010

**LDC Report Date:** 

September 15, 2010

Matrix:

Water

Parameters:

Volatiles

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10080501

### Sample Identification

MW-19-5

MW-19-4

MW-19-3

MW-19-2

MW-19-1

EB-8-08/04/10

TB-8-08/04/10

### Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r²) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
8/10/10	Chloromethane	36.4	All samples in SDG BMI10080501	J (all detects) UJ (all non-detects)	А
	Bromomethane	60.4		J (all detects) UJ (all non-detects)	
8/10/10	2,2-Dichloropropane	34.7	All samples in SDG BMI10080501	J (all detects)	А

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

### V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

### VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS MS07W0810N	Chloromethane Bromomethane	64 (70-130) 40 (70-130)	All samples in SDG BMI10080501	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Р
LCS MS07W0810N	2,2-Dichloropropane	135 (70-130)	All samples in SDG BMI10080501	J (all detects)	Ρ.

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

All internal standard areas and retention times were within QC limits.

### XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

### XII. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

### XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

### XIV. System Performance

Raw data were not reviewed for this SDG.

### XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### XVI. Field Duplicates

No field duplicates were identified in this SDG.

### XVII. Field Blanks

Sample TB-8-08/04/10 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-8-08/04/10 was identified as an equipment blank. No volatile contaminants was found in this blank.

NASA JPL Volatiles - Data Qualification Summary - SDG BMI10080501

SDG	Sample	Compound	Flag	A or P	Reason
BMI10080501	MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1 EB-8-08/04/10 TB-8-08/04/10	Chloromethane Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
BMI1 0080501	MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1 EB-8-08/04/10 TB-8-08/04/10	2,2-Dichloropropane	J (all detects)	A	Continuing calibration (%D)
BMI1 0080501	MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1 EB-8-08/04/10 TB-8-08/04/10	Chloromethane Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Р	Laboratory control samples (%R)
BMI1 0080501	MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1 EB-8-08/04/10 TB-8-08/04/10	2,2-Dichloropropane	J (all detects)	P	Laboratory control samples (%R)

**NASA JPL** 

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI10080501

No Sample Data Qualified in this SDG

	F. 23907C1	VA	LIDATIO				ESS WORKS	DUCEI	Date: (1-13-
SDG i	#: <u> </u>				Leve	1 111			Page: <u></u> of <u>!</u> Reviewer: <u></u>
Labor	atory. Alpha Analytical, II	10.	_	524.	.2				2nd Reviewer:
METH	HOD: GC/MS Volatiles (E	PA <del>S</del>	<del>₩846</del> Meth	od <del>8260B</del>	<del>3</del> )	9n/	1		7
The s	amples listed below were	e revie	ewed for eac	ch of the f			•	Validation findi	ngs are noted in attached
valida	tion findings worksheets.					•			
		<del></del>			<del></del>				
	<u>Validation</u>	Area		•	<u> </u> 			Comments	
1.	Technical holding times			A	Samp	ling d	ates: 8 -	4-10	
11.	GC/MS Instrument performa	ance cl	neck	A	<u> </u>				
111.	Initial calibration			_A_	70	RS	D < 20.	r <sup>2</sup>	
IV.	Continuing calibration/ICV			SW	7	Cu	1/cov = 3	30	
V.	Blanks			Α					
VI.	Surrogate spikes			A					
VII.	Matrix spike/Matrix spike du	plicate	s	2	N	104	required	l	
VIII.	Laboratory control samples			SW	L	CS			
IX.	Regional Quality Assurance		uality Control	N					
X.	Internal standards			A	1				
XI.	Target compound identificat	tion		N					
XII.	Compound quantitation/CR0			N	İ			······································	
XIII.	Tentitatively identified comp		(TICe)	N N					
		Journas	(1103)						
XIV.	System performance			N					
XV.	Overall assessment of data			Α					
XVI.	Field duplicates			7					·
XVII.	Field blanks			70	E	B=	6 TB	= 7	
				<del></del>				•	
Note:	A = Acceptable N = Not provided/applicable	•	R = Rins		is detec	cted	D = Duplica TB = Trip b	ate Jank	
	SW = See worksheet		FB = Fie	eld blank			EB = Equip	ment blank	
Validat	ed Samples:    Water								
			,		Ī	04			
	MW-19-5	11				21		31	
	MW-19-4	12				22		32	
	MVV-19-3	13				23		33	
	MW-19-2	14	<u> </u>			24		34	
	MW-19-1	15				25		35	
6	EB-8-08/04/10	16				26		36	
7	TB-8-08/04/10	17				27		37	
8		18				28		38	
9		19				29		39	
10	MBLK MSOTWOBIOM	20				30		40	

## TARGET COMPOUND WORKSHEET

## METHOD: VOA (EPA Method 524.2)

A. Chloromethane	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chioroethane	X. Bromoform	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Wethyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrytonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	ННН. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene	BB. 1,1,2,2-Tetrachloroethane	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
1. 1,1-Dichloroethane	CC. Toluene	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform	EE. Ethylbenzene	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	0000.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	dddd
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	0000
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	ນບນນ.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	ww.

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2nd Reviewer:

Continuing Calibration

METHOD: GC/MS VOA (EPA Method 524.2)

SDG #:

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? Y (N N/A

Were all percent differences (%D) ≤ 30%?

*	Date	Standard ID	Compound	Finding %D (Limit: <30.0%)	Associated Samples	Qualifications
_	01-01-8	10081003 (CCV)	A	36.4	Vall and	J/U J/A
		1 1	00	34.7		J dets /A
	>		В	h·09	^	J/05/A
1						
$\neg$						ing the management of the property of the pa
$\neg$						

LDC #: 33907C1 SDG #:

## VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: 1 of Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was a LCS analyzed every 20 samples?

Was a LCS analyzed every 20 samples?

Was a LCS analyzed every 20 samples?

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

			•						
<u>"</u>	460	OI OSO //SO I	Compound	LCS %R (Limits)	) 8% 	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
<u>*</u>	Dake O O	MO 1000 1200 02	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	(1 (70-130	<u> </u>			Vall and	1/02/P
<u> </u>	01-01-0	LCS MSO7 WOBIUM	1 0					7 7	->
			200	135 (	(		( )	٦	J dats/P
		>		)	) (		( )		
				)	) (		( )		
					) (		( )		
				)	) (	(	( )		
				)	1		( )		
				_	<u> </u>		( )		
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				)	(		( )		
				)	)  -  -		( )		
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<u> </u>				)			)		
				)	) (	(	( )		
				)	) (	(	( )		
				)	(	(	( )		
		Compound	ac Limi	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Water)	RPD (Water)
ن	Vinyl chloride	el	70-	70-130%	<30	>	Benzene	70-130%	<30
ند	╁	ethane	70-	70-130%	<30	ď.	cis-1,3-Dichloropropene	70-130%	<30
o	$\vdash$	achloride	-02	70-130%	<30	×	Bromoform	70-130%	<30
ď	╫	propane	-02	70-130%	<30	AA.	Tetrachloroethene	70-130%	<30
ςÿ	+-	ene	-02	70-130%	<30	Ë	1,2-Dibromoethane	70-130%	<30
j	1,1,2-Trichloroethane	oroethane	-02	70-130%	<30	ŦŦ	1,4-Dichlorobenzene	70-130%	<30

### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 5, 2010

LDC Report Date:

September 15, 2010

Matrix:

Water

Parameters:

Volatiles

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10080641

### Sample Identification

MW-18-5

MW-18-4

MW-18-3

MW-18-2

10100 10 2

MW-17-4

MW-17-3

MW-17-2

EB-09-08/05/10

TB-09-08/05/10

MW-18-4MS

MW-18-4MSD

### Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r²) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
8/11/10	Chloromethane	42.1	All samples in SDG BMI10080641	J (all detects) UJ (all non-detects)	А
	Bromomethane	53.6		J (all detects) UJ (all non-detects)	

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

### V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

### VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

### VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS MS07W0811N	Chloromethane	58 (70-130)	All samples in SDG BMI10080641	J (all detects) UJ (all non-detects)	Р
	Bromomethane	46 (70-130)		J (all detects) UJ (all non-detects)	

### IX. Regional Quality Assurance and Quality Control

Not applicable.

### X. Internal Standards

All internal standard areas and retention times were within QC limits.

### XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

### XII. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

### XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

### XIV. System Performance

Raw data were not reviewed for this SDG.

### XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### XVI. Field Duplicates

No field duplicates were identified in this SDG.

### XVII. Field Blanks

Sample TB-09-08/05/10 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-09-08/05/10 was identified as an equipment blank. No volatile contaminants was found in this blank.

NASA JPL Volatiles - Data Qualification Summary - SDG BMI10080641

SDG	Sample	Compound	Flag	A or P	Reason
BMI10080641	MW-18-5 MW-18-4 MW-18-3 MW-18-2 MW-17-4 MW-17-3 MW-17-2 EB-09-08/05/10 TB-09-08/05/10	Chloromethane Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
BMI10080641	MW-18-5 MW-18-4 MW-18-3 MW-18-2 MW-17-4 MW-17-3 MW-17-2 EB-09-08/05/10 TB-09-08/05/10	Chloromethane Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)

**NASA JPL** 

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI10080641

No Sample Data Qualified in this SDG

. 50 "	COOCTO 4 VALIDATION	N COME	N ETENESS WORKSHEET	9-15-11
	:23907D1 <b>VALIDATIOI</b> ::BMI10080641		PLETENESS WORKSHEET Level III	Date: 9-15-10
	atory: Alpha Analytical, Inc.	•	Lever III	Page:of_L Reviewer:_ <i>M\(\scrigs</i> _
	•	524		2nd Reviewer:
METH	OD: GC/MS Volatiles (EPA <del>SW846</del> Meth	od <del>8260</del> B	1) 9n4	/
	amples listed below were reviewed for ead ion findings worksheets.	ch of the f	ollowing validation areas. Validation find	dings are noted in attached
	Validation Area		Comments	
I.	Technical holding times	A	Sampling dates: 8 - 5-10	
11.	GC/MS Instrument performance check	A		`
111.	Initial calibration	A	7. RSD ≤ 20, v2	
IV.	Continuing calibration/ICV	SW	ICV/CCV = 30	
V.	Blanks	A		
VI.	Surrogate spikes	Α		,
VII.	Matrix spike/Matrix spike duplicates	Α	MS/MSD	
VIII.	Laboratory control samples	SW	LCS	"
IX.	Regional Quality Assurance and Quality Control	N		
X.	Internal standards	Α		
XI.	Target compound identification	N		
XII.	Compound quantitation/CRQLs	N		
XIII.	Tentitatively identified compounds (TICs)	N		
XIV.	System performance	N		
XV.	Overall assessment of data	A		
XVI.	Field duplicates	N		
XVII.	Field blanks	ND	EB=8, TB=9	

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

ND = No compounds detected R = Rinsate

FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

	all water					
1	MVV-18-5	11	MW-18-4MSD	21	31	
2	MW-18-4	12		22	32	
3	MVV-18-3	13	MBLK MSO7WOBILM	23	33	
4	MW-18-2	14		24	34	
5	MW-17-4	15		25	35	
6	MW-17-3	16		26	36	
7	MW-17-2	17		27	37	
8	EB-09-08/05/10	18		28	38	
9	TB-09-08/05/10	19		29	39	
10	MW-18-4MS	20		30	40	

# TARGET COMPOUND WORKSHEET

# METHOD: VOA (EPA Method 524.2)

A. Chloromethane	U. 1,1,2-Trichloroethane	OO. 2.2-Dichloropropane	III. n-Butvibenzene	CCCC 1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform	RR. Dibromomethane	LLL. Hexachiorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlarobenzene	III. Isobutyl alcohol
H. 1,1-Dichloroethene	BB. 1,1,2,2-Tetrachloroethane	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
1. 1,1-Dichloroethane	CC. Toluene	.WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform	EE. Ethylbenzene	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chiorofoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN.
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	0000
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	. dddd
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	9999.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TITT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	บบบบ.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	WWW.

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2nd Reviewer:

Continuing Calibration

METHOD: GC/MS VOA (EPA Method 524.2)

17.11.7.

SDG #:

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  $(Y)_N N/A$  Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?  $(N)_N N/A$  Were all percent differences  $(%D) \le 30\%$ ?

Y N N/A

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Associated Samples	Qualifications
ı	8-11-10	10081103 (001)	Ą	42.1	all and	J/UJ/A
T			3	9.85	MBLK MSOTWOBILM	
1)						
		•				
_						
					-	
-					-	
-						

LDC #: 0370/UI SDG #:

# VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

α Reviewer:

Page: Lot I 2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". (Y) N/A Was a LCS analyzed for this SDG? Y N N/A

Was a LCS analyzed every 20 samples?

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

		1	,	,	-						
				SOT		CSD	Q.				
*	Date	CS/CSD ID	Compound	%R (Limits	its)	%H (Limits)	mits)	HPD (LIMITS)	ASS	Associated Samples	Qualifications
_	1 01-11-8	LCS MS07W0811 M	A	58 (70-1	130)	)	(	)	) / all	and	J/UJ/P
	-	->	В	1 ) 94	( 1	)	(	•	) (MBLK	MBLK MSOTWOBILM	,
				)	î	)	(	)	) (		
				)	<u> </u>	<b>)</b>	(	)	(		
				<u> </u>	·	)	(	)	)		
				)	)	_		_	)		
				)	<u> </u>	~	^	)	(		
				)		_	(	)	)		
				J	^	_	(	)	)		
				)	(	)	(	)	(		
				<b>~</b>	^	<b>)</b>	(	)	) (		
				)	^	_	(	)	) (		
				)	1	)		)			
				_	^	_	(	)	)		
				)	^	~	(	)	)		
				)	(	)	(	)	)		
				)	(	)	( ·	)	)		
				)	) (	)	(	)	)		
		Compound	QC Limit	QC Limits (Water)	RPD (Water)	Vater)		Compound	ŏ	QC Limits (Water)	RPD (Water)
Ö	Vinyl chloride	e	70-1	70-130%	<30	0.	۷.	Benzene		70-130%	<30
نــــ	1,2-Dichloroethane	ethane	70-1	70-130%	<30	0	R.	cis-1,3-Dichloropropene		70-130%	<30
o	Carbon tetrachloride	chloride	70-1	70-130%	<30	0	×	Bromoform		70-130%	<30
ø	1,2-Dichloropropane	propane	70-1	70-130%	<30	0	Ą¥.	Tetrachloroethene		70-130%	<30
οj	Trichloroethene	ene	70-1	70-130%	<30	0	Ë	1,2-Dibromoethane	-	70-130%	<30
j.	1,1,2-Trichloroethane	roethane	70-1	70-130%	<30	0	포포	1,4-Dichlorobenzene		70-130%	<30

### NASA JPL Data Validation Reports LDC #23907

Chromium



### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

July 30 through August 2, 2010

LDC Report Date:

September 10, 2010

Matrix:

Water

Parameters:

Chromium

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10080401

### Sample Identification

MW-12-3

MW-12-2

MW-12-1

EB-05-07/30/10

MW-24-4

MW-24-3

MW-24-2

MW-24-1\*\*

DUPE-07-3Q10

EB-06/08/2/10

MW-12-2MS

**MW-12-2MSD** 

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

### III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

### IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium was found in the initial, continuing and preparation blanks.

### V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

### VI. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-23-1 MS/MSD (MW-24-4)	Chromium	-	168 (70-130)	29 (≤20)	J (all detects) UJ (all non-detects)	Α

### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples on which an EPA Level IV review was performed with the following exceptions:

Sample	Internal Standard	%R (Limits)	Analyte	Flag	A or P
MW-24-1**	Lithium-6	55 (60-125)	Chromium	J (all detects) UJ (all non-detects)	P

Raw data were not evaluated for the samples reviewed by Level III criteria.

### X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

### XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

### XII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### XIV. Field Duplicates

Samples MW-24-2 and DUPE-07-3Q10 were identified as field duplicates. No chromium was detected in any of the samples.

### XV. Field Blanks

Samples EB-05-07/30/10 and EB-06/08/2/10 were identified as equipment blanks. No chromium was found in these blanks.

NASA JPL Metals - Data Qualification Summary - SDG BMI10080401

SDG	Sample	Analyte	Flag	A or P	Reason
BMI10080401	MW-24-4	Chromium	J (all detects) UJ (all non-detects)	<b>A</b>	Matrix spike/Matrix spike duplicates (%R)(RPD)
BMI10080401	MW-24-1**	Chromium	J (all detects) UJ (all non-detects)	Р	Internal standards (%R)

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI10080401

No Sample Data Qualified in this SDG

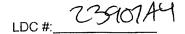
	: 23907A4 : BMI10080401 atory: Alpha Analytical, In		LIDATIO		PLETE evel III		WORKS	SHEET		Date: 7-10- Page: of ) Reviewer: CC 2nd Reviewer:
The sa	<b>OD:</b> Cr (EPA Method 20 amples listed below were ion findings worksheets.		ewed for ea	ch of the fo	ollowing	g valida	tion areas.	Validatio	n finc	lings are noted in attached
···	Validation	Δrea				. 11.11.45	<del></del>	Comm	ents	
I.	Technical holding times		•	A	Samplin	ng dates:	7/3			5/2/10
II.	ICP/MS Tune			A		· ·				
III.	Calibration			A						
IV.	Blanks			A						
V.	ICP Interference Check Sam	nple (I	CS) Analysis	A						
VI.	Matrix Spike Analysis			SW	ms	3/D				
VII.	Duplicate Sample Analysis			N				1		
VIII.	Laboratory Control Samples	(LCS	)	A	LC	5				
IX.	Internal Standard (ICP-MS)			SW	No	+ rei	iewed	500	lei	el III
X.	Furnace Atomic Absorption	QC		(1)			llized			
XI.	ICP Serial Dilution			N	lb	+ 100	Norma	e do		
XII.	Sample Result Verification			A	Not rev	4	r Level III vali			
XIII.	Overall Assessment of Data			A				-		
XIV.	Field Duplicates			MO	(7	,9)				
ΧV	Field Blanks		•	NO	E	3=1	J.10			
Note: /alidate	A = Acceptable N = Not provided/applicable SW = See worksheet ed Samples: ** Indicates sam		R = Rir FB = Fi	ield blank		ed .	D = Duplic TB = Trip EB = Equi		<b>k</b>	
1	MW-12-3	11	MW-12-2MS		2	1			31	Pou (1-4,6-10)
	MW-12-2	12	MW-12-2MS			22			32	PBW (5)
	MVV-12-1	13				23			33	
	EB-05-07/30/10	14			2	24			34	
	MVV-24-4	15				25			35	
	MVV-24-3	16				26			36	
	MW-24-2	17				27			37	
	MW-24-1**	18				28			38	i
9	DUPE-07-3Q10	19				29			39	
	EB-06/08/2/10	20				30			40	
<u> </u>		-	1			······································				

### **VALIDATION FINDINGS CHECKLIST**

Page: U of Z Reviewer: (42 2nd Reviewer: 42

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.				
Cooler temperature criteria was met.	V			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?				
Were %RSD of isotopes in the tuning solution ≤5%?				
III. Calibration				
Were all instruments calibrated daily, each set-up time?		_		
Were the proper number of standards used?				
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?				
Were all initial calibration correlation coefficients > 0.995?	(		<u> </u>	
IV. Blanks				
Was a method blank associated with every sample in this SDG?	~			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		V		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?		<u> </u>	<u> </u>	
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	~			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.		/		
VII. Laboratory control samples	<del>,</del> -	·	·····	
Was an LCS anaylzed for this SDG?		_	<u> </u>	
Was an LCS analyzed per extraction batch?		_	ļ	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?				



### VALIDATION FINDINGS CHECKLIST

Page: Z of Z Reviewer: e 2nd Reviewer: \_\_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC	<del></del>			
f MSA was performed, was the correlation coefficients > 0.995?				
Do all applicable analysies have duplicate injections? (Level IV only)				
or sample concentrations > RL, are applicable duplicate injection RSD values <				
or sample concentrations > RL, are applicable duplicate injection records 20%? (Level IV only)				
Were analytical spike recoveries within the 85-115% QC limits?				
IX. ICP Serial Dilution		L	<u>.                                    </u>	
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	X	/	-	
Were all percent differences (%Ds) < 10%?			-	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			<u>ر</u>	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)		,	1.	
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?		/		
If the %Rs were outside the criteria, was a reanalysis performed?	<u> </u>	U	1	
XI. Regional Quality Assurance and Quality Control		<u> </u>	_	
Were performance evaluation (PE) samples performed?	-	/	1_	<b>/</b>
Were the performance evaluation (PE) samples within the acceptance limits?	<u> </u>	<u></u>		
XII. Sample Result Verification	,		<del></del>	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Overall assessment of data		<del></del>		
Overall assessment of data was found to be acceptable.				
XIV. Field duplicates		<del>а</del>		<u></u>
Field duplicate pairs were identified in this SDG.	/		_	
Target analytes were detected in the field duplicates.			1	
XV. Field blanks	·	1		· · · · · · · · · · · · · · · · · · ·
Field blanks were identified in this SDG.	/	<u> </u>	4	
Target analytes were detected in the field blanks.		1/		

LDC# 239014"

### Matrix Spike/Matrix Spike Duplicates VALIDATION FINDINGS WORKSHEET

2nd Reviewer.

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questig<del>ns are id</del>entified as "N/A". X N/A

Was a matrix spike analyzed for each matrix in this SDG? (70-130)
Were matrix spike percent recoveries (%R) within the control limits 04-35-1252 If the sample concentration exceeded the spike concentration by a factor

Were all duplicate sample relative percent differences  $(RPD\{\le 20\%)$  for water samples and  $\le 35\%$  for soil samples? of 4 or more, no action was taken.

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations. Y N N/A Wer Y)N N/A

Qualifications	J/04/H						·							
Associated Samples	7)								-					
RPD (Limits)	52													
MSD	891													
MS %Recovery	{													
Analyte	Ş													
Matrix	3	CIC	,											
# MS/MSD ID.	1-52-MW	(SNC480MI 100779C			***************************************									

Comments:

LDC #: 2390744 SDG #:

### VALIDATION FINDINGS WORKSHEET Internal Standards (ICP-MS)

Page: \ Reviewer: \(\overline{\capacita}\)

2nd Reviewer:

METHOD: Metals (EPA SW 846 Method <del>6029</del>) 2cひ・8

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

| N | N/A | Were all internal standard percent recoveries within <del>80-120%</del> of the internal standard in the initial calibration standard?

If the response to either of the above questions is no, were the samples reanalyzed as required ?

Li 6	Associated Metals	%R (Units) 55 (60~125)	Associated Samples	Qualifications  (COT / C

LDC# 2390HY

# Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

of	5	(
Page:	Reviewer:_	2nd Reviewer

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution True = concentration (in ug/L) of each analyte in the ICV or CCV source

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
707	ICP/MS (Initial calibration)	3	H5.14	56,00	90		)-
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV (73.32)	ICP/MS (Continuing calibration)	0	M172	02	1001	£ 109	>
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results

LDC# 238744

### VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: 4 of 4 Reviewer: 02 2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found x 100

Where, Found = Concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD =  $\frac{|S-D|}{(S+D)/2} \times 100$ 

Where,

S = Original sample concentration D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

%D = II-SDRI × 100

Where, I = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S / I (units) (mx)	True / D / SDR ( <del>units)</del>	%R/RPD/%D	%R/RPD/%D	Acceptable (Y/N)
ICS PIB	ICP interference check	S	191,5 MgL	15 mg/ 200 mg/	%		)
400	Laboratory control sample		6.6551	0.05	110	2	
	Matrix spike		(SSR-SR) O,O579	50,0	911	7/1	
11/11	Duplicate	<b>→</b>	6,0574	22990	7.7	7.1	
2	ICP serial dilution						>

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 23907A4

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	of \
Reviewer:	a _
2nd reviewer:	1/

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Y N   Y N   Y N	N/A Have results IN/A Are results wind Are all detections analyte results for		y? ments and within the line were recalcu	ear range of the ICI	o? using the following
RD FV In. Vol. Dil	(In. Vol.)  = Raw data concer = Final volume (ml	Recalculation ) )) or weight (G)	lata = 0,(	006478	1_
#	Sample ID	Analyte	Reported Concentration (MS (L)	Calculated Concentration (W&1 (_)	Acceptable (Y/N)
	8		0.0064	0.0064	
Note:					

### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 3, 2010

LDC Report Date:

September 10, 2010

Matrix:

Water

Parameters:

Chromium

**Validation Level:** 

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10080402

### Sample Identification

MW-26-2

MW-26-1

MW-25-5

MW-25-4

MW-25-3

MW-25-2\*\*

MW-25-1

EB-07-8/3/10

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

### Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

### III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

### IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium was found in the initial, continuing and preparation blanks.

### V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

### VI. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples on which an EPA Level IV review was performed with the following exceptions:

Sample	Internal Standard	%R (Limits)	Analyte	Flag	A or P
MW-25-2**	Lithium-6	35 (60-125)	Chromium	J (all detects) UJ (all non-detects)	Р

Raw data were not evaluated for the samples reviewed by Level III criteria.

### X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

### XI. ICP Serial Dilution

Raw data were not reviewed for this SDG.

### XII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

### XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### XIV. Field Duplicates

No field duplicates were identified in this SDG.

### XV. Field Blanks

Sample EB-07-8/3/10 was identified as an equipment blank. No chromium was found in this blank.

### NASA JPL Metals - Data Qualification Summary - SDG BMI10080402

SDG	Sample	Analyte	Flag	A or P	Reason
BMI10080402	MW-25-2**	Chromium	J (all detects) UJ (all non-detects)	Р	Internal standards (%R)

### **NASA JPL**

Metals - Laboratory Blank Data Qualification Summary - SDG BMI10080402

No Sample Data Qualified in this SDG

SDG#	t: <u>23907B4</u> #: <u>BMI10080402</u> atory: <u>Alpha Analytical, I</u>		LIDATIO	_	PLETEN evel III/I\		WORKSHE	EET	Date: 9-10  Page: \( \) of \( \)  Reviewer: \( \)  2nd Reviewer: \( \)
The sa	IOD: Cr (EPA Method 20 amples listed below were tion findings worksheets	e revie	ewed for ea	ch of the fo	ollowing v	alida	tion areas. Val	idation find	dings are noted in attached
	Validation	Area					С	omments	
1.	Technical holding times			A	Sampling o	lates:	8/3/11	0	
11.	ICP/MS Tune			A					
. 111.	Calibration			A				-	
IV.	Blanks			A					
V.	ICP Interference Check Sai	nple (l	CS) Analysis	A					
VI.	Matrix Spike Analysis			A	ms	D	<u>(SNGX</u>	BMII	2080401)
VII.	Duplicate Sample Analysis	•		$\mathcal{N}$					
VIII.	Laboratory Control Samples	s (LCS)	i	A	LCS	<u> </u>			
IX.	Internal Standard (ICP-MS)			SW	161	eu	iewed ?	sor le	evelIII
Χ.	Furnace Atomic Absorption	QC		$\mathcal{N}_{\perp}$	NOTO	انعلا	ized		·
XI.	ICP Serial Dilution			N	1201	0	ieurg		
XII.	Sample Result Verification	<del></del>		IA_	Not review	ed fo	r Level III validatio	n.	
XIII.	Overall Assessment of Data	а		A,					
XIV.	Field Duplicates			N					
X∨	Field Blanks			NO	EB.	=8			
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet		R = Rir FB = F	ield blank			D = Duplicate TB = Trip blank EB = Equipme		
Validate	ed Samples: ** Indicates sam	iple und	derwent Level	IV validation					
1	MW-26-2	11	PBW		21	<u> </u>		31	
2	MW-26-1	12			22	<u> </u>		32	
3	MW-25-5	13			23	ļ		33	
4	MW-25-4	14			24			34	
5	MW-25-3	15			25			35	
6	MW-25-2**	16			26	<u> </u>		36	
7	MW-25-1	17			27	<u> </u>		37	
8	EB-07-8/3/10	18			28	<u> </u>		38	
9	***************************************	19_			29		····	39	
10		20			30	<u> </u>		40	
Notes	:								

### **VALIDATION FINDINGS CHECKLIST**

Page: of Page: of Reviewer: 2nd Reviewer:

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Wiethou: Metals (EPA SVV 846 Method 60 T06/7 000/6020)				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.				
Cooler temperature criteria was met.				
II. ICP/MS Tune		·		
Were all isotopes in the tuning solution mass resolution within 0.1 amu?				
Were %RSD of isotopes in the tuning solution ≤5%?				
III. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?				
Were all initial calibration correlation coefficients ≥ 0.995?				
IV. Blanks				
Was a method blank associated with every sample in this SDG?		~		
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
V. ICP Interference Check Sample			•	
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		ſ		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.				
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?				
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?				

LDC#: 23907BY

### **VALIDATION FINDINGS CHECKLIST**

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Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC		<del></del>	<del></del> /	
If MSA was performed, was the correlation coefficients > 0.995?		سمل	1	
Do all applicable analysies have duplicate injections? (Level IV only)				
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			_	
Were analytical spike recoveries within the 85-115% QC limits?	<u> </u>			
IX. ICP Serial Dilution		<del>1</del>	<del></del>	<u> </u>
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?				
Were all percent differences (%Ds) < 10%?			/	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			,	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)			···	
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?		~	_	
If the %Rs were outside the criteria, was a reanalysis performed?	<u> </u>	1	1	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			1	
Were the performance evaluation (PE) samples within the acceptance limits?		<u></u>	1	
XII. Sample Result Verification		Т>-	<del></del>	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.		1		
XIV. Field duplicates	<del></del>	<del></del>		
Field duplicate pairs were identified in this SDG.	ļ		_	
Target analytes were detected in the field duplicates.		<u></u>	<u> </u>	1
XV. Field blanks	<del></del>		,	
Field blanks were identified in this SDG.		/	ļ.,	
Target analytes were detected in the field blanks.			$\rfloor /$	

# VALIDATION FINDINGS WORKSMEET Internal Standards (ICP-MS)

Reviewer:  $\mathcal Q$ 2nd Reviewer:\_

Page: l of

METHOD: Metals (EPA Method 200.8)

() () s

SDG #:

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Note the internal standard percent recoveries within 60-125% of the intensity of the internal standard in the initial calibration standard?

If the response to the above question is no, were the samples reanalyzed as required?

Qualifications		J/102/P									
Associated Samples		9									
%R (Limits)		35 (60-125)									
Associated Metals		3									
Internal Standard	20- <del>42</del> -€	9!7									PERSONAL
# Date	1778H0										



# VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

**METHOD**: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 True

Where, Found = concentration (in ug/L) of each analyte <u>measured</u> in the analysis of the ICV or CCV solution

True = concentration (in ug/L) of each analyte in the ICV or CCV source

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
	ICP (Initial calibration)						
#CC	ICP/MS (Initial calibration)	5	45.14	50	90		) \
	CVAA (Initial calibration)				-		
	ICP (Continuing calibration)						
(CU(a:-18)	(continuing calibration)	ر ک	97.56 100	100	36	98	<u>}</u>
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

48685 LDC# 238784

### **VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet**

Page: 4 of 4 Reviewer:\_\_ 2nd Reviewer.\_

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found x 100 True

Where, Found = Concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD =  $\frac{|S-D|}{(S+D)/2} \times 100$ 

Where,

S = Original sample concentration D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

%D = |I-SDR| x 100

Where, I = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S / 1 (Lamits) My	True / D / SDR (units)	%R / RPD / %D	%R/RPD/%D	Acceptable (Y/N)
TCSAB	ICP interference check		1915 ugl	200 rg/L	96		<u>}</u> _
227	Laboratory control sample		0.0551	0.65	110	011	
MW-12-7 Matrix spike	Matrix spike		(SSR-SR)	500	911	911	
->	Duplicate	$\rightarrow$	0.0579	0,0622	7. (	7.1	
\	ICP serial dilution		-				

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#:\_ 23407BY

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	of
Reviewer:_	ac_
2nd reviewer:	1/

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Final volume (mi) or weight (G) Dilution factor    Reported Concentration (my (L)) (	Please Y N Y N Y N	N/A N/A	Have results Are results w	ow for all questions ans been reported and cal vithin the calibrated ran tion limits below the CF	culated correctly? ge of the instrumer			
RD = Raw data concentration Fiv = Final volume (mi) or weight (G) Dill = Dilution factor  Reported Concentration (mg/L) (MR)  Sample ID Analyte Concentration (mg/L) (MR)  CO0065  CO0065  Concentration (mg/L) (MR)  CO0065  Conc			te results for _		<u> </u>	were recalcu	ulated and verified	using the following
In vol. = Initial volume (mi) or weight (d)    Harmonia   Dilution factor	Concen	tration =	(RD)(FV)(Dil) (In. Vol.)				1	
# Sample ID Analyte Concentration (reg (L.) (r	RD FV In. Vol. Dil	=	Final volume (m Initial volume (n	ત્રો)	Raw Do	H9 = 0,00(	55mg/L	
	#	S	ample ID	Anal	yte	Concentration	Concentration	
Note:		-	6	C		0,0065	0.0065	7
Note:								
Note.		·						
Note:								
Note:								
Note.								
Note.								
Note:								
Note:								
Note:								
Note:								
Note:								·
Note:		- 7.40						
	Note:_							

### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 5, 2010

**LDC Report Date:** 

September 10, 2010

Matrix:

Water

Parameters:

Chromium

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10080641

### Sample Identification

MW-18-4

MW-18-3

MW-18-2

MW-17-4

MW-17-3

MW-17-2

EB-09-08/05/10

MW-18-4MS

MW-18-4MSD

### Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

### III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

### IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium was found in the initial, continuing and preparation blanks.

### V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

### VI. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

### IX. Internal Standards (ICP-MS)

Raw data were not reviewed for this SDG.

### X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

### XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

### XII. Sample Result Verification

Raw data were not reviewed for this SDG.

### XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

### XIV. Field Duplicates

No field duplicates were identified in this SDG.

### XV. Field Blanks

Sample EB-09-08/05/10 was identified as an equipment blank. No chromium was found in this blank.

NASA JPL Metals - Data Qualification Summary - SDG BMI10080641

No Sample Data Qualified in this SDG

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI10080641

No Sample Data Qualified in this SDG

SDG #	t:23907D4 #:BMI10080641 atory: Alpha Analytical,		LIDATIO		<b>PLETEN</b> Level II		VORKSHEET		Date: 9-10-10 Page: 1 of 1 Reviewer: 2nd Reviewer: 2
METH	IOD: Cr (EPA Method 2	200.8)							Zild Neviewei
	amples listed below we tion findings worksheet		wed for ea	ch of the fo	ollowing	validatior	n areas. Validati	on findir	ngs are noted in attached
	Validatio	n Area					Comr	nents	
1.	Technical holding times			A	Sampling	dates: 8	15/10		
11.	ICP/MS Tune							,	
. 111.	Calibration			A					
IV.	Blanks			A					
V.	ICP Interference Check S	ample (IC	S) Analysis	A					
VI.	Matrix Spike Analysis			A	ms/	0			·
VII.	Duplicate Sample Analysi	s		$\sim$					
VIII.	Laboratory Control Sampl	es (LCS)		A	LES				
IX.	Internal Standard (ICP-MS	3)		N	NO+	evieu	<b>6</b>		
X.	Furnace Atomic Absorption	n QC		$N_{\ell}$	Notreviewed Not Utilized Not performed				
XI.				$\sim$	N Non perfamed				
Xil.	Sample Result Verification	n		N.					
XIII.	Overall Assessment of Da	Overall Assessment of Data							
XIV.	Field Duplicates			$\wedge$	N				
ΧV	Field Blanks	ND	) EB=7						
Note:	A = Acceptable N = Not provided/applical SW = See worksheet	ble	R = Rir	lo compound nsate ield blank	ds detected	-	D = Duplicate TB = Trip blank EB = Equipment bla	nk	
Validat	red Samples:	gier?	<u> </u>						
1	MVV-18-4	11	8001	~/	21			31	
2	MVV-18-3	12			22			32	
3	MVV-18 <b>-</b> 2	13			23			33	
4	MW-17-4	14			24			34	
5	MVV-17-3	15 _			25			35	
6	MW-17-2	16			26			36	
7	EB-09-08/05/10	17		-	27			37	
8	MW-18-4MS	18			28			38	
9	MW-18-4MSD	19			29			39	
10		20			30			40	<u> </u>
	S:								

### NASA JPL Data Validation Reports LDC #23907

Wet Chemistry



### Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** 

NASA JPL

**Collection Date:** 

July 30 through August 2, 2010

LDC Report Date:

September 10, 2010

Matrix:

Water

Parameters:

Wet Chemistry

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10080401

#### Sample Identification

MW-12-5

MW-12-4

MW-12-3

MW-12-2

MW-12-1

DUPE-06-3Q10

EB-05-07/30/10

MW-24-3

MW-24-2

MW-24-1\*\*

DUPE-07-3Q10

EB-06/08/2/10

MW-12-2MS

MW-12-2MSD

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

#### Introduction

This data review covers 14 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous and Sulfate, and EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

#### I. Technical Holding Times

All technical holding time requirements were met with the following exceptions:

Sample Analyte		Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Collection		
MW-24-1**	Orthophosphate as P	14 days	48 hours	J (all detects) R (all non-detects)	Р	

Samples were received in good condition, per the chain-of-custody with the following exception:

Sample	Analyte	Finding	Criteria	Flag	A or P
MW-24-1**	Nitrite as N	Analysis was performed on preserved samples.	Analysis must be performed on an unpreserved aliquot.	J (all detects) UJ (all non-detects)	Р
MW-24-1**	Nitrate as N	Analysis was performed on preserved samples.	Analysis must be performed on an unpreserved aliquot.	J (all detects)	Р

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. Calibration

#### a. Initial Calibration

All criteria for the initial calibration of each method were met.

#### b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
8/16/10	CCV (10:47)	Chloride	82 (90-110)	MW-24-1**	J (all detects) UJ (all non-detects)	Р
8/16/10	CCV (15:07)	Chloride	82 (90-110)	MW-24-1**	J (all detects) UJ (all non-detects)	Р

#### III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

#### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

#### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

#### VII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

#### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

#### IX. Field Duplicates

Samples MW-12-4 and DUPE-06-3Q10 and samples MW-24-2 and DUPE-07-3Q10 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

	Concent		
Analyte	MW-12-4	DUPE-06-3Q10	RPD
Perchiorate	3.45	3.60	4

	Concent	·			
Analyte	MW-24-2	DUPE-07-3Q10	RPD		
Perchlorate	11.1	10.5	6		

#### X. Field Blanks

Samples EB-05-07/30/10 and EB-06/08/2/10 were identified as equipment blanks. No contaminant concentrations were found in these blanks.

NASA JPL
Wet Chemistry - Data Qualification Summary - SDG BMI10080401

SDG	Sample	Analyte	Flag	A or P	Reason
BMI10080401	MW-24-1**	Orthophosphate as P	J (all detects) R (all non-detects)	Р	Technical holding times
BMI10080401	MW-24-1**	Nitrite as N	J (all detects) UJ (all non-detects)	Р	Sample condition (preservation)
BMI10080401	MW-24-1**	Nitrate as N	J (all detects)	Р	Sample condition (preservation)
BMI10080401	MW-24-1**	Chloride	J (all detects) UJ (all non-detects)	Р	Calibration (%R)

NASA JPL
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI10080401

No Sample Data Qualified in this SDG

SDG # Labora	: 23907A6 E BMI10080401 atory: Alpha Analytical, Ir	ic.	_	Le	evel III/I'	<b>/</b>	WORKSHEET  A Method 300.0), F	Perchlo	Date: 9-10-17 Page: \_\text{lof}   Reviewer: \_  2nd Reviewer: \_  orate (EPA Method 314.0),
	amples listed below were ion findings worksheets.		ewed for eac	ch of the fo	ollowing v	alidat	ion areas. Validatio	on find	lings are noted in attached
	Validation	Area					Comm	nents	
1.	Technical holding times			SW	Sampling	dates:	7/30/10	8	12/10
lla.	Initial calibration			A					
llb.	Calibration verification			Sw					
III.	Blanks			n					
IV	Matrix Spike/Matrix Spike D	uplicat	es	A	ms	$\overline{D}$		•	
V	Duplicates			N					
VI.	Laboratory control samples			A	LCS	)			
VII.	Sample result verification			A	Not review	ved for	Level III validation.		
VIII.	Overall assessment of data			7					
IX.	Field duplicates			SW	(2,	6)	, (9,11)		
x	Field blanks			LNO	E0-	: 7	, 1 /2 ·		
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet	)	R = Rin	o compound sate eld blank	s detected		D = Duplicate TB = Trip blank EB = Equipment blan	nk	
Validate	ed Samples: ** Indicates sam ( NOXIV	ple un	derwent Level	IV validation					
1	MVV-12-5	11	DUPE-07-3Q	10	21			31	
2	MW-12-4	12	EB-06/08/2/1	0	22	ļ		32	
3	MW-12-3	13	MW-12-2MS		23			33	
4	MW-12-2	14	MW-12-2MSI	D	24			34	
5	MW-12-1	15			25			35	
6	DUPE-06-3Q10	16			26			36	
7	EB-05-07/30/10	17			27	<u> </u>		37	
8	MVV-24-3	18			28	<u> </u>		38	
9	MVV-24-2	19			29	<b> </b>		39	
10	MW-24-1**	20			30			40	

Notes:\_

Method: Inorganics (EPA Method See Cover)

Method:Inorganics (EPA Method See Cover)		<u>,</u>		
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	ļ	/		
Cooler temperature criteria was met.	V			
II. Calibration				
Were all instruments calibrated daily, each set-up time?		_		
Were the proper number of standards used?				
Were all initial calibration correlation coefficients ≥ 0.995?	V			·
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?		/		·
Were titrant checks performed as required? (Level IV only)				
Were balance checks performed as required? (Level IV only)			_	
III. Blanks				•
Was a method blank associated with every sample in this SDG?	V			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		~		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	<u></u>			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.				
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?				
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?				
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				

LDC# 2390746

#### **VALIDATION FINDINGS CHECKLIST**

Page: \_\_of\_\_ Reviewer: \_\_\_\_\_ 2nd Reviewer: \_\_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification			·	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		_		
Were detection limits < RL?				
VIII. Overall assessment of data		,		
Overall assessment of data was found to be acceptable.	/			
IX. Field duplicates		,		
Field duplicate pairs were identified in this SDG.	/			·
Target analytes were detected in the field duplicates.	/			
X. Field blanks				
Field blanks were identified in this SDG.	1			
Target analytes were detected in the field blanks.		/		

LDC#: <u>139</u>07A6

#### VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: of 1

Reviewer: 2nd reviewer: V

All circled methods are applicable to each sample.

15.10	Matrix_	Parameter
mple ID	IVIALITA	pH TDS OF (NO) (NO) (SO4) PO4 ALK CN' NH3 TKN TOC CR6+ CIO4
10-		nH TDS CLF NO3 NO2 SO4 PO4 ALK CN' NH3 TKN TOC CR" CIO4
1-12		pH TDS CLF NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>51</sup> ClO <sub>4</sub> )
		DH TDS CLE NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CROT CIO4
V:1314		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CROT (CIO4)
<del>x(,, ,, ,  </del>		DH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CROT CIO4
		PH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR CIO4
		DH TDS CLE NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CRO CIO4
		DH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CROT CIO4
		DH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CRS CIO4
		DH TDS CLE NO3 NO2 SO4 PO4 ALK CN. NH3 TKN TOC CROT CIO4
		DH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR ClO4
		DH TDS CLF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CRO CIO4
		pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub>
		pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub>
		pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub>
		pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub>
		ph TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub>
		pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub>
		pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub>
		pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub>
		pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub>
-		pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub>
		pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub>
		ph tds ci f No <sub>3</sub> No <sub>2</sub> So <sub>4</sub> Po <sub>4</sub> Alk cn <sup>-</sup> Nh <sub>3</sub> Tkn toc cr <sup>6+</sup> cio <sub>4</sub> ph tds ci f No <sub>3</sub> No <sub>2</sub> So <sub>4</sub> Po <sub>4</sub> Alk cn <sup>-</sup> Nh <sub>3</sub> Tkn toc cr <sup>6+</sup> cio <sub>4</sub>
		pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> ClO <sub>4</sub> pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> ClO <sub>4</sub>
		pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub> pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> CIO <sub>4</sub>
		pH TDS CLE NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> ClO <sub>4</sub> pH TDS CLE NO <sub>3</sub> NO <sub>6</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup> ClO <sub>4</sub>

Comments:	
Confinence	

LDC # 23901A6

### VALIDATION FINDINGS WORKSHEET <u>Technical Holding Times</u>

Page: of Reviewer: 2nd reviewer:

All circled dates have exc N/A Were all Y N N/A Were all coole	samples preser	ved as applicab	le to each metho	od ?			
Method:	ar temperatures	300,0	Chena:				
Parameters:		O-Parp					
Technical holding tir	me:	48hc5					
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1()	8/2/10	8/16/10	(14 days)				TIRIO
10	10:07	<u>(lı: 25)</u>	( longe)				~\1\1\1
	10	110		-01-00	16.60	hd 50 m	ND
	MU3 and	NOz w (criteria=	ere anaiy	FLOCILO	phasan	ed Same	μ,
		(critelia=	Sampler	hust be u	n preserv	(a)	. ~1.,~/(
						/VUz-/V	:5/0/6:
						N03-N	Joeyl
		*****					

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DG #:

# VALIDATION FINDINGS WORKSHEET Calibration

2nd Reviewer: Reviewer:

ЕТНОD: Inorganics, EPA Method SQQQ

ease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A" N/N N/A

Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% ? Are all correlation coefficients ≥0.995? Were all instruments calibrated daily, each set-up time, and were the proper number of standards used (N)N/A

N N N

ÉVEL IVID ONLY:

Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recaluculation Worksheet for recalulations.

Was a balance check conducted prior to the TDS analysis.? Was the titrant normality checked? N N N

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
-	01191/8	(CV:01)VJJ	Cl	28	01	J/07/B
7	8/16/10	(Lo:51) (D)	CI	2.8		
		`	,			7
						and distance of
						44 (0) (0) (1)
						and the state of t
						and the state of t
5	Olimients.					

#### LDC#<u>23907A6</u>

#### **VALIDATION FINDINGS WORKSHEET** Field Duplicates

_ ( )	
Page.\of	
Reviewer:	
2nd Reviewer:	$\underline{\underline{}}$

Inorganics, Method See Cover

-	M	<u> </u>	NA_
	$\sqrt{h}$	V N	ΙΔ

Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Concentra	ation (ug/L)			
Analyte	2	6	RPD		
Perchiorate	3.45	3.60	4		

	Concent	ration (ug/L)		
Analyte	9	11	RPD	
Perchlorate	11.1	10.5	6	

V:\FIELD DUPLICATES\FD\_inorganic\23907A6.wpd

LDC#: 72961A6

# Initial and Continuing Calibration Calculation Verification Validation Findings Worksheet

Page: of Reviewer: OZ\_

Method: Inorganics, Method SCOCOCL

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula: The correlation coefficient (r) for the calibration of  $MO_2\mathcal{M}$  was recalculated.Calibration date:

01/22/1

%R = Found X 100

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (mg/l)	Area	r or r²	r or r²	(Y/N)
Initial calibration		s1	0.125	0.00907			
		s2	0.25	0.01829	0.999781	0.999781	
		s3	0.5	0.04			
,	Nozz	s4	2	0.08			>
	7	S5	2	0.41			<u></u>
		9s	10	0.84			
		s7	15	1.29			
		88	20	1.76		-	
Calibration verification	\$N03N	CCV	5	h92b'h	99		
Calibration verification	Jag.	ND	20	SI,4299	103		
Calibration verification	clay	() ()	52	26260 106,5 196,5	5/901	10,5	<b>\</b>

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.\_

LDC# 23807#6

# VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: of Reviewer: 02 2nd Reviewer:

METHOD: Inorganics, Method See Cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

Where, %R = Found × 100

Found = concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

Where, RPD =  $|S-D| \times 100$ (S+D)/2

" " O

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

Original sample concentration Duplicate sample concentration

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found IS (units) Lou	True / D (unite) Aql	%R/RPD	%R/RPD	Acceptable (Y/N)
537	Laboratory control sample	Clemen	812.1	SO.	26	96	> -
5	Matrix spike sample	Cloy	(SSR.SR)	52	701	601	
MC1	Duplicate sample	$\rightarrow$	31,4	25.2	5'2	5,5	<b>\rightarrow</b>

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 2390186

#### **VALIDATION FINDINGS WORKSHEET**

#### Sample Calculation Verification

Page: of Reviewer: CC 2nd reviewer:

				· · · · · · · · · · · · · · · · · · ·
METHOD: Inorganics, Method	d See cover			
N N/A Have results   Y N N/A Are results w	ow for all questions answered "N". Not appl been reported and calculated correctly? ithin the calibrated range of the instrument ion limits below the CRQL?	•	e identified as "N/.	Α".
Compound (analyte) results for recalculated and verified using	or SO 4 g the following equation:	repo	rted with a positiv	ve detect were
Concentration =	Recalculation:		,	
Area	1,36003	=51%		
Slope	,			
# Sample ID	Analyte	Reported Concentration ( MGL)	Calculated Concentration (・ツタ (ニ)	Acceptable (Y/N)
10	CI	75	75	7.
	NO3-N	1.	1.1	
	564	51	51	
	C10'4	5.84 cal	5.85 mg	+ 1

-	Outtiple to		L		
	10	CI	75	75	<i>\rangle</i> .
		NO3-N SO4 C104		1 · )	
		564	51 5.84 mg/L	51 5.85/19/0	
		C10'4	5.84 cal	5.85 mg/	+ \
			<i>J</i>	)	
	,				
					·
			,		

Note:				
		 	 ····	
	·			

### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 3, 2010

**LDC Report Date:** 

September 10, 2010

Matrix:

Water

Parameters:

Perchlorate

Validation Level:

EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10080402

#### Sample Identification

MW-26-2

MW-26-1

MW-25-5

MW-25-4

MW-25-3

MW-25-2\*\*

MW-25-1

EB-07-8/3/10

<sup>\*\*</sup>Indicates sample underwent EPA Level IV review

#### Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent an EPA Level IV review. An EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

#### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. Calibration

#### a. Initial Calibration

All criteria for the initial calibration of each method were met.

#### b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### III. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the initial, continuing and preparation blanks.

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

#### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

#### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

#### VII. Sample Result Verification

All sample result verifications were acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

#### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Field Blanks

Sample EB-07-8/3/10 was identified as an equipment blank. No perchlorate was found in this blank.

NASA JPL
Perchlorate - Data Qualification Summary - SDG BMI10080402

No Sample Data Qualified in this SDG

**NASA JPL** 

Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI10080402

No Sample Data Qualified in this SDG

SDG #	#: 23907B6 #: BMI10080402 atory: <u>Alpha Analytical,</u> l		LIDATIO		PLETEN evel III/I\	ESS WOR /	KSHEET	2	Date:  Page: ( of / Reviewer: C
METH	IOD: Perchlorate (EPA	Method	d 314.0),						
	amples listed below wer tion findings worksheets		wed for ea	ch of the fo	ollowing v	alidation area	as. Validation	findings	are noted in attached
	Validation	n Area					Commer	nts	
I.	Technical holding times			わ	Sampling o	lates: 8	3/10		
lla.	Initial calibration			A					
IIb.	Calibration verification			A					
III.	Blanks			A					
IV	Matrix Spike/Matrix Spike [	Duplicate	es	A	ms/D	(SD6x	BMIIOS	10401	
V	Duplicates			N					
VI.	Laboratory control samples	s		A	LCS				
VII.	Sample result verification			4	Not review	ed for Level III	validation.		
VIII.	Overall assessment of data	a		P,				*	
IX.	Field duplicates			$\sim$					-
x	Field blanks			NO	EB=	8		· · · · · · · · · · · · · · · · · · ·	
N = Not provided/applicable R = Rinsate TB = SW = See worksheet FB = Field blank EB = Validated Samples: ** Indicates sample underwent Level IV validation							plicate rip blank quipment blank		
	water	<del></del>				T	· · · · · · · · · · · · · · · · · · ·	<del></del> 1	
	MW-26-2	11	PBL		21		3	1	
	MW-26-1	12			22		33		<u> </u>
	MW-25-5	13			23		3:	3	
	MW-25-4	14		<del></del>	24		3-	4	
	MW-25-3	15			25		3:	5	
	MW-25-2**	16			26		3	6	
7	MW-25-1	17			27		3'	7	
8	EB-07-8/3/10	18			28		3	8	
9		19			29	1	3:	9	
10		20			30		4	0	

Notes:\_

#### **VALIDATION FINDINGS CHECKLIST**

Page: of 2
Reviewer: cr2
2nd Reviewer: \_\_\_\_

Method: Inorganics (EPA Method See Cover-)

Inethod: morganics (LFA inethod &&& (0)(00)			T	
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	,		,	
All technical holding times were met.				
Cooler temperature criteria was met.				
II. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial calibration correlation coefficients > 0.995?				
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?				
Were titrant checks performed as required? (Level IV only)				
Were balance checks performed as required? (Level IV only)				
III. Blanks				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates			· · · · · · · · · · · · · · · · · · ·	
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	_			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.				
V. Laboratory control samples				
Was an LCS anayized for this SDG?		<u> </u>		
Was an LCS analyzed per extraction batch?	/	1	ļ	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control			_	
Were performance evaluation (PE) samples performed?				/
Were the performance evaluation (PE) samples within the acceptance limits?				

LDC#: 23907836

#### VALIDATION FINDINGS CHECKLIST

Page: 2 2
Reviewer: 42
2nd Reviewer: 1

Validation Area	Yes	No	NA	Findings/Comments					
	li		L						
VII. Sample Result Verification		<u> </u>	ı ——						
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?									
Were detection limits < RL?									
VIII. Overall assessment of data									
Overall assessment of data was found to be acceptable.									
IX. Field duplicates									
Field duplicate pairs were identified in this SDG.		/							
Target analytes were detected in the field duplicates.									
X. Field blanks									
Field blanks were identified in this SDG.	/		_						
Target analytes were detected in the field blanks.			<u> </u>						

LDC#: 2390785

# Initial and Continuing Calibration Calculation Verification Validatin Findings Worksheet

2nd Reviewer:\_ Page:\_\_\_\_ Reviewer:\_

Method: Inorganics, Method\_

The correlation coefficient (r) for the calibration of  $\overline{Cl}$  was recalculated.Calibration date:\_\_\_

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	r or r²	r or r²	(Y/N)
Initial calibration		s1	0.5	0.00115			
		s2	-	0.00283	0.998652		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
		s3	2	0.00511			)
		84	5	0.01467			
	3	s5	10	0.02665			
		gs	25	0.07416	<u>-</u> -		
		57	50	0.13868			
Calibration verification	1CP	ICV	25	75,3794	101.5	9' 101	
Calibration verification	<b>-</b>	20	3	h'bb (SIL'bh	4,00	h'bb	
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.\_

LDC #: 2384736

# VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

Page: of\_of\_ Reviewer. (72) 2nd Reviewer:

METHOD: Inorganics, Method See Covel

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

Where, %R = Found × 100

Found =

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result). True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

Where, RPD =  $\frac{|S-D|}{(S+D)/2} \times 100$ 

s 0

Original sample concentration Duplicate sample concentration

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units) LOL	True / D (anits) MM	%R/RPD	%R/RPD	Acceptable (Y/N)
527	Laboratory control sample	Clay	h2	25	96	%	<i>\</i>
2-21-MM	Matrix spike sample		(88.88) 25,891	25	hol	401	
$\rightarrow$	Duplicate sample	<b>\rightarrow</b>	31.4	272	52	5'2	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 23910785

#### **VALIDATION FINDINGS WORKSHEET**

Sample Calculation Verification

Page:_	of
Reviewer:	CC_
2nd reviewer:	استا

METH	OD: Inorganics, Method	See cover	<del>-</del>			
Y N Y N Y N Compo	N/A Have results to N/A Are results wing N/A Are all detection ound (analyte) results found and verified using N/A Have results for the N/A Are all detection out the N/A Are all detection out the N/A Are all detection out the N/A Are all detection out the N/A Are all detection out the N/A Are all detection out the N/A Are results with the N/A Are results with the N/A Are results with the N/A Are results with the N/A Are results with the N/A Are results with the N/A Are results with the N/A Are all detection out	the following equation:	d correctly? the instruments	? repoi	ted with a positiv	
	tration =	Recalculai		i4 1L	11. h	
Joens	rla ge Callibration Fo	encrol	0,0027	3 = 1 <sup>L</sup>	1,1 Mg1	
#	Sample ID	Analyte		Reported Concentration (\L(L)	Calculated Concentration ( M(L)	Acceptable (Y/N)
#	Sample is	Clo	1	14.1	14.1	Y .
-	,					
						İ
-						

Note	

## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 4, 2010

**LDC Report Date:** 

September 10, 2010

Matrix:

Water

Parameters:

Perchlorate

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10080501

#### Sample Identification

MW-19-5

MW-19-4

MW-19-3

MW-19-2

MW-19-1

EB-8-08/04/10

#### Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

#### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. Calibration

#### a. Initial Calibration

All criteria for the initial calibration of each method were met.

#### b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### III. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the initial, continuing and preparation blanks.

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

#### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

#### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

#### VII. Sample Result Verification

Raw data were not reviewed for this SDG.

#### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Field Blanks

Sample EB-8-08/04/10 was identified as an equipment blank. No perchlorate was found in this blank.

**NASA JPL** 

Perchlorate - Data Qualification Summary - SDG BMI10080501

No Sample Data Qualified in this SDG

**NASA JPL** 

Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI10080501

No Sample Data Qualified in this SDG

)G #	:23907C6 t:BMI10080501 atory:_Alpha_Analytical,_Ii		LIDATIO		PLETEN Level III	ESS WOR	KSHEET	2r	Date: 9-(0- Page: \_of \_ Reviewer: nd Reviewer:
ne sa	OD: Perchlorate (EPA Mamples listed below were ion findings worksheets	e revie		ch of the f	ollowing v	/alidation area	as. Validation	findings a	are noted in attache
	Validation	Area			1		Commer	nts	
l.	Technical holding times			A	Sampling	dates: 8/U	110		
lla.	Initial calibration			M					
llb.	Calibration verification		:	A	·			-	
III.	Blanks			A					
IV	Matrix Spike/Matrix Spike D	uplicat	es	A	ms/	D CSOGN	BMIIO	064	1)
V	Duplicates			N					
VI.	Laboratory control samples			A	LCS				
∕II.	Sample result verification			N					
/111.	Overall assessment of data			A,					
IX.	Field duplicates			N					
х	Field blanks			LNO	EB	<del>-</del> 6			
te: lidate	A = Acceptable N = Not provided/applicable SW = See worksheet ed Samples:		R = Rin	o compound sate eld blank	ls detected		olicate ip blank quipment blank		
	MW-19-5	11	305~		21		3	1	
	MW-19-4	12			22		3		
	MW-19-3	13			23		3		
$\prod$	MW-19-2	14			24		3	4	
	MW-19-1	15	-		25		3	5	
	EB-8-08/04/10	16			26		3	6	
		17		-	27		3	7	
		18			28		3	8	
		19			29		3	9	
		20			30		4	_	

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** 

NASA JPL

**Collection Date:** 

August 5, 2010

LDC Report Date:

September 10, 2010

Matrix:

Water

Parameters:

Perchlorate

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10080641

#### Sample Identification

MW-18-5

MW-18-4

MW-18-3

MW-18-2

MW-17-4

MW-17-3

MW-17-2

EB-09-08/05/10

MW-18-4MS

MW-18-4MSD

#### Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

#### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. Calibration

#### a. Initial Calibration

All criteria for the initial calibration of each method were met.

#### b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### III. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the initial, continuing and preparation blanks.

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

#### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

#### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

#### VII. Sample Result Verification

Raw data were not reviewed for this SDG.

#### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Field Blanks

Sample EB-09-08/05/10 was identified as an equipment blank. No perchlorate was found in this blank.

**NASA JPL** 

Perchlorate - Data Qualification Summary - SDG BMI10080641

No Sample Data Qualified in this SDG

**NASA JPL** 

Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI10080641

No Sample Data Qualified in this SDG

SDG	#: <u>23907D6</u> #: <u>BMI10080641</u> ratory: <u>Alpha Analytical,</u>		LIDATIO 		PLETENES Level III	S WORKSH	IEET	Date: 9-10-10 Page: of Reviewer: 2nd Reviewer:
METI	HOD: Perchlorate (EPA	Metho	d 314.0),					
	camples listed below were ation findings worksheets		ewed for ea	ch of the f	ollowing valid	ation areas. Va	alidation finding	gs are noted in attached
	Validation	n Area					Comments	
Ī.	Technical holding times			B	Sampling date	0/5/1	$\Diamond$	
lla.	Initial calibration			A				
IIb.	Calibration verification			A				
III.	Blanks			A				
IV	Matrix Spike/Matrix Spike I	Duplicat	es	IA.	ms/D			
V	Duplicates			N			· · · · · · · · · · · · · · · · · · ·	
VI.	Laboratory control samples	<u>s</u>		I A	<u>LCS</u>			
VII.	Sample result verification			N				
VIII	Overall assessment of dat	а						
IX.	Field duplicates			//	50-6			
L <sub>X</sub>	Field blanks			1/0()_	128=5	6		
Note:	A = Acceptable N = Not provided/applicab SW = See worksheet	le	R = Rir	lo compound nsate ield blank	ds detected	D = Duplicate TB = Trip blai EB = Equipm	nk	
Valida	ted Samples:	2						
1	MVV-18-5	11	RBW		21		31	
2	MW-18-4	12			22		32	
3	MVV-18-3	13			23		33	
4	MW-18-2	14			24	.=	34	
5	MW-17-4	15			25		35	
6	MW-17-3	16			26		36	
7	MW-17-2	17			27		37	
8	EB-09-08/05/10	18			28		38	
9	MW-18-4MS	19	:		29		39	
10	MW-18-4MSD	20		-	30		40	
Notes:								



#### LABORATORY DATA CONSULTANTS, INC.

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Battelle 505 King Avenue Room 10-1-170 Columbus, OH 43201 ATTN: Ms. Betsy Cutie

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on September 10, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

#### **LDC Project # 23922:**

SDG#

**Fraction** 

BMI10081041

Volatiles, Chromium, Perchlorate

September 15, 2010

The data validation was performed under EPA Level III guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto

**Operations Manager/Senior Chemist** 

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#### NASA JPL Data Validation Reports LDC #23922

Volatiles



### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 6 through August 9, 2010

**LDC Report Date:** 

September 14, 2010

Matrix:

Water

Parameters:

Volatiles

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10081041

#### Sample Identification

MW-21-5

MW-21-4

MW-21-3

MW-21-2

MW-21-1

EB-10-08/06/10

TB-10-08/06/10

MW-14-5

MW-14-4

MW-14-3

MW-14-2

MW-14-1

EB-11-08/09/10

TB-11-08/09/10

MW-21-3MS

MW-21-3MSD

#### Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

#### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

#### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r²) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
8/13/10	Chloromethane	50.1	All samples in SDG BMI10081041	J (all detects) UJ (all non-detects)	А
	Bromomethane	56.4		J (all detects) UJ (all non-detects)	

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

#### V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

#### VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

#### VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-21-3MS/MSD (MW-21-3)	Naphthalene	-	-	23.1 (≤20)	J (all detects) UJ (all non-detects)	A

#### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS MS15W0813M	Chloromethane	50 (70-130)	All samples in SDG BMI10081041	J (all detects) UJ (all non-detects)	Р
	Bromomethane	43 (70-130)		J (all detects) UJ (all non-detects)	

#### IX. Regional Quality Assurance and Quality Control

Not applicable.

#### X. Internal Standards

All internal standard areas and retention times were within QC limits.

#### XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

#### XII. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

#### XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

#### XIV. System Performance

Raw data were not reviewed for this SDG.

#### XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

#### XVI. Field Duplicates

No field duplicates were identified in this SDG.

#### XVII. Field Blanks

Samples TB-10-08/06/10 and TB-11-08/09/10 were identified as trip blanks. No volatile contaminants were found in these blanks.

Samples EB-10-08/06/10 and EB-11-08/09/10 were identified as equipment blanks. No volatile contaminants was found in these blanks with the following exceptions:

Equipment Blank ID	Compound	Concentration (ug/L)
EB-11-08/09/10	Acetone 2-Methyl-1-propene	32 3.8

NASA JPL Volatiles - Data Qualification Summary - SDG BMI10081041

SDG	Sample	Compound	Flag	A or P	Reason
BMI10081041	MW-21-5 MW-21-4 MW-21-3 MW-21-2 MW-21-1 EB-10-08/06/10 TB-10-08/06/10 MW-14-5 MW-14-4 MW-14-3 MW-14-2 MW-14-1 EB-11-08/09/10 TB-11-08/09/10	Chloromethane Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
BMI10081041	MW-21-3	Naphthalene	J (all detects) UJ (all non-detects)	А	Matrix spike/Matrix spike duplicates (RPD)
BMI10081041	MW-21-5 MW-21-4 MW-21-3 MW-21-2 MW-21-1 EB-10-08/06/10 TB-10-08/06/10 MW-14-5 MW-14-4 MW-14-3 MW-14-2 MW-14-1 EB-11-08/09/10 TB-11-08/09/10	Chloromethane Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)		Laboratory control samples (%R)

NASA JPL Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI10081041

No Sample Data Qualified in this SDG

LDC #: 23922A1 <b>V</b>	ALIDATION COMPLETENESS WORKSHEET	Date: 9-14-10
SDG #: BMI10081041	Level III	Page: 1 of 1
Laboratory: Alpha Analytical, Inc.	<del></del>	Reviewer: MC 2nd Reviewer:
METHOD: GC/MS Volatiles (EPA	SW846 Method 8260B)	

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
<u> </u>	Technical holding times	A	Sampling dates: 8-6-10 through 8-9-10
11.	GC/MS Instrument performance check	A	
HI.	Initial calibration	Α	7. RSD = 20 , r2
IV.	Continuing calibration/ICV	SW	ICV/CCV = 30
V.	Blanks	A	
VI.	Surrogate spikes	Α	
VII.	Matrix spike/Matrix spike duplicates	SW	MS/MSD
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	·
Х.	Internal standards	<u> </u>	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentitatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	EB=6,13 TB=7,14*

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

★ = ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank
EB = Equipment blank

#### Validated Samples:

$\overline{}$	T	<del></del>	T	T T	
1	MW-21-5	11	MVV-14-2	21	31
2	MW-21-4	12	MW-14-1	22	32
3	MVV-21-3	13	EB-11-08/09/10	23	33
4	MW-21-2	14	TB-11-08/09/10	24	34
5	MW-21-1	15	MW-21-3MS	25	35
6	EB-10-08/06/10	16	MW-21-3MSD	26	36
7	TB-10-08/06/10	17		27	37
8	MW-14-5	18		28	38
9	MW-14-4	19		29	39
10	MW-14-3	20	MBLK MSIEWOBI3M	30	40

# TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method 524.2)

A. Chloromethane	Q. 1,2-Dichloropropane	GG. Xylenes, total	WW. Bromobenzene	MMM. Naphthalene
B. Bromomethane	R. cls-1,3-Dichloropropene	HH. Vinyl acetate	XX. 1,2,3-Trichloropropane	NNN. 1,2,3-Trichlorobenzene
C. Vinyl choride	S. Trichloroethene	II. 2-Chloroethylvinyl ether	YY, n-Propylbenzene	OOO. 1.3.5-Trichlorobenzene
D. Chloroethane	T. Dibromochioromethane	JJ. Dichlorodifluoromethane	ZZ. 2-Chlorotoluene	PPP. trans-1,2-Dichloroethens
E. Methylene chloride	U. 1,1,2-Trichloroethane	KK. Trichlorofluoromethane	AAA. 1,3,5-Trimethylbenzene	QQQ. cis-1,2-Dichloroethene
F, Acetone	V. Benzene	LL. Methyl-tert-butyl ether	BBB. 4-Chlorotoluene	RRR. m.p-Xylenes
G. Carbon disulfide	W. trans-1,3-Dichloropropene	MM. 1,2-Dibromo-3-chloropropane	CCC, tert-Butylbenzene	SSS. o-Xylene
H. 1,1-Dichloroethene	X. Bromoform	NN. Diethyl ether	DDD. 1,2,4-Trimethylbenzene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane
I. 1,1-Dichioroethans	Y, 4-Methyt-2-pentanone	00. 2,2-Dichloropropane	EEE. sec-Butylbenzene	UUU. Benzyl chloride
J. 1,2-Dichloroethens, total	Z. 2-Hexanone	PP. Bromochioromethane	FFF. 1,3-Dichlorobenzene	VVV. 4-Ethyltoluene
K. Chloroform	AA. Tetrachloroethene	QQ. 1,1-Dichloropropene	GGG. p-isopropyltoluene	WWW. Ethanol
L. 1,2-Dichloroethane	BB. 1,1,2,2-Tetrachioroethane	RR. Dibromomethane	HHH. 1,4-Dichlorobenzene	XXX. Ethyl ether
M. 2-Butanone	CC. Toluene	SS. 1,3-Dichloropropane	III. n-Butyibenzene	
N. 1,1,1-Trichloroethane	DD. Chlorobenzene	TT. 1,2-Dibromoethane	JJJ, 1,2-Dichlorobenzene	
O. Carbon tetrachloride	EE. Ethylbenzene	UU. 1,1,1,2-Tetrachioroethane	KKK. 1,2,4-Trichlorobenzene	
P. Bromodichloromethane	FF. Styrene	VV. isopropylbenzene	LLL. Hexachlorobutadiene	

Notes:	

23932A1 LDC #

# VALIDATION FINDINGS WORKSHEET

Page: 1 of

2nd Reviewer; Reviewer:

Continuing Calibration

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y N/A Were all percent differences (%D) < 30%?

Qualifications	1/11/1	7														
Associated Samples	all and	l M														
Finding %D (Limit: <30.0%)	50.1	56.4														
Compound	A	В														
Standard ID	10081303 (cev)	->														
	8-13-10	->			-											
*	<u> </u>		$\perp$	$oldsymbol{\perp}$						-						

LDC #. 23922A | SDC #:

# VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: of Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A

Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG? (Not required)

Y N N/A

Were a MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

Ĺ										
#	Date	MS/MSD ID	Compound	MS %R (Limits)		MSD %R (Limits)	RPD (	RPD (Limits)	Associated Samples	Qualifications
	8-13-10	12/10	MWW	)	(	(	33.1 (	< 30 )	m	1/02/A
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				)	) (	(				
	ဝိ	Compound	QC Limit	QC Limits (Water)	RPD (Water)		Com	Compound	QC Limits (Water)	RPD (Water)
o.	Vinyl chloride		70-1	70-130%	<30	^	Benzene		70-130%	<30
نـ	1,2-Dichloroethane	ıne	70-1	70-130%	<30	Œ	cis-1,3-Dichloropropene	propropene	70-130%	<30
o	Carbon tetrachloride	oride	70-1	70-130%	<30	×	Bromoform		70-130%	<30
ď	1,2-Dichloropropane	oane	70-1	70-130%	<30	¥	Tetrachloroethene	thene	70-130%	<30
တ်	Trichloroethene		70-1	70-130%	<30	E	1,2-Dibromoethane	ethane	70-130%	<30
Ü.	1,1,2-Trichloroethane	hane	70-1	70-130%	<30	E	1,4-Dichlorobenzene	enzene	70-130%	<30

LDC #: 3392A1 SDG #:

# VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: Reviewer:

2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for ali questions answered "N". Not applicable questing are identified as "N/A".

| N | N/A | Was a LCS analyzed every 20 samples?
| Y | N | N/A | Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limit

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

//											
	Date	TCS/LCSD ID	Compound	LCS %R (Limits)	its)	LCSD %R (Limits)	its)	RPD (Limits)	Associated Samples	Qualifications	1
	8-13-10 1	LCS MSISW0813M	А	50 (70-1	-130)				all and	J/T/1/7	71
		->	В	43 (	^	_		)	111		
				_	(	)		)		<b>A</b>	T
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				<b>.</b>	(	)	^	( )			
1				•	(	)	( )	( )			
				`	)	)		( )			
		Compound	QC Limits (Water)	(Water)	RPD (Water)	ter)		Compound	QC Limits (Water)	RPD (Water)	
	Vinyl chloride		70-130%	30%	<30		>	Benzene	70-130%	<30	
	1,2-Dichloroethane	thane	70-130%	30%	<30		ж.	cis-1,3-Dichloropropene	70-130%	<30	
	Carbon tetrachloride	chloride	70-130%	30%	<30		×	Bromoform	70-130%	<30	
	1,2-Dichloropropane	ropane	70-130%	30%	<30		AA.	Tetrachloroethene	70-130%	<30	
	Trichloroethene	ne	70-130%	%08	<30		ш	1,2-Dibromoethane	70-130%	<30	
!!	1,1,2-Trichloroethane	oethane	70-130%	%01	<30	I	H.	1,4-Dichlorobenzene	70-130%	<30	
							1				

LDC#: 239241 SDG #:

VANDANON NINDINGS WORKSHEET

Page: of /

Reviewer: 2nd Reviewer:

Field Blanks

METHOD: GCMS VOA (EPA Method 524.2)

Were target compounds detected in the feeld branks? Were field blanks identified in this SDG? N/N N/A K N N N

Mg/L Associated sample units: Mg Blank units:

Sampling date: 8-9-10 Field blank type: (circle one) Field Blank / Rinsate / Trip Blank /Other:

8-12 Associated Samples: EB

Compound	Blank ID		Sample Identification
	-2	1 1 A B	
Methylene chloride			
Acetone	32	13 / 00	
Chloroform			
2-Methy  -1-propene	3.8		
CRal			

Associated sample units: Blank units:

Sampling date:

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other:

Associated Samples:

	Blank ID	Samio Identification
	- 	Campre Identification
Methylene chloride		
Δοστουρ		
al Clark		
Chloroform		
	-	
CRQL.		

Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were also qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U". CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:

## NASA JPL Data Validation Reports LDC #23922

Chromium



## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 6 through August 9, 2010

LDC Report Date:

September 13, 2010

Matrix:

Water

Parameters:

Chromium

Validation Level:

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10081041

#### Sample Identification

MW-21-5

MW-21-4

MW-21-3

MW-21-2

MW-21-1

EB-10-08/06/10

MW-14-3

MW-14-2

MW-14-1

EB-11-08/09/10

#### Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

#### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

#### III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

#### IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium was found in the initial, continuing and preparation blanks.

#### V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

#### VI. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

#### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

#### IX. Internal Standards (ICP-MS)

Raw data were not reviewed for this SDG.

#### X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

#### XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

#### XII. Sample Result Verification

Raw data were not reviewed for this SDG.

#### XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

#### XIV. Field Duplicates

No field duplicates were identified in this SDG.

#### XV. Field Blanks

Samples EB-10-08/06/10 and EB-11-08/09/10 were identified as equipment blanks. No chromium were found in these blanks.

NASA JPL Metals - Data Qualification Summary - SDG BMI10081041

No Sample Data Qualified in this SDG

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI10081041

No Sample Data Qualified in this SDG

	#: <u>BMI10081041</u> atory: <u>Alpha Analytical,</u>	Inc.	LIDATION		LETENESS Level III	S WORKSHEE	Т	Date: $91/17/1$ Page: 1 of 1 Reviewer: 144 2nd Reviewer: 2
Γhe s	IOD: Cr (EPA Method 2 amples listed below wer tion findings worksheets	e revie	ewed for ead	ch of the fo	ollowing valida	ition areas. Valida	tion findi	ngs are noted in attached
	Validation	n Area				Com	ments	
1.	Technical holding times			A	Sampling dates:	8/6/10,8/9	10	
II.	ICP/MS Tune			A				
<u>III.</u>	Calibration			A				
IV.	Blanks			Δ				
V.	ICP Interference Check Sa	ample (I	CS) Analysis	À				
VI.	Matrix Spike Analysis			A	7M5/N	un from SDG	BMIIO	08064
VII.	Duplicate Sample Analysis	3		N		7		<b>,</b>
VIII.	Laboratory Control Sample	es (LCS)	)	A	Les			
IX.	Internal Standard (ICP-MS	5)		N	Not ver	ieved		
X.	Furnace Atomic Absorption	n QC		N	Not ut	ligs.		
XI.	ICP Serial Dilution			N	r:t per	hmed		
XII.	Sample Result Verification	l		N	١	<u> </u>		
XIII.	Overall Assessment of Da	ta		A				
XIV.	Field Duplicates			N				
ΧV	XV Field Blanks				ZB=6.	[P		
Note:	A = Acceptable N = Not provided/applicab SW = See worksheet	le	R = Rins	o compound sate eld blank	s detected	D = Duplicate TB = Trip blank EB = Equipment bl	ank	
/alldat	ed Samples:		<b>,</b>	· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·	
1	MW-21-5	11	MB		21		31	
2	MW-21-4	12			22		32	
3	MW-21-3	13			23		33	
4	MW-21-2	14			24		34	
5	MW-21-1	15			25		35	
6	EB-10-08/06/10	16			26		36	
7	MW-14-3	17			27		37	
8	MW-14-2	18			28		38	
9 10	MVV-14-1	19			29	***	39	
10	EB-11-08/09/10	20			30		40	

#### NASA JPL Data Validation Reports LDC #23922

Perchlorate



### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

NASA JPL

**Collection Date:** 

August 6 through August 9, 2010

LDC Report Date:

September 13, 2010

Matrix:

Water

Parameters:

Perchlorate

**Validation Level:** 

EPA Level III

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI10081041

#### Sample Identification

MW-21-5

MW-21-4

MW-21-3

MW-21-2

MW-21-1

EB-10-08/06/10

MW-14-5

MW-14-4

MW-14-3

MW-14-2

MW-14-1

EB-11-08/09/10

MW-21-3MS

MW-21-3MSD

#### Introduction

This data review covers 14 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical or advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

#### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. Calibration

#### a. Initial Calibration

All criteria for the initial calibration of each method were met.

#### b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### III. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the initial, continuing and preparation blanks.

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

#### V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

#### VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

#### VII. Sample Result Verification

Raw data were not reviewed for this SDG.

#### VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Field Blanks

Samples EB-10-08/06/10 and EB-11-08/09/10 were identified as equipment blanks. No perchlorate was found in these blanks.

**NASA JPL** 

Perchlorate - Data Qualification Summary - SDG BMI10081041

No Sample Data Qualified in this SDG

**NASA JPL** 

Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI10081041

No Sample Data Qualified in this SDG

SDG#	: 23922A6 #: BMI10081041		LIDATION		PLETENI Level III	ESS WORKSI	HEET	Date: <u>9/13/</u> Page: <u>1</u> of <u>/</u> Reviewer: <u>/</u> /
_apora	atory: <u>Alpha Analytical, In</u>	ıC.						2nd Reviewer:
WETH!	IOD: Perchlorate (EPA M	letho	d 314.0)					
The sa	amples listed below were	revie	ewed for eac	h of the f	ollowing va	alidation areas. V	/alidation findir	ngs are noted in attache
	tion findings worksheets.				-			
	T	—			T			
<u></u>	Validation /	<u>Area</u>			1	1	Comments	
l.	Technical holding times			<u>A</u>	Sampling d	lates: 8/6/10	8/9/10	
IIa.	Initial calibration					- 		
IIb.	Calibration verification			A				
III.	Blanks			A				
IV	Matrix Spike/Matrix Spike Du	uplicat	es	Á	, ms	1645		
V	Duplicates	<u> </u>		N	1	<i>f</i>		
VI.	Laboratory control samples			A	Ly			
VII.	Sample result verification			<i>P</i> )				
VIII.	Overall assessment of data					<del></del>		
IX.	Field duplicates			A				
_x_	Field blanks			MD	6B=	6,12		
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet	<b>;</b>	ND = No R = Rins FB = Fie		is detected	D = Duplicat TB = Trip bla EB = Equipn	ank	
Validate	ed Samples:							
1	MW-21-5	11	MVV-14-1		21	Mrs	31	
2	MW-21-4	12	EB-11-08/09/1	10	22		32	
3	MW-21-3	13	MW-21-3MS		23		33	
4	MW-21-2	14	MW-21-3MSD	)	24		34	
5	MW-21-1	15			25		35	
6	EB-10-08/06/10	16			26		36	
7	MW-14-5	17			27		37	
8	MW-14-4	18			28		38	
	PWW 44.2						20	,

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Notes:_			 	
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MW-14-2