# 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 second quarter 2011sampling 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 second quarter 2011 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-5, MW-6, MW-8, MW-12 (Screen 3), MW-19 (Screen 3), MW-20 (Screen 4), MW-24 (Screen 2), and MW-25 (Screen 2). 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 nondedicated sampling equipment was used. 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 contaminants were detected in the equipment blanks as shown in Table 1-1. The tentatively identified compounds (TICs), tert-butyl alcohol (TBA) and isobutylene were detected in one equipment blank as shown in Table 1-1. The source of these detections could not be determined, however, 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 collected during this 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 second quarter 2011 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 1-1SUMMARY OF CONTAMINANTS DETECTED IN QUALITY CONTROL SAMPLESCOLLECTED DURING THE APR/MAY 2011 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-10-5/11/11	MW-19	5 U	1 U	1 U	10 U		tert-Butyl alcohol (TBA)	16
				. 0		100		Isobutylene (2-methyl-1-propene)	2.8
EQUIPMENT BLANK	EB-11-5/12/11	MW-17	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-12-5/16/11	MW-18	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-13-5/17/11	MW-25	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-1-4/25/11	MW-14	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-14-5/18/11	MW-26	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-15-5/19/11	MW-21	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-2-4/26/11	MW-7, MW-22	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-3-4/27/11	MW-6, MW-8, MW-15, MW-24	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-4-4/28/11	MW-4, MW-5, MW-13	5 U	2 U	2 U	10 U			
EQUIPMENT BLANK	EB-5-5/2/11	MW-1, MW-9, MW-12	5 U	2 U	2 U	10 U			
EQUIPMENT BLANK	EB-6-5/3/11	MW-10, MW-23	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-7-5/4/11	MW-11	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-8-5/5/11	MW-16, MW-20	5 U	1 U	1 U	10 U			
EQUIPMENT BLANK	EB-9-5/10/11	MW-3	5 U	1 U	1 U	10 U			
SOURCE BLANK	SB-1-4/25/11	MW-14	5 U	1 U	1 U	10 U			
TRIP BLANK	TB-10-5/11/11	MW-19	NA	1 U	1 U	10 U			
TRIP BLANK	TB-11-5/12/11	MW-17	NA	1 U	1 U	10 U			
TRIP BLANK	TB-12-5/16/11	MW-18	NA	1 U	1 U	10 U			
TRIP BLANK	TB-13-5/17/11	MW-25	NA	1 U	1 U	10 U			
TRIP BLANK	TB-1-4/25/11	MW-14	NA	1 U	1 U	10 U			
TRIP BLANK	TB-14-5/18/11	MW-26	NA	1 U	1 U	10 U			
TRIP BLANK	TB-15-5/19/11	MW-21	NA	1 U	1 U	10 U			
TRIP BLANK	TB-2-4/26/11	MW-7, MW-22	NA	1 U	1 U	10 U			
TRIP BLANK	TB-3-4/27/11	MW-6, MW-8, MW-15, MW-24	NA	1 U	1 U	10 U			
TRIP BLANK	TB-4-4/28/11	MW-4, MW-5, MW-13	NA	1 U	1 U	10 U			
TRIP BLANK	TB-5-5/2/11	MW-1, MW-9, MW-12	NA	2 U	2 U	10 U			
TRIP BLANK	TB-6-5/3/11	MW-10, MW-23	NA	1 U	1 U	10 U			1
TRIP BLANK	TB-7-5/4/11	MW-11	NA	1 U	1 U	10 U			1
TRIP BLANK	TB-8-5/5/11	MW-16, MW-20	NA	1 U	1 U	10 U			
TRIP BLANK	TB-9-5/10/11	MW-3	NA	1 U	1 U	10 U			
<u>Notes</u> NA U	Not Analyzed Analyte was analyzed for	but not detected at or above the stated	limit						

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, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437

Web www.lab-data.com

Fax 760.634.0439

May 6, 2011

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 April 29, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

# LDC Project # 25405:

# <u>SDG #</u>

# **Fraction**

P1101547, P1101560, P1101561 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

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#### LDC Report# 25405A6

# Laboratory Data Consultants, Inc. Data Validation Report

Columbia Analytical Services, Inc.

Project/Site Name:	NASA JPL
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Collection Date: April 25, 2011

LDC Report Date: May 6, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III &IV

Laboratory:

Sample Delivery Group (SDG): P1101547

# Sample Identification

MW-14-5 MW-14-4 MW-14-3 MW-14-2\*\* MW-14-1 EB-1-4/25/11 SB-1-4/25/11 MW-14-2MS MW-14-2MSD

\*\*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 SW846 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 table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

# III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

# VI. Duplicates

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

# **VII. Laboratory Control Samples**

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

#### VIII. Sample Result Verification

All sample result verifications were 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.

# IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

# X. Field Duplicates

No field duplicates were identified in this SDG.

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#### X. Field Blanks

Sample EB-1-4/25/11 was identified as an equipment blank. No hexavalent chromium was found in this blank.

Sample SB-1-4/25/11 was identified as a source blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101547

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101547

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL
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Collection Date: April 26, 2011

LDC Report Date: May 6, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III &IV

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1101560

# Sample Identification

MW-22-5\*\* MW-22-4 MW-22-3 MW-22-2 MW-22-1 EB-2-4/26/11 MW-22-5MS MW-22-5MSD

\*\*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 SW846 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 table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

All sample result verifications were 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.

# IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

#### X. Field Duplicates

No field duplicates were identified in this SDG.

# X. Field Blanks

Sample EB-2-4/26/11 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101560

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101560

No Sample Data Qualified in this SDG

# LDC Report# 25405C6

# Laboratory Data Consultants, Inc. Data Validation Report

<b>Project/Site</b>	Name:	NASA JPL

Collection Date: April 26, 2011

LDC Report Date: May 6, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1101561

# Sample Identification

MW-7 MW-7MS MW-7MSD

#### Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW846 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 table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

#### **VII. Laboratory Control Samples**

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

#### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

#### IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

# X. Field Duplicates

No field duplicates were identified in this SDG.

# X1. Field Blanks

No field blanks were identified in this SDG.

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NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101561

No Sample Data Qualified in this SDG

NASA JPL

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Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101561

No Sample Data Qualified in this SDG



# Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 Web www.lab-data.com

Fax 760.634.0439

May 11, 2011

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

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed is the final validation report for the fraction listed below. This SDG was received on May 9, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

# LDC Project # 25427:

<u>SDG #</u>

# <u>Fraction</u>

P1101638

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

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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	May 2, 2011
LDC Report Date:	May 11, 2011
Matrix:	Water
Parameters:	Hexavalent Chromium
Validation Level:	EPA Level III &IV
Laboratory:	Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1101638

# Sample Identification

MW-12-5 MW-12-4 MW-12-3 MW-12-2 MW-12-1\*\* EB-5-5/2/11 MW-12-1MS MW-12-1MSD

\*\*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 SW846 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 table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

# III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

# **VII. Laboratory Control Samples**

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

#### VIII. Sample Result Verification

All sample result verifications were 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.

# IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

# X. Field Duplicates

No field duplicates were identified in this SDG.

# X. Field Blanks

Sample EB-5-5/2/11 was identified as an equipment blank. No hexavalent chromium was found in this blank.

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NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101638

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101638

No Sample Data Qualified in this SDG



# Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

**Phone** 760.634.0437

Web www.lab-data.com

Fax 760.634.0439

May 13, 2011

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 May 11, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

# LDC Project # 25433:

# <u>SDG #</u>

# **Fraction**

P1101639, P1101655, P1101656 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 Superfund Data Review, January 2010
- 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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# Laboratory Data Consultants, Inc. Data Validation Report

Columbia Analytical Services, Inc.

Project/Site Name:	NASA JPL

Collection	Date:	May 2,	2011
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LDC Report Date: May 12, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III &IV

Laboratory:

Sample Delivery Group (SDG): P1101639

# Sample Identification

MW-1 DUPE-5-2Q11 MW-9\*\* MW-1MS MW-1MSD

\*\*Indicates sample underwent EPA Level IV review

#### Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW846 Method 7196A for Hexavalent Chromium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

# III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

# IV. Blanks

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

# V. Matrix Spike/Matrix Spike Duplicates

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.

# VI. Duplicates

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

# VII. Laboratory Control Samples

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

# VIII. Sample Result Verification

All sample result verifications were 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.

# IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

# X. Field Duplicates

Samples MW-1 and DUPE-5-2Q11 were identified as field duplicates. No hexavalent chromium were 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 P1101639

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101639

#### LDC Report# 25433B6

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL

Collection Date: May 3, 2011

LDC Report Date: May 12, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III &IV

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1101655

#### Sample Identification

MW-23-5\*\* MW-23-4 MW-23-3 MW-23-2 MW-23-1 EB-6-5/3/11 MW-23-1MS MW-23-1MSD

\*\*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 SW846 Method 7196A for Hexavalent Chromium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

All sample result verifications were 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.

#### IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

#### X. Field Duplicates

No field duplicates were identified in this SDG.

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#### X. Field Blanks

Sample EB-6-5/3/11 was identified as an equipment blank. No hexavalent chromium were found in this blank

#### NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101655

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101655

# Laboratory Data Consultants, Inc. Data Validation Report

Columbia Analytical Services, Inc.

- Project/Site Name: NASA JPL
- Collection Date: May 3, 2011

LDC Report Date: May 12, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III

Laboratory:

Sample Delivery Group (SDG): P1101656

#### 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 SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

#### IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

#### X. Field Duplicates

No field duplicates were identified in this SDG.

#### XI. Field Blanks

No field blanks were identified in this SDG.

#### NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101656

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101656



### Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 Web www.

Web www.lab-data.com

Fax 760.634.0439

May 17, 2011

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 May 11, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

#### LDC Project # 25454:

#### <u>SDG #</u>

#### <u>Fraction</u>

P1101581, P1101667, P1101682 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 Superfund Data Review, January 2010
- 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 Report# 25454A6

# Laboratory Data Consultants, Inc. Data Validation Report

Columbia Analytical Services, Inc.

Project/Site Name: NASA JP	<b>Project/Site</b>	Name:	NASA JPL
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Collection Date: April 27, 2011

LDC Report Date: May 16, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III

Laboratory:

Sample Delivery Group (SDG): P1101 581

#### Sample Identification

MW-6 DUPE-7-2Q11 MW-8 DUPE-8-2Q11 MW-15 MW-6MS MW-6MSD

#### Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

All sample result verifications were 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.

#### IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

#### X. Field Duplicates

Samples MW-20-4 and DUPE-2-2Q11 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

#### X. Field Blanks

Sample EB-8-5/5/11 was identified as an equipment blank. No Hexavalent Chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101581

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101581

#### LDC Report# 25454B6

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	May 4, 2011
LDC Report Date:	May 16, 2011
Matrix:	Water
Parameters:	Hexavalent Chromium
Validation Level:	EPA Level III
Laboratory:	Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1101667

#### Sample Identification

MW-11-5 MW-11-4 MW-11-3 MW-11-2 MW-11-1 EB-7-5/4/11 MW-11-5MS MW-11-5MSD

#### Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

Method blanks were reviewed for each matrix as applicable. No Hexavalent Chromium was found in the initial, continuing and method blanks.

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

#### IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

Move PD X. Field Duplicates

No field duplicates were identified in this SDG.

**XI. Field Blanks** Sample EB-7-5/4/11 was identified as an equipment blank. No Hexavalent Chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101667

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101667

#### LDC Report# 25454C6

# Laboratory Data Consultants, Inc. Data Validation Report

Columbia Analytical Services, Inc.

Project/Site Name: NASA JPL
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Collection	Deter	May 5	2011
Conection	Date:	May 5,	2011

LDC Report Date: May 16, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III &IV

Laboratory:

Sample Delivery Group (SDG): P1101682

#### Sample Identification

MW-20-5\*\* MW-20-4 MW-20-3 MW-20-2 MW-20-1 DUPE-2-2Q11 EB-8-5/5/11 MW-20-5MS MW-20-5MSd

\*\*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 SW846 Method 7196A for Hexavalent Chromium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

All sample result verifications were 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.

#### IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

#### X. Field Duplicates

Samples MW-20-4 and DUPE-2-2Q11 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

#### X. Field Blanks

Sample EB-8-5/5/11 was identified as an equipment blank. No Hexavalent Chromium was found in this blank.

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NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101682

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101682



### Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 Web www.lab-data.com

Fax 760.634.0439

June 6, 2011

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 May 20, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

#### LDC Project # 25502:

# SDG #FractionP1101579, P11016051,4-Dioxane, N-Nitrosodimethylamine,P1101607Hexavalent 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 Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- 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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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	April 27, 2011
LDC Report Date:	May 31, 2011
Matrix:	Water
Parameters:	1,4-Dioxane
Validation Level:	EPA Level III
Laboratory:	Columbia Analytical Services, Inc.

#### Sample Delivery Group (SDG): P1101579

#### Sample Identification

MW-24-1 MW-24-1MS MW-24-1MSD

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#### Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for 1,4-Dioxane.

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.

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 30.0%.

Average relative response factors (RRF) were within validation criteria.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0%.

The percent difference (%D) of the second source calibration standard were less than or equal to 25.0%.

All of the continuing calibration RRF values were within validation criteria.

#### V. Blanks

Method blanks were reviewed for each matrix as applicable. No 1,4-dioxane was 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) samples were reviewed for each matrix as applicable. 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.

#### 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 1,4-Dioxane - Data Qualification Summary - SDG P1101579

No Sample Data Qualified in this SDG

NASA JPL

1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG P1101579

# LDC Report# 25502B2a

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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	April 28, 2011
LDC Report Date:	May 31, 2011
Matrix:	Water
Parameters:	1,4-Dioxane
Validation Level:	EPA Level III
Laboratory:	Columbia Analytical Services, Inc.
Sample Delivery Group (SDG):	P1101605

Sample Identification

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MW-4-1

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for 1,4-Dioxane.

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.

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

- 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 gualification 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 30.0%.

Average relative response factors (RRF) were within validation criteria.

# **IV.** Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0%.

The percent difference (%D) of the second source calibration standard were less than or equal to 25.0%.

All of the continuing calibration RRF values were within validation criteria.

# V. Blanks

Method blanks were reviewed for each matrix as applicable. No 1,4-dioxane was 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

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.

# 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 1,4-Dioxane - Data Qualification Summary - SDG P1101605

No Sample Data Qualified in this SDG

NASA JPL

1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG P1101605

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL	
Collection Date:	April 28, 2011	
LDC Report Date:	May 31, 2011	
Matrix:	Water	
Parameters:	1,4-Dioxane	
Validation Level:	EPA Level III	
Laboratory:	Columbia Analytical Services, Inc.	
Sample Delivery Group (SDG): P1101607		
Sample Identification		

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MW-13

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This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for 1,4-Dioxane.

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.

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

- 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 30.0%.

Average relative response factors (RRF) were within validation criteria.

# IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0%.

The percent difference (%D) of the second source calibration standard were less than or equal to 25.0%.

All of the continuing calibration RRF values were within validation criteria.

# V. Blanks

Method blanks were reviewed for each matrix as applicable. No 1,4-dioxane was 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

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.

# 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 1,4-Dioxane - Data Qualification Summary - SDG P1101607

No Sample Data Qualified in this SDG

NASA JPL

1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG P1101607

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Columbia Analytical Services, Inc.

Project/Site Name:	NASA JPL
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Collection Date: April 28, 2011

LDC Report Date: May 31, 2011

Matrix: Water

Parameters: N-Nitrosodimethylamine

Validation Level: EPA Level III

Laboratory:

Sample Delivery Group (SDG): P1101579

## Sample Identification

MW-24-1

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 521 for N-Nitrosodimethylamine.

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.

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

- 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 analysis was not required by the method.

#### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination  $(r^2)$  was greater than or equal to 0.990.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0%.

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

#### V. Blanks

Method blanks were reviewed for each matrix as applicable. No N-Nitrosodimethylamine was 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

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.

#### 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 N-Nitrosodimethylamine - Data Qualification Summary - SDG P1101579

# No Sample Data Qualified in this SDG

NASA JPL

N-Nitrosodimethylamine - Laboratory Blank Data Qualification Summary - SDG P1101579

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	April 28, 2011
LDC Report Date:	May 31, 2011
Matrix:	Water
Parameters:	N-Nitrosodimethylamine
Validation Level:	EPA Level III
Laboratory:	Columbia Analytical Services, Inc.
Sample Delivery Group (SDG):	P1101605
Sample Identification	

MW-4-1

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 521 for N-Nitrosodimethylamine.

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.

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

- 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 analysis was not required by the method.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination  $(r^2)$  was greater than or equal to 0.990.

# **IV. Continuing Calibration**

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0%.

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

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No N-Nitrosodimethylamine was 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

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.

# 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 N-Nitrosodimethylamine - Data Qualification Summary - SDG P1101605

# No Sample Data Qualified in this SDG

NASA JPL

N-Nitrosodimethylamine - Laboratory Blank Data Qualification Summary - SDG P1101605

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Columbia Analytical Services, Inc.

Project/Site Name: N	IASA JPL
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Collection Date: April 28, 2011

LDC Report Date: May 31, 2011

Matrix: Water

Parameters: N-Nitrosodimethylamine

Validation Level: EPA Level III

Laboratory:

Sample Delivery Group (SDG): P1101607

# Sample Identification

MW-13 MW-13MS MW-13MSD

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 521 for N-Nitrosodimethylamine.

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.

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

- 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 analysis was not required by the method.

#### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination  $(r^2)$  was greater than or equal to 0.990.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0%.

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

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No N-Nitrosodimethylamine was 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) samples were reviewed for each matrix as applicable. 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.

# 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

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No field blanks were identified in this SDG.

# NASA JPL N-Nitrosodimethylamine - Data Qualification Summary - SDG P1101607

# No Sample Data Qualified in this SDG

NASA JPL

N-Nitrosodimethylamine - Laboratory Blank Data Qualification Summary - SDG P1101607

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
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Collection Date: April 27, 2011

LDC Report Date: June 3, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1101579

# Sample Identification

MW-24-5 MW-24-4 MW-24-3 MW-24-2 MW-24-1 DUPE-1-2Q11 EB-3-4/27/11 MW-24-5MS MW-24-5MSD

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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

- 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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

## VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

#### IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

#### X. Field Duplicates

Samples MW-24-2 and DUPE-1-2Q11 were identified as field duplicates. No hexavalent chromium was detected in any of the samples

# XI. Field Blanks

Sample EB-3-4/27/11 was identified as an equipment blank. No hexavalent chromium was found in this blank.

.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101579

No Sample Data Qualified in this SDG

NASA JPL Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101579

No Sample Data Qualified in this SDG

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# Laboratory Data Consultants, Inc. Data Validation Report

Columbia Analytical Services, Inc.

Collection Date: April 28, 2011

LDC Report Date: May 23, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III

Laboratory:

Sample Delivery Group (SDG): P1101605

## Sample Identification

MW-4-5 MW-4-4 MW-4-3 MW-4-2 MW-4-1 EB-4-4/28/11 MW-4-4MS MW-4-4MSD

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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

- 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. Initial Calibration

All criteria for the initial calibration were met.

# III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

# IV. Blanks

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

# V. Matrix Spike/Matrix Spike Duplicates

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.

## VI. Duplicates

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

## VII. Laboratory Control Samples

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

## VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

## IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

## X. Field Duplicates

No field duplicates were identified in this SDG.

## XI. Field Blanks

Sample EB-4-4/28/11 was identified as an equipment blank. No hexavalent chromium was found in this blank.

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# NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101605

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101605

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Columbia Analytical Services, Inc.

Project/Site	Name:	NASA JPL
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Collection	Date:	April 28,	2011
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LDC Report Date: May 23, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III

Laboratory:

Sample Delivery Group (SDG): P1101607

# Sample Identification

MW-13 MW-5 DUPE-6-2Q11 MW-13MS MW-13MSD

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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

- 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. Initial Calibration

All criteria for the initial calibration were met.

## III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

### IV. Blanks

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

### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

## VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

#### IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

#### X. Field Duplicates

Samples MW-5 and DUPE-6-2Q11 were identified as field duplicates. No hexavalent chromium was detected in any of the samples

# XI. Field Blanks

No field blanks were identified in this SDG.

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NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101607

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101607

No Sample Data Qualified in this SDG



# Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 Web www.lab-data.com

Fax 760.634.0439

June 3, 2011

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. This SDG was received on May 23, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

#### LDC Project # 25519:

## SDG # Fraction

BMI11042621 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 Superfund Data Review, January 2010
- 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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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JPL
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Collection Date: April 25, 2011

LDC Report Date: May 27, 2011

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11042621

## Sample Identification

MW-14-5 MW-14-4 MW-14-3 MW-14-2\*\* MW-14-1 EB1-4/25/11 TB-1-4/25/11 SB-1-4/25/11 MW-14-2MS MW-14-2MSD

\*\*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 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 advisory nature.

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.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0%.

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

# 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.

## 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.

#### XIV. System Performance

The system performance was 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.

#### **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-1-4/25/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB1-4/25/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

Sample SB-1-4/25/11 was identified as a source blank. No volatile contaminants were found in this blank.

# NASA JPL Volatiles - Data Qualification Summary - SDG BMI11042621

# No Sample Data Qualified in this SDG

NASA JPL

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11042621

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
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	Collection	Date:	April 25, 2011
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LDC Report Date: June 2, 2011

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI1104261

## Sample Identification

MW-14-5 MW-14-4 MW-14-3 MW-14-2\*\* MW-14-1 EB-1-4/25/11 SB-1-4/25/11

\*\*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 Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 metal contaminants were 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

No field duplicates were identified in this SDG.

#### XV. Field Blanks

Sample EB-1-4/25/11 was identified as an equipment blank. No metal contaminants were found in this blank.

Sample SB-1-4/25/11 was identified as a source blank. No metal contaminants were found in this blank.

## NASA JPL Metals - Data Qualification Summary - SDG BMI1104261

No Sample Data Qualified in this SDG

NASA JPL

Metals - Laboratory Blank Data Qualification Summary - SDG BMI1104261

No Sample Data Qualified in this SDG

## NASA JPL Metals - Data Qualification Summary - SDG BMI1104261

# No Sample Data Qualified in this SDG

NASA JPL

Metals - Laboratory Blank Data Qualification Summary - SDG BMI1104261

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
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Collection Date:	April 25, 2011

LDC Report Date: June 2, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11042621

## Sample Identification

MW-14-5 MW-14-4 MW-14-3 MW-14-2\*\* MW-14-1 EB1-4/25/11 SB-1-4/25/11 MW-14-2MS MW-14-2MSD

\*\*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 Standard Method 2320B for Alkalinity, Standard Method 2540C for Total Dissolved Solids, EPA Method 150.1 for pH, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Sulfate, and Orthophosphate as Phosphorous, 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.

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. Initial Calibration

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

### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

### IV. Blanks

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

### V. 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.

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. 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.

#### IX. Overall Assessment of Data

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

## X. Field Duplicates

No field duplicates were identified in this SDG.

## X. Field Blanks

Sample EB1-4/25/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB1-4/25/11	Total alkalinity Bicarbonate alkalinity pH	10 mg/L 10 mg/L 6.2 units

Sample SB1-4/25/11 was identified as a source blank. No contaminant concentrations were found in this blank with the following exceptions:

Source Blank ID	Analyte	Concentration
SB1-4/25/11	рH	6.0 units

## NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11042621

# No Sample Data Qualified in this SDG

NASA JPL

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11042621

No Sample Data Qualified in this SDG



7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 Web www.lab-data.com

Fax 760.634.0439

June 6, 2011

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 May 24, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

# LDC Project # 25525:

# <u>SDG #</u> <u>Fraction</u>

BMI11042703 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 Superfund Data Review, January 2010
- 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,

Pauto

Erlinda T. Rauto Operations Manager/Senior Chemist

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25525ST.wpd

## LDC Report# 25525A1

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	April 26, 2011
LDC Report Date:	June 3, 2011
Matrix:	Water
Parameters:	Volatiles
Validation Level:	EPA Level III & IV
Laboratory:	Alpha Analytical, Inc.
Sample Delivery Group (SDG):	BMI11042703

## Sample Identification

MW-22-5\*\* MW-22-4 MW-22-3 MW-22-2 MW-22-1 EB-2-4/26/11 TB-2-4/26/11 MW-7 MW-7 MW-7MS MW-7MSD

\*\*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 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 advisory nature.

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.

### **IV.** Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0%.

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

## 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.

## 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 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.

#### 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-2-4/26/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-2-4/26/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

## NASA JPL Volatiles - Data Qualification Summary - SDG BMI11042703

# No Sample Data Qualified in this SDG

NASA JPL

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11042703

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

<b>Project/Site</b>	Name:	NASA JPL

Collection Date: April 26, 2011

LDC Report Date: June 2, 2011

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11042703

## Sample Identification

MW-22-5\*\* MW-22-4 MW-22-3 MW-22-2 MW-22-1 EB-2-4/26/11 MW-7 MW-7MS MW-7MSD

\*\*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 Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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.
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- 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 metal contaminants were 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

No field duplicates were identified in this SDG.

## XV. Field Blanks

Sample EB-2-4/26/11 was identified as an equipment blank. No metal contaminants were found in this blank.

## NASA JPL Metals - Data Qualification Summary - SDG BMI11042703

No Sample Data Qualified in this SDG

NASA JPL

Metals - Laboratory Blank Data Qualification Summary - SDG BMI11042703

No Sample Data Qualified in this SDG

#### LDC Report# 25525A6

# Laboratory Data Consultants, Inc. Data Validation Report

- Project/Site Name: NASA JPL
- Collection Date: April 26, 2011

LDC Report Date: June 3, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11042703

## Sample Identification

MW-22-5\*\* MW-22-4 MW-22-3 MW-22-2 MW-22-1 EB-2-4/26/11 MW-7 MW-7 MW-7MS MW-7MSD

\*\*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 Standard Method 2320B for Alkalinity, EPA Method 150.1 for pH, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Sulfate, and Orthophosphate as Phosphorous, EPA Method 314.0 for Perchlorate, and Standard Method 2540C for Total Dissolved Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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. Initial Calibration**

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

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. 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.

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. 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.

#### IX. Overall Assessment of Data

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

#### X. Field Duplicates

No field duplicates were identified in this SDG.

### X. Field Blanks

Sample EB2-4/26/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB2-4/26/11	рН	4.9 units

# NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11042703

No Sample Data Qualified in this SDG

NASA JPL Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11042703

No Sample Data Qualified in this SDG



# Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437

Web www.lab-data.com

Fax 760.634.0439

June 2, 2011

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

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed is the final validation report for the fraction listed below. This SDG was received on May 24, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

#### LDC Project # 25527:

<u>SDG #</u>

<u>Fraction</u>

P1101750

Hexavalent Chromium

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 Inorganic Superfund Data Review, January 2010
- 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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# Laboratory Data Consultants, Inc. Data Validation Report

Columbia Analytical Services, Inc.

Project/Site	Name:	NASA JPL
Frojecuone	name.	NAGA JEL

Collection	Date:	May 10, 2011

LDC Report Date: May 27, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III

Laboratory:

Sample Delivery Group (SDG): P1101750

# Sample Identification

MW-3-5 MW-3-4 MW-3-3 MW-3-2 MW-3-1 EB-9-5/10/11 MW-3-4MS MW-3-4MSD

#### Introduction

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This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

#### IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

#### X. Field Duplicates

No field duplicates were identified in this SDG.

# XI. Field Blanks

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Sample EB-9-5/10/11 was identified as an equipment blank. No hexavalent chromium was found in this blank.

## NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101750

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101750

No Sample Data Qualified in this SDG



# Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

**Phone** 760.634.0437

Web www.lab-data.com

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June 3, 2011

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 May 25, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

#### LDC Project # 25538:

<u>SDG #</u>

#### <u>Fraction</u>

P1101772, P1101835

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 Superfund Data Review, January 2010
- 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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# Laboratory Data Consultants, Inc. Data Validation Report

Columbia Analytical Services, Inc.

Project/Site Name:	NASA JPL

Collection	Date:	May 11,	2011
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LDC Report Date: June 2, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III

Laboratory:

Sample Delivery Group (SDG): P1101772

#### Sample Identification

MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1 DUPE-3-2Q11 EB-10-5/11/11 MW-19-5MS MW-19-5MSD

#### Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

#### **VII. Laboratory Control Samples**

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

#### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

#### IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

#### X. Field Duplicates

Samples MW-19-3 and DUPE-3-2Q11 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

# X. Field Blanks

Sample EB-10-5/11/11 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101772

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101772

No Sample Data Qualified in this SDG

#### LDC Report# 25538B6

# Laboratory Data Consultants, Inc. Data Validation Report

- Project/Site Name: NASA JPL
- Collection Date: May 16, 2011

LDC Report Date: June 2, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III &IV

Laboratory: Columbia Analytical Services, Inc.

#### Sample Delivery Group (SDG): P1101835

#### Sample Identification

MW-18-5 MW-18-4\*\* MW-18-3 MW-18-2 MW-18-1 EB-11-5/16/11 MW-18-5MS MW-18-5MSD

\*\*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 SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

All sample result verifications were 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.

#### IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

#### X. Field Duplicates

No field duplicates were identified in this SDG.

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# X. Field Blanks

Sample EB-11-5/16/11 was identified as an equipment blank. No hexavalent chromium was found in this blank.

# NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101835

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101835

No Sample Data Qualified in this SDG



# Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carisbad, CA 92009

Phone 760.634.0437 Web www.lab-data.com

Fax 760.634.0439

June 6, 2011

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 May 26, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

#### LDC Project # 25549:

#### <u>SDG #</u>

#### **Fraction**

BMI11042807, BMI11042907 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 Superfund Data Review, January 2010
- 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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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	April 27, 2011
LDC Report Date:	June 2, 2011
Matrix:	Water
Parameters:	Volatiles

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11042807

# Sample Identification

MW-6 DUPE-7-2Q11 MW-8 DUPE-8-2Q11 MW-15 MW-24-5 MW-24-5 MW-24-3 MW-24-3 MW-24-2 MW-24-2 MW-24-1 DUPE-1-2Q11 EB-3-4/27/11 TB-3-4/27/11

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#### 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 advisory nature.

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.

#### **IV.** Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
5/2/11	Chloromethane Bromomethane 2,2-Dichloropropane 1,1,1-Trichloroethane Carbon tetrachloride	39.8 32.9 38.8 31.4 37.7	All samples in SDG BMI11042807	J (all detects) UJ (all non-detects)	Р

#### 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 MS15W0502M	Chloromethane Bromomethane	60 (70-130) 67 (70-130)	All samples in SDG BMI11042807	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ
LCS MS15W0502M	2,2-Dichloropropane 1,1,1-Trichloroethane Carbon tetrachloride	139 (70-130) 131 (70-130) 138 (70-130)	All samples in SDG BMI11042807	J (all detects) J (all detects) J (all detects)	Р
LCS MS15W0502M	1,2,4-Trimethylbenzene	0 (70-130)	All samples in SDG BMI11042807	J (all detects) R (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

Samples MW-6 and DUPE-7-2Q11, samples MW-8 and DUPE-8-2Q11, and samples MW-24-2 and DUPE-1-2Q11 were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

	Concentra	ation (ug/L)	
Compound	MW-6	DUPE-7-2Q11	RPD
Chloroform	0.61	0.61	0
Trichloroethene	3.4	3.6	6
Tetrachloroethene	0.98	1.1	12

## XVII. Field Blanks

Sample TB-3-4/27/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-3-4/27/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

# NASA JPL Volatiles - Data Qualification Summary - SDG BMI11042807

SDG	Sample	Compound	Flag	A or P	Reason
BMI11042807 ,	MW-6 DUPE-7-2Q11 MW-8 DUPE-8-2Q11 MW-15 MW-24-5 MW-24-5 MW-24-4 MW-24-3 MW-24-2 MW-24-2 MW-24-1 DUPE-1-2Q11 EB-3-4/27/11 TB-3-4/27/11	Chloromethane Bromomethane 2,2-Dichloropropane 1,1,1-Trichloroethane Carbon tetrachloride	J (all detects) UJ (all non-detects)	Ρ	Continuing calibration (%D)
BMI11042807	MW-6 DUPE-7-2Q11 MW-8 DUPE-8-2Q11 MW-15 MW-24-5 MW-24-5 MW-24-4 MW-24-3 MW-24-2 MW-24-2 MW-24-1 DUPE-1-2Q11 EB-3-4/27/11 TB-3-4/27/11	Chloromethane Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ	Laboratory control samples (%R)
BMI11042807	MW-6 DUPE-7-2Q11 MW-8 DUPE-8-2Q11 MW-15 MW-24-5 MW-24-5 MW-24-4 MW-24-3 MW-24-2 MW-24-1 DUPE-1-2Q11 EB-3-4/27/11 TB-3-4/27/11	2,2-Dichloropropane 1,1,1-Trichloroethane Carbon tetrachloride	J (all detects) J (all detects) J (all detects)	Ρ	Laboratory control samples (%R)
BMI11042807	MW-6 DUPE-7-2Q11 MW-8 DUPE-8-2Q11 MW-15 MW-24-5 MW-24-5 MW-24-4 MW-24-3 MW-24-2 MW-24-1 DUPE-1-2Q11 EB-3-4/27/11 TB-3-4/27/11	1,2,4-Trimethylbenzene	J (all detects) R (all non-detects)	Ρ	Laboratory control samples (%R)

# NASA JPL Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11042807

No Sample Data Qualified in this SDG

# LDC Report# 25549B1

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL		
Collection Date:	April 28, 2011		
LDC Report Date:	June 2, 2011		
Matrix:	Water		
Parameters:	Volatiles		
Validation Level:	EPA Level III		
Laboratory:	Alpha Analytical, Inc.		

Sample Delivery Group (SDG): BMI11042907

# Sample Identification

MW-13 MW-5 DUPE-6-2Q11 MW-4-5 MW-4-4 MW-4-3 MW-4-3 MW-4-2 MW-4-1 EB-4-4/28/11 TB-4-4/28/11 MW-4-4MS MW-4-4MSD

#### 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 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 advisory nature.

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.
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- 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.

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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.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0%.

# 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) samples were reviewed for each matrix as applicable. 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.

# 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-5 and DUPE-6-2Q11 were identified as field duplicates. No volatiles were detected in any of the samples.

#### XVII. Field Blanks

Sample TB-4-4/28/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-4-4/28/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

## NASA JPL Volatiles - Data Qualification Summary - SDG BMI11042907

No Sample Data Qualified in this SDG

NASA JPL

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11042907

## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL

Collection Date: April 27, 2011

LDC Report Date: June 3, 2011

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11042807

## Sample Identification

MW-6 DUPE-7-2Q11 MW-8 DUPE-8-2Q11 MW-15 MW-24-5 MW-24-5 MW-24-4 MW-24-3 MW-24-2 MW-24-1 DUPE-1-2Q11 EB-3-4/27/11 MW-6MS MW-6MSD

#### 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 200.8 for Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 metal contaminants were 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

Samples MW-6 and DUPE-7-2Q11, samples MW-8 and DUPE-8-2Q11 and samples MW-24-2 and DUPE-1-2Q11 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

	Concentra		
Analyte	MW-6	DUPE-7-2Q11	RPD
Calcium	130	120	8
Iron	0.63	0.79	23
Magnesium	42	40	5
Potassium	2.5	2.3	8
Sodium	37	35	6

	Concentration (mg/L)		
Analyte	MW-8	DUPE-8-2Q11	RPD
Calcium	38	37	3
Magnesium	13	13	0

	Concentration (mg/L)		
Analyte	MW-8	DUPE-8-2Q11	RPD
Potassium	2.3	2.2	4
Sodium	17	17	0

	Concentra		
Analyte	MW-24-2	DUPE-1-2Q11	RPD
Arsenic	0.0021	0.0020U	200
Calcium	42	42	0
Magnesium	13	13	0
Potassium	2.8	2.8	0
Sodium	40	40	0

## XV. Field Blanks

Sample EB-3-4/27/11 was identified as an equipment blank. No metal contaminants were found in this blank.

## NASA JPL Metals - Data Qualification Summary - SDG BMI11042807

No Sample Data Qualified in this SDG

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI11042807

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## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
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Collection Date:	April 28, 2011

LDC Report Date: June 3, 2011

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11042907

## Sample Identification

MW-13 MW-5 DUPE-6-2Q11 MW-4-5 MW-4-4 MW-4-3 MW-4-2 MW-4-1 EB-4-4/28/11

#### 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 Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 metal contaminants were 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

Samples MW-5 and DUPE-6-2Q11 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

	Concentra		
Analyte	MW-5	DUPE-6-2Q11	RPD
Calcium	34	36	6
Magnesium	10	10	0
Potassium	2.7	2.8	4
Sodium	14	14	0

## XV. Field Blanks

Sample EB-4-4/28/11 was identified as an equipment blank. No metal contaminants were found in this blank.

## NASA JPL Metals - Data Qualification Summary - SDG BMI11042907

No Sample Data Qualified in this SDG

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI11042907

## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
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Collection Date: April 27, 2011

LDC Report Date: June 3, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11042807

## Sample Identification

MW-6 DUPE-7-2Q11 MW-8 DUPE-8-2Q11 MW-15 MW-24-5 MW-24-4 MW-24-3 MW-24-3 MW-24-2 MW-24-1 DUPE-1-2Q11 EB-3-4/27/11 MW-15MS MW-15MSD

## Introduction

This data review covers 14 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, EPA Method 314.0 for Perchlorate, Standard Method 2540C for Total Dissolved Solids, and Standard Method 4500-H B for pH.

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.

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. Initial Calibration

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

## III. 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
4/28/11	CCV (19:53)	Nitrite as N	86.9 (90-110)	MW-15 MW-24-5 MW-24-4 MW-24-3 MW-24-2 MW-24-1 DUPE-1-2Q11 EB-3-4/27/11 MW-15MS MW-15MSD	J (all detects) UJ (all non-detects)	Ρ

## IV. Blanks

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

## V. 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.

## VI. Duplicates

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

## VII. Laboratory Control Samples

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

## VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

## IX. Overall Assessment of Data

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

#### X. Field Duplicates

Samples MW-6 and DUPE-7-2Q11, samples MW-8 and DUPE-8-2Q11 and samples MW-24-2 and DUPE-1-2Q11 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

	Conce		
Analyte	MW-6	DUPE-7-2Q11	RPD
Bicarbonate Alkalinity	240 mg/L	240 mg/L	0
Total Alkalinity	240 mg/L	240 mg/L	0
Chloride	120 mg/L	120 mg/L	0
Nitrate as N	14 mg/L	14 mg/L	0
Perchlorate	2.54 ug/L	2.51 ug/L	1
рН	6.8 units	6.9 units	1
Sulfate	190 mg/L	190 mg/L	0
Total dissolved solids	810 mg/L	860 mg/L	6

	Concentration		
Analyte	MW-8	DUPE-8-2Q11	RPD
Bicarbonate Alkalinity	180 (mg/L)	180 (mg/L)	0
Total Alkalinity	180 (mg/L)	180 (mg/L)	0
Chloride	7.5 (mg/L)	7.4 (mg/L)	1
Nitrate as N	1.7 (mg/L)	1.7 (mg/L)	0

	Conce		
Analyte	MW-8	RPD	
рН	7.2 units	7.2 units	0
Sulfate	18 (mg/L)	19 (mg/L)	5
Total dissolved solids	210 (mg/L)	250 (mg/L)	17

	Conce	ntration	
Analyte	MW-24-2	RPD	
Bicarbonate Alkalinity	170 (mg/L)	170 (mg/L)	0
Total Alkalinity	170 (mg/L)	170 (mg/L)	0
Chloride	43 (mg/L)	43 (mg/L)	0
Nitrate as N	2.0 (mg/L)	2.0 (mg/L)	0
Perchlorate	17.2 ug/L	17.5 ug/L	2
рН	7.6 units	7.7 units	1
Sulfate	27 (mg/L)	27 (mg/L)	0
Total dissolved solids	360 (mg/L)	320 (mg/L)	12

## X. Field Blanks

Sample EB-3-4/27/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-3-4/27/11	рH	5.9 units

## NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11042807

SDG	Sample	Analyte	Flag	A or P	Reason
BMI11042807	MW-15 MW-24-5 MW-24-4 MW-24-3 MW-24-2 MW-24-1 DUPE-1-2Q11 EB-3-4/27/11	Nitrite as N	J (all detects) UJ (all non-detects)	Ρ	Continuing calibration (%R)

## NASA JPL Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11042807

## Laboratory Data Consultants, Inc. Data Validation Report

LDC Report Date: June 3, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11042907

## Sample Identification

MW-13 MW-5 DUPE-6-2Q11 MW-4-5 MW-4-4 MW-4-3 MW-4-2 MW-4-2 MW-4-1 EB-4-4/28/11 MW-4-4MS MW-4-4MSD

#### Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, EPA Method 314.0 for Perchlorate, Standard Method 2540C for Total Dissolved Solids, and Standard Method 4500-H B for pH.

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.

The following are definitions of the data qualifiers:

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- 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. Initial Calibration

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

## III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

## IV. Blanks

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

## V. 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.

## VI. Duplicates

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

## VII. Laboratory Control Samples

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

## VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

## IX. Overall Assessment of Data

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

## X. Field Duplicates

Samples MW-5 and DUPE-6-2Q11 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

	Conce	ntration	
Analyte	. MW-5	DUPE-6-2Q11	RPD
Bicarbonate Alkalinity	140 mg/L	140 mg/L	0
Total Alkalinity	140 mg/L	140 mg/L	0
Chloride	5.4 mg/L	5.4 mg/L	0
Nitrate as N	0.66 mg/L	0.70 mg/L	6
рН	6.9 pH units	7.0 pH units	1
Sulfate	20 mg/L	20 mg/L	0
Total dissolved solids	200 mg/L.	200 mg/L	0

## XI. Field Blanks

Sample EB-4-4/28/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-4-4/28/11	рН	6.3 units

## NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11042907

No Sample Data Qualified in this SDG

NASA JPL

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11042907



## Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

**Phone** 760.634.0437

Web www.lab-data.com

Fax 760.634.0439

June 3, 2011

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 May 31, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

## LDC Project # 25563:

## <u>SDG #</u>

## <u>Fraction</u>

P1101846, P1101873, P1101890 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 Superfund Data Review, January 2010
- 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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## Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Na	ame:	NASA JPL

Collection	Date:	May 17,	2011

LDC Report Date: June 2, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III &IV

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): P1101846

#### Sample Identification

MW-25-5\*\* MW-25-4 MW-25-3 MW-25-2 MW-25-1 DUPE-4-2Q11 EB-13-5/17/11 MW-25-5MS MW-25-5MSD

\*\*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 SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

## IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

## **VI. Duplicates**

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

#### VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

All sample result verifications were 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.

## IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

#### X. Field Duplicates

Samples MW-25-2 and DUPE-4-2Q11 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

## X. Field Blanks

Sample EB-13-5/17/11 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101846

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101846

## LDC Report# 25563B6

## Laboratory Data Consultants, Inc. Data Validation Report

June 2, 2011

Columbia Analytical Services, Inc.

Project/Site Name:	NASA JPL
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Collection	Date:	May 18,	2011

LDC Report Date:

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III

Laboratory:

Sample Delivery Group (SDG): P1101873

# Sample Identification

MW-26-2 MW-26-1 EB-14-5/18/11 MW-26-2MS MW-26-2MSD

#### Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

## VI. Duplicates

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

## VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

## IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

## X. Field Duplicates

No field duplicates were identified in this SDG.

## X. Field Blanks

Sample EB-14-5/18/11 was identified as an equipment blank. No hexavalent chromium was found in this blank.

## NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101873

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101873

## Laboratory Data Consultants, Inc. Data Validation Report

Columbia Analytical Services, Inc.

Collection	Date:	May 19	2011
Concouon	Date:	intay io	, 2011

LDC Report Date: June 2, 2011

Matrix: Water

Parameters: Hexavalent Chromium

Validation Level: EPA Level III

Laboratory:

Sample Delivery Group (SDG): P1101890

## Sample Identification

MW-21-5 MW-21-4 MW-21-3 MW-21-2 MW-21-1 EB-15-5/19/11 MW-21-5MS MW-21-5MSD

#### Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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. Initial Calibration

All criteria for the initial calibration were met.

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

## VI. Duplicates

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

## VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

## IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

## X. Field Duplicates

No field duplicates were identified in this SDG.

# X. Field Blanks

Sample EB-15-5/19/11 was identified as an equipment blank. No hexavalent chromium was found in this blank.

NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101890

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101890

No Sample Data Qualified in this SDG



# Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 Web www.lab-data.com

n **Fax** 760.634.0439

June 14, 2011

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 June 2, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

#### LDC Project # 25587:

<u>SDG #</u>

#### **Fraction**

BMI11050302, BMI11050403 Volatiles, Chromium, Wet Chemistry BMI11050501

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 Superfund Data Review, January 2010
- 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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Shaded cells indicate Level IV validation (all other cells are Level III validation).

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	May 2, 2011
LDC Report Date:	June 9, 2011
Matrix:	Water
Parameters:	Volatiles
Validation Level:	EPA Level III & IV
Laboratory:	Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11050302

# Sample Identification

MW-1 DUPE-5-2Q11 MW-9\*\* MW-12-5 MW-12-4 MW-12-3 MW-12-2 MW-12-1\*\* EB-5-5/2/11 TB-5-5/2/11 MW-12-1MS MW-12-1MSD

\*\*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 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 advisory nature.

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.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0%.

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

## 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.

## 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 a 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 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.

## 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-1 and DUPE-5-2Q11 were identified as field duplicates. No volatiles were detected in any of the samples.

#### XVII. Field Blanks

Sample TB-5-5/2/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-5-5/2/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

# NASA JPL Volatiles - Data Qualification Summary - SDG BMI11050302

No Sample Data Qualified in this SDG

NASA JPL

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11050302

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NA	ASA JPL
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Collection Date: May 3, 2011

LDC Report Date: June 9, 2011

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11050403

# Sample Identification

MW-10 MW-23-5\*\* MW-23-4 MW-23-3 MW-23-2 MW-23-1 EB-6-5/3/11 TB-6-5/3/11 MW-23-1MS MW-23-1MSD

\*\*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 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 advisory nature.

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.

#### **IV.** Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0%.

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

## 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.

# 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 a 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 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.

## 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-6-5/3/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-6-5/3/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

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## NASA JPL Volatiles - Data Qualification Summary - SDG BMI11050403

No Sample Data Qualified in this SDG

NASA JPL

Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11050403

No Sample Data Qualified in this SDG

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# Laboratory Data Consultants, Inc. Data Validation Report

- Project/Site Name: NASA JPL
- Collection Date: May 4, 2011
- LDC Report Date: June 14, 2011
- Matrix: Water
- Parameters: Volatiles
- Validation Level: EPA Level III
- Laboratory: Alpha Analytical, Inc.
- Sample Delivery Group (SDG): BMI11050501

## Sample Identification

MW-11-5 MW-11-4 MW-11-3 MW-11-2 MW-11-1 EB-7-5/4/11 TB-7-5/4/11

#### 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 advisory nature.

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.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
5/9/11	Naphthalene	37.2	All samples in SDG BMI11050501	J (all detects) UJ (all non-detects)	А

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

## 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

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.

#### 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

Sample TB-7-5/4/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-7-5/4/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

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# NASA JPL Volatiles - Data Qualification Summary - SDG BMI11050501

SDG	Sample	Compound	Flag	A or P	Reason
BMI11050501	MW-11-5 MW-11-4 MW-11-3 MW-11-2 MW-11-1 EB-7-5/4/11 TB-7-5/4/11	Naphthalene	J (ali detects) UJ (ali non-detects)	A ,	Continuing calibration (%D)

# NASA JPL Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11050501

No Sample Data Qualified in this SDG

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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	May 2, 2011
LDC Report Date:	June 10, 2011
Matrix:	Water
Parameters:	Metals
Validation Level:	EPA Level III & IV
Laboratory:	Alpha Analytical, Inc.

# Sample Delivery Group (SDG): BMI11050302

## Sample Identification

MW-1 DUPE-5-2Q11 MW-9\*\* MW-12-5 MW-12-4 MW-12-3 MW-12-2 MW-12-2 MW-12-1\*\* EB-5-5/2/11 MW-9MS MW-9MSD

\*\*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 200.8 for Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 metal contaminants were 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-1 and DUPE-5-2Q11 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

	Concentra		
Analyte	MW-1	DUPE-5-2Q11	RPD
Calcium	67	65	3
íron	0.36	0.36	0
Magnesium	21	20	5
Potassium	3.2	3.3	3
Sodium	31	31	0

## XV. Field Blanks

Sample EB-5-5/2/11 was identified as an equipment blank. No metal contaminants were found in this blank.

## NASA JPL Metals - Data Qualification Summary - SDG BMI11050302

No Sample Data Qualified in this SDG

NASA JPL

Metals - Laboratory Blank Data Qualification Summary - SDG BMI11050302

No Sample Data Qualified in this SDG

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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	May 3, 2011

LDC Report Date: June 10, 2011

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11050403

## Sample Identification

MW-10 MW-23-5\*\* MW-23-4 MW-23-3 MW-23-2 MW-23-1 EB-6-5/3/11

\*\*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 Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 metal contaminants were 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

No field duplicates were identified in this SDG.

## XV. Field Blanks

Sample EB-6-5/3/11 was identified as an equipment blank. No metal contaminants were found in this blank.

## NASA JPL Metals - Data Qualification Summary - SDG BMI11050403

No Sample Data Qualified in this SDG

NASA JPL

Metals - Laboratory Blank Data Qualification Summary - SDG BMI11050403

No Sample Data Qualified in this SDG

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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
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Collection Date:	May 4, 2011
Concellon Date.	1010y <del>-</del> , 2011

LDC Report Date: June 10, 2011

Matrix: Water

Parameters: Metals

Validation Level: EPA Level

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11050501

## Sample Identification

MW-11-5 MW-11-4 MW-11-3 MW-11-2 MW-11-1 EB-7-5/4/11

### 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 200.8 for Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 metal contaminants were 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-7-5/4/11 was identified as an equipment blank. No metal contaminants were found in this blank.

## NASA JPL Metals - Data Qualification Summary - SDG BMI11050501

## No Sample Data Qualified in this SDG

NASA JPL

Metals - Laboratory Blank Data Qualification Summary - SDG BMI11050501

No Sample Data Qualified in this SDG

## LDC Report# 25587A6

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
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Collection Date:	May 2, 2011
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LDC Report Date: June 10, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11050302

## Sample Identification

MW-1 DUPE-5-2Q11 MW-9\*\* MW-12-5 MW-12-4 MW-12-3 MW-12-2 MW-12-2 MW-12-1\*\* EB-5-5/2/11 MW-12-1MS MW-12-1MSD

\*\*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 Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, EPA Method 314.0 for Perchlorate, Standard Method 2540C for Total Dissolved Solids, and Standard Method 4500 for pH.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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. Initial Calibration

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

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. 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.

## VI. Duplicates

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

## VII. Laboratory Control Samples

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

#### VIII. 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.

## IX. Overall Assessment of Data

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

## X. Field Duplicates

Samples MW-1 and DUPE-5-2Q11 were identified as equipment blanks. No contaminant concentrations were found in this blank with the following exceptions:

	Conce		
Analyte	MW-1	DUPE-5-2Q11	RPD
Total alkalinity	230 mg/L	230 mg/L	0
Bicarbonate alkalinity	230 mg/L	230 mg/L	0
Chloride	21 mg/L	21 mg/L	0
Nitrate as N	0.36 mg/L	0.36 mg/L	0
Sulfate	49 mg/L.	49 mg/L	0
Total dissolved solids	310 mg/L	320 mg/L	3
рН	7.5 units	7.5 units	0

## X. Field Blanks

Sample EB-5-5/2/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-5-5/2/11	рН	6.3 units

## NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11050302

No Sample Data Qualified in this SDG

NASA JPL

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11050302

No Sample Data Qualified in this SDG

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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: N	ASA JPL
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<b>Collection Date:</b>	May 3, 2011

LDC Report Date: June 10, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11050403

## Sample Identification

MW-10 MW-23-5\*\* MW-23-4 MW-23-3 MW-23-2 MW-23-1 EB-6-5/3/11 MW-23-1MS MW-23-1MSD

\*\*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 Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, EPA Method 314.0 for Perchlorate, Standard Method 2540C for Total Dissolved Solids, and Standard Method 4500 for pH.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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. Initial Calibration

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

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. 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.

## VI. Duplicates

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

## VII. Laboratory Control Samples

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

LCS ID (Associated Samples)	Analyte	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/LCSD (All samples in SDG BMI11050403)	Orthophosphate as P	114 (90-110)	-	-	J (all detects)	Р

## VIII. 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.

## IX. Overall Assessment of Data

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

## X. Field Duplicates

No field duplicates were identified in this SDG.

## X. Field Blanks

Sample EB-6-5/3/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-6-5/3/11	рН	6.2 units

## NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11050403

SDG	Sample	Analyte	Flag	A or P	Reason
BMI11050403	MW-10 MW-23-5** MW-23-4 MW-23-3 MW-23-2 MW-23-1 EB-6-5/3/11	Orthophosphate as P	J (all detects)	Ρ	Laboratory control samples (%R)

## NASA JPL Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11050403

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NA
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Collection	Date:	May 4, 2011

LDC Report Date: June 10, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11050501

## Sample Identification

MW-11-5 MW-11-4 MW-11-3 MW-11-2 MW-11-1 EB-7-5/4/11 MW-11-5MS MW-11-5MSD

\*\*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 Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, EPA Method 314.0 for Perchlorate, Standard Method 2540C for Total Dissolved Solids, and Standard Method 4500 for pH.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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. Initial Calibration

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

## III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. 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.

## VI. Duplicates

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

## VII. Laboratory Control Samples

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

#### VIII. 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.

## IX. Overall Assessment of Data

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

## X. Field Duplicates

No field duplicates were identified in this SDG.

## X. Field Blanks

Sample EB-7-5/4/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-7-5/4/11	pH	6.6 units

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## NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11050501

No Sample Data Qualified in this SDG

NASA JPL

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11050501

No Sample Data Qualified in this SDG



## Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 Web www.lab-data.com

Fax 760.634.0439

June 22, 2011

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 June 3, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

#### LDC Project # 25604:

## <u>SDG #</u>

#### **Fraction**

BMI11050604, BMI11051102 BMI11051205, BMI11051304 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 Superfund Data Review, January 2010
- 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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Shaded cells indicate Level IV validation (all other cells are Level III validation).

# Laboratory Data Consultants, Inc. Data Validation Report

- Project/Site Name: NASA JPL
- Collection Date: May 5, 2011
- LDC Report Date: June 15, 2011
- Matrix: Water
- Parameters: Volatiles
- Validation Level: EPA Level III & IV
- Laboratory: Alpha Analytical, Inc.
- Sample Delivery Group (SDG): BMI11050604

## Sample Identification

MW-16 MW-20-5\*\* MW-20-4 MW-20-3 MW-20-2 MW-20-1 DUPE-2-2Q11 EB-8-5/5/11 TB-8-5/5/11 TB-8-5/5/11 MW-16MS MW-16MSD

\*\*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 advisory nature.

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.

#### **IV.** Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
5/13/11	Naphthalene Chloromethane Bromomethane	31.2 31.9 33.3	All samples in SDG BMI11050604	J (all detects) UJ (all non-detects)	A

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

## 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
MS15W0513M-BLK	Chloromethane Bromomethane Naphthalene	68 (70-130) 67 (70-130) 69 (70-130)	All samples in SDG BMI11050604	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)

All tentatively identified compounds 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.

## XIV. System Performance

The system performance was 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.

### 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-20-4 and DUPE-2-2Q11 were identified as field duplicates. No volatiles were detected in any of the samples.

#### XVII. Field Blanks

Sample TB-8-5/5/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-5-5/2/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

## NASA JPL Volatiles - Data Qualification Summary - SDG BMI11050604

SDG	Sample	Compound	Flag	A or P	Reason
BMI11050604	MW-16 MW-20-5** MW-20-4 MW-20-3 MW-20-2 MW-20-1 DUPE-2-2Q11 EB-8-5/5/11 TB-8-5/5/11	Naphthalene Chloromethane Bromomethane	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
BMI11050604	MW-16 MW-20-5** MW-20-4 MW-20-3 MW-20-2 MW-20-1 DUPE-2-2Q11 EB-8-5/5/11 TB-8-5/5/11	Chloromethane Bromomethane Naphthalene	J (all detects) UJ (all non-detects)	Ρ	Laboratory control samples (%R)

## NASA JPL Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11050604

No Sample Data Qualified in this SDG

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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL

Collection Date: May 10, 2011

LDC Report Date: June 21, 2011

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051102

## Sample Identification

MW-3-5 MW-3-4 MW-3-3 MW-3-2 MW-3-1 EB-9-5/10/11 TB-9-5/10/11 MW-3-4MS MW-3-4MSD

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#### 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 advisory nature.

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.

#### **IV. Continuing Calibration**

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
5/16/11	Chloromethane 1,2-Dibromo-3-chloropropane Naphthalene	32.8 32.5 35.5	All samples in SDG BMI11051102	J (all detects) UJ (all non-detects)	A

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

## 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
MS15W0516M-LCS	Chloromethane Naphthalene	67 (70-130) 58 (70-130)	All samples in SDG BM111051102	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-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-9-5/10/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-9-5/10/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

## NASA JPL Volatiles - Data Qualification Summary - SDG BMI11051102

SDG	Sample	Compound	Flag	A or P	Reason
BMI11051102	MW-3-5 MW-3-4 MW-3-3 MW-3-2 MW-3-1 EB-9-5/10/11 TB-9-5/10/11	Chloromethane 1,2-Dibromo-3-chloropropane Naphthalene	J (all detects) UJ (all non-detects)	<b>A</b>	Continuing calibration (%D)
BMI11051102	MW-3-5 MW-3-4 MW-3-3 MW-3-2 MW-3-1 EB-9-5/10/11 TB-9-5/10/11	Chloromethane Naphthalene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Ρ	Laboratory control samples (%R)

## NASA JPL Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11051102

No Sample Data Qualified in this SDG

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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	May 11, 2011

LDC Report Date: June 15, 2011

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051205

## Sample Identification

MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1 DUPE-3-2Q11 EB-10-5/11/11 TB-10-5/11/11

#### 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 advisory nature.

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.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
5/17/11	Chloromethane	67.8	All samples in SDG BMI11051205	J (all detects) UJ (all non-detects)	A
	Bromomethane	62.9		J (all detects) UJ (all non-detects)	

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

## 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
MS15W0517M-LCS	Chloromethane Bromomethane Naphthalene	32 (70-130) 37 (70-130) 65 (70-130)	All samples in SDG BMI11051205	J (all detects) UJ (all non-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

Samples MW-19-3 and DUPE-3-2Q11 were identified as field duplicates. No volatiles were detected in any of the samples.

#### XVII. Field Blanks

Sample TB-10-5/11/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-10-5/11/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

### NASA JPL Volatiles - Data Qualification Summary - SDG BMI11051205

SDG	Sample	Compound	Flag	A or P	Reason
BMI11051205	MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1 DUPE-3-2Q11 EB-10-5/11/11 TB-10-5/11/11	Chloromethane Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
BMI11051205	MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1 DUPE-3-2Q11 EB-10-5/11/11 TB-10-5/11/11	Chloromethane Bromomethane Naphthalene	J (all detects) UJ (all non-detects)	Ρ	Laboratory control samples (%R)

### NASA JPL Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11051205

No Sample Data Qualified in this SDG

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Project/Site Name: N	IASA JPL
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Collection	Date:	May 12,	2011

LDC Report Date: June 16, 2011

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051304

### Sample Identification

MW-17-5 MW-17-4 MW-17-3 MW-17-2 MW-17-1 EB-11-5/12/11 TB-11-5/12/11 MW-17-2MS MW-17-2MSD

#### 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 advisory nature.

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.

#### **IV.** Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
5/17/11	Naphthalene Bromomethane Chloromethane	35.0 62.9 67.8	All samples in SDG BMI11051304	J (all detects) UJ (all non-detects)	A

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

#### 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
MS15W0517W-LCS	Chloromethane Bromomethane Naphthalene	32 (70-130) 37 (70-130) 65 (70-130)	All samples in SDG BMI11051304	J (all detects) UJ (all non-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-11-5/12/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-11-5/12/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

### NASA JPL Volatiles - Data Qualification Summary - SDG BMI11051304

SDG	Sample	Compound	Flag	A or P	Reason
BMI11051304	MW-17-5 MW-17-4 MW-17-3 MW-17-2 MW-17-1 EB-11-5/12/11 TB-11-5/12/11	Naphthalene Bromomethane Chloromethane	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
BMI11051304	MW-17-5 MW-17-4 MW-17-3 MW-17-2 MW-17-1 EB-11-5/12/11 TB-11-5/12/11	Chloromethane Bromomethane Naphthalene	J (all detects) UJ (all non-detects)	Ρ	Laboratory control samples (%R)

### NASA JPL Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11051304

No Sample Data Qualified in this SDG

Project/Site Name: NAS	A JPL
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Collection	Date:	May 5, 2011
Collection	Date:	May 5, 201

LDC Report Date: June 15, 2011

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

### Sample Delivery Group (SDG): BMI11050604

#### Sample Identification

MW-16 MW-20-5\*\* MW-20-4 MW-20-3 MW-20-2 MW-20-1 DUPE-2-2Q11 EB-8-5/5/11 MW-16MS MW-16MSD

\*\*Indicates sample underwent EPA Level IV review

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### 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 Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 metal contaminants were 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-20-4 and DUPE-2-2Q11 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

	Concentration (mg/L)		
Analyte	MW-20-4	DUPE-2-2Q11	RPD
Calcium	8.9	8.9	0
Magnesium	3.1	3.2	3
Potassium	0.63	0.67	6
Sodium	61	63	3

### XV. Field Blanks

Sample EB-8-5/5/11 was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-8-5/5/11	Sodium	0.58 mg/L

### NASA JPL Metals - Data Qualification Summary - SDG BMI11050604

No Sample Data Qualified in this SDG

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI11050604

No Sample Data Qualified in this SDG

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Project/Site Name:	NASA JPL

Collection Date:	May 10, 2011
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LDC Report Date: June 15, 2011

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051102

#### Sample Identification

MW-3-5 MW-3-4 MW-3-3 MW-3-2 MW-3-1 EB-9-5/10/11 MW-3-4MS MW-3-4MSD

#### 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 Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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.
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- 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 with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
5/19/11	CCV (14:03)	Magnesium	88 (90-110)	MW-3-5 MW-3-4 MW-3-2 MW-3-1 EB-9-5/10/11	J (all detects) UJ (all non-detects)	Ρ
5/19/11	CCV (16:21)	Iron	115 (90-110)	MW-3-4 MW-3-3 MW-3-2 MW-3-1 EB-9-5/10/11	J (all detects)	Р

#### IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were 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-9-5/10/11 was identified as an equipment blank. No metal contaminants were found in this blank.

## NASA JPL Metals - Data Qualification Summary - SDG BMI11051102

SDG	Sample	Analyte	Flag	A or P	Reason
BMI11051205	MW-3-5 MW-3-4 MW-3-2 MW-3-1 EB-9-5/10/11	Magnesium	J (all detects) UJ (all non-detects)	Ρ	Continuing calibration (CCV %R)
BMI11051205	MW-3-4 MW-3-3 MW-3-2 MW-3-1 EB-9-5/10/11	Iron	J (all detects)	Ρ	Continuing calibration (CCV %R)

### NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI11051102

No Sample Data Qualified in this SDG

Project/Site Name: NASA JPL
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Collection Date:	May 11, 2011
Concolion Date:	may rij = o ri

LDC Report Date: June 15, 2011

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051205

### Sample Identification

MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1 DUPE-3-2Q11 EB-10-5/11/11

#### 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 Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
5/19/11	CCV (14:03)	Magnesium	88 (90-110)	MW-19-5 MW-19-4 MW-19-3 MW-19-2	J (all detects) UJ (all non-detects)	Ρ
5/19/11	CCV (16:21)	Iron	115 (90-110)	All samples in SDG BMI11051205	J (all detects)	Р

### IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were 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

Samples MW-19-3 and DUPE-3-2Q11 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

	Concentra		
Analyte	MW-19-3	DUPE-3-2Q11	RPD
Calcium	71	72	1
Iron	0.30U	0.36	200
Magnesium	25	22	13
Potassium	2.4	2.7	12
Sodium	20	30	40

## XV. Field Blanks

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Sample EB-10-5/11/11 was identified as an equipment blank. No metal contaminants were found in this blank.

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### NASA JPL Metals - Data Qualification Summary - SDG BMI11051205

SDG	Sample	Analyte	Flag	A or P	Reason
BMI11051205	MW-19-5 MW-19-4 MW-19-3 MW-19-2	Magnesium	J (all detects) UJ (all non-detects)	Ρ	Continuing calibration (CCV %R)
BMI11051205	MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1 DUPE-3-2Q11 EB-10-5/11/11	Iron	J (all detects)	Ρ	Continuing calibration (CCV %R)

### NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI11051205

No Sample Data Qualified in this SDG

Project/Site Name:	NASA JPL
Collection Date:	May 12, 2011
LDC Report Date:	June 15, 2011
Matrix:	Water
Parameters:	Metals

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051304

### Sample Identification

MW-17-5 MW-17-4 MW-17-3 MW-17-2 MW-17-1 EB-11-5/12/11

#### 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 200.8 for Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
5/19/11	CCV (16:21)	Iron	115 (90-110)	MW-17-5 MW-17-4 MW-17-3 MW-17-1 EB-11-5/12/11	J (all detects)	Ρ

#### IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were 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-11-5/12/11 was identified as an equipment blank. No metal contaminants were found in this blank.

### NASA JPL Metals - Data Qualification Summary - SDG BMI11051304

SDG	Sample	Analyte	Flag	A or P	Reason
BMI11051205	MW-17-5 MW-17-4 MW-17-3 MW-17-1 EB-11-5/12/11	Iron	J (all detects)	Ρ	Continuing calibration (CCV %R)

### NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI11051304

No Sample Data Qualified in this SDG

Project/Site Name: N	IASA JPL
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Collection Date: May 5, 2011

LDC Report Date: June 15, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

### Sample Delivery Group (SDG): BMI11050604

#### Sample Identification

MW-16 MW-20-5\*\* MW-20-4 MW-20-3 MW-20-2 MW-20-1 DUPE-2-2Q11 EB-8-5/5/11 MW-16MS MW-16MSD

\*\*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 Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, EPA Method 314.0 for Perchlorate, Standard Method 2540C for Total Dissolved Solids, and Standard Method 4500-H B for pH.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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. Initial Calibration

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

### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

### IV. Blanks

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

### V. 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.

#### VI. Duplicates

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

### VII. Laboratory Control Samples

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

#### VIII. 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.

#### IX. Overall Assessment of Data

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

### X. Field Duplicates

Samples MW-20-4 and DUPE-2-2Q11 were identified as equipment blanks. No contaminant concentrations were found in this blank with the following exceptions:

	Conce		
Analyte	MW-20-4	DUPE-2-2Q11	RPD
Total alkalinity	140 mg/L	140 mg/L	0
Bicarbonate alkalinity	80 mg/L	74 mg/L	8
Carbonate alkalinity	60 mg/L	65 mg/L	8
Chloride	10 mg/L	10 mg/L	0
Perchlorate	15.1 ug/L	15.8 ug/L	5
рН	9.3 units	9.3 units	0
Sulfate	12 mg/L	12 mg/L	0
Total dissolved solids	180 mg/L	180 mg/L	0

### X. Field Blanks

Sample EB-8-5/5/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-8-5/5/11	рН	6.8 units

### NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11050604

## No Sample Data Qualified in this SDG

## NASA JPL

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11050604

No Sample Data Qualified in this SDG

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Project/Site Name:	NASA JPL	
Collection Date:	May 10, 2011	
LDC Report Date:	June 15, 2011	
Matrix:	Water	
Parameters:	Wet Chemistry	
Validation Level:	EPA Level III	
Laboratory:	Alpha Analytical, I	nc.

Sample Delivery Group (SDG): BMI11051102

### Sample Identification

MW-3-5 MW-3-4 MW-3-3 MW-3-2 MW-3-1 EB-9-5/10/11 MW-3-4MS MW-3-4MSD

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, EPA Method 314.0 for Perchlorate, Standard Method 2540C for Total Dissolved Solids, and Standard Method 4500-H B for pH.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

- 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.

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. Initial Calibration

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

# III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

# IV. Blanks

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

# V. 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.

# VI. Duplicates

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

# VII. Laboratory Control Samples

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

### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

# IX. Overall Assessment of Data

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

# X. Field Duplicates

No field duplicates were identified in this SDG.

# XI. Field Blanks

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Sample EB-9-5/10/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-9-5/10/11	рH	6.5 units

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### NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11051102

No Sample Data Qualified in this SDG

NASA JPL

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11051102

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	May 11, 2011
LDC Report Date:	June 15, 2011
Matrix:	Water
Parameters:	Wet Chemistry
Validation Level:	EPA Level III
Laboratory:	Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051205

# Sample Identification

MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1 DUPE-3-2Q11 EB-10-5/11/11 MW-19-5MS MW-19-5MSD

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, EPA Method 314.0 for Perchlorate, Standard Method 2540C for Total Dissolved Solids, and Standard Method 4500-H B for pH.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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

- 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.

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. Initial Calibration

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

# III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

# IV. Blanks

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

# V. 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-19-5MS/MSD (All samples in SDG BMI11051205)	Orthophosphate as P	-	130 (80-120)	-	J (all detects)	A

# VI. Duplicates

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

# VII. Laboratory Control Samples

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

# VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

# IX. Overall Assessment of Data

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

# X. Field Duplicates

Samples MW-19-3 and DUPE-3-2Q11 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

	Conce	ntration	
Analyte	MW-19-3	DUPE-3-2Q11	RPD
Total alkalinity	180 mg/L	180 mg/L	D
Bicarbonate alkalinity	180 mg/L	180 mg/L	0
Chloride	51 mg/L	52 mg/L	2
Nitrate-N	12 mg/L	12 mg/L	0
Perchlorate	3.14 ug/L	2.84 ug/L	10
рН	7.8 units	7.7 units	1
Sulfate	51 mg/L	51 mg/L	0
Total dissolved solids	410 mg/L	410 mg/L	0

### XI. Field Blanks

Sample EB-10-5/11/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-10-5/11/11	рН	6.2 units

# NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11051205

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SDG	Sample	Analyte	Flag	A or P	Reason
BMI11051205	MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1 DUPE-3-2Q11 EB-10-5/11/11	Orthophosphate as P	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)

# NASA JPL Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11051205

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL

Collection Date:	May 12, 2011
	may 12, 2011

LDC Report Date: June 15, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051304

# Sample Identification

MW-17-5 MW-17-4 MW-17-3 MW-17-2 MW-17-1 EB-11-5/12/11 MW-17-2MS MW-17-2MSD

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, EPA Method 314.0 for Perchlorate, Standard Method 2540C for Total Dissolved Solids, and Standard Method 4500-H B for pH.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

- 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.

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. Initial Calibration

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

# III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

# IV. Blanks

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

# V. 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.

### VI. Duplicates

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

### VII. Laboratory Control Samples

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

### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

### IX. Overall Assessment of Data

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

# X. Field Duplicates

No field duplicates were identified in this SDG.

# XI. Field Blanks

Sample EB-11-5/12/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-11-5/12/11	рН	6.4 units

# NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11051304

No Sample Data Qualified in this SDG

NASA JPL

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11051304

No Sample Data Qualified in this SDG



# Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 Web www.lab-data.com

Fax 760.634.0439

June 13, 2011

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 June 7, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

### LDC Project # 25623:

<u>SDG #</u>	Fraction
P1101793	1,4-Dioxane, N-Nitrosodimethylamine, Hexavalent Chromium

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 Superfund Data Review, January 2010
- 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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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	May 12, 2011
LDC Report Date:	June 10, 2011
Matrix:	Water
Parameters:	1,4-Dioxane
Validation Level:	EPA Level III
Laboratory:	Columbia Analytical Services, Inc.
Sample Delivery Group (SDG):	P1101793

**Sample Identification** 

MW-17-4

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for 1,4-Dioxane.

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.

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

- 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.

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 30.0%.

Average relative response factors (RRF) were within validation criteria.

### **IV. Continuing Calibration**

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0%.

The percent difference (%D) of the second source calibration standard were less than or equal to 25.0%.

All of the continuing calibration RRF values were within validation criteria.

### V. Blanks

Method blanks were reviewed for each matrix as applicable. No 1,4-dioxane was 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

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.

# 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 1,4-Dioxane - Data Qualification Summary - SDG P1101793

No Sample Data Qualified in this SDG

NASA JPL

1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG P1101793

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	May 12, 2011
LDC Report Date:	June 10, 2011
Matrix:	Water
Parameters:	N-Nitrosodimethylamine
Validation Level:	EPA Level III
Laboratory:	Columbia Analytical Services, Inc.
Sample Delivery Group (SDG):	P1101793

# Sample Identification

MW-17-4 MW-17-4MS MW-17-4MSD

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 521 for N-Nitrosodimethylamine.

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.

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

- 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.

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 analysis was not required by the method.

# III. Initial Calibration

Initial calibration was performed using required standard concentrations.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination  $(r^2)$  was greater than or equal to 0.990.

### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0%.

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

### V. Blanks

Method blanks were reviewed for each matrix as applicable. No N-Nitrosodimethylamine was 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) samples were reviewed for each matrix as applicable. 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.

# 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 N-Nitrosodimethylamine - Data Qualification Summary - SDG P1101793

# No Sample Data Qualified in this SDG

NASA JPL

N-Nitrosodimethylamine - Laboratory Blank Data Qualification Summary - SDG P1101793

No Sample Data Qualified in this SDG

### LDC Report# 25623A6

# Laboratory Data Consultants, Inc. Data Validation Report

Hexavalent Chromium

Columbia Analytical Services, Inc.

Project/Site Name: NASA JF
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Collection Date: May 12, 2011

LDC Report Date: June 13, 2011

Matrix: Water

Parameters:

Validation Level: EPA Level III

Laboratory:

Sample Delivery Group (SDG): P1101793

#### Sample Identification

MW-17-5 MW-17-4 MW-17-3 MW-17-2 MW-17-1 EB-11-5/12/11 MW-17-2MS MW-17-2MSD

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This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A table summarizing all data qualification is provided at the end of this report. 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 advisory nature.

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

- 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.

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. Initial Calibration**

All criteria for the initial calibration were met.

#### **III. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

### IV. Blanks

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

#### V. Matrix Spike/Matrix Spike Duplicates

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.

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

### IX. Overall Assessment of Data

Data flags are summarized at the end of this report.

#### X. Field Duplicates

No field duplicates were identified in this SDG.

# X. Field Blanks

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Sample EB-11-5/12/11 was identified as an equipment blank. No hexavalent chromium was found in this blank.

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J

# NASA JPL Hexavalent Chromium - Data Qualification Summary - SDG P1101793

No Sample Data Qualified in this SDG

NASA JPL

Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P1101793

No Sample Data Qualified in this SDG



# Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 Web www.lab-data.com

Fax 760.634.0439

June 22, 2011

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 June 8, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

### LDC Project # 25627:

<u>SDG #</u>

### **Fraction**

BMI11051702, BMI11051802 BMI11051902 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 Superfund Data Review, January 2010
- 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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Shaded cells indicate Level IV validation (all other cells are Level III validation).

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# Laboratory Data Consultants, Inc. Data Validation Report

- Project/Site Name: NASA JPL
- Collection Date: May 16, 2011
- LDC Report Date: June 15, 2011
- Matrix: Water
- Parameters: Volatiles
- Validation Level: EPA Level III & IV
- Laboratory: Alpha Analytical, Inc.
- Sample Delivery Group (SDG): BMI11051702

### Sample Identification

MW-18-5 MW-18-4\*\* MW-18-3 MW-18-2 MW-18-1 EB-12-5/16/11 TB-12-5/16/11

\*\*Indicates sample underwent EPA Level IV review

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 advisory nature.

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.

- 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.

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.

# **IV.** Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
5/23/11	Naphthalene tert-Butyl alcohol	48.5 41.7	All samples in SDG BMI11051702	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

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

# 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:

# 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
MS15W0523M-LCS	Naphthalene	52 (70-130)	All samples in SDG BMI11051702	J (all detects) UJ (all non-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

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 a 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 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.

#### 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-12-5/16/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-12-5/16/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

## NASA JPL Volatiles - Data Qualification Summary - SDG BMI11051702

SDG	Sample	Compound	Flag	A or P	Reason
BMI11051702	MW-18-5 MW-18-4** MW-18-3 MW-18-2 MW-18-1 EB-12-5/16/11 TB-12-5/16/11	Naphthalene tert-Butyl alcohol	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
BMI11051702	MW-18-5 MW-18-4** MW-18-3 MW-18-2 MW-18-1 EB-12-5/16/11 TB-12-5/16/11	Naphthalene	J (all detects) UJ (all non-detects)	Ρ	Laboratory control samples (%R)

## NASA JPL

# Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11051702

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL

Collection Date: May 17, 2011

LDC Report Date: June 15, 2011

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051802

## Sample Identification

MW-25-5\*\* MW-25-4 MW-25-3 MW-25-2 MW-25-1 DUPE-4-2Q11 EB-13-5/17/11 TB-13-5/17/11 MW-25-5MS MW-25-5MSD

\*\*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 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 advisory nature.

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.

## **IV. Continuing Calibration**

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
5/23/11	Naphthalene tert-Butyl alcohol	48.5 41.7	All samples in SDG BMI11051802	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

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

## 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:

# 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:

	Compound	%R (Limits)	Associated Samples	Flag	A or P
MS15W0523M-LCS	Naphthalene	52 (70-130)	All samples in SDG BMI11051802	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)

All tentatively identified compounds 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.

### XIV. System Performance

The system performance was 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.

#### **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-25-2 and DUPE-4-2Q11 were identified as field duplicates. No volatiles were detected in any of the samples.

#### XVII. Field Blanks

Sample TB-13-5/17/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-13-5/17/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

## NASA JPL Volatiles - Data Qualification Summary - SDG BMI11051802

SDG	Sample	Compound	Flag	A or P	Reason
BMI11051802	MW-25-5** MW-25-4 MW-25-3 MW-25-2 MW-25-1 DUPE-4-2Q11 EB-13-5/17/11 TB-13-5/17/11	Naphthalene tert-Butyl alcohol	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
BMI11051802	MW-25-5** MW-25-4 MW-25-3 MW-25-2 MW-25-1 DUPE-4-2Q11 EB-13-5/17/11 TB-13-5/17/11	Naphthalene	J (all detects) UJ (all non-detects)	Ρ	Laboratory control samples (%R)

## NASA JPL Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11051802

No Sample Data Qualified in this SDG

## LDC Report# 25627C1

# Laboratory Data Consultants, Inc. Data Validation Report

- Project/Site Name: NASA JPL
- Collection Date: May 18, 2011
- LDC Report Date: June 15, 2011
- Matrix: Water
- Parameters: Volatiles
- Validation Level: EPA Level III
- Laboratory: Alpha Analytical, Inc.
- Sample Delivery Group (SDG): BMI11051902

## Sample Identification

MW-26-2 MW-26-1 EB-14-5/18/11 TB-14-5/18/11 MW-26-2MS MW-26-2MSD

### Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA 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 advisory nature.

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.

## **IV.** Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
5/25/11	Naphthalene tert-Butyl alcohol	32.8 33.3	All samples in SDG BMI11051902	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

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

## 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
MS15W0525W-LCS	Naphthalene	67 (70-130)	All samples in SDG BMI11051902	J (all detects) UJ (all non-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-14-5/18/11 was identified as a trip blank. No volatile contaminants were found in this blank.

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Sample EB-14-5/18/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

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# NASA JPL Volatiles - Data Qualification Summary - SDG BMI11051902

SDG	Sample	Compound	Flag	A or P	Reason
BMI11051902	MW-26-2 MW-26-1 EB-14-5/18/11 TB-14-5/18/11	Naphthalene tert-Butyl alcohol	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
BMI11051902	MW-26-2 MW-26-1 EB-14-5/18/11 TB-14-5/18/11	Naphthalene	J (all detects) UJ (all non-detects)	Ρ	Laboratory control samples (%R)

# NASA JPL Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11051902

No Sample Data Qualified in this SDG

# LDC Report# 25627A4

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JF	ᆚ
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Collection Date: May 16, 2011

LDC Report Date: June 21, 2011

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III & IV

Laboratory:

Alpha Analytical, Inc.

# Sample Delivery Group (SDG): BMI11051702

## Sample Identification

MW-18-5 MW-18-4\*\* MW-18-3 MW-18-2 MW-18-1 EB-12-5/16/11 MW-18-4MS MW-18-4MSD

\*\*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 Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 metal contaminants were 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

No field duplicates were identified in this SDG.

#### XV. Field Blanks

Sample EB-12-5/16/11 was identified as an equipment blank. No metal contaminants were found in this blank.

# NASA JPL Metals - Data Qualification Summary - SDG BMI11051702

No Sample Data Qualified in this SDG

NÀSA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI11051702

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
Collection Date:	May 17, 2011
LDC Report Date:	June 17, 2011
Matrix:	Water
Parameters:	Metals
Validation Level:	EPA Level III & IV
Laboratory:	Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051802

## Sample Identification

MW-25-5\*\* MW-25-4 MW-25-3 MW-25-2 MW-25-1 DUPE-4-2Q11 EB-13-5/17/11 MW-25-5MS MW-25-5MSD

\*\*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 Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 metal contaminants were 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.

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# 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-25-2 and DUPE-4-2Q11 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

	Concentra		
Analyte	MW-25-2	DUPE-4-2Q11	RPD
Calcium	74	73	1
Iron	0.40	0.37	8
Magnesium	22	21	5
Potassium	2.4	2.4	0
Sodium	26	25	4

# XV. Field Blanks

Sample EB-13-5/17/11 was identified as an equipment blank. No metal contaminants were found in this blank.

# NASA JPL Metals - Data Qualification Summary - SDG BMI11051802

No Sample Data Qualified in this SDG

NASA JPL

Metals - Laboratory Blank Data Qualification Summary - SDG BMI11051802

No Sample Data Qualified in this SDG

# LDC Report# 25627C4

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL
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Collection Date:	May 18, 2011
	100 NG 10, 2011

LDC Report Date: June 17, 2011

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051902

# Sample Identification

MW-26-2 MW-26-1 EB-14-5/18/11

## 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 Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 metal contaminants were 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-14-5/18/11 was identified as an equipment blank. No metal contaminants were found in this blank.

# NASA JPL Metals - Data Qualification Summary - SDG BMI11051902

No Sample Data Qualified in this SDG

NASA JPL Metals - Laboratory Blank Data Qualification Summary - SDG BMI11051902

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Proi	ect/Site Name:	NASA JPL
FIUJ	ecualle Manie.	

Collection	Date:	May 16, 2011
Conection	Dale.	way 10, 2011

LDC Report Date: June 21, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051702

## Sample Identification

MW-18-5 MW-18-4\*\* MW-18-3 MW-18-2 MW-18-1 EB-12-5/16/11 MW-18-5MS MW-18-5MSD

\*\*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 Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, EPA Method 314.0 for Perchlorate, Standard Method 2540C for Total Dissolved Solids, and Standard Method 4500-H B for pH.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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. Initial Calibration

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

## III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. 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-18-5MS/MSD (All samples in SDG BMI11051702)	Orthophosphate as P	124 (80-120)	-	-	J (all detects)	A

## VI. Duplicates

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

## VII. Laboratory Control Samples

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

## Vill. 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.

# IX. Overall Assessment of Data

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

## X. Field Duplicates

No field duplicates were identified in this SDG.

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## XI. Field Blanks

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Sample EB-12-5/16/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-12-5/16/11	рН	6.3 units

# NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11051702

SDG	Sample	Analyte	Flag	A or P	Reason
BMI11051702	MW-18-5 MW-18-4** MW-18-3 MW-18-2 MW-18-1 EB-12-5/16/11	Orthophosphate as P	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)

# NASA JPL Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11051702

No Sample Data Qualified in this SDG

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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL		
Collection Date:	May 17, 2011		

LDC Report Date: June 17, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III & IV

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051802

### Sample Identification

MW-25-5\*\* MW-25-4 MW-25-3 MW-25-2 MW-25-1 DUPE-4-2Q11 EB-13-5/17/11 MW-25-5MS MW-25-5MSD

\*\*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 Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, EPA Method 314.0 for Perchlorate, Standard Method 2540C for Total Dissolved Solids, and Standard Method 4500-H B for pH.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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. Initial Calibration

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

## III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

## IV. Blanks

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

## V. 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-25-5MS/MSD (All samples in SDG BMI11051802)	Orthophosphate as P	-	121 (80-120)	-	J (all detects)	А

## VI. Duplicates

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

## VII. Laboratory Control Samples

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

#### VIII. 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.

# IX. Overall Assessment of Data

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

# X. Field Duplicates

Samples MW-25-2 and DUPE-4-2Q11 were identified as equipment blanks. No contaminant concentrations were found in this blank with the following exceptions:

	Conce	entration	
Analyte	MW-25-2	DUPE-4-2Q11	RPD
Bicarbonate alkalinity	190 mg/L	190 mg/L	0
Total alkalinity	190 mg/L	190 mg/L	0
Chloride	43 mg/L	43 mg/L	0
Nitrate as N	9.9 mg/L	9.8 mg/L	1
Perchlorate	13.3 ug/L	13.1 ug/L	2
рН	7.8 units	8.0 units	3
Sulfate	77 mg/L	77 mg/L	0
Total dissolved solids	430 mg/L	420 mg/L	2

#### X. Field Blanks

Sample EB-13-5/17/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-13-5/17/11	рН	6.3 units

# NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11051802

SDG	Sample	Analyte	Flag	A or P	Reason
BMI11051802	MW-25-5** MW-25-4 MW-25-3 MW-25-2 MW-25-1 DUPE-4-2Q11 EB-13-5/17/11	Orthophosphate as P	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)

# NASA JPL Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11051802

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: NASA JP
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Collection Date:	May 18, 2011
oonoodon Bato.	100 Hours 10, 2011

LDC Report Date: June 17, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11051902

## Sample Identification

MW-26-2 MW-26-1 EB-14-5/18/11 MW-26-2MS MW-26-2MSD

#### Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, EPA Method 314.0 for Perchlorate, Standard Method 2540C for Total Dissolved Solids, and Standard Method 4500-H B for pH.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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. Initial Calibration

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

#### III. 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
5/19/11	CCV (11:18)	Nitrate as N	87.8 (90-110)	All samples in SDG BMI11051902	J (all detects) UJ (all non-detects)	Ρ

#### IV. Blanks

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

## V. 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.

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

## IX. Overall Assessment of Data

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

# X. Field Duplicates

No field duplicates were identified in this SDG.

## XI. Field Blanks

Sample EB-14-5/18/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration
EB-14-5/18/11	РΗ	6.3 units

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# NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11051902

SDG	Sample	Analyte	Flag	A or P	Reason
BMI11051902	MW-26-2 MW-26-1 EB-14-5/18/11	Nitrate as N	J (all detects) UJ (all non-detects)	Ρ	Calibration verification (%R)

## NASA JPL Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11051902

No Sample Data Qualified in this SDG



# Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 Web www.lab-data.com

Fax 760.634.0439

July 1, 2011

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 June 21, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

#### LDC Project # 25715:

<u>SDG #</u>	<u>Fraction</u>
BMI11052004	Volatiles, Metals, Wet Chemistry

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 ٠ for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010
- 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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<u>∧</u> ∧	A Metals B) (200.8)	Alk. (2320B)	CI,SO4 (300.0)	NO <sub>3</sub> -N NO <sub>2</sub> -N (300.0)	O-PO4 (300.0)	CLO4 (314.0)	pH (4500 HB)	TDS (2540C)	ر) د									
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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site	Name:	NASA JPL
Project/Site	name:	NASA JPL

Collection Date: May 19, 2011

LDC Report Date: June 24, 2011

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11052004

#### Sample Identification

MW-21-5 MW-21-4 MW-21-3 MW-21-2 MW-21-1 EB-15-5/19/11 TB-15-5/19/11

#### 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 8260B 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 advisory nature.

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 30.0% 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 20.0% for calibration check compounds (CCCs) and 25.0% for all other 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

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.

## 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
MS15W0525M-LCS	Naphthalene	67 (70-130)	All samples in SDG BMI11052004	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

Sample TB-15-5/19/11 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-15-5/19/11 was identified as an equipment blank. No volatile contaminants were found in this blank.

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## NASA JPL Volatiles - Data Qualification Summary - SDG BMI11052004

SDG	Sample	Compound	Flag	A or P	Reason
BMI11052004	MW-21-5 MW-21-4 MW-21-3 MW-21-2 MW-21-1 EB-15-5/19/11 TB-15-5/19/11	Naphthalene	J (all detects) UJ (all non-detects)	Ρ	Laboratory control samples (%R)

## NASA JPL Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI11052004

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	NASA JPL

Collection Date:	May 19, 2011
	1 May 10, 2011

LDC Report Date: June 28, 2011

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11052004

## Sample Identification

MW-21-5 MW-21-4 MW-21-3 MW-21-2 MW-21-1 EB-15-5/19/11 MW-21-5MS MW-21-5MSD

#### 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 Metals. The metals analyzed were Arsenic, Calcium, Chromium, Iron, Lead, Magnesium, Potassium, and Sodium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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 metal contaminants were 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-15-5/19/11 was identified as an equipment blank. No metal contaminants were found in this blank.

## NASA JPL Metals - Data Qualification Summary - SDG BMI11052004

No Sample Data Qualified in this SDG

NASA JPL

Metals - Laboratory Blank Data Qualification Summary - SDG BMI11052004

No Sample Data Qualified in this SDG

# Laboratory Data Consultants, Inc. Data Validation Report

LDC Report Date: June 28, 2011

Matrix: Water

Parameters: Wet Chemistry

Validation Level: EPA Level III

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): BMI11052004

#### Sample Identification

MW-21-5 MW-21-4 MW-21-3 MW-21-2 MW-21-1 EB-15-5/19/11 MW-21-5MS MW-21-5MSD

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#### Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorous, and Sulfate, Standard Method 4500-H B for pH, EPA Method 314.0 for Perchlorate, and Standard Method 2540C for Total Dissolved Solids.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

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.

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.
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- 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. Initial Calibration

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

#### III. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### IV. Blanks

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

#### V. 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-21-5MS/MSD (All samples in SDG BMI11052004)	Orthophosphate as P	123 (80-120)	124 (80-120)	-	J (all detects)	A

#### VI. Duplicates

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

#### VII. Laboratory Control Samples

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

#### VIII. Sample Result Verification

Raw data were not reviewed for this SDG.

## IX. Overall Assessment of Data

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

## X. Field Duplicates

No field duplicates were identified in this SDG.

#### XI. Field Blanks

Sample EB-15-5/19/11 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration	
EB-15-5/19/11	ρΗ	6.3 units	

# NASA JPL Wet Chemistry - Data Qualification Summary - SDG BMI11052004

SDG	Sample	Analyte	Flag	A or P	Reason
BMI11052004	MW-21-5 MW-21-4 MW-21-3 MW-21-2 MW-21-1 EB-15-5/19/11	Orthophosphate as P	J (all detects)	А	Matrix spike/Matrix spike duplicate (%R)

## NASA JPL

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI11052004

No Sample Data Qualified in this SDG