

## **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 fourth quarter 2009 sampling event were acceptable for their intended use of characterizing aquifer quality.

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

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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 VOCs and metals detected in the field quality control samples during the fourth quarter 2009 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-3 (Screen 1), MW-4 (Screen 3), MW-9, MW-12 (Screen 3), MW-17 (Screen 1), MW-20 (Screen 1), MW-22 (Screen 4) and MW-25 (Screen 4). The analytical results for the field duplicate samples were comparable to the results of the original groundwater samples for VOCs (Table 1) and Metals (Table 2).

**Equipment Rinsate Blanks.** Equipment rinsate blanks were collected each day that non-dedicated sampling equipment was used. The 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. Several VOC contaminants were detected in the equipment rinsate blanks including ethylbenzene, m,p-xylenes and styrene as shown in Table 1-1. The detections in the equipment blanks were compared to the detections in the monitoring well samples to determine if the blanks may have adversely affected the data. The validation contractor did not flag any of the monitoring well results as being adversely affected by the equipment blank contamination.

The tentatively identified compounds (TICs), isobutylene and tert-butyl alcohol (TBA) were detected in one or more equipment blanks in varying amounts as shown in Table 4. However, isobutylene and TBA 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. This QC sample served as a check for any contamination present in the source water. No VOC contaminants were detected in the source blank as shown in Table 1-1. In addition, no TICs were detected in the source blank, as shown in Table 1-1.

## 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; 2004).

**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 all of the data from the fourth quarter 2009 sampling event were acceptable for their intended use of characterizing aquifer quality.

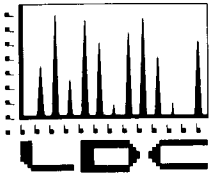
The data validation reports are included in Attachment 2.

## 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. *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*. June.
- U.S. EPA. 2004. *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. October.

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

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



**LABORATORY DATA CONSULTANTS, INC.**

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

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

January 20, 2010

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on January 4, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 22332:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
BMI09120203	Volatiles, Chromium, Wet Chemistry
BMI09120304	

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

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

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

Sincerely,

Erlinda T. Rauto  
Operations Manager/Senior Chemist



NASA JPL  
Data Validation Reports  
LDC #22332

Volatiles

**LDC**



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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 1, 2009  
**LDC Report Date:** January 20, 2010  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09120203

**Sample Identification**

MW-12-5  
MW-12-4  
MW-12-3  
MW-12-2  
MW-12-1  
DUPE-06-4Q09  
EB-09-12/01/09  
TB-09-12/01/09  
MW-12-5MS  
MW-12-5MSD

## 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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

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

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## **III. Initial Calibration**

Initial calibration was performed using required standard concentrations.

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

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. 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% .

## **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-12-3 and DUPE-06-4Q09 were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	MW-12-3	DUPE-06-4Q09	
Chloroform	2.4	2.9	19
Carbon tetrachloride	1.7	2.2	26

## **XVII. Field Blanks**

Sample TB-09-12/01/09 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-09-12/01/09 was identified as an equipment blank. No volatile contaminants were found in this blank.

**NASA JPL**  
**Volatiles - Data Qualification Summary - SDG BMI09120203**

No Sample Data Qualified in this SDG

**NASA JPL**  
**Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI09120203**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** December 2, 2009  
**LDC Report Date:** January 20, 2010  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09120304

### Sample Identification

MW-11-5\*\*  
MW-11-4  
MW-11-3\*\*  
MW-11-2  
MW-11-1  
EB-10-12/02/09  
TB-10-12/02/09

\*\*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 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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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



## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. 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% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
12/4/09	Bromomethane	49.2	All samples in SDG BMI09120304	J (all detects) UJ (all non-detects)	P

## 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	Analyte	%R (Limits)	Associated Samples	Flag	A or P
LCSMS15W1204M	Bromomethane	132 (70-130)	All samples in SDG BMI09120304	J (all detects)	P

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

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

## XI. Target Compound Identifications

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

## XII. Compound Quantitation and CRQLs

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

## XIII. Tentatively Identified Compounds (TICs)

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

## **XV. Overall Assessment of Data**

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

## **XVI. Field Duplicates**

No field duplicates were identified in this SDG.

## **XVII. Field Blanks**

Sample TB-10-12/02/09 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-10-12/02/09 was identified as an equipment blank. No volatile contaminants were found in this blank.

**NASA JPL**  
**Volatiles - Data Qualification Summary - SDG BMI09120304**

SDG	Sample	Compound	Flag	A or P	Reason
BMI09120304	MW-11-5** MW-11-4 MW-11-3** MW-11-2 MW-11-1 EB-10-12/02/09 TB-10-12/02/09	Bromomethane	J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)
BMI09120304	MW-11-5** MW-11-4 MW-11-3** MW-11-2 MW-11-1 EB-10-12/02/09 TB-10-12/02/09	Bromomethane	J (all detects)	P	Laboratory control samples (%R)

**NASA JPL**  
**Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI09120304**

No Sample Data Qualified in this SDG

NASA JPL  
Data Validation Reports  
LDC #22332

Chromium

**LDC**

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 1, 2009  
**LDC Report Date:** January 18, 2010  
**Matrix:** Water  
**Parameters:** Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09120203

**Sample Identification**

MW-12-5  
MW-12-4  
MW-12-3  
MW-12-2  
MW-12-1  
DUPE-06-4Q09  
EB-09-12/01/09

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. ICPMS Tune

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

## III. Calibration

An initial calibration was performed.

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

## IV. Blanks

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

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

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-4-1MS/MSD (All samples in SDG BMIO9120203)	Chromium	121 (80-120)	-	-	J (all detects)	A

## VII. Duplicate Sample Analysis

Duplicate 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**

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-12-3 and DUPE-06-4Q09 were identified as field duplicates. No chromium was detected in any of the samples.

### **XV. Field Blanks**

Sample EB-09-12/01/09 was identified as an equipment blank. No chromium was found in this blank.

**NASA JPL  
Chromium - Data Qualification Summary - SDG BMI09120203**

SDG	Sample	Analyte	Flag	A or P	Reason
BMI09120203	MW-12-5 MW-12-4 MW-12-3 MW-12-2 MW-12-1 DUPE-06-4Q09 EB-09-12/01/09	Chromium	J (all detects)	A	Matrix spike/Matrix spike duplicates (%R)

**NASA JPL  
Chromium - Laboratory Blank Data Qualification Summary - SDG BMI09120203**

No Sample Data Qualified in this SDG

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 2, 2009  
**LDC Report Date:** January 18, 2010  
**Matrix:** Water  
**Parameters:** Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09120304

**Sample Identification**

MW-11-5\*\*  
MW-11-4  
MW-11-3\*\*  
MW-11-2  
MW-11-1  
EB-10-12/02/09

\*\*Indicates sample underwent EPA Level IV review

## 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 Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. ICPMS Tune**

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

## **III. Calibration**

An initial calibration was performed.

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

## **IV. Blanks**

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

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

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike Analysis**

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

## **VII. Duplicate Sample Analysis**

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

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

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

## **IX. Internal Standards**

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-10-12/02/09 was identified as an equipment blank. No chromium was found in this blank.

**NASA JPL  
Chromium - Data Qualification Summary - SDG BMI09120304**

No Sample Data Qualified in this SDG

**NASA JPL  
Chromium - Laboratory Blank Data Qualification Summary - SDG BMI09120304**

No Sample Data Qualified in this SDG

NASA JPL  
Data Validation Reports  
LDC #22332

Wet Chemistry

**LDC**



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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 1, 2009  
**LDC Report Date:** January 18, 2010  
**Matrix:** Water  
**Parameters:** Perchlorate  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09120203

**Sample Identification**

MW-12-5  
MW-12-4  
MW-12-3  
MW-12-2  
MW-12-1  
DUPE-06-4Q09  
EB-09-12/01/09

## Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## IX. Field Duplicates

Samples MW-12-3 and DUPE-06-4Q09 were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD
	MW-12-3	DUPE-06-4Q09	
Perchlorate	3.16	3.11	2

## X. Field Blanks

Sample EB-09-12/01/09 was identified as an equipment blank. No perchlorate was found in this blank.

**NASA JPL**  
**Perchlorate - Data Qualification Summary - SDG BMI09120203**

No Sample Data Qualified in this SDG

**NASA JPL**  
**Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI09120203**

No Sample Data Qualified in this SDG

LDC# 22332A6  
SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 1  
Reviewer: me  
2nd Reviewer: CR

Inorganics, Method See Cover

Y N NA  
Y N NA

Were field duplicate pairs identified in this SDG?

Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (ug/L)		RPD	
	3	6		
Perchlorate	3.16	3.11	2	

V:\FIELD DUPLICATES\FD\_inorganic\22332A6.wpd

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 2, 2009  
**LDC Report Date:** January 18, 2010  
**Matrix:** Water  
**Parameters:** Wet Chemistry  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09120304

**Sample Identification**

MW-11-5\*\*  
MW-11-4  
MW-11-3\*\*  
MW-11-2  
MW-11-1  
EB-10-12/02/09  
MW-11-1MS  
MW-11-1MSD

\*\*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 Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate and EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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



## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. Calibration

### a. Initial Calibration

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

### b. Calibration Verification

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

## III. Blanks

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

## IV. Matrix Spike/Matrix Spike Duplicates

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-11-1MS/MSD (MW-11-1)	Orthophosphate as P	123 (80-120)	138 (80-120)	11.7 ( $\leq 10$ )	J (all detects) UJ (all non-detects)	A

## V. Duplicates

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

## VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 (MW-11-1)	Orthophosphate as P	113 (90-110)	-	-	J (all detects)	P

## VII. Sample Result Verification

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

## VIII. Overall Assessment of Data

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

## IX. Field Duplicates

No field duplicates were identified in this SDG.

## X. Field Blanks

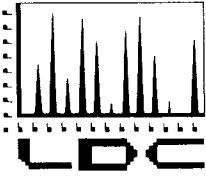
Sample EB-10-12/02/09 was identified as an equipment blank. No contaminant concentrations were found in this blank.

**NASA JPL  
Wet Chemistry - Data Qualification Summary - SDG BMI09120304**

SDG	Sample	Analyte	Flag	A or P	Reason
BMI09120304	MW-11-1	Orthophosphate as P	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)(RPD)
BMI09120304	MW-11-1	Orthophosphate as P	J (all detects)	P	Laboratory control samples (%R)

**NASA JPL  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI09120304**

No Sample Data Qualified in this SDG



**LABORATORY DATA CONSULTANTS, INC.**

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

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

January 20, 2010

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on December 31, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 22314:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
BMI09120150	Volatiles, Chromium, Perchlorate

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

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

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

Sincerely,

Erlinda T. Rauto  
Operations Manager/Senior Chemist



NASA JPL  
Data Validation Reports  
LDC #22314

Volatiles

**LDC**

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 30, 2009  
**LDC Report Date:** January 18, 2010  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09120150

### Sample Identification

MW-4-5  
MW-4-4\*\*  
MW-4-3  
MW-4-2  
MW-4-1  
DUPE-05-4209  
EB-08-11/30/09  
TB-08-11/30/09  
MW-4-1MS  
MW-4-1MSD

\*\*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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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



## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. 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% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
12/4/09	Bromomethane	49.2	All samples in SDG BMI09120150	J (all detects) UJ (all non-detects)	P

## 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 with the following exceptions:

LCS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
LCSMS15W1204M	Bromomethane	132 (70-130)	All samples in SDG BMI09120150	J (all detects)	P

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

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

## XI. Target Compound Identifications

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

## XII. Compound Quantitation and CRQLs

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

## XIII. Tentatively Identified Compounds (TICs)

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

## XV. Overall Assessment of Data

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

## XVI. Field Duplicates

Samples MW-4-3 and DUPE-05-4209 were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	MW-4-3	DUPE-05-4209	
Ethylbenzene	0.95	1.1	15
Styrene	0.52	0.55	6

## XVII. Field Blanks

Sample TB-08-11/30/09 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-08-11/30/09 was identified as an equipment blank. No volatile contaminants were found in this blank.

**NASA JPL**  
**Volatiles - Data Qualification Summary - SDG BMI09120150**

SDG	Sample	Compound	Flag	A or P	Reason
BMI09120150	MW-4-5 MW-4-4** MW-4-3 MW-4-2 MW-4-1 DUPE-05-4209 EB-08-11/30/09 TB-08-11/30/09	Bromomethane	J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)
BMI09120150	MW-4-5 MW-4-4** MW-4-3 MW-4-2 MW-4-1 DUPE-05-4209 EB-08-11/30/09 TB-08-11/30/09	Bromomethane	J (all detects)	P	Laboratory control samples (%R)

**NASA JPL**  
**Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI09120150**

No Sample Data Qualified in this SDG

NASA JPL  
Data Validation Reports  
LDC #22314

Chromium

**LDC**

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 30, 2009  
**LDC Report Date:** January 18, 2010  
**Matrix:** Water  
**Parameters:** Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09120150

### Sample Identification

MW-4-5  
MW-4-4\*\*  
MW-4-3  
MW-4-2  
MW-4-1  
DUPE-05-4209  
EB-08-11/30/09  
MW-4-1MS  
MW-4-1MSD

\*\*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 EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. ICPMS Tune

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

## III. Calibration

An initial calibration was performed.

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

## IV. Blanks

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

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

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-4-1MS/MSD (All samples in SDG BMI09120150)	Chromium	121 (80-120)	-	-	J (all detects)	A

## 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**

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

### **X. Furnace Atomic Absorption QC**

Graphite furnace atomic absorption was not utilized in this SDG.

### **XI. ICP Serial Dilution**

ICP serial dilution was not performed for this SDG.

### **XII. Sample Result Verification**

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

### **XIII. Overall Assessment of Data**

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

### **XIV. Field Duplicates**

Samples MW-4-3 and DUPE-05-4209 were identified as field duplicates. No chromium was detected in any of the samples.

### **XV. Field Blanks**

Sample EB-08-11/30/09 was identified as an equipment blank. No chromium was found in this blank.

**NASA JPL  
Chromium - Data Qualification Summary - SDG BMI09120150**

SDG	Sample	Analyte	Flag	A or P	Reason
BMI09120150	MW-4-5 MW-4-4** MW-4-3 MW-4-2 MW-4-1 DUPE-05-4209 EB-08-11/30/09	Chromium	J (all detects)	A	Matrix spike/Matrix spike duplicates (%R)

**NASA JPL  
Chromium - Laboratory Blank Data Qualification Summary - SDG BMI09120150**

No Sample Data Qualified in this SDG

NASA JPL  
Data Validation Reports  
LDC #22314

Perchlorate

**LDC**

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

**Project/Site Name:** NASA JPL  
**Collection Date:** November 30, 2009  
**LDC Report Date:** January 18, 2010  
**Matrix:** Water  
**Parameters:** Perchlorate  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09120150

**Sample Identification**

MW-4-5  
MW-4-4\*\*  
MW-4-3  
MW-4-2  
MW-4-1  
DUPE-05-4209  
EB-08-11/30/09  
MW-4-1MS  
MW-4-1MSD

\*\*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 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) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

Samples MW-4-3 and DUPE-05-4209 were identified as field duplicates. No perchlorate was detected in any of the samples.

## **X. Field Blanks**

Sample EB-08-11/30/09 was identified as an equipment blank. No perchlorate was found in this blank.

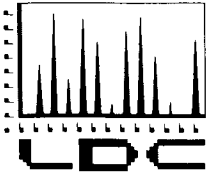
**NASA JPL  
Perchlorate - Data Qualification Summary - SDG BMI09120150**

No Sample Data Qualified in this SDG

**NASA JPL  
Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI09120150**

No Sample Data Qualified in this SDG





**LABORATORY DATA CONSULTANTS, INC.**

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

January 18, 2010

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 December 28, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 22294:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
BMI09112508	Volatiles, Chromium, Perchlorate

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

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

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

Sincerely,

Erlinda T. Rauto  
Operations Manager/Senior Chemist



NASA JPL  
Data Validation Reports  
LDC #22294

Volatiles

**LDC**

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

**Project/Site Name:** NASA JPL  
**Collection Date:** November 24, 2009  
**LDC Report Date:** January 14, 2010  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09112508

**Sample Identification**

MW-22-5  
MW-22-4  
MW-22-3  
MW-22-2  
MW-22-1  
DUPE-04-4Q09  
EB-07-11/24/09  
TB-07-11/24/09

## 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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UU 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 selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. 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% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
12/1/09	Dichlorodifluoromethane	42.2	All samples in SDG BMI09112508	J (all detects)	P
	Trichlorofluoromethane	30.4		UJ (all non-detects)	
				J (all detects)	
				UJ (all non-detects)	

## 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 with the following exceptions:

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCSMS15W1201M	2-Butanone	67 (70-130)	All samples in SDG BMI09112508	J (all detects) UJ (all non-detects)	P

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

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

## XI. Target Compound Identifications

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-22-4 and DUPE-04-4Q09 were identified as field duplicates. No volatiles were detected in any of the samples.

## **XVII. Field Blanks**

Sample TB-07-11/24/09 was identified as a trip blank. No volatile contaminants were found in this blank.

Samples EB-07-11/24/09 were identified as equipment blanks. No volatile contaminants were found in these blanks.



**NASA JPL  
Volatiles - Data Qualification Summary - SDG BMI09112508**

SDG	Sample	Compound	Flag	A or P	Reason
BMI09112508	MW-22-5 MW-22-4 MW-22-3 MW-22-2 MW-22-1 DUPE-04-4Q09 EB-07-11/24/09 TB-07-11/24/09	Dichlorodifluoromethane  Trichlorofluoromethane	J (all detects) UJ (all non-detects)  J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)
BMI09112508	MW-22-5 MW-22-4 MW-22-3 MW-22-2 MW-22-1 DUPE-04-4Q09 EB-07-11/24/09 TB-07-11/24/09	2-Butanone	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)

**NASA JPL  
Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI09112508**

No Sample Data Qualified in this SDG

NASA JPL  
Data Validation Reports  
LDC #22294

Chromium

**LDC**

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 24, 2009  
**LDC Report Date:** January 13, 2010  
**Matrix:** Water  
**Parameters:** Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09112508

### Sample Identification

MW-22-5  
MW-22-4  
MW-22-3  
MW-22-2  
MW-22-1  
DUPE-04-4Q09  
EB-07-11/24/09

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. ICPMS Tune**

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

## **III. Calibration**

An initial calibration was performed.

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

## **IV. Blanks**

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

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

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike Analysis**

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

## **VII. Duplicate Sample Analysis**

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

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

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

## **IX. Internal Standards**

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-22-4 and DUPE-04-4Q09 were identified as field duplicates. No chromium was detected in any of the samples.

## **XV. Field Blanks**

Sample EB-07-11/24/09 was identified as an equipment blank. No chromium was found in this blank.

**NASA JPL**

**Chromium - Data Qualification Summary - SDG BMI09112508**

No Sample Data Qualified in this SDG

**NASA JPL**

**Chromium - Laboratory Blank Data Qualification Summary - SDG BMI09112508**

No Sample Data Qualified in this SDG

NASA JPL  
Data Validation Reports  
LDC #22294

Perchlorate

**LDC**



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

**Project/Site Name:** NASA JPL  
**Collection Date:** November 24, 2009  
**LDC Report Date:** January 13, 2010  
**Matrix:** Water  
**Parameters:** Perchlorate  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09112508

**Sample Identification**

MW-22-5  
MW-22-4  
MW-22-3  
MW-22-2  
MW-22-1  
DUPE-04-4Q09  
EB-07-11/24/09

## Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

Samples MW-22-4 and DUPE-04-4Q09 were identified as field duplicates. No volatiles were detected in any of the samples.

## **X. Field Blanks**

Sample EB-07-11/24/09 was identified as an equipment blank. No perchlorate was found in this blank.

**NASA JPL**

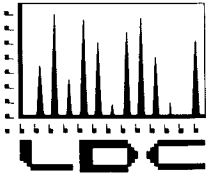
**Perchlorate - Data Qualification Summary - SDG BMI09112508**

No Sample Data Qualified in this SDG

**NASA JPL**

**Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI09112508**

No Sample Data Qualified in this SDG



**LABORATORY DATA CONSULTANTS, INC.**

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

January 11, 2010

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 December 18, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 22258:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
BMI09111903, BMI09112008 BMI09112406	Volatiles, Chromium, Wet Chemistry

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

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

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

Sincerely,

Erlinda T. Rauto  
Operations Manager/Senior Chemist



NASA JPL  
Data Validation Reports  
LDC #22258

Volatiles

**LDC**



## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 17 through November 18, 2009  
**LDC Report Date:** January 6, 2010  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09111903

### Sample Identification

MW-13  
MW-8  
QCEB-17 NOV  
MW-1  
MW-3-5  
MW-3-4  
MW-3-3  
MW-3-2  
MW-3-1  
DUPE-02-4Q09  
EB-04-11/18/09  
TB-04-11/18/09  
MW-13MS  
MW-13MSD  
MW-3-1MS  
MW-3-1MSD

## Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

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

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## **III. Initial Calibration**

Initial calibration was performed using required standard concentrations.

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

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. 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% .

## **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-3-1 and DUPE-02-4Q09 were identified as field duplicates. No volatiles were detected in any of the samples.

### **XVII. Field Blanks**

Sample TB-04-11/18/09 was identified as a trip blank. No volatile contaminants were found in this blank.

Samples QCEB-17 NOV and EB-04-11/18/09 were identified as equipment blanks. No volatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Compound	Concentration (ug/L)
QCEB-17 NOV	Ethylbenzene m,p-Xylenes Styrene Naphthalene	0.51 1.7 2.7 1.4

**NASA JPL**  
**Volatiles - Data Qualification Summary - SDG BMI09111903**

No Sample Data Qualified in this SDG

**NASA JPL**  
**Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI09111903**

No Sample Data Qualified in this SDG

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

**Project/Site Name:** NASA JPL  
**Collection Date:** November 18 through November 19, 2009  
**LDC Report Date:** January 8, 2010  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09112008

**Sample Identification**

QCEB-18 NOV  
MW-16  
MW-7  
MW-9  
DUPE-8-4Q09  
MW-17-5  
MW-17-4  
MW-17-3  
MW-17-2  
MW-17-1  
DUPE-03-4Q09  
EB-05-11/19/09  
TB-05-11/19/09  
MW-17-1MS  
MW-17-1MSD

## Introduction

This data review covers 15 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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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



## **I. Technical Holding Times**

All technical holding time requirements were met.

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

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

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## **III. Initial Calibration**

Initial calibration was performed using required standard concentrations.

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

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. 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% .

## **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 with the following exceptions:

LCS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
LCSMS15W1123M	Chloromethane	66 (70-130)	All samples in SDG BMI09112008	J (all detects) UJ (all non-detects)	P

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

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

## XI. Target Compound Identifications

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-9 and DUPE-8-4Q09 and samples MW-17-1 and DUPE-03-4Q09 were identified as field duplicates. No volatiles were detected in any of the samples.

## XVII. Field Blanks

Sample TB-05-11/19/09 was identified as a trip blank. No volatile contaminants were found in this blank.

Samples QCEB-18 NOV and EB-05-11/19/09 were identified as equipment blanks. No volatile contaminants were found in these blanks with the following exceptions:

<b>Equipment Blank ID</b>	<b>Compound</b>	<b>Concentration (ug/L)</b>
QCEB-18 NOV	m,p-Xylenes Styrene	0.79 0.92

**NASA JPL**

**Volatiles - Data Qualification Summary - SDG BMI09112008**

<b>SDG</b>	<b>Sample</b>	<b>Compound</b>	<b>Flag</b>	<b>A or P</b>	<b>Reason</b>
BMI09112008	QCEB-18 NOV MW-16 MW-7 MW-9 DUPE-8-4Q09 MW-17-5 MW-17-4 MW-17-3 MW-17-2 MW-17-1 DUPE-03-4Q09 EB-05-11/19/09 TB-05-11/19/09	Chloromethane	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)

**NASA JPL**

**Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI09112008**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 19 through November 23, 2009  
**LDC Report Date:** January 8, 2010  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09112406

### Sample Identification

QCEB-19NOV  
MW-10  
QCEB-20NOV  
MW-14-5  
MW-14-4  
MW-14-3  
MW-14-2  
MW-14-1\*\*  
EB-06-11/23/09  
TB-06-11/23/09  
MW-14-4MS  
MW-14-4MSD

\*\*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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. 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% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
12/1/09	Trichlorofluoromethane	30.4	All samples in SDG BMI09112406	J (all detects) UJ (all non-detects)	P

## 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 with the following exceptions:

LCS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
LCSMS15W1201M	2-Butanone	67 (70-130)	All samples in SDG BMI09112406	J (all detects) UJ (all non-detects)	P

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

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

## XI. Target Compound Identifications

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

## XII. Compound Quantitation and CRQLs

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

## XIII. Tentatively Identified Compounds (TICs)

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



### XV. Overall Assessment of Data

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

### XVI. Field Duplicates

No field duplicates were identified in this SDG.

### XVII. Field Blanks

Sample TB-06-11/23/09 was identified as a trip blank. No volatile contaminants were found in this blank.

Samples QCEB-19NOV, QCEB-20NOV, and EB-06-11/23/09 were identified as equipment blanks. No volatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Compound	Concentration (ug/L)
QCEB-19NOV	m,p-Xylenes	1.3
	Styrene	1.9
QCEB-20NOV	Ethylbenzene	0.74
	m,p-Xylenes	2.2
	Styrene	20
	o-Xylene	0.78
	Naphthalene	2.0

**NASA JPL**  
**Volatiles - Data Qualification Summary - SDG BMI09112406**

SDG	Sample	Compound	Flag	A or P	Reason
BMI09112406	QCEB-19NOV MW-10 QCEB-20NOV MW-14-5 MW-14-4 MW-14-3 MW-14-2 MW-14-1** EB-06-11/23/09 TB-06-11/23/09	Trichlorofluoromethane	J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)
BMI09112406	QCEB-19NOV MW-10 QCEB-20NOV MW-14-5 MW-14-4 MW-14-3 MW-14-2 MW-14-1** EB-06-11/23/09 TB-06-11/23/09	2-Butanone	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)

**NASA JPL**  
**Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI09112406**

No Sample Data Qualified in this SDG

NASA JPL  
Data Validation Reports  
LDC #22258

Chromium

**LDC**

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

**Project/Site Name:** NASA JPL  
**Collection Date:** November 18, 2009  
**LDC Report Date:** January 8, 2010  
**Matrix:** Water  
**Parameters:** Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09111903

**Sample Identification**

MW-13  
MW-8  
MW-1  
MW-3-5  
MW-3-4  
MW-3-3  
MW-3-2  
MW-3-1  
DUPE-02-4Q09  
EB-04-11/18/09

## Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. ICPMS Tune**

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

## **III. Calibration**

An initial calibration was performed.

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

## **IV. Blanks**

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

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

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike Analysis**

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

## **VII. Duplicate Sample Analysis**

Duplicate 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**

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-3-1 and DUPE-02-4Q09 were identified as field duplicates. No chromium was detected in any of the samples.

## **XV. Field Blanks**

Sample EB-04-11/18/09 was identified as an equipment blank. No chromium was found in this blank.

**NASA JPL**  
**Chromium - Data Qualification Summary - SDG BMI09111903**

No Sample Data Qualified in this SDG

**NASA JPL**  
**Chromium - Laboratory Blank Data Qualification Summary - SDG BMI09111903**

No Sample Data Qualified in this SDG



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

**Project/Site Name:** NASA JPL  
**Collection Date:** November 19, 2009  
**LDC Report Date:** January 8, 2010  
**Matrix:** Water  
**Parameters:** Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09112008

**Sample Identification**

MW-16  
MW-7  
MW-9  
DUPE-8-4Q09  
MW-17-5  
MW-17-4  
MW-17-3  
MW-17-2  
MW-17-1  
DUPE-03-4Q09  
EB-05-11/19/09  
MW-17-1MS  
MW-17-1MSD

## 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 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. ICPMS Tune

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

## III. Calibration

An initial calibration was performed.

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

## IV. Blanks

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

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

The frequency of analysis was met.

The criteria for analysis were met with the following exceptions:

ICS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
ICSAB	Chromium	74 (80-120)	All samples in SDG BMI09112008	J (all detects) UJ (all non-detects)	P

Samples were qualified as estimated (J) if the interferent concentrations in the samples were greater than ninety percent of the spiked interferent concentrations in the ICSAB.

## 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 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

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-9 and DUPE-8-4Q09 and samples MW-17-1 and DUPE-03-4Q09 were identified as field duplicates. No chromium was detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/L)		RPD
	MW-9	DUPE-8-4Q09	
Chromium	0.013	0.0078	50

### XV. Field Blanks

Sample EB-05-11/19/09 was identified as an equipment blank. No chromium was found in this blank.

**NASA JPL  
Chromium - Data Qualification Summary - SDG BMI09112008**

No Sample Data Qualified in this SDG

**NASA JPL  
Chromium - Laboratory Blank Data Qualification Summary - SDG BMI09112008**

No Sample Data Qualified in this SDG

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

**Project/Site Name:** NASA JPL  
**Collection Date:** November 20 through November 23, 2009  
**LDC Report Date:** January 6, 2010  
**Matrix:** Water  
**Parameters:** Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09112406

**Sample Identification**

MW-10  
MW-14-5  
MW-14-4  
MW-14-3  
MW-14-2  
MW-14-1\*\*  
EB-06-11/23/09

\*\*Indicates sample underwent EPA Level IV review

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. ICPMS Tune**

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

## **III. Calibration**

An initial calibration was performed.

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

## **IV. Blanks**

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

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

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike Analysis**

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

## **VII. Duplicate Sample Analysis**

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

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

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



## **IX. Internal Standards**

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-06-11/23/09 was identified as an equipment blank. No chromium was found in this blank.

**NASA JPL  
Chromium - Data Qualification Summary - SDG BMI09112406**

No Sample Data Qualified in this SDG

**NASA JPL  
Chromium - Laboratory Blank Data Qualification Summary - SDG BMI09112406**

No Sample Data Qualified in this SDG

NASA JPL  
Data Validation Reports  
LDC #22258

Wet Chemistry

**LDC**

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 18, 2009  
**LDC Report Date:** January 6, 2010  
**Matrix:** Water  
**Parameters:** Wet Chemistry  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09111903

### Sample Identification

MW-13  
MW-8  
MW-1  
MW-3-5  
MW-3-4  
MW-3-3  
MW-3-2  
MW-3-1  
DUPE-02-4Q09  
EB-04-11/18/09  
MW-13MS  
MW-13MSD

## Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate, and EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. Calibration

### a. Initial Calibration

All criteria for the initial calibration were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

## III. Blanks

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

## IV. Matrix Spike/Matrix Spike Duplicates

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-13MS/MSD (MW-13 MW-8)	Orthophosphate as P	-	127 (80-120)	13.9 ( $\leq 10$ )	J (all detects) UJ (all non-detects)	A

## V. Duplicates

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

## VI. Laboratory Control Samples

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

## VII. Sample Result Verification

Raw data were not reviewed for this SDG.

### **VIII. Overall Assessment of Data**

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

### **IX. Field Duplicates**

Samples MW-3-1 and DUPE-02-4Q09 were identified as field duplicates. No contaminant concentrations were detected in any of the samples.

### **X. Field Blanks**

Sample EB-04-11/18/09 was identified as an equipment blank. No contaminant concentrations were found in this blank.

**NASA JPL**

**Wet Chemistry - Data Qualification Summary - SDG BMI09111903**

<b>SDG</b>	<b>Sample</b>	<b>Analyte</b>	<b>Flag</b>	<b>A or P</b>	<b>Reason</b>
BMI09111903	MW-13 MW-8	Orthophosphate as P	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)(RPD)

**NASA JPL**

**Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI09111903**

No Sample Data Qualified in this SDG



## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 19, 2009  
**LDC Report Date:** January 8, 2010  
**Matrix:** Water  
**Parameters:** Wet Chemistry  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09112008

### Sample Identification

MW-16  
MW-7  
MW-9  
DUPE-8-4Q09  
MW-17-5  
MW-17-4  
MW-17-3  
MW-17-2  
MW-17-1  
DUPE-03-4Q09  
EB-05-11/19/09  
MW-16MS  
MW-16MSD  
MW-17-1MS  
MW-17-1MSD

## Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate, and EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

Samples MW-9 and DUPE-8-4Q09 and samples MW-17-1 and DUPE-03-4Q09 were identified as field duplicates. No contaminant concentrations were detected in any of the samples.

## **X. Field Blanks**

Sample EB-05-11/19/09 was identified as an equipment blank. No contaminant concentrations were found in this blank.

**NASA JPL**  
**Wet Chemistry - Data Qualification Summary - SDG BMI09112008**

No Sample Data Qualified in this SDG

**NASA JPL**  
**Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI09112008**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 20 through November 23, 2009  
**LDC Report Date:** January 6, 2010  
**Matrix:** Water  
**Parameters:** Perchlorate  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09112406

### Sample Identification

MW-10  
MW-14-5  
MW-14-4  
MW-14-3  
MW-14-2  
MW-14-1\*\*  
EB-06-11/23/09  
MW-14-4MS  
MW-14-4MSD

\*\*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 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) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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



## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

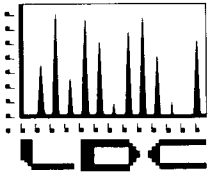
Sample EB-06-11/23/09 was identified as an equipment blank. No perchlorate was found in this blank.

**NASA JPL**  
**Perchlorate - Data Qualification Summary - SDG BMI09112406**

No Sample Data Qualified in this SDG

**NASA JPL**  
**Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI09112406**

No Sample Data Qualified in this SDG



**LABORATORY DATA CONSULTANTS, INC.**

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

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

January 11, 2010

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on December 17, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 22239:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
P0904197, P0904214	Hexavalent Chromium

The data validation was performed under EPA Level III and Level 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



NASA JPL  
Data Validation Reports  
LDC #22239

Hexavalent Chromium

**LDC**

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 8, 2009  
**LDC Report Date:** January 8, 2010  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Columbia Analytical Services, Inc.  
**Sample Delivery Group (SDG):** P0904197

**Sample Identification**

MW-25-5\*\*  
MW-25-4  
Mw-25-3  
MW-25-2  
MW-25-1  
DUPE-07-4Q09  
EB-13-12/08/09  
MW-26-2  
MW-26-1  
MW-25-5MS  
MW-25-5MSD

\*\*Indicates sample underwent EPA Level IV review

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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



## **IX. Field Duplicates**

Samples MW-25-4 and DUPE-07-4Q09 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

## **X. Field Blanks**

Sample EB-13-12/08/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.

## **XII. Compound Quantitation and Reported CRQLs**

Raw data were not reviewed for this SDG.

## **XIII. Overall Assessment of Data**

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

<b>Sample</b>	<b>Compound</b>	<b>Flag</b>	<b>A or P</b>
SB-EC-91-20.0	All TCL compounds	R	A

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.

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 9, 2009  
**LDC Report Date:** January 6, 2010  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** P0904214

**Sample Identification**

MW-18-5  
MW-18-4  
MW-18-3  
MW-18-2  
MW-18-1\*\*  
EB-14-12/09/09  
MW-18-3MS  
MW-18-3MSD

\*\*Indicates sample underwent EPA Level IV review

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

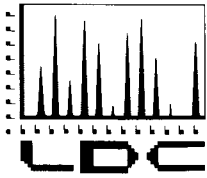
Sample EB-14-12/09/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0904214**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0904214**

No Sample Data Qualified in this SDG



**LABORATORY DATA CONSULTANTS, INC.**

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

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

January 4, 2009

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on December 11, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 22208:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
P0904110, P0904124, P0904140 P0904161	Hexavalent Chromium

The data validation was performed under EPA Level III and Level 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





**NASA JPL  
Data Validation Reports  
LDC #22208**

Hexavalent Chromium

**LDC**

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** December 1, 2009  
**LDC Report Date:** December 30, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Columbia Analytical Services, Inc.  
**Sample Delivery Group (SDG):** P0904110

### Sample Identification

MW-12-5  
MW-12-4  
MW-12-3  
MW-12-2  
MW-12-1  
DUPE-06-4Q09  
EB-09-12/01/09  
MW-12-5MS  
MW-12-5MSD

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

Samples MW-12-3 and DUPE-06-4Q09 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

## **X. Field Blanks**

Sample EB-09-12/01/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0904110**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0904110**

No Sample Data Qualified in this SDG

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 2, 2009  
**LDC Report Date:** December 30, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Columbia Analytical Services, Inc.  
**Sample Delivery Group (SDG):** P0904124

**Sample Identification**

MW-11-5\*\*  
MW-11-4  
MW-11-3\*\*  
MW-11-2  
MW-11-1  
EB-10-12/02/09  
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 EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

Sample EB-10-12/02/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0904124**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0904124**

No Sample Data Qualified in this SDG

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 3, 2009  
**LDC Report Date:** December 30, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Columbia Analytical Services, Inc.  
**Sample Delivery Group (SDG):** P0904140

**Sample Identification**

MW-24-5  
MW-24-4  
MW-24-3  
MW-24-2  
MW-24-1  
EB-11-12/03/09  
MW-24-5MS  
MW-24-5MSD

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

Sample EB-11-12/03/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.



**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0904140**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0904140**

No Sample Data Qualified in this SDG

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 4, 2009  
**LDC Report Date:** December 30, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Columbia Analytical Services, Inc.  
**Sample Delivery Group (SDG):** P0904161

**Sample Identification**

MW-23-5  
MW-23-4  
MW-23-3  
MW-23-2  
MW-23-1  
EB-12-12/04/09  
MW-23-5MS  
MW-23-5MSD

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

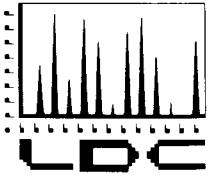
Sample EB-12-12/04/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0904161**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0904161**

No Sample Data Qualified in this SDG



**LABORATORY DATA CONSULTANTS, INC.**

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

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

January 5, 2009

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on December 10, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 22197:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
BMI09111704	Volatiles, Chromium, Perchlorate
BMI09111801	

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

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

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

Sincerely,

Erlinda T. Rauto  
Operations Manager/Senior Chemist





**NASA JPL  
Data Validation Reports  
LDC #22197**

Volatiles

**LDC**

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 13 through November 16, 2009  
**LDC Report Date:** December 30, 2009  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09111704

### Sample Identification

MW-21-5  
MW-21-4  
MW-21-3  
MW-21-2  
MW-21-1  
EB-01-11/13/09  
TB-01-11/13/09  
MW-15  
MW-19-5  
MW-19-4  
MW-19-3  
MW-19-2  
MW-19-1\*\*  
EB-02-11/16/09  
TB-02-11/16/09  
MW-21-1MS  
MW-21-1MSD

\*\*Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 17 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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. 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% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
11/20/09 (01992003)	Trichlorofluoromethane	32.7	MW-21-5 MW-21-4 MW-21-3 MW-21-2 MW-21-1 MW-21-1MS MW-21-1MSD MBLK MS15W1120M	J (all detects) UJ (all non-detects)	P

Date	Compound	%D	Associated Samples	Flag	A or P
11/20/09 (09112033)	Trichlorofluoromethane	37.6	EB-01-11/13/09 TB-01-11/13/09 MW-15 MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1** EB-02-11/16/09 TB-02-11/16/09 MBLK MS15W	J (all detects) UJ (all non-detects)	P

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

#### 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**

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

## **XV. Overall Assessment of Data**

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

## **XVI. Field Duplicates**

No field duplicates were identified in this SDG.

## **XVII. Field Blanks**

Samples TB-01-11/13/09 and TB-02-11/16/09 were identified as trip blanks. No volatile contaminants were found in these blanks.

Samples EB-01-11/13/09 and EB-02-11/16/09 were identified as equipment blanks. No volatile contaminants were found in these blanks.

**NASA JPL**  
**Volatiles - Data Qualification Summary - SDG BMI09111704**

SDG	Sample	Compound	Flag	A or P	Reason
BMI09111704	MW-21-5 MW-21-4 MW-21-3 MW-21-2 MW-21-1 EB-01-11/13/09 TB-01-11/13/09 MW-15 MW-19-5 MW-19-4 MW-19-3 MW-19-2 MW-19-1** EB-02-11/16/09 TB-02-11/16/09	Trichlorofluoromethane	J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)

**NASA JPL**  
**Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI09111704**

No Sample Data Qualified in this SDG

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

**Project/Site Name:** NASA JPL  
**Collection Date:** November 16 through November 17, 2009  
**LDC Report Date:** December 30, 2009  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09111801

**Sample Identification**

QCEB-16-NOV  
MW-5  
MW-6  
MW-20-5  
MW-20-4  
MW-20-3  
MW-20-2\*\*  
MW-20-1  
DUPE-01-4Q09  
EB-03-11/17/09  
TB-03-11/17/09  
MW-20-4MS  
MW-20-4MSD

\*\*Indicates sample underwent EPA Level IV review



## Introduction

This data review covers 13 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

### I. Technical Holding Times

All technical holding time requirements were met.

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

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. 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% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
11/20/09 (01992033)	Trichlorofluoromethane	37.6	QCEB-16-NOV MW-5 MW-6 MW-20-5 MW-20-4 MW-20-3 MW-20-2** MW-20-1 DUPE-01-4Q09 EB-03-11/17/09 MW-20-4MS MW-20-4MSD MBLK MS015W1120N	J (all detects) UJ (all non-detects)	P

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

## **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**

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

#### **XV. Overall Assessment of Data**

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

#### **XVI. Field Duplicates**

Samples MW-20-1 and DUPE-01-4Q09 were identified as field duplicates. No volatiles were detected in any of the samples.

#### **XVII. Field Blanks**

Sample TB-03-11/17/09 was identified as a trip blank. No volatile contaminants were found in this blank.

Samples QCEB-16-NOV and EB-03-11/17/09 were identified as equipment blanks. No volatile contaminants were found in these blanks with the following exceptions:

<b>Equipment Blank ID</b>	<b>Compound</b>	<b>Concentration (ug/L)</b>
QCEB-16-NOV	m,p-Xylenes Styrene	1.0 1.9

**NASA JPL**  
**Volatiles - Data Qualification Summary - SDG BMI09111801**

SDG	Sample	Compound	Flag	A or P	Reason
BMI09111801	QCEB-16-NOV MW-5 MW-6 MW-20-5 MW-20-4 MW-20-3 MW-20-2** MW-20-1 DUPE-01-4Q09 EB-03-11/17/09	Trichlorofluoromethane	J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)

**NASA JPL**  
**Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI09111801**

No Sample Data Qualified in this SDG

**NASA JPL  
Data Validation Reports  
LDC #22197**

Chromium

**LDC**

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 13 through November 16, 2009  
**LDC Report Date:** January 4, 2010  
**Matrix:** Water  
**Parameters:** Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09111704

### Sample Identification

MW-21-5  
MW-21-4  
MW-21-3  
MW-21-2  
MW-21-1  
EB-01-11/13/09  
MW-15  
MW-19-5  
MW-19-4  
MW-19-3  
MW-19-2  
MW-19-1\*\*  
EB-02-11/16/09  
MW-21-1MS  
MW-21-1MSD

\*\*Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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



## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. ICPMS Tune**

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

## **III. Calibration**

An initial calibration was performed.

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

## **IV. Blanks**

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

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

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike Analysis**

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

## **VII. Duplicate Sample Analysis**

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

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

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

## **IX. Internal Standards**

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**

Samples EB-01-11/13/09 and EB-02-11/16/09 were identified as equipment blanks. No chromium was found in these blanks.

**NASA JPL  
Chromium - Data Qualification Summary - SDG BMI09111704**

No Sample Data Qualified in this SDG

**NASA JPL  
Chromium - Laboratory Blank Data Qualification Summary - SDG BMI09111704**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 17, 2009  
**LDC Report Date:** December 30, 2009  
**Matrix:** Water  
**Parameters:** Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09111801

### Sample Identification

MW-5  
MW-6  
MW-20-5  
MW-20-4  
MW-20-3  
MW-20-2\*\*  
MW-20-1  
DUPE-01-4Q09  
EB-03-11/17/09  
MW-20-4MS  
MW-20-4MSD

\*\*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 Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. ICPMS Tune**

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

## **III. Calibration**

An initial calibration was performed.

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

## **IV. Blanks**

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

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

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike Analysis**

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

## **VII. Duplicate Sample Analysis**

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

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

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

## **IX. Internal Standards**

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-20-1 and DUPE-01-4Q09 were identified as field duplicates. No chromium was detected in any of the samples.

## **XV. Field Blanks**

Sample EB-03-11/17/09 was identified as an equipment blank. No chromium was found in this blank.

**NASA JPL  
Chromium - Data Qualification Summary - SDG BMI09111801**

No Sample Data Qualified in this SDG

**NASA JPL  
Chromium - Laboratory Blank Data Qualification Summary - SDG BMI09111801**

No Sample Data Qualified in this SDG



NASA JPL  
Data Validation Reports  
LDC #22197

Perchlorate

**LDC**

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

**Project/Site Name:** NASA JPL  
**Collection Date:** November 13 through November 16, 2009  
**LDC Report Date:** January 4, 2010  
**Matrix:** Water  
**Parameters:** Perchlorate  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09111704

**Sample Identification**

MW-21-5  
MW-21-4  
MW-21-3  
MW-21-2  
MW-21-1  
EB-01-11/13/09  
MW-15  
MW-19-5  
MW-19-4  
MW-19-3  
MW-19-2  
MW-19-1\*\*  
EB-02-11/16/09  
MW-21-1MS  
MW-21-1MSD

\*\*Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

Samples EB-01-11/13/09 and EB-02-11/16/09 were identified as equipment blanks. No perchlorate was found in these blanks.

**NASA JPL  
Perchlorate - Data Qualification Summary - SDG BMI09111704**

No Sample Data Qualified in this SDG

**NASA JPL  
Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI09111704**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 17, 2009  
**LDC Report Date:** December 30, 2009  
**Matrix:** Water  
**Parameters:** Perchlorate  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09111801

### Sample Identification

MW-5  
MW-6  
MW-20-5  
MW-20-4  
MW-20-3  
MW-20-2\*\*  
MW-20-1  
DUPE-01-4Q09  
EB-03-11/17/09  
MW-20-4MS  
MW-20-4MSD

\*\*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 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) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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



## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

Samples MW-20-1 and DUPE-01-4Q09 were identified as field duplicates. No perchlorate was detected in any of the samples.

## **X. Field Blanks**

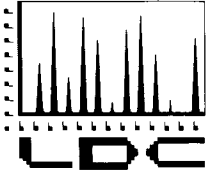
Sample EB-03-11/17/09 was identified as an equipment blank. No perchlorate was found in this blank.

**NASA JPL**  
**Perchlorate - Data Qualification Summary - SDG BMI09111801**

No Sample Data Qualified in this SDG

**NASA JPL**  
**Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI09111801**

No Sample Data Qualified in this SDG



**LABORATORY DATA CONSULTANTS, INC.**

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

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

January 4, 2009

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed is the final validation report for the fraction listed below. This SDG was received on December 7, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 22154:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
P0904091	Hexavalent Chromium

The data validation was performed under EPA Level III and Level 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



**NASA JPL  
Data Validation Reports  
LDC #22154**

Hexavalent Chromium

**LDC**

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

**Project/Site Name:** NASA JPL  
**Collection Date:** November 30, 2009  
**LDC Report Date:** December 24, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Columbia Analytical Services, Inc.  
**Sample Delivery Group (SDG):** P0904091

**Sample Identification**

MW-4-5  
MW-4-4\*\*  
MW-4-3  
MW-4-2  
MW-4-1  
DUPE-05-4Q09  
EB-08-11/30/09  
MW-4-1MS  
MW-4-1MSD

\*\*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 EPA SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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



## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

Samples MW-4-3 and DUPE-05-4Q09 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

## **X. Field Blanks**

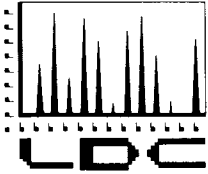
Sample EB-08-11/30/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0904091**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0904091**

No Sample Data Qualified in this SDG



**LABORATORY DATA CONSULTANTS, INC.**

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

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

December 22, 2009

**SUBJECT: NASA JPL, Data Validation**

Dear Ms. Cutie,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on December 1, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 22129:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
P0904014, P0904023, P0904048	Hexavalent Chromium

The data validation was performed under EPA Level III and Level 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



NASA JPL  
Data Validation Reports  
LDC #22129

Hexavalent Chromium

**LDC**

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

**Project/Site Name:** NASA JPL  
**Collection Date:** November 20, 2009  
**LDC Report Date:** December 17, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Columbia Analytical Services, Inc.  
**Sample Delivery Group (SDG):** P0904014

**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 SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
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- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
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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. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

No field blanks were identified in this SDG.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0904014**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0904014**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 23, 2009  
**LDC Report Date:** December 17, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Columbia Analytical Services, Inc.  
**Sample Delivery Group (SDG):** P0904023

### Sample Identification

MW-14-5  
MW-14-4  
MW-14-3  
MW-14-2  
MW-14-1\*\*  
EB-06-11/23/09  
MW-14-4MS  
MW-14-4MSD

\*\*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 SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
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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. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

Sample EB-06-11/23/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0904023**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0904023**

No Sample Data Qualified in this SDG



## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 24, 2009  
**LDC Report Date:** December 17, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** P0904048

### Sample Identification

MW-22-5  
MW-22-4  
MW-22-3  
MW-22-2  
MW-22-1  
DUPE-04-4Q09  
EB-07-11/24/09  
MW-22-5MS  
MW-22-5MSD

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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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.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

Samples MW-22-4 and DUPE-04-4Q09 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

## **X. Field Blanks**

Sample EB-07-11/24/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL**

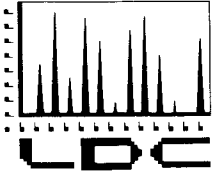
**Hexavalent Chromium - Data Qualification Summary - SDG P0904048**

No Sample Data Qualified in this SDG

**NASA JPL**

**Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG P0904048**

No Sample Data Qualified in this SDG



**LABORATORY DATA CONSULTANTS, INC.**

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

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

December 14, 2009

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 1, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 22080:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
P0903920, P0903941, P0903942 P0903952, P0903953, P0903983 P0903984, P0904000, P0904001	Hexavalent Chromium

The data validation was performed under EPA Level III and Level 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



**NASA JPL  
Data Validation Reports  
LDC #22080**

Hexavalent Chromium

**LDC**



## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 13, 2009  
**LDC Report Date:** December 14, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** P0903920

### Sample Identification

MW-21-5  
MW-21-4  
MW-21-3  
MW-21-2  
MW-21-1  
EB-01-11/13/09  
MW-21-1MS  
MW-21-1MSD

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

Sample EB-01-11/13/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0903920**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0903920**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 16, 2009  
**LDC Report Date:** December 14, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Columbia Analytical Services, Inc.  
**Sample Delivery Group (SDG):** P0903941

### Sample Identification

MW-19-5  
MW-19-4  
MW-19-3  
MW-19-2  
MW-19-1\*\*  
EB-02-11/16/09  
MW-19-5MS  
MW-19-5MSD

\*\*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 SW 846 Method 7196A for Hexavalent Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
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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. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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



## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

Sample EB-02-11/16/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0903941**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0903941**

No Sample Data Qualified in this SDG

Analytical Report

Client : Battelle  
 Project Name : JPL GW Mon 4Q09  
 Project Number : G486090  
 Sample Matrix : WATER

Service Request : P0903941  
 Date Collected : 11/16/09  
 Date Received : 11/16/09

Chromium, Hexavalent

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

Units : mg/L (ppm)  
 Basis : NA

Sample Name	Lab Code	PQL	MDL	Dilution Factor	Date Extracted	Date/Time Analyzed	Result	Result Notes
MW-19-5	P0903941-001	0.010	0.003	1	NA	11/16/09 16:50	ND	
MW-19-4	P0903941-002	0.010	0.003	1	NA	11/16/09 16:50	ND	
MW-19-3	P0903941-003	0.010	0.003	1	NA	11/16/09 16:50	ND	
MW-19-2	P0903941-004	0.010	0.003	1	NA	11/16/09 16:50	ND	
MW-19-1	P0903941-005	0.010	0.003	1	NA	11/16/09 16:50	ND	
EB-02-11/16/09	P0903941-006	0.010	0.003	1	NA	11/16/09 16:50	ND	
Method Blank	P0903941-MB	0.010	0.003	1	NA	11/16/09 16:50	ND	

Approved By

*Karu Rya*

Date :

*11/17/09*

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

**Project/Site Name:** NASA JPL  
**Collection Date:** November 16, 2009  
**LDC Report Date:** December 14, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** P0903942

**Sample Identification**

MW-15  
MW-15MS  
MW-15MSD

## 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 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) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

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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. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

Sample EB-02-11/16/09 (from SDG P0903941) was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0903942**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0903942**

No Sample Data Qualified in this SDG



## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 17, 2009  
**LDC Report Date:** December 14, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Columbia Analytical Services, Inc.  
**Sample Delivery Group (SDG):** P0903952

### Sample Identification

MW-20-5  
MW-20-4  
MW-20-3  
MW-20-2\*\*  
MW-20-1  
DUPE-01-4Q09  
EB-03-11/17/09  
MW-20-4MS  
MW-20-4MSD

\*\*Indicates sample underwent EPA Level IV review

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

Samples MW-20-1 and DUPE-01-4Q09 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

## **X. Field Blanks**

Sample EB-03-11/17/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0903952**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0903952**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 17, 2009  
**LDC Report Date:** December 14, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** P0903953

### Sample Identification

MW-5  
MW-6  
MW-5MS  
MW-5MSD

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.



## **X. Field Blanks**

Sample EB-03-11/17/09 (from SDG P0903952) was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0903953**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0903953**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 18, 2009  
**LDC Report Date:** December 14, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** P0903983

### Sample Identification

MW-3-5  
MW-3-4  
MW-3-3  
MW-3-2  
MW-3-1  
DUPE-02-4Q09  
EB-04-11/18/09  
MW-3-1MS  
MW-3-1MSD

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

Samples MW-3-1 and DUPE-02-4Q09 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

## **X. Field Blanks**

Sample EB-04-11/18/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0903983**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0903983**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 18, 2009  
**LDC Report Date:** December 14, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Columbia Analytical Services, Inc.  
**Sample Delivery Group (SDG):** P0903984

### Sample Identification

MW-13  
MW-8  
MW-1  
MW-13MS  
MW-13MSD



## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

Sample EB-04-11/18/09 (from SDG P0903983) was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0903984**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0903984**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 19, 2009  
**LDC Report Date:** December 14, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Columbia Analytical Services, Inc.  
**Sample Delivery Group (SDG):** P0904000

### Sample Identification

MW-17-5  
MW-17-4  
MW-17-3  
MW-17-2  
MW-17-1  
DUPE-03-4Q09  
EB-05-11/19/09  
MW-17-1MS  
MW-17-1MSD

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

Samples MW-17-1 and DUPE-03-4Q09 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

## **X. Field Blanks**

Sample EB-05-11/19/09 was identified as an equipment blank. No hexavalent chromium was found in this blank.



**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0904000**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0904000**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** November 19, 2009  
**LDC Report Date:** December 14, 2009  
**Matrix:** Water  
**Parameters:** Hexavalent Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** P0904001

### Sample Identification

MW-16  
MW-7  
MW-9  
DUPE-8-4Q09  
MW-16MS  
MW-16MSD

## Introduction

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

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

All criteria for the initial calibration were met.

### **b. Calibration Verification**

Calibration verification frequency and analysis criteria were met.

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

Samples MW-9 and DUPE-8-4Q09 were identified as field duplicates. No hexavalent chromium was detected in any of the samples.

## **X. Field Blanks**

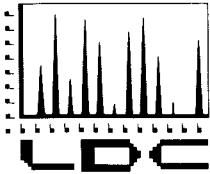
Sample EB-05-11/19/09 (from SDG P0904000) was identified as an equipment blank. No hexavalent chromium was found in this blank.

**NASA JPL  
Hexavalent Chromium - Data Qualification Summary - SDG P0904001**

No Sample Data Qualified in this SDG

**NASA JPL  
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG  
P0904001**

No Sample Data Qualified in this SDG



**LABORATORY DATA CONSULTANTS, INC.**

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

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

January 28, 2010

SUBJECT: NASA JPL, Data Validation

Dear Ms. Cutie,

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

**LDC Project # 22368:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
BMI09120403	Volatiles, Chromium, Wet Chemistry
BMI09120901	
BMI09121005	

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

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

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

Sincerely,

Erlinda T. Rauto  
Operations Manager/Senior Chemist





**NASA JPL  
Data Validation Reports  
LDC #22368**

Volatiles

**LDC**

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 3, 2009  
**LDC Report Date:** January 20, 2010  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09120403

**Sample Identification**

MW-24-5  
MW-24-4  
MW-24-3  
MW-24-2  
MW-24-1  
EB-11-12/03/09  
TB-11-12/03/09

## 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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UU 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 selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. 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% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
12/10/09	Bromomethane	48.2	All samples in SDG BMI09120403	J (all detects) UJ (all non-detects)	P

## 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
LCS MS15W1210M	Bromomethane	136 (70-130)	All samples in SDG BMI09120403	J (all detects)	P

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

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

## XI. Target Compound Identifications

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.

**NASA JPL**  
**Volatiles - Data Qualification Summary - SDG BMI09120403**

SDG	Sample	Compound	Flag	A or P	Reason
BMI09120403	MW-24-5 MW-24-4 MW-24-3 MW-24-2 MW-24-1 EB-11-12/03/09 TB-11-12/03/09	Bromomethane	J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)
BMI09120403	MW-24-5 MW-24-4 MW-24-3 MW-24-2 MW-24-1 EB-11-12/03/09 TB-11-12/03/09	Bromomethane	J (all detects)	P	Laboratory control samples (%R)

**NASA JPL**  
**Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI09120403**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** December 4 through December 8, 2009  
**LDC Report Date:** January 20, 2010  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09120901

### Sample Identification

MW-23-5  
MW-23-4  
MW-23-3  
MW-23-2  
MW-23-1  
EB-12-12/04/09  
TB-12-12/04/09  
SB-1-4Q09  
MW-25-5\*\*  
MW-25-4  
MW-25-3  
MW-25-2  
MW-25-1  
DUPE-07-4Q09  
EB-13-12/08/09  
MW-26-2  
MW-26-1  
MW-25-5MS  
MW-25-5MSD

\*\*Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 19 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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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



## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

## 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
12/15/09	Chloromethane	35.0	All samples in SDG BMI09120901	J (all detects)	P
	Bromomethane	40.4		UJ (all non-detects)	
				J (all detects)	
				UJ (all non-detects)	

## V. Blanks

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

## VI. Surrogate Spikes

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

## VII. Matrix Spike/Matrix Spike Duplicates

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

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-25-5MS/MSD (MW-25-5**)	Vinyl chloride Bromomethane	- -	- -	23.7 ( $\leq 20$ ) 20.8 ( $\leq 20$ )	J (all detects) J (all detects)	A

## VIII. Laboratory Control Samples (LCS)

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

LCS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
LCSMS15W1215M	Chloromethane Bromomethane	64 (70-130) 62 (70-130)	All samples in SDG BMI09120901	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

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

## XI. Target Compound Identifications

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

## XII. Compound Quantitation and CRQLs

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

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

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

### **XV. Overall Assessment of Data**

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

### **XVI. Field Duplicates**

Samples MW-25-4 and DUPE-07-4Q09 were identified as field duplicates. No volatiles were detected in any of the samples

### **XVII. Field Blanks**

Sample TB-12-12/04/09 was identified as a trip blank. No volatile contaminants were found in this blank.

Samples EB-12-12/04/09 and EB-13-12/08/09 were identified as equipment blanks. No volatile contaminants were found in these blanks.

Sample SB-1-4Q09 was identified as a source blank. No volatile contaminants were found in this blank.

**NASA JPL**  
**Volatiles - Data Qualification Summary - SDG BMI09120901**

SDG	Sample	Compound	Flag	A or P	Reason
BMI09120901	MW-23-5 MW-23-4 MW-23-3 MW-23-2 MW-23-1 EB-12-12/04/09 TB-12-12/04/09 SB-1-4Q09 MW-25-5** MW-25-4 MW-25-3 MW-25-2 MW-25-1 DUPE-07-4Q09 EB-13-12/08/09 MW-26-2 MW-26-1	Chloromethane  Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)
BMI09120901	MW-25-5**	Vinyl chloride Bromomethane	J (all detects) J (all detects)	A	Matrix spike/Matrix spike duplicates (RPD)
BMI09120901	MW-23-5 MW-23-4 MW-23-3 MW-23-2 MW-23-1 EB-12-12/04/09 TB-12-12/04/09 SB-1-4Q09 MW-25-5** MW-25-4 MW-25-3 MW-25-2 MW-25-1 DUPE-07-4Q09 EB-13-12/08/09 MW-26-2 MW-26-1	Chloromethane  Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)

**NASA JPL**  
**Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI09120901**

No Sample Data Qualified in this SDG

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 9, 2009  
**LDC Report Date:** January 20, 2010  
**Matrix:** Water  
**Parameters:** Volatiles  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09121005

**Sample Identification**

MW-18-5  
MW-18-4  
MW-18-3  
MW-18-2  
MW-18-1\*\*  
EB-14-12/09/09  
TB-14-12/09/09  
MW-18-3MS  
MW-18-3MSD

\*\*Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. 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% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
12/11/09	Bromomethane	32.1	All samples in SDG BMI09121005	J (all detects) UJ (all non-detects)	P

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

## **XV. Overall Assessment of Data**

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



## **XVI. Field Duplicates**

No field duplicates were identified in this SDG.

## **XVII. Field Blanks**

Sample TB-14-12/09/09 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB-14-12/09/09 was identified as an equipment blank. No volatile contaminants were found in this blank.

**NASA JPL  
Volatiles - Data Qualification Summary - SDG BMI09121005**

SDG	Sample	Compound	Flag	A or P	Reason
BMI09121005	MW-18-5 MW-18-4 MW-18-3 MW-18-2 MW-18-1** EB-14-12/09/09 TB-14-12/09/09	Bromomethane	J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)

**NASA JPL  
Volatiles - Laboratory Blank Data Qualification Summary - SDG BMI09121005**

No Sample Data Qualified in this SDG

**NASA JPL  
Data Validation Reports  
LDC #22368**

Chromium

**LDC**

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 3, 2009  
**LDC Report Date:** January 25, 2010  
**Matrix:** Water  
**Parameters:** Chromium  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09120403

**Sample Identification**

MW-24-5  
MW-24-4  
MW-24-3  
MW-24-2  
MW-24-1  
EB-11-12/03/09

## 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 Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. ICPMS Tune**

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

## **III. Calibration**

An initial calibration was performed.

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

## **IV. Blanks**

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

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

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike Analysis**

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

## **VII. Duplicate Sample Analysis**

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

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

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

## **IX. Internal Standards**

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-11-12/03/09 was identified as an equipment blank. No chromium was found in this blank.

**NASA JPL**  
**Chromium - Data Qualification Summary - SDG BMI09120403**

No Sample Data Qualified in this SDG

**NASA JPL**  
**Chromium - Laboratory Blank Data Qualification Summary - SDG BMI09120403**

No Sample Data Qualified in this SDG



## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** December 4 through December 8, 2009  
**LDC Report Date:** January 25, 2010  
**Matrix:** Water  
**Parameters:** Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09120901

### Sample Identification

MW-23-5  
MW-23-4  
MW-23-3  
MW-23-2  
MW-23-1  
EB-12-12/04/09  
MW-25-5\*\*  
MW-25-4  
MW-25-3  
MW-25-2  
MW-25-1  
DUPE-07-4Q09  
EB-13-12/08/09  
MW-26-2  
MW-26-1  
MW-23-5MS  
MW-23-5MSD

\*\*Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 17 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UU 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
12/11/09	ICV (12:28)	Chromium	112 (90-110)	All samples in SDG BMI09120901	J (all detects)	P

## IV. Blanks

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

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

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-23-5MS/MSD (All samples in SDG BMI09120901)	Chromium	122 (80-120)	125 (80-120)	-	J (all detects)	A

## 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

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-25-4 and DUPE-07-4Q09 were identified as field duplicates. No chromium was detected in any of the samples.

## **XV. Field Blanks**

Samples EB-12-12/04/09 and EB-13-12/08/09 were identified as equipment blanks. No chromium was found in these blanks.

**NASA JPL**  
**Chromium - Data Qualification Summary - SDG BMI09120901**

SDG	Sample	Analyte	Flag	A or P	Reason
BMI09120901	MW-23-5 MW-23-4 MW-23-3 MW-23-2 MW-23-1 EB-12-12/04/09 MW-25-5** MW-25-4 MW-25-3 MW-25-2 MW-25-1 DUPE-07-4Q09 EB-13-12/08/09 MW-26-2 MW-26-1	Chromium	J (all detects)	P	Calibration (ICV %R)
BMI09120901	MW-23-5 MW-23-4 MW-23-3 MW-23-2 MW-23-1 EB-12-12/04/09 MW-25-5** MW-25-4 MW-25-3 MW-25-2 MW-25-1 DUPE-07-4Q09 EB-13-12/08/09 MW-26-2 MW-26-1	Chromium	J (all detects)	A	Matrix spike/Matrix spike duplicates (%R)

**NASA JPL**  
**Chromium - Laboratory Blank Data Qualification Summary - SDG BMI09120901**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** December 9, 2009  
**LDC Report Date:** January 25, 2010  
**Matrix:** Water  
**Parameters:** Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09121005

### Sample Identification

MW-18-5  
MW-18-4  
MW-18-3  
MW-18-2  
MW-18-1\*\*  
EB-14-12/09/09  
MW-18-3MS  
MW-18-3MSD

\*\*Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Methods Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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



## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. ICPMS Tune

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

## III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
12/11/09	ICV (12:28)	Chromium	112 (90-110)	All samples in SDG BMI09121005	J (all detects)	P

## IV. Blanks

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

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

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

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

## VII. Duplicate Sample Analysis

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

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

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

## **IX. Internal Standards**

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-14-12/09/09 was identified as an equipment blank. No chromium was found in this blank.

**NASA JPL**

**Chromium - Data Qualification Summary - SDG BMI09121005**

<b>SDG</b>	<b>Sample</b>	<b>Analyte</b>	<b>Flag</b>	<b>A or P</b>	<b>Reason</b>
BMI09121005	MW-18-5 MW-18-4 MW-18-3 MW-18-2 MW-18-1** EB-14-12/09/09	Chromium	J (all detects)	P	Calibration (ICV %R)

**NASA JPL**

**Chromium - Laboratory Blank Data Qualification Summary - SDG BMI09121005**

No Sample Data Qualified in this SDG

**NASA JPL  
Data Validation Reports  
LDC #22368**

Wet Chemistry

**LDC**

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 3, 2009  
**LDC Report Date:** January 25, 2010  
**Matrix:** Water  
**Parameters:** Wet Chemistry  
**Validation Level:** EPA Level III  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09120403

**Sample Identification**

MW-24-5  
MW-24-4  
MW-24-3  
MW-24-2  
MW-24-1  
EB-11-12/03/09  
MW-24-1MS  
MW-24-1MSD

## 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 300.0 for Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate and EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. Calibration

### a. Initial Calibration

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

### b. Calibration Verification

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

## III. Blanks

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

## IV. Matrix Spike/Matrix Spike Duplicates

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-24-1MS/MSD (MW-24-1)	Orthophosphate as P	124 (80-120)	122 (80-120)	-	J (all detects)	A
MW-18-3MS/MSD (All samples in SDG BMI09120403)	Perchlorate	122 (80-120)	125 (80-120)	-	J (all detects)	A

## V. Duplicates

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

## VI. Laboratory Control Samples

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

## **VII. Sample Result Verification**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

Sample EB-11-12/03/09 was identified as an equipment blank. No contaminant concentrations were found in this blank.



**NASA JPL  
Wet Chemistry - Data Qualification Summary - SDG BMI09120403**

<b>SDG</b>	<b>Sample</b>	<b>Analyte</b>	<b>Flag</b>	<b>A or P</b>	<b>Reason</b>
BMI09120403	MW-24-1	Orthophosphate as P	J (all detects)	A	Matrix spike/Matrix spike duplicates (%R)
BMI09120403	MW-24-5 MW-24-4 MW-24-3 MW-24-2 MW-24-1 EB-11-12/03/09	Perchlorate	J (all detects)	A	Matrix spike/Matrix spike duplicates (%R)

**NASA JPL  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG BMI09120403**

No Sample Data Qualified in this SDG

## Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** NASA JPL  
**Collection Date:** December 4 through December 8, 2009  
**LDC Report Date:** January 25, 2010  
**Matrix:** Water  
**Parameters:** Perchlorate  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.  
**Sample Delivery Group (SDG):** BMI09120901

### Sample Identification

MW-23-5  
MW-23-4  
MW-23-3  
MW-23-2  
MW-23-1  
EB-12-12/04/09  
MW-25-5\*\*  
MW-25-4  
MW-25-3  
MW-25-2  
MW-25-1  
DUPE-07-4Q09  
EB-13-12/08/09  
MW-26-2  
MW-26-1  
MW-25-5MS  
MW-25-5MSD

\*\*Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 17 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

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

### **b. Calibration Verification**

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

## **III. Blanks**

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

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

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

## **V. Duplicates**

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

## **VI. Laboratory Control Samples**

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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

### IX. Field Duplicates

Samples MW-25-4 and DUPE-07-4Q09 were identified as equipment blanks. No perchlorate was found in these blanks with the following exceptions:

Analyte	Concentration (ug/L)		RPD
	MW-25-4	DUPE-07-4Q09	
Perchlorate	7.42	7.42	0

### X. Field Blanks

Samples EB-12-12/04/09 and EB-13-12/08/09 were identified as equipment blanks. No perchlorate was found in this blank.

**NASA JPL**  
**Perchlorate - Data Qualification Summary - SDG BMI09120901**

No Sample Data Qualified in this SDG

**NASA JPL**  
**Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI09120901**

No Sample Data Qualified in this SDG

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

**Project/Site Name:** NASA JPL  
**Collection Date:** December 9, 2009  
**LDC Report Date:** January 25, 2010  
**Matrix:** Water  
**Parameters:** Perchlorate  
**Validation Level:** EPA Level III & IV  
**Laboratory:** Alpha Analytical, Inc.

**Sample Delivery Group (SDG):** BMI09121005

**Sample Identification**

MW-18-5  
MW-18-4  
MW-18-3  
MW-18-2  
MW-18-1\*\*  
EB-14-12/09/09  
MW-18-3MS  
MW-18-3MSD

\*\*Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

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## I. Technical Holding Times

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## II. Calibration

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

## III. Blanks

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

## IV. Matrix Spike/Matrix Spike Duplicates

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
MW-18-3MS/MSD (All samples in SDG BMI09121005)	Perchlorate	122 (80-120)	125 (80-120)	-	J (all detects)	A

## V. Duplicates

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

## VI. Laboratory Control Samples

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

## **VII. Sample Result Verification**

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

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

## **X. Field Blanks**

Sample EB-14-12/09/09 was identified as an equipment blank. No perchlorate found in this blank.

**NASA JPL**  
**Perchlorate - Data Qualification Summary - SDG BMI09121005**

SDG	Sample	Analyte	Flag	A or P	Reason
BMI09121005	MW-18-5 MW-18-4 MW-18-3 MW-18-2 MW-18-1** EB-14-12/09/09	Perchlorate	J (all detects)	A	Matrix spike/Matrix spike duplicates (%R)

**NASA JPL**  
**Perchlorate - Laboratory Blank Data Qualification Summary - SDG BMI09121005**

No Sample Data Qualified in this SDG