

DATA VALIDATION REPORT
MICROBAC LABORATORY SDG L12070327

Project / Site Name: Environmental Remediation Services at White Sands Missile Range (WSMR), NM; CCWS-62, Former STP Percolation Ditches

Project No.: 139791

Data Reviewer: M. Lyon, Shaw Environmental, Inc.

Review Date: August 8, 2012

Matrix: Groundwater, 2 samples and 1 field duplicate

Parameters: Metals 6010B/6020/7470A
Anions 300.0
pH 9040C
Alkalinity 310.2
Cyanide 9014/9010C/SM4500-CN-C, G/SM4500-CN-I
Conductivity 120.1
Ammonia-Nitrogen 350.1
Nitrate+Nitrite-Nitrogen 353.2
Orthophosphate SM4500-P-E-20th
Total Dissolved Solids 160.1/SM2540C
Total Organic Carbon 415.1
Total Suspended Solids 160.2

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc. Ohio Valley Division

Sample Delivery Group L12070327

Sample Nos.: MPL10-0712-1, MPL13-0712-1, and MPL13-0712-2

Comments: Field duplicate QC sample was submitted for this SDG. Trip blank sample not applicable.

The data were reviewed and qualified according to the *Sampling and Analysis Plan/Quality Assurance Project Plan, Environmental Remediation Services, White Sands Missile Range, New Mexico October 2010*; *Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 4.2, 2010*; laboratory-specific statistical process control criteria, and the analytical method specific requirements.

DATA VALIDATION REQUIREMENTS

Level IV or Full Validation includes all parameters listed below. Level III Cursory Validation parameters are indicated by an asterisk (*).

Organic Parameters

- * Temperature
- * Holding times
- GC/MS instrument performance check
- * Initial and continuing calibrations
- * Blanks
- * Surrogate recoveries
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Internal standard performance
- Target compound identification
- Tentatively identified compounds
- Compound quantitation
- Reported detection limits
- System performance
- * Overall data assessment

Inorganic and General Chemistry Parameters

- * Temperature
- * Holding times
- * Initial and continuing calibration
- * Blanks
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Matrix duplicate
- ICP interference check sample
- CVAA / GFAA quality controls
- * ICP serial dilution
- Sample results verification
- Analyte quantitation
- Reported detection limits
- * Overall data assessment

DATA VALIDATION QUALIFIER DEFINITIONS

No qualifier indicates that the data are acceptable both qualitatively and quantitatively.

- U Not detected. The analyte was analyzed for but was not detected above the level of the associated value. The associated value is the Limit of Quantitation (LOQ).
- J Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is in determinable.
- J- Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined low due to associated quality control indicators.
- J+ Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined high due to associated quality control indicators.
- N Tentatively identified. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- UN Tentatively not detected, the LOQ is estimated. The analyte was analyzed for but was not detected above the reported LOQ. However, the reported LOQ is an estimate and may not be accurate or precise.
- NJ Tentatively identified. The reported concentration is an estimate. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents the approximate concentration.
- R Rejected. The data are not usable. The presence or absence of the analyte cannot be confirmed.

DATA VALIDATION QUALIFIER REASON CODES

Reason Code	Data Quality Condition Resulting in Assigned Qualification
General Use	
FB	Field blank contamination
FD	Field duplicate evaluation criteria not met
HT	Holding time requirement was not met
PR	Preservation requirements not met
LCS	Laboratory control sample evaluation criteria not met
MB	Method blank or preparation blank contamination
RB	Rinsate blank contamination
TB	Trip blank contamination
SDL	Sample quantitation limit exceeds decision criteria and the analyte was not detected
Inorganic Methods	
CCB	Continuing calibration blank contamination
CCV	Continuing calibration verification evaluation criteria not met
D	Laboratory duplicate precision evaluation criteria not met
DL	Serial dilution results did not meet evaluation criteria
ICS	Interference check sample evaluation criteria not met
ICV	Initial calibration verification evaluation criteria not met
MS	Matrix spike recovery outside acceptance range
PDS	Post-digestion spike recovery outside acceptance range
MSA	Method of standard additions correlation coefficient < 0.995
PB	Preparation blank
Organic Methods	
CCAL	Continuing calibration evaluation criteria not met
ICAL	Initial calibration evaluation criteria not met
ID	Target compound identification criteria not met
IS	Internal standard evaluation criteria not met
MS/MSD	Matrix spike/matrix spike duplicate accuracy and/or precision criteria not met
SUR	Surrogate recovery outside acceptance range
TUNE	Instrument performance (tuning) criteria not met
P	The detected concentration difference between the primary and secondary column is greater than 25%.

**SAMPLE DELIVERY GROUP L12070327
LEVEL III DATA VALIDATION SUMMARY**

Analysis / Method	Temperature	Holding Times	Calibration	Blanks	MS/MSD	LCS	Duplicate	Serial Dilution	Other
Metals 6010B	✓	✓	✓	✓	NA	✓	✓	✓	✓
Metals 6020	✓	✓	✓	✓	NA	✓	✓	✓	✓
Mercury 7470A	✓	✓	✓	✓	NA	✓	✓	NA	✓
Anions 300.0	✓	✓	✓	✓	NA	✓	✓	NA	✓
pH 9040C	✓	✓	✓	NA	NA	✓	✓	NA	NA
Alkalinity 310.2/SM2320B	✓	✓	✓	✓	NA	✓	✓	NA	NA
Cyanide; Total, Amenable, Dissociable 9014-9010C/SM4500-CN	✓	✓	✓	✓	NA	✓	✓	NA	NA
Conductivity 120.1	✓	✓	NA	✓	NA	✓	✓	NA	NA
Ammonia-N 350.1	✓	✓	✓	✓	NA	✓	✓	NA	NA
Nitrate+Nitrite-N 353.2	✓	✓	✓	✓	NA	✓	✓	NA	NA
Orthophosphate SM4500-P	✓	✓	✓	✓	NA	✓	✓	NA	NA
Total Dissolved Solids 160.1	✓	✓	NA	✓	NA	✓	18	NA	NA
Total Organic Carbon 415.1	✓	✓	✓	✓	NA	✓	✓	NA	NA
Total Suspended Solids 160.2	✓	✓	NA	✓	NA	✓	✓	NA	NA

Notes:

✓ Indicates that all quality control criteria were met for the parameter(s)

N/A Indicates the validation criteria is not applicable to the analysis

If validation criteria were not met and the data were qualified, then details can be found at the page number indicated in the table.

DATA ASSESSMENT
METALS (Method 6010B)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance.

IV. Blanks

- A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance. The method contained an estimated quantity of calcium greater than the limit of detection but less than the quantitation limit. The laboratory flagged calcium results for non-compliant blank data. The concentrations of calcium in the field samples were orders of magnitude greater than the blank results. Validation qualifiers were not assigned.

V. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

- A. MS/MSD analyses were performed in the applicable analytical batch on sample noted as internal laboratory QC (not a WSMR groundwater sample). These data were not evaluated and validation qualifiers were not assigned.

VI. Laboratory Control Sample (LCS)

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. The field duplicate sample submitted for this SDG showed precision measures less than 3 relative percent difference (RPD) for metals reported in both samples greater than the quantitation limits.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

A. Limits of Quantitation (LOQ) were reviewed and found compliant.

METALS (Method 6020)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, low-level calibration check, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were performed in the applicable analytical batch on a sample identified as internal laboratory QC (not a WSMR groundwater sample). These data were not evaluated and validation qualifiers were not assigned.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. The field duplicate sample submitted for this SDG showed precision measures less than 16 RPD for metals reported in both samples greater than the quantitation limits.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. LOQ were reviewed and found compliant.

MERCURY (Method 7470A)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were performed in the applicable analytical batch on a sample noted to be internal laboratory QC (not a WSMR groundwater sample). These data were not evaluated and validation qualifiers were not assigned..

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. The field duplicate sample submitted for this SDG was not evaluated as both sample and duplicate results were non-detect for mercury. MSD precision was found to be in compliance.

VIII. Other

- A. LOQ were reviewed and found compliant

ANIONS (Method 300.0 [9056])

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank and CCB analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. The field duplicate sample submitted for this SDG showed precision less than 9 RPD for the analytes detected greater than quantitation limits in both samples.

VIII. Other

- A. LOQ were reviewed and found compliant. Chloride concentration was determined from a 4-times dilution analysis.

pH (Method 9040C)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. Hydrogen ion activities (pH) were measured in the field at the time of sample collection and again at the. The paired measurements show good agreement with 0.5 standard units difference. Data validation qualifiers were not assigned.

III. Calibration

- A. pH meter calibration at the laboratory was documented using buffer solutions pH 4, 7, and 10.

IV. LCS

- A. The LCS sample pH was measured at the laboratory and the results were acceptable.

V. Duplicate

- A. The field duplicate sample submitted for this SDG showed precision RPD less than one.

ALKALINITY (Methods 310.2 / SM2320B)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance.

VI. Duplicate

- A. Field duplicate precision was less than eight RPD. LCS duplicates were also analyzed and results found to be in compliance.

CYANIDE (Methods 9014-9010C / SM4500-CN-C)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blanks were reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance. Cyanide amenable to chlorination is a difference measurement which the LCS calculation accounts for inversely.

VI. Duplicate

- A. The field duplicate precision was less than eight RPD.

VII. Other

- A. LOQ was reviewed and found compliant.

CONDUCTIVITY (Method 120.1)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. The field duplicate precision was less than one RPD. A LCS duplicate was also analyzed and results found to be in compliance.

VI. Other

- A. LOQ was reviewed and found compliant.

AMMONIA AS NITROGEN (Method 350.1)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. Duplicate

- A. The field duplicate precision could not be evaluated. Analysis results were either not detected or less than quantitation limits.

VII. Other

- A. LOQ was reviewed and found compliant.

NITRATE + NITRITE AS NITROGEN (Method 353.2)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. Duplicate

- A. The field duplicate precision was less than three RPD. A LCS duplicate was also analyzed and results found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

ORTHOPHOSPHATE AS PHOSPHOROUS (Method SM4500-P)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. Duplicate

- A. The field duplicate precision could not be evaluated. Analysis results were both not detected. LCS duplicate was also analyzed. The results were reviewed and found to be compliant.

VII. Other

- A. LOQ was reviewed and found compliant.

TOTAL DISSOLVED SOLIDS (Method 160.1)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. The field duplicate precision was 43 RPD. A LCS duplicate was analyzed and results found to be in compliance. Parent and duplicate sample results are qualified “J” with reason code “FD” for field duplicate exceeding acceptable limits.

VI. Other

- A. LOQ was reviewed and found compliant.

TOTAL ORGANIC CARBON (Method 415.1)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation and ICV were reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. Duplicate

- A. The field duplicate precision could not be evaluated. Analysis results were both detected less than the quantitation limits. LCS duplicate was also analyzed. The results were reviewed and found to be compliant.

VII. Other

- A. LOQ was reviewed and found compliant.

TOTAL SUSPENDED SOLIDS (Method 160.2)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. Field duplicate results could not be evaluated, both were less than detectable. A LCS duplicate was analyzed and results found to be in compliance.

VI. Other

- A. LOQ was reviewed and found compliant.

DATA QUALIFICATION SUMMARY

CCWS-62, Former STP Percolation Ditches, SDG L12070327, two samples plus field duplicate: MPL10-0712-1, MPL13-0712-1, and MPL13-0712-2.

Metals – Data Qualification Summary

No sample data were qualified in this SDG.

Anions – Data Qualification Summary

No sample data were qualified in this SDG

Cyanide – Data Qualification Summary

No sample data were qualified in this SDG.

General and Wet Chemistry – Data Qualification Summary

Total dissolved solids in the parent sample and field duplicate MPL13-0712-1 and MPL13-0712-2, were qualified as estimated values “J” with reason code “FD” as field duplicate precision was greater than 40 RPD.

OVERALL ASSESSMENT OF DATA

I. Compliance with method and project requirements

- A. All analyses were performed within the analytical methods specifications and project requirements.

II. Usability

- A. Based on the quality control criteria reviewed, all unqualified data are usable for project purposes. No data results were rejected as unusable. Data qualifiers assigned by the laboratory in the analytical report include the “J” qualifier when analytes were identified but at concentrations less than the LOQ. Estimated results are usable for limited purposes.

III. Duplicate Sample Precision

Method	Parameter	MPL13-0712-1		MPL13-0712-2		RPD
6010B	Beryllium	0.002	u	0.002	u	NC
6010B	Calcium	41.1	b	40.4	b	1.7%
6010B	Magnesium	6.88		6.73		2.2%
6010B	Potassium	2.11		2.07		1.9%
6010B	Sodium	21.9		21.6		1.4%
6010B	Tin	0.5	u	0.5	u	NC
6010B	Vanadium	0.00722	j	0.0069	j	NC
6010B	Zinc	0.02	u	0.02	u	NC
6020	Antimony	0.001	u	0.001	u	NC
6020	Arsenic	0.00132		0.00133		0.8%
6020	Barium	0.0977		0.0974		0.3%
6020	Cadmium	0.0006	u	0.0006	u	NC
6020	Chromium	0.00223		0.00261		15.7%
6020	Cobalt	0.001	u	0.001	u	NC
6020	Copper	0.002	u	0.002	u	NC
6020	Lead	0.001	u	0.001	u	NC
6020	Manganese	0.002	u	0.0014	j	NC
6020	Nickel	0.004	u	0.004	u	NC
6020	Selenium	0.00475		0.0049		3.1%
6020	Silver	0.001	u	0.001	u	NC
6020	Thallium	0.00011	j	0.0002	u	NC
7470A	Mercury	0.0002	u	0.0002	u	NC
300.0	Chloride	35.2		32.2		8.9%
300.0	Fluoride	0.258		0.261		1.2%
300.0	Sulfate	56.9		57.2		0.5%
9040	pH	7.85		7.87		0.3%
310.2	Alkalinity, total	76.2		70.9		7.2%
9014	Cyanide	0.110		0.119		7.9%
120.1	Conductivity	405		402		0.7%
350.1	Ammonia, as N	0.100	u	0.0891	j	NC
353.2	Nitrate-Nitrite, as N	5.02		4.89		2.6%
SM4500-P-E-20th	Orthophosphate	0.05	u	0.05	u	NC
160.1	Total Dissolved Solids	246		382		43.3%
415.1	Total Organic Carbon	0.716	j	0.686	j	NC
160.2	Total Suspended Solids	5	u	5.00	u	NC

COC No. A 30682

158 Starlite Drive
Marietta, OH 45750



Phone: 740-373-4071
Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: **Shaw / Zia**

Project Contact: **Mark Lyon** Contact Phone #: **505-262-8920**

Turn Around Requirements: **Normal** Location: **WSMR STP**

Project ID: **WSMR STP SAMU 82**

Sampler (print): **Allison Jenness** Signature: *[Signature]*

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*
MPL05-0712-1	X	X	7-11-12	0927	W
MPL18-0712-1	X	X	7-11-12	1014	W
MPL16-0712-1	X	X	7-11-12	1212	W

Hold	ANIONS (Cl, F, SO4)	Conductivity	pH	PO4	CN- Total	CN- Amenable	CN- WAD - Free	Metals	TSS - TDS	Alkalinity	NH3	NO3-NO2	TOC	X No, K, Ca, Mg, Mn	TOTAL # (LAB USE)	Program		ADDITIONAL REQUIREMENTS
																<input type="checkbox"/> CWA	<input type="checkbox"/> RCRA	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
	X	X	X	X	X	X	X	X	X	X	X	X	X	X				

Relinquished by: *[Signature]* Date: **7-11-12** Time: **1600** Received (Signature): *[Signature]*

Relinquished by: *[Signature]* Date: **7-11-12** Time: **10:33** Received (Signature): *[Signature]*

By: ROSEMARY SCOTT

Microbac OVD
Received: 07/12/2012 10:33
By: ROSEMARY SCOTT

221000026688

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

DATA VALIDATION REPORT
MICROBAC LABORATORY SDG L12070328

Project / Site Name: Environmental Remediation Services at White Sands Missile Range (WSMR), NM; CCWS-62, Former STP Percolation Ditches

Project No.: 139791

Data Reviewer: M. Lyon, Shaw Environmental, Inc.

Review Date: August 9, 2012

Matrix: Groundwater, 4 samples and extra volume for MS/MSD

Parameters: Metals 6010B/6020/7470A
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Total Dissolved Solids 160.1/SM2540C
Total Organic Carbon 415.1
Total Suspended Solids 160.2

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc. Ohio Valley Division

Sample Delivery Group L12070328

Sample Nos.: MPL05-0712-1, MPL18-0712-1, MPL16-0712-1, and MPL17-0712-1

Comments: Extra sample volume submitted for MS/MSD on MPL17-0712-1. Trip blank sample not applicable.

The data were reviewed and qualified according to the *Sampling and Analysis Plan/Quality Assurance Project Plan, Environmental Remediation Services, White Sands Missile Range, New Mexico October 2010; Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 4.2, 2010*; laboratory-specific statistical process control criteria, and the analytical method specific requirements.

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- * Laboratory control sample / blank spike
- * Field duplicate
- * Internal standard performance
- Target compound identification
- Tentatively identified compounds
- Compound quantitation
- Reported detection limits
- System performance
- * Overall data assessment

Inorganic and General Chemistry Parameters

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- * Holding times
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- * Field duplicate
- * Matrix duplicate
- ICP interference check sample
- CVAA / GFAA quality controls
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- J- Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined low due to associated quality control indicators.
- J+ Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined high due to associated quality control indicators.
- N Tentatively identified. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- UN Tentatively not detected, the LOQ is estimated. The analyte was analyzed for but was not detected above the reported LOQ. However, the reported LOQ is an estimate and may not be accurate or precise.
- NJ Tentatively identified. The reported concentration is an estimate. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents the approximate concentration.
- R Rejected. The data are not usable. The presence or absence of the analyte cannot be confirmed.

DATA VALIDATION QUALIFIER REASON CODES

Reason Code	Data Quality Condition Resulting in Assigned Qualification
General Use	
FB	Field blank contamination
FD	Field duplicate evaluation criteria not met
HT	Holding time requirement was not met
PR	Preservation requirements not met
LCS	Laboratory control sample evaluation criteria not met
MB	Method blank or preparation blank contamination
RB	Rinsate blank contamination
TB	Trip blank contamination
SDL	Sample quantitation limit exceeds decision criteria and the analyte was not detected
Inorganic Methods	
CCB	Continuing calibration blank contamination
CCV	Continuing calibration verification evaluation criteria not met
D	Laboratory duplicate precision evaluation criteria not met
DL	Serial dilution results did not meet evaluation criteria
ICS	Interference check sample evaluation criteria not met
ICV	Initial calibration verification evaluation criteria not met
MS	Matrix spike recovery outside acceptance range
PDS	Post-digestion spike recovery outside acceptance range
MSA	Method of standard additions correlation coefficient < 0.995
PB	Preparation blank
Organic Methods	
CCAL	Continuing calibration evaluation criteria not met
ICAL	Initial calibration evaluation criteria not met
ID	Target compound identification criteria not met
IS	Internal standard evaluation criteria not met
MS/MSD	Matrix spike/matrix spike duplicate accuracy and/or precision criteria not met
SUR	Surrogate recovery outside acceptance range
TUNE	Instrument performance (tuning) criteria not met
P	The detected concentration difference between the primary and secondary column is greater than 25%.

**SAMPLE DELIVERY GROUP L12070328
LEVEL III DATA VALIDATION SUMMARY**

Analysis / Method	Temperature	Holding Times	Calibration	Blanks	MS/MSD	LCS	Duplicate	Serial Dilution	Other
Metals 6010B	✓	✓	✓	✓	✓	✓	NA	✓	✓
Metals 6020	✓	✓	✓	✓	✓	✓	NA	✓	✓
Mercury 7470A	✓	✓	✓	✓	✓	✓	NA	NA	✓
Anions 300.0	✓	✓	✓	✓	10	✓	NA	NA	✓
pH 9040C	✓	✓	✓	NA	NA	✓	NA	NA	NA
Alkalinity 310.2/SM2320B	✓	✓	✓	NA	NA	✓	NA	NA	NA
Cyanide; Total, Amenable, Dissociable 9014-9010C/SM4500-CN	✓	✓	✓	✓	✓	✓	NA	NA	✓
Conductivity 120.1	✓	✓	✓	✓	NA	✓	NA	NA	✓
Ammonia-N 350.1	✓	✓	✓	✓	✓	✓	NA	NA	✓
Nitrate+Nitrite-N 353.2	✓	✓	✓	✓	✓	✓	NA	NA	✓
Orthophosphate SM4500-P	✓	✓	✓	✓	✓	✓	NA	NA	✓
Total Dissolved Solids 160.1	✓	✓	NA	✓	✓	✓	NA	NA	✓
Total Organic Carbon 415.1	✓	✓	✓	✓	✓	✓	NA	NA	✓
Total Suspended Solids 160.2	✓	✓	NA	✓	20	20	✓	NA	NA

Notes:

✓ Indicates that all quality control criteria were met for the parameter(s)N/A Indicates the validation criteria is not applicable to the analysis
 If validation criteria were not met and the data were qualified, then details can be found at the page number indicated in the table.

DATA ASSESSMENT
METALS (Method 6010B)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance.

IV. Blanks

- A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance. The method contained an estimated quantity of calcium greater than the limit of detection but less than the quantitation limit. The laboratory flagged calcium results for non-compliant blank data. The concentrations of calcium in the field samples were orders of magnitude greater than the blank results. Validation qualifiers were not assigned.

V. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

- A. MS/MSD analyses were performed on sample MPL17-0712-1. Calcium recovered greater than the upper acceptance limit. Calcium result in the parent sample is qualified with “J+” for estimated result with reason code “MS.” All other metals met criteria.

VI. Laboratory Control Sample (LCS)

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG. MSD precision was compliant.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

A. Limits of Quantitation (LOQ) were reviewed and found compliant.

METALS (Method 6020)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, low-level calibration check, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were performed on sample MPL17-0712-1. All analyte recoveries and precision met acceptance limits.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG. MSD precision was compliant.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. LOQ were reviewed and found compliant.

MERCURY (Method 7470A)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were performed on sample MPL17-0712-1. All analyte recoveries and precision met acceptance limits.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG. MSD precision was compliant.

VIII. Other

- A. LOQ were reviewed and found compliant

ANIONS (Method 300.0 [9056])

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank and CCB analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were performed on sample MPL17-0712-1. Chloride recoveries were slightly greater than the upper acceptance limit while sulfate recoveries were slightly less than the lower acceptance limit. Parent sample concentrations are qualified with “J+ and J-“ reason code MS.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG. MSD precision was compliant.

VIII. Other

- A. LOQ were reviewed and found compliant

pH (Method 9040C)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. Hydrogen ion activities (pH) were measured in the field at the time of sample collection and again at the laboratory. The paired measurements show good agreement.

III. Calibration

- A. pH meter calibration at the laboratory was documented using buffer solutions pH 4, 7, and 10.

IV. LCS

- A. The LCS sample pH was measured at the laboratory and the results were acceptable.

V. Duplicate

- A. The field duplicate sample was not submitted for this SDG.

ALKALINITY (Methods 310.2 / SM2320B)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyzed on MPL17-0712-1. For alkalinity the recovery and precision results were not evaluated.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicates were also analyzed and results found to be in compliance.

CYANIDE (Methods 9014-9010C / SM4500-CN-C)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blanks were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD performed on MPL17-0712-1 showed recoveries and precision within limits.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance. Cyanide amenable to chlorination is a difference measurement which the LCS calculation accounts for inversely.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. MSD precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

CONDUCTIVITY (Method 120.1)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VI. Other

- A. LOQ was reviewed and found compliant.

AMMONIA AS NITROGEN (Method 350.1)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. MS/MSD

- A. MS/MSD performed on MPL17-0712-1 showed recoveries and precision within limits.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. MSD precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

NITRATE + NITRITE AS NITROGEN (Method 353.2)

I. Temperature

- A. Shipping cooler temperature was measured at 5 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

VI. MS/MSD

- A. MS/MSD performed on MPL17-0712-1 showed recovery for the MS and precision within limits. Recovery for the MSD was slightly less than lower acceptance limit. Validation qualifier was not assigned.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. MSD precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

ORTHOPHOSPHATE AS PHOSPHOROUS (Method SM4500-P)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD performed on MPL17-0712-1 showed recoveries and precision within limits.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate and MSD precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL DISSOLVED SOLIDS (Method 160.1)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD performed on MPL17-0712-1 showed recoveries and precision within limits.

V. LCS

- A. The LCS results were reviewed and found to be in compliance.

VI. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate and MSD precision results were found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

TOTAL ORGANIC CARBON (Method 415.1)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation and ICV were reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD performed on MPL17-0712-1 showed recoveries and precision within limits.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate and MSD precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL SUSPENDED SOLIDS (Method 160.2)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD performed on MPL17-0712-1 showed recoveries and precision exceeding acceptance limits. Suspended solids were not detected in any field sample. Validation qualifiers were not assigned.

V. LCS

- A. The LCS results recovered greater than acceptance limits. Suspended solids were not detected in any field sample. Validation qualifiers were not assigned.

VI. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision met criteria while MSD precision results were out of compliance. Suspended solids were not detected in any field sample. Validation qualifiers were not assigned.

VII. Other

- A. LOQ was reviewed and found compliant.

DATA QUALIFICATION SUMMARY

CCWS-62, Former STP Percolation Ditches, SDG L12070327, two samples plus field duplicate: MPL05-0712-1, MPL18-0712-1, MPL16-0712-1, and MPL17-0712-1.

Metals – Data Qualification Summary

No sample data were qualified in this SDG.

Anions – Data Qualification Summary

Sample MPL17-0712-1 saw chloride and sulfate qualified for matrix spike recoveries out of specifications.

Cyanide – Data Qualification Summary

No sample data were qualified in this SDG.

General and Wet Chemistry – Data Qualification Summary

No sample data were qualified in this SDG.

OVERALL ASSESSMENT OF DATA

I. Compliance with method and project requirements

- A. All analyses were performed within the analytical methods specifications and project requirements.

II. Usability

- A. Based on the quality control criteria reviewed, all unqualified data are usable for project purposes. No data results were rejected as unusable. Data qualifiers assigned by the laboratory in the analytical report include the “J” qualifier when analytes were identified but at concentrations less than the LOQ. Estimated results are usable for limited purposes.

COC No. A 30684

158 Starlite Drive
Marietta, OH 45750



Phone: 740-373-4071
Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: Shaw / Zia
 Project Contact: Mark Lyon Contact Phone #: 505-262-8920
 Turn Around Requirements: Normal Location: WSMR STP
 Project ID: WSMR STP SWMU 82
 Sampler (print): Allison Jenness Signature: [Signature]

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold
TYO-0712-1	X	X	7-12-12	0955	W	8	
MPL 07-0712-1	X	X	7-12-12	1110	W	8	
MPL 06-0712-1	X	X	7-12-12	1218	W	11	
MPL 06-0712-TB	X	X	7-12-12	1218	W	3	
MPL 26-0712-1	X	X	7-12-12	1350	W	8	

Program	ADDITIONAL REQUIREMENTS	TOTAL # (LAB USE)	ANIONS (Cl, F, SO4)	Conductivity	pH	PO4	CN - Total	CN - Amenable	CN - WAD - Free	Metals	TSS - TDS	Alkalinity	NH3	NO3-NO2	TDC	Na, K, Ca, Mg, Mn	VOCs	
<input type="checkbox"/> CWA			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
<input type="checkbox"/> RCRA			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
<input type="checkbox"/> DOD			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
<input type="checkbox"/> AFCEE			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
<input type="checkbox"/> Other			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	TRIP blank

Relinquished by: (Signature) Big Red Date 1600 Time (S)
 Relinquished by: (Signature) _____ Date _____ Time (S)
 Received by: (Signature) _____ Date _____ Time (S)
 Remarks: _____

Microbac OVD
 Received: 07/13/2012 10:15
 By: GARA STRICKLER
 221000026716
 [Barcode]

Cara Strickler

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

DATA VALIDATION REPORT
MICROBAC LABORATORY SDG L12070373

Project / Site Name: Environmental Remediation Services at White Sands Missile Range (WSMR), NM; CCWS-62, Former STP Percolation Ditches

Project No.: 139791

Data Reviewer: M. Lyon, Shaw Environmental, Inc.

Review Date: August 9, 2012

Matrix: Groundwater, 4

Parameters: Volatile Organic Compounds (VOC) 8260B
Metals 6010B/6020/7470A
Anions 300.0
pH 9040C
Alkalinity 310.2
Cyanide 9014/9010C/SM4500-CN-C, G/SM4500-CN-I
Conductivity 120.1
Ammonia-Nitrogen 350.1
Nitrate+Nitrite-Nitrogen 353.2
Orthophosphate SM4500-P-E-20th
Total Dissolved Solids 160.1/SM2540C
Total Organic Carbon 415.1
Total Suspended Solids 160.2

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc. Ohio Valley Division

Sample Delivery Group: L12070373

Sample Nos.: T40-0712-1, MPL07-0712-1, MPL06-0712-1, and MPL26-0712-1

Comments: Trip blank sample MPL06-0712-TB submitted.

The data were reviewed and qualified according to the *Sampling and Analysis Plan/Quality Assurance Project Plan, Environmental Remediation Services, White Sands Missile Range, New Mexico October 2010; Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 4.2, 2010*; laboratory-specific statistical process control criteria, and the analytical method specific requirements.

DATA VALIDATION REQUIREMENTS

Level IV or Full Validation includes all parameters listed below. Level III Cursory Validation parameters are indicated by an asterisk (*).

Organic Parameters

- * Temperature
- * Holding times
- GC/MS instrument performance check
- * Initial and continuing calibrations
- * Blanks
- * Surrogate recoveries
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Internal standard performance
- Target compound identification
- Tentatively identified compounds
- Compound quantitation
- Reported detection limits
- System performance
- * Overall data assessment

Inorganic and General Chemistry Parameters

- * Temperature
- * Holding times
- * Initial and continuing calibration
- * Blanks
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Matrix duplicate
- ICP interference check sample
- CVAA / GFAA quality controls
- * ICP serial dilution
- Sample results verification
- Analyte quantitation
- Reported detection limits
- * Overall data assessment

DATA VALIDATION QUALIFIER DEFINITIONS

No qualifier indicates that the data are acceptable both qualitatively and quantitatively.

- U Not detected. The analyte was analyzed for but was not detected above the level of the associated value. The associated value is the Limit of Quantitation (LOQ).
- J Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is in determinable.
- J- Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined low due to associated quality control indicators.
- J+ Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined high due to associated quality control indicators.
- N Tentatively identified. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- UN Tentatively not detected, the LOQ is estimated. The analyte was analyzed for but was not detected above the reported LOQ. However, the reported LOQ is an estimate and may not be accurate or precise.
- NJ Tentatively identified. The reported concentration is an estimate. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents the approximate concentration.
- R Rejected. The data are not usable. The presence or absence of the analyte cannot be confirmed.

DATA VALIDATION QUALIFIER REASON CODES

Reason Code	Data Quality Condition Resulting in Assigned Qualification
General Use	
FB	Field blank contamination
FD	Field duplicate evaluation criteria not met
HT	Holding time requirement was not met
PR	Preservation requirements not met
LCS	Laboratory control sample evaluation criteria not met
MB	Method blank or preparation blank contamination
RB	Rinsate blank contamination
TB	Trip blank contamination
SDL	Sample quantitation limit exceeds decision criteria and the analyte was not detected
Inorganic Methods	
CCB	Continuing calibration blank contamination
CCV	Continuing calibration verification evaluation criteria not met
D	Laboratory duplicate precision evaluation criteria not met
DL	Serial dilution results did not meet evaluation criteria
ICS	Interference check sample evaluation criteria not met
ICV	Initial calibration verification evaluation criteria not met
MS	Matrix spike recovery outside acceptance range
PDS	Post-digestion spike recovery outside acceptance range
MSA	Method of standard additions correlation coefficient < 0.995
PB	Preparation blank
Organic Methods	
CCAL	Continuing calibration evaluation criteria not met
ICAL	Initial calibration evaluation criteria not met
ID	Target compound identification criteria not met
IS	Internal standard evaluation criteria not met
MS/MSD	Matrix spike/matrix spike duplicate accuracy and/or precision criteria not met
SUR	Surrogate recovery outside acceptance range
TUNE	Instrument performance (tuning) criteria not met
P	The detected concentration difference between the primary and secondary column is greater than 25%.

**SAMPLE DELIVERY GROUP L12070373
LEVEL III DATA VALIDATION SUMMARY**

Analysis / Method	Temperature	Holding Times	Calibration	Blanks	MS/MSD	LCS	Duplicate	Serial Dilution	Other
VOC 8260B	✓	✓	✓	✓	NA	✓	NA	NA	✓
Metals 6010B	✓	✓	✓	✓	NA	✓	NA	✓	✓
Metals 6020	✓	✓	✓	✓	NA	✓	NA	NA	✓
Mercury 7470A	✓	✓	✓	✓	NA	✓	NA	NA	✓
Anions 300.0	✓	✓	✓	✓	NA	✓	NA	NA	✓
pH 9040C	✓	✓	✓	NA	NA	✓	NA	NA	NA
Alkalinity 310.2/SM2320B	✓	✓	✓	NA	NA	✓	NA	NA	NA
Cyanide; Total, Amenable, Dissociable 9014-9010C/SM4500-CN	✓	✓	✓	✓	NA	✓	NA	NA	✓
Conductivity 120.1	✓	✓	✓	NA	NA	✓	NA	NA	✓
Ammonia-N 350.1	✓	✓	✓	✓	NA	✓	NA	NA	✓
Nitrate+Nitrite-N 353.2	✓	✓	✓	✓	NA	✓	NA	NA	✓
Orthophosphate SM4500-P	✓	✓	✓	✓	NA	✓	NA	NA	✓
Total Dissolved Solids 160.1	✓	✓	NA	✓	NA	✓	NA	NA	✓
Total Organic Carbon 415.1	✓	✓	✓	✓	NA	✓	NA	NA	✓
Total Suspended Solids 160.2	✓	✓	NA	✓	NA	✓	✓	NA	NA

Notes:

✓ Indicates that all quality control criteria were met for the parameter(s)

N/A Indicates the validation criteria is not applicable to the analysis

If validation criteria were not met and the data were qualified, then details can be found at the page number indicated in the table.

DATA ASSESSMENT

VOC (Method 8260B)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Instrument tune, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance with exceptions. Vinyl chloride failed to meet percent difference criteria in the alternative source check. Chloromethane and vinyl acetate did not meet criteria percent difference criteria in a CCV. Validation qualifiers were not assigned.

IV. Blanks

- A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance.

V. Surrogate Spike / Matrix Spike / Matrix Spike Duplicate (MS/MSD)

- A. Surrogate spike recoveries met criteria in all samples. MS/MSD analyses were not reported for this SDG.

VI. Laboratory Control Sample (LCS)

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. Precision measures in the LCS duplicate were acceptable.

VIII. Other

- A. Internal standard areas and retention times met acceptance criteria. Limits of Quantitation (LOQ) were reviewed and found compliant.

METALS (Method 6010B)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance.

IV. Blanks

- A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance. The method contained an estimated quantity of calcium greater than the limit of detection but less than the quantitation limit. The laboratory flagged calcium results for non-compliant blank data. The concentrations of calcium in the field samples were orders of magnitude greater than the blank results. Validation qualifiers were not assigned.

V. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

- A. MS/MSD analyses were performed in the applicable analytical batch on sample noted as internal laboratory QC (not a WSMR groundwater sample). These data were not evaluated and validation qualifiers were not assigned.

VI. Laboratory Control Sample (LCS)

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. Precision measures for the MSD were acceptable.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. Limits of Quantitation (LOQ) were reviewed and found compliant.

METALS (Method 6020)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, low-level calibration check, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were performed in the applicable analytical batch on a sample identified as internal laboratory QC (not a WSMR groundwater sample). These data were not evaluated and validation qualifiers were not assigned.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. . Precision measures for the MSD were acceptable.

VIII. Serial Dilution

- A. Serial dilution results was not reported due to an instrument malfunction.

IX. Other

- A. LOQ were reviewed and found compliant.

MERCURY (Method 7470A)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were performed in the applicable analytical batch on a sample noted to be internal laboratory QC (not a WSMR groundwater sample). These data were not evaluated and validation qualifiers were not assigned..

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. Precision measures for the MSD were acceptable.

VIII. Other

- A. LOQ were reviewed and found compliant

ANIONS (Method 300.0 [9056])

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank and CCB analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ were reviewed and found compliant. Sample MPL260712-1 had high target anion content, chloride and sulfate, which required dilution prior to analysis. Consequently the limit of detection for fluoride increased an order of magnitude. Fluoride was not detected in the sample.

pH (Method 9040C)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. Hydrogen ion activities (pH) were measured in the field at the time of sample collection and again at the. The paired measurements show good agreement with 0.5 standard units difference. Data validation qualifiers were not assigned.

III. Calibration

- A. pH meter calibration at the laboratory was documented using buffer solutions pH 4, 7, and 10.

IV. LCS

- A. The LCS sample pH was measured at the laboratory and the results were acceptable.

V. Duplicate

- A. The field duplicate sample was not submitted for this SDG. A laboratory duplicate showed precision RPD less than one.

ALKALINITY (Methods 310.2 / SM2320B)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance.

VI. Duplicate

- A. The field duplicate sample was not submitted for this SDG. A LCS duplicate showed acceptable precision.

CYANIDE (Methods 9014-9010C / SM4500-CN-C)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blanks were reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance. Cyanide amenable to chlorination is a difference measurement which the LCS calculation accounts for inversely.

VI. Duplicate

- A. The field duplicate sample was not submitted for this SDG.

VII. Other

- A. LOQ was reviewed and found compliant.

CONDUCTIVITY (Method 120.1)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. The field duplicate sample was not submitted for this SDG.

VI. Other

- A. LOQ was reviewed and found compliant.

AMMONIA AS NITROGEN (Method 350.1)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. Duplicate

- A. The field duplicate sample was not submitted for this SDG.

VII. Other

- A. LOQ was reviewed and found compliant.

NITRATE + NITRITE AS NITROGEN (Method 353.2)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. Duplicate

- A. The field duplicate sample was not submitted for this SDG. The LCS duplicate showed acceptable precision.

VII. Other

- A. LOQ was reviewed and found compliant.

ORTHOPHOSPHATE AS PHOSPHOROUS (Method SM4500-P)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. Duplicate

- A. The field duplicate sample was not submitted for this SDG. The LCS duplicate showed acceptable precision.

VII. Other

- A. LOQ was reviewed and found compliant.

TOTAL DISSOLVED SOLIDS (Method 160.1)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. The field duplicate sample was not submitted for this SDG. The LCS duplicate showed acceptable precision.

VI. Other

- A. LOQ was reviewed and found compliant.

TOTAL ORGANIC CARBON (Method 415.1)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation and ICV were reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. Duplicate

- A. The field duplicate sample was not submitted for this SDG. The LCS duplicate showed acceptable precision.

VII. Other

- A. LOQ was reviewed and found compliant.

TOTAL SUSPENDED SOLIDS (Method 160.2)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. The field duplicate sample was not submitted for this SDG. The LCS duplicate showed acceptable precision.

VI. Other

- A. LOQ was reviewed and found compliant.

DATA QUALIFICATION SUMMARY

CCWS-62, Former STP Percolation Ditches, SDG L12070373, four samples:
T40-0712-1, MPL07-0712-1, MPL06-0712-1, and MPL26-0712-1.

Metals – Data Qualification Summary

No sample data were qualified in this SDG.

Anions – Data Qualification Summary

No sample data were qualified in this SDG

Cyanide – Data Qualification Summary

No sample data were qualified in this SDG.

General and Wet Chemistry – Data Qualification Summary

No sample data were qualified in this SDG.

OVERALL ASSESSMENT OF DATA

I. Compliance with method and project requirements

- A. All analyses were performed within the analytical methods specifications and project requirements.

II. Usability

- A. Based on the quality control criteria reviewed, all unqualified data are usable for project purposes. No data results were rejected as unusable. Data qualifiers assigned by the laboratory in the analytical report include the “J” qualifier when analytes were identified but at concentrations less than the LOQ. Estimated results are usable for limited purposes.

COC No. A 30685

158 Starlite Drive
Marietta, OH 45750



Phone: 740-373-4071
Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: Shaw / Zia
 Project Contact: Mark Lyon Contact Phone #: 505-262-8920
 Turn Around Requirements: Normal Location: WSMR STP
 Project ID: WSMR STP SWMU 82
 Sampler (print): Allison Jenness Signature: [Signature]

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	Hold	Anions (F, Cl, SO4)	Conductivity	pH	PO4	CN-Total	CN-Amenable	CN-WAD-Free	Metals	TSS-TDS	Alkalinity	NH3	NO3-NO2	TDC	K, Ca, Mg, Mn	TOTAL # (LAB USE)	Program		ADDITIONAL REQUIREMENTS
																						<input type="checkbox"/> CWA	<input type="checkbox"/> RCRA	
MPL 29-0712-1	X	X	7-13-12	1143	W	8	X	X	X	X	X	X	X	X	X	X	X	X	X	X		<input type="checkbox"/> CWA	<input type="checkbox"/> RCRA	
MPL 30-0712-1	X	X	7-13-12	1323	W	8	X	X	X	X	X	X	X	X	X	X	X	X	X	X		<input type="checkbox"/> CWA	<input type="checkbox"/> RCRA	

Microbac OVD

Received: 07/14/2012 09:10
By: CARA STRICKLER

221000026764

Relinquished by: [Signature] Date: 7-13-12 Time: 1000 Received by: [Signature]
 Relinquished by: [Signature] Date: _____ Time: _____ Received by: [Signature]

Remarks: Cara Strickler

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

DATA VALIDATION REPORT
MICROBAC LABORATORY SDG L12070425

Project / Site Name: Environmental Remediation Services at White Sands Missile Range (WSMR), NM; CCWS-62, Former STP Percolation Ditches

Project No.: 139791

Data Reviewer: M. Lyon, Shaw Environmental, Inc.

Review Date: August 14, 2012

Matrix: Groundwater, 2 samples

Parameters: Metals 6010B/6020/7470A
Anions 300.0
pH 9040C
Alkalinity 310.2
Cyanide 9014/9010C/SM4500-CN-C, G/SM4500-CN-I
Conductivity 120.1
Ammonia-Nitrogen 350.1
Nitrate+Nitrite-Nitrogen 353.2
Orthophosphate SM4500-P-E-20th
Total Dissolved Solids 160.1/SM2540C
Total Organic Carbon 415.1
Total Suspended Solids 160.2

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc. Ohio Valley Division

Sample Delivery Group L12070425

Sample Nos.: MPL29-0712-1 and MPL30-0712-1

Comments: Trip blank sample not applicable.

The data were reviewed and qualified according to the *Sampling and Analysis Plan/Quality Assurance Project Plan, Environmental Remediation Services, White Sands Missile Range, New Mexico October 2010; Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 4.2, 2010*; laboratory-specific statistical process control criteria, and the analytical method specific requirements.

DATA VALIDATION REQUIREMENTS

Level IV or Full Validation includes all parameters listed below. Level III Cursory Validation parameters are indicated by an asterisk (*).

Organic Parameters

- * Temperature
- * Holding times
- GC/MS instrument performance check
- * Initial and continuing calibrations
- * Blanks
- * Surrogate recoveries
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Internal standard performance
- Target compound identification
- Tentatively identified compounds
- Compound quantitation
- Reported detection limits
- System performance
- * Overall data assessment

Inorganic and General Chemistry Parameters

- * Temperature
- * Holding times
- * Initial and continuing calibration
- * Blanks
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Matrix duplicate
- ICP interference check sample
- CVAA / GFAA quality controls
- * ICP serial dilution
- Sample results verification
- Analyte quantitation
- Reported detection limits
- * Overall data assessment

DATA VALIDATION QUALIFIER DEFINITIONS

No qualifier indicates that the data are acceptable both qualitatively and quantitatively.

- U Not detected. The analyte was analyzed for but was not detected above the level of the associated value. The associated value is the Limit of Quantitation (LOQ).
- J Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is in determinable.
- J- Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined low due to associated quality control indicators.
- J+ Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined high due to associated quality control indicators.
- N Tentatively identified. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- UN Tentatively not detected, the LOQ is estimated. The analyte was analyzed for but was not detected above the reported LOQ. However, the reported LOQ is an estimate and may not be accurate or precise.
- NJ Tentatively identified. The reported concentration is an estimate. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents the approximate concentration.
- R Rejected. The data are not usable. The presence or absence of the analyte cannot be confirmed.

DATA VALIDATION QUALIFIER REASON CODES

Reason Code	Data Quality Condition Resulting in Assigned Qualification
General Use	
FB	Field blank contamination
FD	Field duplicate evaluation criteria not met
HT	Holding time requirement was not met
PR	Preservation requirements not met
LCS	Laboratory control sample evaluation criteria not met
MB	Method blank or preparation blank contamination
RB	Rinsate blank contamination
TB	Trip blank contamination
SDL	Sample quantitation limit exceeds decision criteria and the analyte was not detected
Inorganic Methods	
CCB	Continuing calibration blank contamination
CCV	Continuing calibration verification evaluation criteria not met
D	Laboratory duplicate precision evaluation criteria not met
DL	Serial dilution results did not meet evaluation criteria
ICS	Interference check sample evaluation criteria not met
ICV	Initial calibration verification evaluation criteria not met
MS	Matrix spike recovery outside acceptance range
PDS	Post-digestion spike recovery outside acceptance range
MSA	Method of standard additions correlation coefficient < 0.995
PB	Preparation blank
Organic Methods	
CCAL	Continuing calibration evaluation criteria not met
ICAL	Initial calibration evaluation criteria not met
ID	Target compound identification criteria not met
IS	Internal standard evaluation criteria not met
MS/MSD	Matrix spike/matrix spike duplicate accuracy and/or precision criteria not met
SUR	Surrogate recovery outside acceptance range
TUNE	Instrument performance (tuning) criteria not met
P	The detected concentration difference between the primary and secondary column is greater than 25%.

**SAMPLE DELIVERY GROUP L12070425
LEVEL III DATA VALIDATION SUMMARY**

Analysis / Method	Temperature	Holding Times	Calibration	Blanks	MS/MSD	LCS	Duplicate	Serial Dilution	Other
Metals 6010B	✓	✓	✓	✓	NA	✓	NA	✓	✓
Metals 6020	✓	✓	✓	✓	NA	✓	NA	✓	✓
Mercury 7470A	✓	✓	✓	✓	NA	✓	NA	NA	✓
Anions 300.0	✓	✓	✓	✓	NA	✓	NA	NA	✓
pH 9040C	✓	✓	✓	NA	NA	✓	NA	NA	NA
Alkalinity 310.2/SM2320B	✓	✓	✓	✓	NA	✓	NA	NA	NA
Cyanide; Total, Amenable, Dissociable 9014-9010C/SM4500-CN	✓	✓	✓	✓	NA	✓	NA	NA	✓
Conductivity 120.1	✓	✓	✓	✓	NA	✓	NA	NA	✓
Ammonia-N 350.1	✓	✓	✓	✓	NA	✓	NA	NA	✓
Nitrate+Nitrite-N 353.2	✓	✓	✓	✓	NA	✓	NA	NA	✓
Orthophosphate SM4500-P	✓	✓	✓	✓	NA	✓	NA	NA	✓
Total Dissolved Solids 160.1	✓	✓	NA	✓	NA	✓	NA	NA	NA
Total Organic Carbon 415.1	✓	✓	NA	✓	NA	✓	NA	NA	NA
Total Suspended Solids 160.2	✓	✓	NA	✓	NA	✓	✓	NA	NA

Notes:

✓ Indicates that all quality control criteria were met for the parameter(s)N/A Indicates the validation criteria is not applicable to the analysis
If validation criteria were not met and the data were qualified, then details can be found at the page number indicated in the table.

DATA ASSESSMENT
METALS (Method 6010B)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance.

IV. Blanks

- A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance.

V. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

- A. MS/MSD analyses were performed on an internal laboratory quality control sample, i.e., not a WSMR project sample, for this SDG. MS/MSD recoveries met acceptance limits or parent sample concentrations exceeded spike level by more than four times invalidating the quality measurements. Validation qualifiers were not assigned.

VI. Laboratory Control Sample (LCS)

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG. MSD precision was compliant.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. Limits of Quantitation (LOQ) were reviewed and found compliant.

METALS (Method 6020)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, low-level calibration check, and CCV were reviewed and found to be in compliance. As narrated by the laboratory, silver was reanalyzed on a later compliant CCV after failure of an earlier CCV. All analytes were reported from compliant calibration checks.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. LOQ were reviewed and found compliant.

MERCURY (Method 7470A)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were performed on an internal laboratory quality control sample, i.e., not a WSMR project sample, for this SDG. Validation qualifiers were not assigned.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG

VIII. Other

- A. LOQ were reviewed and found compliant

ANIONS (Method 300.0 [9056])

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank and CCB analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG

VIII. Other

- A. LOQ were reviewed and found compliant

pH (Method 9040C)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. Hydrogen ion activities (pH) were measured in the field at the time of sample collection and again at the laboratory. The paired measurements show good agreement.

III. Calibration

- A. pH meter calibration at the laboratory was documented using buffer solutions pH 4, 7, and 10.

IV. LCS

- A. The LCS sample pH was measured at the laboratory and the results were acceptable.

V. Duplicate

- A. The field duplicate sample was not submitted for this SDG.

ALKALINITY (Methods 310.2 / SM2320B)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicates were also analyzed and results found to be in compliance.

CYANIDE (Methods 9014-9010C / SM4500-CN-C)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blanks were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance. Cyanide amenable to chlorination is a difference measurement which the LCS calculation accounts for inversely.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ was reviewed and found compliant.

CONDUCTIVITY (Method 120.1)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VI. Other

- A. LOQ was reviewed and found compliant.

AMMONIA AS NITROGEN (Method 350.1)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. MS/MSD

- A. MS/MSD were not reported for this SDG.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

NITRATE + NITRITE AS NITROGEN (Method 353.2)

I. Temperature

- A. Shipping cooler temperature was measured at 0°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

VI. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

ORTHOPHOSPHATE AS PHOSPHOROUS (Method SM4500-P)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL DISSOLVED SOLIDS (Method 160.1)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD were not reported for this SDG.

V. LCS

- A. The LCS results were reviewed and found to be in compliance.

VI. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

TOTAL ORGANIC CARBON (Method 415.1)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation and ICV were reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL SUSPENDED SOLIDS (Method 160.2)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD were not reported for this SDG.

V. LCS

- A. The LCS results recovered within the acceptance limits.

VI. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision slightly exceeded the laboratory 10 RPD limit. Validation qualifiers were not assigned.

VII. Other

- A. LOQ was reviewed and found compliant.

DATA QUALIFICATION SUMMARY

CCWS-62, Former STP Percolation Ditches, SDG L12070425, two samples:
MPL29-0712-1 and MPL30-0712-1.

Metals – Data Qualification Summary

No sample data were qualified in this SDG.

Anions – Data Qualification Summary

No sample data were qualified in this SDG.

Cyanide – Data Qualification Summary

No sample data were qualified in this SDG.

General and Wet Chemistry – Data Qualification Summary

No sample data were qualified in this SDG.

OVERALL ASSESSMENT OF DATA

I. Compliance with method and project requirements

- A. All analyses were performed within the analytical methods specifications and project requirements.

II. Usability

- A. Based on the quality control criteria reviewed, all unqualified data are usable for project purposes. No data results were rejected as unusable. Data qualifiers assigned by the laboratory in the analytical report include the “J” qualifier when analytes were identified but at concentrations less than the LOQ. Estimated results are usable for limited purposes.

COC No. A 30686

158 Starlite Drive
Marietta, OH 45750



Phone: 740-373-4071
Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: **Shaw / Zia**

Project Contact: **Mark Lyon**
Contact Phone #: **505-262-8920**

Turn Around Requirements: **NORMAL**
Location: **WSMR STP**

Project ID: **WSMR STP**
Sampler (print): **Allison Jenness**
Signature: *[Signature]*

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*
MPL 03-0712-1	X	X	7-17-12	1842	W
MPL 03-0712-2	X	X	7-17-12	1242	W

Hold	ANIONS (Cl, F, SO4)	Conductivity	PH	PO4	CN-Total	CN-Amenable	CN-WAD-Free	Metals	TSS-TDS	Alkalinity	NH3	NO3-NO2	TOC	Na, K, Ca, Mg, Mn	TOTAL # (LAB USE)
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Program
 CWA
 RCRA
 DOD
 AFCEE
 Other

ADDITIONAL REQUIREMENTS

Relinquished by: *[Signature]*
Date: 7-17-12 Time: 1700

Relinquished by: *[Signature]*
Date: 7-17-12 Time: 1700

Microbac OVD
 Received: 07/18/2012 10:59
 By: BRENDA GREENMALT
 221000026668

Remarks: *Brenda Greenmalt*

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

DATA VALIDATION REPORT
MICROBAC LABORATORY SDG L12070507

Project / Site Name: Environmental Remediation Services at White Sands Missile Range (WSMR), NM; CCWS-62, Former STP Percolation Ditches

Project No.: 139791

Data Reviewer: M. Lyon, Shaw Environmental, Inc.

Review Date: August 20, 2012

Matrix: Groundwater, one sample and one field duplicate

Parameters: Metals 6010B/6020/7470A
Anions 300.0
pH 9040C
Alkalinity 310.2
Cyanide 9014/9010C/SM4500-CN-C, G/SM4500-CN-I
Conductivity 120.1
Ammonia-Nitrogen 350.1
Nitrate+Nitrite-Nitrogen 353.2
Orthophosphate SM4500-P-E-20th
Total Dissolved Solids 160.1/SM2540C
Total Organic Carbon 415.1
Total Suspended Solids 160.2

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc. Ohio Valley Division

Sample Delivery Group L12070507

Sample Nos.: MPL23-0712-1 and MPL23-0712-2 (Field Duplicate)

Comments: Trip blank sample not applicable.

The data were reviewed and qualified according to the *Sampling and Analysis Plan/Quality Assurance Project Plan, Environmental Remediation Services, White Sands Missile Range, New Mexico October 2010*; *Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 4.2, 2010*; laboratory-specific statistical process control criteria, and the analytical method specific requirements.

DATA VALIDATION REQUIREMENTS

Level IV or Full Validation includes all parameters listed below. Level III Cursory Validation parameters are indicated by an asterisk (*).

Organic Parameters

- * Temperature
- * Holding times
- GC/MS instrument performance check
- * Initial and continuing calibrations
- * Blanks
- * Surrogate recoveries
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Internal standard performance
- Target compound identification
- Tentatively identified compounds
- Compound quantitation
- Reported detection limits
- System performance
- * Overall data assessment

Inorganic and General Chemistry Parameters

- * Temperature
- * Holding times
- * Initial and continuing calibration
- * Blanks
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Matrix duplicate
- ICP interference check sample
- CVAA / GFAA quality controls
- * ICP serial dilution
- Sample results verification
- Analyte quantitation
- Reported detection limits
- * Overall data assessment

DATA VALIDATION QUALIFIER DEFINITIONS

No qualifier indicates that the data are acceptable both qualitatively and quantitatively.

- U Not detected. The analyte was analyzed for but was not detected above the level of the associated value. The associated value is the Limit of Quantitation (LOQ).
- J Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is in determinable.
- J- Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined low due to associated quality control indicators.
- J+ Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined high due to associated quality control indicators.
- N Tentatively identified. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- UN Tentatively not detected, the LOQ is estimated. The analyte was analyzed for but was not detected above the reported LOQ. However, the reported LOQ is an estimate and may not be accurate or precise.
- NJ Tentatively identified. The reported concentration is an estimate. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents the approximate concentration.
- R Rejected. The data are not usable. The presence or absence of the analyte cannot be confirmed.

DATA VALIDATION QUALIFIER REASON CODES

Reason Code	Data Quality Condition Resulting in Assigned Qualification
General Use	
FB	Field blank contamination
FD	Field duplicate evaluation criteria not met
HT	Holding time requirement was not met
PR	Preservation requirements not met
LCS	Laboratory control sample evaluation criteria not met
MB	Method blank or preparation blank contamination
RB	Rinsate blank contamination
TB	Trip blank contamination
SDL	Sample quantitation limit exceeds decision criteria and the analyte was not detected
Inorganic Methods	
CCB	Continuing calibration blank contamination
CCV	Continuing calibration verification evaluation criteria not met
D	Laboratory duplicate precision evaluation criteria not met
DL	Serial dilution results did not meet evaluation criteria
ICS	Interference check sample evaluation criteria not met
ICV	Initial calibration verification evaluation criteria not met
MS	Matrix spike recovery outside acceptance range
PDS	Post-digestion spike recovery outside acceptance range
MSA	Method of standard additions correlation coefficient < 0.995
PB	Preparation blank
Organic Methods	
CCAL	Continuing calibration evaluation criteria not met
ICAL	Initial calibration evaluation criteria not met
ID	Target compound identification criteria not met
IS	Internal standard evaluation criteria not met
MS/MSD	Matrix spike/matrix spike duplicate accuracy and/or precision criteria not met
SUR	Surrogate recovery outside acceptance range
TUNE	Instrument performance (tuning) criteria not met
P	The detected concentration difference between the primary and secondary column is greater than 25%.

**SAMPLE DELIVERY GROUP L12070507
LEVEL III DATA VALIDATION SUMMARY**

Analysis / Method	Temperature	Holding Times	Calibration	Blanks	MS/MSD	LCS	Duplicate	Serial Dilution	Other
Metals 6010B	✓	✓	✓	✓	NA	✓	✓	✓	✓
Metals 6020	✓	✓	✓	✓	NA	✓	✓	✓	✓
Mercury 7470A	✓	✓	✓	✓	NA	✓	✓	NA	✓
Anions 300.0	✓	✓	✓	✓	NA	✓	✓	NA	✓
pH 9040C	✓	✓	✓	NA	NA	✓	✓	NA	NA
Alkalinity 310.2/SM2320B	✓	✓	✓	NA	NA	✓	✓	NA	NA
Cyanide; Total, Amenable, Dissociable 9014-9010C/SM4500-CN	✓	✓	✓	✓	NA	✓	✓	NA	✓
Conductivity 120.1	✓	✓	NA	✓	NA	✓	✓	NA	NA
Ammonia-N 350.1	✓	✓	✓	14	NA	✓	NA	NA	NA
Nitrate+Nitrite-N 353.2	✓	✓	✓	✓	NA	✓	✓	NA	NA
Orthophosphate SM4500-P	✓	✓	✓	✓	NA	✓	✓	NA	NA
Total Dissolved Solids 160.1	✓	✓	NA	✓	NA	✓	✓	NA	NA
Total Organic Carbon 415.1	✓	✓	✓	✓	NA	✓	✓	NA	NA
Total Suspended Solids 160.2	✓	✓	NA	✓	NA	✓	✓	NA	NA

Notes:

✓ Indicates that all quality control criteria were met for the parameter(s)N/A Indicates the validation criteria is not applicable to the analysis
If validation criteria were not met and the data were qualified, then details can be found at the page number indicated in the table.

DATA ASSESSMENT
METALS (Method 6010B)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance.

IV. Blanks

- A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance.

V. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

- A. MS/MSD analyses were performed on an internal laboratory quality control sample, i.e., not a WSMR project sample, for this SDG. MS/MSD recoveries met acceptance limits or parent sample concentrations exceeded spike level by more than four times invalidating the quality measurements. Validation qualifiers were not assigned.

VI. Laboratory Control Sample (LCS)

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was submitted for this SDG. Field duplicate precision of analytes quantified in both samples of the pair was less than 3 RPD. Precision was compliant.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. Limits of Quantitation (LOQ) were reviewed and found compliant.

METALS (Method 6020)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, low-level calibration check, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were performed on an internal laboratory quality control sample, i.e., not a WSMR project sample, for this SDG. MS/MSD recoveries met acceptance limits or parent sample concentrations exceeded spike level by more than four times invalidating the quality measurements. Validation qualifiers were not assigned.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was submitted for this SDG. Field duplicate precision of analytes quantified in both samples of the pair was less than 6 RPD. Precision was compliant.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. LOQ were reviewed and found compliant.

MERCURY (Method 7470A)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were performed on an internal laboratory quality control sample, i.e., not a WSMR project sample, for this SDG. Validation qualifiers were not assigned.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was submitted for this SDG. Precision could not be evaluated from the field duplicate as the analyte was not detected in either sample. MSD precision was compliant.

VIII. Other

- A. LOQ were reviewed and found compliant

ANIONS (Method 300.0 [9056])

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank and CCB analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was submitted for this SDG. Precision measurements were less than 4 RPD. Precision is acceptable.

VIII. Other

- A. LOQ were reviewed and found compliant

pH (Method 9040C)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. Hydrogen ion activities (pH) were measured in the field at the time of sample collection and again at the laboratory. The paired measurements show good agreement.

III. Calibration

- A. pH meter calibration at the laboratory was documented using buffer solutions pH 4, 7, and 10.

IV. LCS

- A. The LCS sample pH was measured at the laboratory and the results were acceptable.

V. Duplicate

- A. The field duplicate sample was submitted for this SDG. Precision measurement was compliant.

ALKALINITY (Methods 310.2 / SM2320B)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was submitted for this SDG. Field duplicate precision was acceptable.

CYANIDE (Methods 9014-9010C / SM4500-CN-C)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blanks were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance. Cyanide amenable to chlorination is a difference measurement which the LCS calculation accounts for inversely.

VII. Duplicate

- A. A field duplicate sample was submitted for this SDG. Overall precision could not be evaluated as the analyte was not detectable.

VIII. Other

- A. LOQ was reviewed and found compliant.

CONDUCTIVITY (Method 120.1)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. A field duplicate sample was submitted for this SDG. Precision results were found to be in compliance.

VI. Other

- A. LOQ was reviewed and found compliant.

AMMONIA AS NITROGEN (Method 350.1)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank contained ammonia at a concentration greater than ½ the quantitation limit. Similar concentrations for ammonia reported in the field samples were qualified “J” as estimated values with reason code “MB” for method blank.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. MS/MSD

- A. MS/MSD were not reported for this SDG.

VII. Duplicate

- A. A field duplicate sample was submitted for this SDG. Duplicate precision results could not be evaluated as quantifiable results were not reported in both samples.

VIII. Other

- A. LOQ was reviewed and found compliant.

NITRATE + NITRITE AS NITROGEN (Method 353.2)

I. Temperature

- A. Shipping cooler temperature was measured at 1°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

VI. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was submitted for this SDG. Precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

ORTHOPHOSPHATE AS PHOSPHOROUS (Method SM4500-P)

I. Temperature

A. Shipping cooler temperature was measured at 1°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

A. MS/MSD were not reported for this SDG.

VI. LCS

A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

A. A field duplicate sample was submitted for this SDG. Precision in the field duplicates could not be evaluated as both sample results were non-detect. LCS duplicate precision was compliant.

VIII. Other

A. LOQ was reviewed and found compliant.

TOTAL DISSOLVED SOLIDS (Method 160.1)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD were not reported for this SDG.

V. LCS

- A. The LCS results were reviewed and found to be in compliance.

VI. Duplicate

- A. A field duplicate sample was submitted for this SDG. Duplicate precision results were found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

TOTAL ORGANIC CARBON (Method 415.1)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation and ICV were reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was submitted for this SDG however both analysis results were below quantification levels and precision was not calculated. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL SUSPENDED SOLIDS (Method 160.2)

I. Temperature

- A. Shipping cooler temperature was measured at 1 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD were not reported for this SDG.

V. LCS

- A. The LCS results recovered within the acceptance limits.

VI. Duplicate

- A. A field duplicate sample was submitted for this SDG however both analysis results were below quantification levels and precision was not calculated. LCS duplicate precision results were found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

DATA QUALIFICATION SUMMARY

CCWS-62, Former STP Percolation Ditches, SDG L12070507, one sample and one field duplicate:

MPL23-0712-1 and MPL23-0712-2.

Metals – Data Qualification Summary

No sample data were qualified in this SDG.

Anions – Data Qualification Summary

No sample data were qualified in this SDG.

Cyanide – Data Qualification Summary

No sample data were qualified in this SDG.

General and Wet Chemistry – Data Qualification Summary

Ammonia nitrogen results were qualified for method blank contamination.

Concentrations for ammonia reported in the field samples were qualified “J” as estimated values with reason code “MB” for method blank

OVERALL ASSESSMENT OF DATA

I. Compliance with method and project requirements

- A. All analyses were performed within the analytical methods specifications and project requirements.

II. Usability

- A. Based on the quality control criteria reviewed, all unqualified data are usable for project purposes. No data results were rejected as unusable. Data qualifiers assigned by the laboratory in the analytical report include the “J” qualifier when analytes were identified but at concentrations less than the LOQ. Estimated results are usable for limited purposes.

III. Duplicate Sample Precision

Method	Parameter	MPL23-0712-1		MPL23-0712-2		RPD
6010B	Beryllium	0.002	u	0.002	u	NC
6010B	Calcium	31.1	v	32	v	2.9%
6010B	Magnesium	3.91	v	3.97	v	1.5%
6010B	Potassium	2.06	v	2.09	v	1.4%
6010B	Sodium	24.7	v	25.2	v	2.0%
6010B	Tin	0.5	u	0.5	u	NC
6010B	Vanadium	0.006	j	0.00715	j	NC
6010B	Zinc	0.0119	j	0.02	u	NC
6020	Antimony	0.001	u	0.001	u	NC
6020	Arsenic	0.00187	v	0.00186	v	0.5%
6020	Barium	0.0186	v	0.0176	v	5.5%
6020	Cadmium	0.0006	u	0.0006	u	NC
6020	Chromium	0.00484	v	0.0049	v	1.2%
6020	Cobalt	0.001	u	0.001	u	NC
6020	Copper	0.00149	j	0.002	u	NC
6020	Lead	0.001	u	0.001	u	NC
6020	Manganese	0.00125	j	0.00106	j	NC
6020	Nickel	0.004	u	0.004	u	NC
6020	Selenium	0.00217	v	0.00211	v	2.8%
6020	Silver	0.001	u	0.001	u	NC
6020	Thallium	0.0002	u	0.0002	u	NC
7470A	Mercury	0.0002	u	0.0002	u	NC

300.0	Chloride	13.4	v	13.3	v	0.7%
300.0	Fluoride	0.327	v	0.317	v	3.1%
300.0	Sulfate	54.7	v	54.1	v	1.1%
9040	pH	8.16	v	8.16	v	0.0%
310.2	Alkalinity, total	85.5	v	87.5	v	2.3%
9014	Cyanide	0.010	u	0.01	u	NC
120.1	Conductivity	336	v	361	v	7.2%
350.1	Ammonia, as N	0.106	v	0.093	j	NC
353.2	Nitrate-Nitrite, as N	1.53	v	1.57	v	2.6%
SM4500-P-E-20th	Orthophosphate	0.05	u	0.05	u	NC
160.1	Total Dissolved Solids	206	v	216	v	4.7%
415.1	Total Organic Carbon	0.778	j	0.773	j	NC
160.2	Total Suspended Solids	3.50	j	4.00	j	NC

DATA VALIDATION REPORT
MICROBAC LABORATORY SDG L12070639

Project / Site Name: Environmental Remediation Services at White Sands Missile Range (WSMR), NM; CCWS-62, Former STP Percolation Ditches

Project No.: 139791

Data Reviewer: M. Lyon, Shaw Environmental, Inc.

Review Date: August 22, 2012

Matrix: Groundwater, three samples

Parameters: Metals 6010B/6020/7470A
Anions 300.0
pH 9040C
Alkalinity 310.2
Cyanide 9014/9010C/SM4500-CN-C, G/SM4500-CN-I
Conductivity 120.1
Ammonia-Nitrogen 350.1
Nitrate+Nitrite-Nitrogen 353.2
Orthophosphate SM4500-P-E-20th
Total Dissolved Solids 160.1/SM2540C
Total Organic Carbon 415.1
Total Suspended Solids 160.2

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc. Ohio Valley Division

Sample Delivery Group L12070639

Sample Nos.: MPL24-0712-1, SWM1-0712-1, and SWM4-0712-1

Comments: Trip blank sample not applicable.

The data were reviewed and qualified according to the *Sampling and Analysis Plan/Quality Assurance Project Plan, Environmental Remediation Services, White Sands Missile Range, New Mexico October 2010; Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 4.2, 2010*; laboratory-specific statistical process control criteria, and the analytical method specific requirements.

DATA VALIDATION REQUIREMENTS

Level IV or Full Validation includes all parameters listed below. Level III Cursory Validation parameters are indicated by an asterisk (*).

Organic Parameters

- * Temperature
- * Holding times
- GC/MS instrument performance check
- * Initial and continuing calibrations
- * Blanks
- * Surrogate recoveries
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Internal standard performance
- Target compound identification
- Tentatively identified compounds
- Compound quantitation
- Reported detection limits
- System performance
- * Overall data assessment

Inorganic and General Chemistry Parameters

- * Temperature
- * Holding times
- * Initial and continuing calibration
- * Blanks
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Matrix duplicate
- ICP interference check sample
- CVAA / GFAA quality controls
- * ICP serial dilution
- Sample results verification
- Analyte quantitation
- Reported detection limits
- * Overall data assessment

DATA VALIDATION QUALIFIER DEFINITIONS

No qualifier indicates that the data are acceptable both qualitatively and quantitatively.

- U Not detected. The analyte was analyzed for but was not detected above the level of the associated value. The associated value is the Limit of Quantitation (LOQ).
- J Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is in determinable.
- J- Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined low due to associated quality control indicators.
- J+ Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined high due to associated quality control indicators.
- N Tentatively identified. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- UN Tentatively not detected, the LOQ is estimated. The analyte was analyzed for but was not detected above the reported LOQ. However, the reported LOQ is an estimate and may not be accurate or precise.
- NJ Tentatively identified. The reported concentration is an estimate. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents the approximate concentration.
- R Rejected. The data are not usable. The presence or absence of the analyte cannot be confirmed.

DATA VALIDATION QUALIFIER REASON CODES

Reason Code	Data Quality Condition Resulting in Assigned Qualification
General Use	
FB	Field blank contamination
FD	Field duplicate evaluation criteria not met
HT	Holding time requirement was not met
PR	Preservation requirements not met
LCS	Laboratory control sample evaluation criteria not met
MB	Method blank or preparation blank contamination
RB	Rinsate blank contamination
TB	Trip blank contamination
SDL	Sample quantitation limit exceeds decision criteria and the analyte was not detected
Inorganic Methods	
CCB	Continuing calibration blank contamination
CCV	Continuing calibration verification evaluation criteria not met
D	Laboratory duplicate precision evaluation criteria not met
DL	Serial dilution results did not meet evaluation criteria
ICS	Interference check sample evaluation criteria not met
ICV	Initial calibration verification evaluation criteria not met
MS	Matrix spike recovery outside acceptance range
PDS	Post-digestion spike recovery outside acceptance range
MSA	Method of standard additions correlation coefficient < 0.995
PB	Preparation blank
Organic Methods	
CCAL	Continuing calibration evaluation criteria not met
ICAL	Initial calibration evaluation criteria not met
ID	Target compound identification criteria not met
IS	Internal standard evaluation criteria not met
MS/MSD	Matrix spike/matrix spike duplicate accuracy and/or precision criteria not met
SUR	Surrogate recovery outside acceptance range
TUNE	Instrument performance (tuning) criteria not met
P	The detected concentration difference between the primary and secondary column is greater than 25%.

**SAMPLE DELIVERY GROUP L12070639
LEVEL III DATA VALIDATION SUMMARY**

Analysis / Method	Temperature	Holding Times	Calibration	Blanks	MS/MSD	LCS	Duplicate	Serial Dilution	Other
Metals 6010B	✓	✓	✓	✓	NA	✓	NA	✓	✓
Metals 6020	✓	✓	✓	✓	NA	✓	NA	✓	✓
Mercury 7470A	✓	✓	✓	✓	NA	✓	NA	NA	✓
Anions 300.0	✓	✓	✓	✓	NA	✓	NA	NA	✓
pH 9040C	✓	✓	✓	NA	NA	✓	NA	NA	NA
Alkalinity 310.2/SM2320B	✓	✓	✓	✓	NA	✓	NA	NA	NA
Cyanide; Total, Amenable, Dissociable 9014-9010C/SM4500-CN	✓	✓	✓	✓	NA	✓	NA	NA	✓
Conductivity 120.1	✓	✓	NA	✓	NA	✓	NA	NA	✓
Ammonia-N 350.1	✓	✓	✓	✓	NA	✓	NA	NA	✓
Nitrate+Nitrite-N 353.2	✓	✓	✓	✓	NA	✓	NA	NA	✓
Orthophosphate SM4500-P	✓	✓	✓	✓	NA	✓	NA	NA	✓
Total Dissolved Solids 160.1	✓	✓	NA	✓	NA	✓	NA	NA	✓
Total Organic Carbon 415.1	✓	✓	✓	✓	NA	✓	NA	NA	✓
Total Suspended Solids 160.2	✓	✓	NA	✓	NA	✓	✓	NA	NA

Notes:

✓ Indicates that all quality control criteria were met for the parameter(s)N/A Indicates the validation criteria is not applicable to the analysis
If validation criteria were not met and the data were qualified, then details can be found at the page number indicated in the table.

DATA ASSESSMENT
METALS (Method 6010B)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance.

IV. Blanks

- A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance.

V. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

- A. MS/MSD analyses were performed on an internal laboratory quality control sample, i.e., not a WSMR project sample, for this SDG. Validation qualifiers were not assigned.

VI. Laboratory Control Sample (LCS)

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG. Matrix spike duplicate precision was compliant.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. Limits of Quantitation (LOQ) were reviewed and found compliant.

METALS (Method 6020)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, low-level calibration check, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were not reported for this SDG. Validation qualifiers were not assigned.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. LOQ were reviewed and found compliant.

MERCURY (Method 7470A)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were not reported for this SDG. Validation qualifiers were not assigned.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ were reviewed and found compliant

ANIONS (Method 300.0 [9056])

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank and CCB analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ were reviewed and found compliant

pH (Method 9040C)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. Hydrogen ion activities (pH) were measured in the field at the time of sample collection and again at the laboratory. The paired measurements show good agreement.

III. Calibration

- A. pH meter calibration at the laboratory was documented using buffer solutions pH 4, 7, and 10.

IV. LCS

- A. The LCS sample pH was measured at the laboratory and the results were acceptable.

V. Duplicate

- A. The field duplicate sample was not submitted for this SDG.

ALKALINITY (Methods 310.2 / SM2320B)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision was acceptable.

CYANIDE (Methods 9014-9010C / SM4500-CN-C)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blanks were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance. Cyanide amenable to chlorination is a difference measurement which the LCS calculation accounts for inversely.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ was reviewed and found compliant.

CONDUCTIVITY (Method 120.1)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VI. Other

- A. LOQ was reviewed and found compliant.

AMMONIA AS NITROGEN (Method 350.1)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. MS/MSD

- A. MS/MSD were not reported for this SDG.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ was reviewed and found compliant.

NITRATE + NITRITE AS NITROGEN (Method 353.2)

I. Temperature

- A. Shipping cooler temperature was measured at 0°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

VI. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

ORTHOPHOSPHATE AS PHOSPHOROUS (Method SM4500-P)

I. Temperature

- A. Shipping cooler temperature was measured at 0°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision was compliant.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL DISSOLVED SOLIDS (Method 160.1)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD were not reported for this SDG.

V. LCS

- A. The LCS results were reviewed and found to be in compliance.

VI. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

TOTAL ORGANIC CARBON (Method 415.1)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation and ICV were reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL SUSPENDED SOLIDS (Method 160.2)

I. Temperature

- A. Shipping cooler temperature was measured at 0°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD were not reported for this SDG.

V. LCS

- A. The LCS results recovered within the acceptance limits.

VI. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

DATA QUALIFICATION SUMMARY

CCWS-62, Former STP Percolation Ditches, SDG L12070639, three samples:

MPL24-0712-1, SMW1-0712-1 and SMW4-0712-1.

Metals – Data Qualification Summary

No sample data were qualified in this SDG.

Anions – Data Qualification Summary

No sample data were qualified in this SDG.

Cyanide – Data Qualification Summary

No sample data were qualified in this SDG.

General and Wet Chemistry – Data Qualification Summary

No sample data were qualified in this SDG.

OVERALL ASSESSMENT OF DATA

I. Compliance with method and project requirements

- A. All analyses were performed within the analytical methods specifications and project requirements.

II. Usability

- A. Based on the quality control criteria reviewed, all unqualified data are usable for project purposes. No data results were rejected as unusable. Data qualifiers assigned by the laboratory in the analytical report include the “J” qualifier when analytes were identified but at concentrations less than the LOQ. Estimated results are usable for limited purposes.

COC No. A 30688

158 Starlite Drive
Marietta, OH 45750



Phone: 740-373-4071
Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: **SHAW/Zia**

Project Contact: **MARK LYON** Contact Phone #: **505-262-8920**

Turn Around Requirements: **NORMAL** Location: **WSMR STP**

Project ID: **WSMR STP SWMU 82**

Sampler (print): **Allison Jenness** Signature: *[Signature]*

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Anions (F, Cl, SO4)	Conductivity	pH	PO4	CN-Total	CN-Amenable	CN-WAD-Free	Metals	TSS-TDS	Alkalinity	NH3	NO3-NO2	TOC	Na, K, Ca, Mg, Mn	TOTAL # (LAB USE)	Program		ADDITIONAL REQUIREMENTS
																							<input type="checkbox"/> CWA	<input type="checkbox"/> RCRA	
MPL 21-0712-1	X	X	7-19-12	1106	W	8		X	X	X	X	X	X	X	X	X	X	X	X	X	X				
MPL 22-0712-1	X	X	7-19-12	1345	W	8		X	X	X	X	X	X	X	X	X	X	X	X	X	X				
MPL 25-0712-1	X	X	7-19-12	1540	W	8		X	X	X	X	X	X	X	X	X	X	X	X	X	X				

Microbac OVD

Received: 07/20/2012 10:42
By: ROSEMARY SCOTT

221000026987

[Signature]

Relinquished by: *[Signature]* Date: **7-19-12** Time: **1700**

Relinquished by: *[Signature]* Date: _____ Time: _____

Remarks: _____

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

DATA VALIDATION REPORT
MICROBAC LABORATORY SDG L12070640

Project / Site Name: Environmental Remediation Services at White Sands Missile Range (WSMR), NM; CCWS-62, Former STP Percolation Ditches

Project No.: 139791

Data Reviewer: M. Lyon, Shaw Environmental, Inc.

Review Date: August 27, 2012

Matrix: Groundwater, three samples

Parameters: Metals 6010B/6020/7470A
Anions 300.0
pH 9040C
Alkalinity 310.2
Cyanide 9014/9010C/SM4500-CN-C, G/SM4500-CN-I
Conductivity 120.1
Ammonia-Nitrogen 350.1
Nitrate+Nitrite-Nitrogen 353.2
Orthophosphate SM4500-P-E-20th
Total Dissolved Solids 160.1/SM2540C
Total Organic Carbon 415.1
Total Suspended Solids 160.2

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc. Ohio Valley Division

Sample Delivery Group L12070640

Sample Nos.: MPL21-0712-1, MPL22-0712-1, and MPL25-0712-1

Comments: Trip blank sample not applicable

The data were reviewed and qualified according to the *Sampling and Analysis Plan/Quality Assurance Project Plan, Environmental Remediation Services, White Sands Missile Range, New Mexico October 2010*; *Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 4.2, 2010*; laboratory-specific statistical process control criteria, and the analytical method specific requirements.

DATA VALIDATION REQUIREMENTS

Level IV or Full Validation includes all parameters listed below. Level III Cursory Validation parameters are indicated by an asterisk (*).

Organic Parameters

- * Temperature
- * Holding times
- GC/MS instrument performance check
- * Initial and continuing calibrations
- * Blanks
- * Surrogate recoveries
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Internal standard performance
- Target compound identification
- Tentatively identified compounds
- Compound quantitation
- Reported detection limits
- System performance
- * Overall data assessment

Inorganic and General Chemistry Parameters

- * Temperature
- * Holding times
- * Initial and continuing calibration
- * Blanks
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Matrix duplicate
- ICP interference check sample
- CVAA / GFAA quality controls
- * ICP serial dilution
- Sample results verification
- Analyte quantitation
- Reported detection limits
- * Overall data assessment

DATA VALIDATION QUALIFIER DEFINITIONS

No qualifier indicates that the data are acceptable both qualitatively and quantitatively.

- U Not detected. The analyte was analyzed for but was not detected above the level of the associated value. The associated value is the Limit of Quantitation (LOQ).
- J Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is in determinable.
- J- Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined low due to associated quality control indicators.
- J+ Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined high due to associated quality control indicators.
- N Tentatively identified. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- UN Tentatively not detected, the LOQ is estimated. The analyte was analyzed for but was not detected above the reported LOQ. However, the reported LOQ is an estimate and may not be accurate or precise.
- NJ Tentatively identified. The reported concentration is an estimate. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents the approximate concentration.
- R Rejected. The data are not usable. The presence or absence of the analyte cannot be confirmed.

DATA VALIDATION QUALIFIER REASON CODES

Reason Code	Data Quality Condition Resulting in Assigned Qualification
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Inorganic Methods	
CCB	Continuing calibration blank contamination
CCV	Continuing calibration verification evaluation criteria not met
D	Laboratory duplicate precision evaluation criteria not met
DL	Serial dilution results did not meet evaluation criteria
ICS	Interference check sample evaluation criteria not met
ICV	Initial calibration verification evaluation criteria not met
MS	Matrix spike recovery outside acceptance range
PDS	Post-digestion spike recovery outside acceptance range
MSA	Method of standard additions correlation coefficient < 0.995
PB	Preparation blank
Organic Methods	
CCAL	Continuing calibration evaluation criteria not met
ICAL	Initial calibration evaluation criteria not met
ID	Target compound identification criteria not met
IS	Internal standard evaluation criteria not met
MS/MSD	Matrix spike/matrix spike duplicate accuracy and/or precision criteria not met
SUR	Surrogate recovery outside acceptance range
TUNE	Instrument performance (tuning) criteria not met
P	The detected concentration difference between the primary and secondary column is greater than 25%.

**SAMPLE DELIVERY GROUP L12070640
LEVEL III DATA VALIDATION SUMMARY**

Analysis / Method	Temperature	Holding Times	Calibration	Blanks	MS/MSD	LCS	Duplicate	Serial Dilution	Other
Metals 6010B	✓	✓	✓	✓	NA	✓	NA	✓	✓
Metals 6020	✓	✓	✓	✓	NA	✓	NA	✓	✓
Mercury 7470A	✓	✓	✓	✓	NA	✓	NA	NA	✓
Anions 300.0	✓	✓	✓	✓	NA	✓	NA	NA	✓
pH 9040C	✓	✓	✓	NA	NA	✓	NA	NA	NA
Alkalinity 310.2/SM2320B	✓	✓	✓	✓	NA	✓	NA	NA	NA
Cyanide; Total, Amenable, Dissociable 9014-9010C/SM4500-CN	✓	✓	✓	✓	NA	✓	NA	NA	✓
Conductivity 120.1	✓	✓	NA	✓	NA	✓	NA	NA	NA
Ammonia-N 350.1	✓	✓	✓	✓	NA	✓	NA	NA	✓
Nitrate+Nitrite-N 353.2	✓	✓	✓	✓	NA	✓	NA	NA	✓
Orthophosphate SM4500-P	✓	✓	✓	✓	NA	✓	NA	NA	✓
Total Dissolved Solids 160.1	✓	✓	NA	✓	NA	✓	NA	NA	NA
Total Organic Carbon 415.1	✓	✓	NA	✓	NA	✓	NA	NA	NA
Total Suspended Solids 160.2	✓	✓	NA	✓	NA	✓	✓	NA	NA

Notes:

✓ Indicates that all quality control criteria were met for the parameter(s)N/A Indicates the validation criteria is not applicable to the analysis
If validation criteria were not met and the data were qualified, then details can be found at the page number indicated in the table.

DATA ASSESSMENT
METALS (Method 6010B)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance.

IV. Blanks

- A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance.

V. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

- A. MS/MSD analyses were performed on an internal laboratory quality control sample, i.e., not a WSMR project sample, for this SDG. Validation qualifiers were not assigned.

VI. Laboratory Control Sample (LCS)

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG. Matrix spike duplicate precision was compliant.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. Limits of Quantitation (LOQ) were reviewed and found compliant.

METALS (Method 6020)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, low-level calibration check, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance

V. MS/MSD

- A. MS/MSD analyses were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. LOQ were reviewed and found compliant.

MERCURY (Method 7470A)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were not reported for this SDG. Validation qualifiers were not assigned.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ were reviewed and found compliant

ANIONS (Method 300.0 [9056])

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank and CCB analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ were reviewed and found compliant

pH (Method 9040C)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. Hydrogen ion activities (pH) were measured in the field at the time of sample collection and again at the laboratory. The paired measurements show good agreement.

III. Calibration

- A. pH meter calibration at the laboratory was documented using buffer solutions pH 4, 7, and 10.

IV. LCS

- A. The LCS sample pH was measured at the laboratory and the results were acceptable.

V. Duplicate

- A. The field duplicate sample was not submitted for this SDG.

ALKALINITY (Methods 310.2 / SM2320B)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision was acceptable.

CYANIDE (Methods 9014-9010C / SM4500-CN-C)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blanks were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance. Cyanide amenable to chlorination is a difference measurement which the LCS calculation accounts for inversely.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ was reviewed and found compliant.

CONDUCTIVITY (Method 120.1)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VI. Other

- A. LOQ was reviewed and found compliant.

AMMONIA AS NITROGEN (Method 350.1)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. MS/MSD

- A. MS/MSD were not reported for this SDG.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ was reviewed and found compliant.

NITRATE + NITRITE AS NITROGEN (Method 353.2)

I. Temperature

- A. Shipping cooler temperature was measured at 3°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

VI. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

ORTHOPHOSPHATE AS PHOSPHOROUS (Method SM4500-P)

I. Temperature

- A. Shipping cooler temperature was measured at 3°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision was compliant.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL DISSOLVED SOLIDS (Method 160.1)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD were not reported for this SDG.

V. LCS

- A. The LCS results were reviewed and found to be in compliance.

VI. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

TOTAL ORGANIC CARBON (Method 415.1)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation and ICV were reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL SUSPENDED SOLIDS (Method 160.2)

I. Temperature

- A. Shipping cooler temperature was measured at 3°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD were not reported for this SDG.

V. LCS

- A. The LCS results recovered within the acceptance limits.

VI. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

DATA QUALIFICATION SUMMARY

CCWS-62, Former STP Percolation Ditches, SDG L12070640, three samples:

MPL21-0712-1, MPL22-0712-1, and MPL25-0712-1.

Metals – Data Qualification Summary

No sample data were qualified in this SDG.

Anions – Data Qualification Summary

No sample data were qualified in this SDG.

Cyanide – Data Qualification Summary

No sample data were qualified in this SDG.

General and Wet Chemistry – Data Qualification Summary

No sample data were qualified in this SDG.

OVERALL ASSESSMENT OF DATA

I. Compliance with method and project requirements

- A. All analyses were performed within the analytical methods specifications and project requirements.

II. Usability

- A. Based on the quality control criteria reviewed, all unqualified data are usable for project purposes. No data results were rejected as unusable. Data qualifiers assigned by the laboratory in the analytical report include the “J” qualifier when analytes were identified but at concentrations less than the LOQ. Estimated results are usable for limited purposes.

DATA VALIDATION REPORT
MICROBAC LABORATORY SDG L12070673

Project / Site Name: Environmental Remediation Services at White Sands Missile Range (WSMR), NM; CCWS-62, Former STP Percolation Ditches

Project No.: 139791

Data Reviewer: M. Lyon, Shaw Environmental, Inc.

Review Date: August 28, 2012

Matrix: Groundwater, two samples

Parameters: Volatile Organic Compounds 8260B
Metals 6010B/6020/7470A
Anions 300.0
pH 9040C
Alkalinity 310.2
Cyanide 9014/9010C/SM4500-CN-C, G/SM4500-CN-I
Conductivity 120.1
Ammonia-Nitrogen 350.1
Nitrate+Nitrite-Nitrogen 353.2
Orthophosphate SM4500-P-E-20th
Total Dissolved Solids 160.1/SM2540C
Total Organic Carbon 415.1
Total Suspended Solids 160.2

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc. Ohio Valley Division

Sample Delivery Group: L12070673

Sample Nos.: MPL19-0712-1 and MPL20-0712-1

Comments: Trip blank sample MLP19-0712-TB

The data were reviewed and qualified according to the *Sampling and Analysis Plan/Quality Assurance Project Plan, Environmental Remediation Services, White Sands Missile Range, New Mexico October 2010; Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 4.2, 2010*; laboratory-specific statistical process control criteria, and the analytical method specific requirements.

DATA VALIDATION REQUIREMENTS

Level IV or Full Validation includes all parameters listed below. Level III Cursory Validation parameters are indicated by an asterisk (*).

Organic Parameters

- * Temperature
- * Holding times
- GC/MS instrument performance check
- * Initial and continuing calibrations
- * Blanks
- * Surrogate recoveries
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Internal standard performance
- Target compound identification
- Tentatively identified compounds
- Compound quantitation
- Reported detection limits
- System performance
- * Overall data assessment

Inorganic and General Chemistry Parameters

- * Temperature
- * Holding times
- * Initial and continuing calibration
- * Blanks
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Matrix duplicate
- ICP interference check sample
- CVAA / GFAA quality controls
- * ICP serial dilution
- Sample results verification
- Analyte quantitation
- Reported detection limits
- * Overall data assessment

DATA VALIDATION QUALIFIER DEFINITIONS

No qualifier indicates that the data are acceptable both qualitatively and quantitatively.

- U Not detected. The analyte was analyzed for but was not detected above the level of the associated value. The associated value is the Limit of Quantitation (LOQ).
- J Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is in determinable.
- J- Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined low due to associated quality control indicators.
- J+ Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined high due to associated quality control indicators.
- N Tentatively identified. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- UN Tentatively not detected, the LOQ is estimated. The analyte was analyzed for but was not detected above the reported LOQ. However, the reported LOQ is an estimate and may not be accurate or precise.
- NJ Tentatively identified. The reported concentration is an estimate. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents the approximate concentration.
- R Rejected. The data are not usable. The presence or absence of the analyte cannot be confirmed.

DATA VALIDATION QUALIFIER REASON CODES

Reason Code	Data Quality Condition Resulting in Assigned Qualification
General Use	
FB	Field blank contamination
FD	Field duplicate evaluation criteria not met
HT	Holding time requirement was not met
PR	Preservation requirements not met
LCS	Laboratory control sample evaluation criteria not met
MB	Method blank or preparation blank contamination
RB	Rinsate blank contamination
TB	Trip blank contamination
SDL	Sample quantitation limit exceeds decision criteria and the analyte was not detected
Inorganic Methods	
CCB	Continuing calibration blank contamination
CCV	Continuing calibration verification evaluation criteria not met
D	Laboratory duplicate precision evaluation criteria not met
DL	Serial dilution results did not meet evaluation criteria
ICS	Interference check sample evaluation criteria not met
ICV	Initial calibration verification evaluation criteria not met
MS	Matrix spike recovery outside acceptance range
PDS	Post-digestion spike recovery outside acceptance range
MSA	Method of standard additions correlation coefficient < 0.995
PB	Preparation blank
Organic Methods	
CCAL	Continuing calibration evaluation criteria not met
ICAL	Initial calibration evaluation criteria not met
ID	Target compound identification criteria not met
IS	Internal standard evaluation criteria not met
MS/MSD	Matrix spike/matrix spike duplicate accuracy and/or precision criteria not met
SUR	Surrogate recovery outside acceptance range
TUNE	Instrument performance (tuning) criteria not met
P	The detected concentration difference between the primary and secondary column is greater than 25%.

**SAMPLE DELIVERY GROUP L12070673
LEVEL III DATA VALIDATION SUMMARY**

Analysis / Method	Temperature	Holding Times	Calibration	Blanks	MS/MSD	LCS	Duplicate	Serial Dilution	Other
Volatile Organic Compounds 8260B	✓	✓	✓	✓	NA	✓	NA	NA	✓
Metals 6010B	✓	✓	✓	✓	NA	✓	NA	✓	✓
Metals 6020	✓	✓	✓	✓	NA	✓	NA	✓	✓
Mercury 7470A	✓	✓	✓	✓	NA	✓	NA	NA	✓
Anions 300.0	✓	✓	✓	✓	NA	✓	NA	NA	✓
pH 9040C	✓	✓	✓	NA	NA	✓	NA	NA	NA
Alkalinity 310.2/SM2320B	✓	✓	✓	✓	NA	✓	NA	NA	NA
Cyanide; Total, Amenable, Dissociable 9014-9010C/SM4500-CN	✓	✓	✓	✓	NA	✓	NA	NA	✓
Conductivity 120.1	✓	✓	NA	✓	NA	✓	NA	NA	NA
Ammonia-N 350.1	✓	✓	✓	✓	NA	✓	NA	NA	✓
Nitrate+Nitrite-N 353.2	✓	✓	✓	✓	NA	✓	NA	NA	✓
Orthophosphate SM4500-P	✓	✓	✓	✓	NA	✓	NA	NA	✓
Total Dissolved Solids 160.1	✓	✓	NA	✓	NA	✓	NA	NA	NA
Total Organic Carbon 415.1	✓	✓	NA	✓	NA	✓	NA	NA	NA
Total Suspended Solids 160.2	✓	✓	NA	✓	NA	✓	✓	NA	NA

Notes:

✓ Indicates that all quality control criteria were met for the parameter(s)N/A Indicates the validation criteria is not applicable to the analysis
If validation criteria were not met and the data were qualified, then details can be found at the page number indicated in the table.

DATA ASSESSMENT

VOLATILE ORGANIC COMPOUNDS (VOC, Method 8260B)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Instrument tuning, initial calibration, initial calibration verification (ICV), and continuing calibration verification (CCV), alternate source checks were reviewed and found to be in compliance.

IV. Blanks

- A. Initial calibration blank (ICB), continuing calibration blank (CCB), method blank, and trip blank analysis results were reviewed and found to be in compliance. Methylene chloride was detected in the trip blank but not in the field samples. Qualifiers were not assigned.

V. Surrogate Spike and Matrix Spike / Matrix Spike Duplicate (MS/MSD)

- A. Surrogate spike compounds recovered within specifications. MS/MSD analyses were not reported for this SDG. Validation qualifiers were not assigned.

VI. Laboratory Control Sample (LCS)

- A. LCS results showed numerous compound recoveries slightly exceeding the upper limits. The compounds were not detected in the field samples and validation qualifiers were not assigned.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG. Laboratory control sample duplicate precision was compliant.

VIII. Other

- A. Internal standard areas and retention times were reviewed and found compliant.

METALS (Method 6010B)

I. Temperature

- A. Shipping cooler temperature was measured at 0 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance.

IV. Blanks

- A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance.

V. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

- A. MS/MSD analyses were performed on an internal laboratory quality control sample, i.e., not a WSMR project sample, for this SDG. Validation qualifiers were not assigned.

VI. Laboratory Control Sample (LCS)

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG. Matrix spike duplicate precision was compliant.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. Limits of Quantitation (LOQ) were reviewed and found compliant.

METALS (Method 6020)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, low-level calibration check, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance. The laboratory flagged non-detected antimony results for antimony detected in a CCB less than quantitation limit. Validation qualifiers were not assigned.

V. MS/MSD

- A. MS/MSD analyses were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. LOQ were reviewed and found compliant.

MERCURY (Method 7470A)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were not reported for this SDG. Validation qualifiers were not assigned.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ were reviewed and found compliant

ANIONS (Method 300.0 [9056])

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank and CCB analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ were reviewed and found compliant

pH (Method 9040C)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. Hydrogen ion activities (pH) were measured in the field at the time of sample collection and again at the laboratory. The paired measurements show good agreement.

III. Calibration

- A. pH meter calibration at the laboratory was documented using buffer solutions pH 4, 7, and 10.

IV. LCS

- A. The LCS sample pH was measured at the laboratory and the results were acceptable.

V. Duplicate

- A. The field duplicate sample was not submitted for this SDG.

ALKALINITY (Methods 310.2 / SM2320B)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision was acceptable.

CYANIDE (Methods 9014-9010C / SM4500-CN-C)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blanks were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance. Cyanide amenable to chlorination is a difference measurement which the LCS calculation accounts for inversely.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ was reviewed and found compliant.

CONDUCTIVITY (Method 120.1)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VI. Other

- A. LOQ was reviewed and found compliant.

AMMONIA AS NITROGEN (Method 350.1)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. MS/MSD

- A. MS/MSD were not reported for this SDG.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ was reviewed and found compliant.

NITRATE + NITRITE AS NITROGEN (Method 353.2)

I. Temperature

- A. Shipping cooler temperature was measured at 3°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

VI. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

ORTHOPHOSPHATE AS PHOSPHOROUS (Method SM4500-P)

I. Temperature

- A. Shipping cooler temperature was measured at 3°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision was compliant.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL DISSOLVED SOLIDS (Method 160.1)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD were not reported for this SDG.

V. LCS

- A. The LCS results were reviewed and found to be in compliance.

VI. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

TOTAL ORGANIC CARBON (Method 415.1)

I. Temperature

- A. Shipping cooler temperature was measured at 3 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation and ICV were reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL SUSPENDED SOLIDS (Method 160.2)

I. Temperature

- A. Shipping cooler temperature was measured at 3°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD were not reported for this SDG.

V. LCS

- A. The LCS results recovered within the acceptance limits.

VI. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

DATA QUALIFICATION SUMMARY

CCWS-62, Former STP Percolation Ditches, SDG L12070673, two samples:
MPL19-0712-1 and MPL20-0712-1.

Metals – Data Qualification Summary

No sample data were qualified in this SDG.

Anions – Data Qualification Summary

No sample data were qualified in this SDG.

Cyanide – Data Qualification Summary

No sample data were qualified in this SDG.

General and Wet Chemistry – Data Qualification Summary

No sample data were qualified in this SDG.

OVERALL ASSESSMENT OF DATA

I. Compliance with method and project requirements

- A. All analyses were performed within the analytical methods specifications and project requirements.

II. Usability

- A. Based on the quality control criteria reviewed, all unqualified data are usable for project purposes. No data results were rejected as unusable. Data qualifiers assigned by the laboratory in the analytical report include the “J” qualifier when analytes were identified but at concentrations less than the LOQ. Estimated results are usable for limited purposes.

DATA VALIDATION REPORT
MICROBAC LABORATORY SDG L12070716

Project / Site Name: Environmental Remediation Services at White Sands Missile Range (WSMR), NM; CCWS-62, Former STP Percolation Ditches

Project No.: 139791

Data Reviewer: M. Lyon, Shaw Environmental, Inc.

Review Date: August 28, 2012

Matrix: Groundwater, one sample

Parameters: Metals 6010B/6020/7470A
Anions 300.0
pH 9040C
Alkalinity 310.2
Cyanide 9014/9010C/SM4500-CN-C, G/SM4500-CN-I
Conductivity 120.1
Ammonia-Nitrogen 350.1
Nitrate+Nitrite-Nitrogen 353.2
Orthophosphate SM4500-P-E-20th
Total Dissolved Solids 160.1/SM2540C
Total Organic Carbon 415.1
Total Suspended Solids 160.2

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc. Ohio Valley Division

Sample Delivery Group L12070716

Sample Nos.: MPL28-0712-1

Comments: Trip blank sample not applicable

The data were reviewed and qualified according to the *Sampling and Analysis Plan/Quality Assurance Project Plan, Environmental Remediation Services, White Sands Missile Range, New Mexico October 2010*; *Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 4.2, 2010*; laboratory-specific statistical process control criteria, and the analytical method specific requirements.

DATA VALIDATION REQUIREMENTS

Level IV or Full Validation includes all parameters listed below. Level III Cursory Validation parameters are indicated by an asterisk (*).

Organic Parameters

- * Temperature
- * Holding times
- GC/MS instrument performance check
- * Initial and continuing calibrations
- * Blanks
- * Surrogate recoveries
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Internal standard performance
- Target compound identification
- Tentatively identified compounds
- Compound quantitation
- Reported detection limits
- System performance
- * Overall data assessment

Inorganic and General Chemistry Parameters

- * Temperature
- * Holding times
- * Initial and continuing calibration
- * Blanks
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Matrix duplicate
- ICP interference check sample
- CVAA / GFAA quality controls
- * ICP serial dilution
- Sample results verification
- Analyte quantitation
- Reported detection limits
- * Overall data assessment

DATA VALIDATION QUALIFIER DEFINITIONS

No qualifier indicates that the data are acceptable both qualitatively and quantitatively.

- U Not detected. The analyte was analyzed for but was not detected above the level of the associated value. The associated value is the Limit of Quantitation (LOQ).
- J Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is in determinable.
- J- Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined low due to associated quality control indicators.
- J+ Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined high due to associated quality control indicators.
- N Tentatively identified. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- UN Tentatively not detected, the LOQ is estimated. The analyte was analyzed for but was not detected above the reported LOQ. However, the reported LOQ is an estimate and may not be accurate or precise.
- NJ Tentatively identified. The reported concentration is an estimate. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents the approximate concentration.
- R Rejected. The data are not usable. The presence or absence of the analyte cannot be confirmed.

DATA VALIDATION QUALIFIER REASON CODES

Reason Code	Data Quality Condition Resulting in Assigned Qualification
General Use	
FB	Field blank contamination
FD	Field duplicate evaluation criteria not met
HT	Holding time requirement was not met
PR	Preservation requirements not met
LCS	Laboratory control sample evaluation criteria not met
MB	Method blank or preparation blank contamination
RB	Rinsate blank contamination
TB	Trip blank contamination
SDL	Sample quantitation limit exceeds decision criteria and the analyte was not detected
Inorganic Methods	
CCB	Continuing calibration blank contamination
CCV	Continuing calibration verification evaluation criteria not met
D	Laboratory duplicate precision evaluation criteria not met
DL	Serial dilution results did not meet evaluation criteria
ICS	Interference check sample evaluation criteria not met
ICV	Initial calibration verification evaluation criteria not met
MS	Matrix spike recovery outside acceptance range
PDS	Post-digestion spike recovery outside acceptance range
MSA	Method of standard additions correlation coefficient < 0.995
PB	Preparation blank
Organic Methods	
CCAL	Continuing calibration evaluation criteria not met
ICAL	Initial calibration evaluation criteria not met
ID	Target compound identification criteria not met
IS	Internal standard evaluation criteria not met
MS/MSD	Matrix spike/matrix spike duplicate accuracy and/or precision criteria not met
SUR	Surrogate recovery outside acceptance range
TUNE	Instrument performance (tuning) criteria not met
P	The detected concentration difference between the primary and secondary column is greater than 25%.

**SAMPLE DELIVERY GROUP L12070716
LEVEL III DATA VALIDATION SUMMARY**

Analysis / Method	Temperature	Holding Times	Calibration	Blanks	MS/MSD	LCS	Duplicate	Serial Dilution	Other
Metals 6010B	✓	✓	✓	✓	NA	✓	NA	✓	✓
Metals 6020	✓	✓	✓	✓	NA	✓	NA	✓	✓
Mercury 7470A	✓	✓	✓	✓	NA	✓	NA	NA	✓
Anions 300.0	✓	✓	✓	✓	NA	✓	NA	NA	✓
pH 9040C	✓	✓	✓	✓	NA	✓	NA	NA	✓
Alkalinity 310.2/SM2320B	✓	✓	✓	✓	NA	✓	NA	NA	✓
Cyanide; Total, Amenable, Dissociable 9014-9010C/SM4500-CN	✓	✓	✓	✓	NA	✓	NA	NA	✓
Conductivity 120.1	✓	✓	NA	✓	NA	✓	NA	NA	
Ammonia-N 350.1	✓	✓	✓	✓	NA	✓	NA	NA	✓
Nitrate+Nitrite-N 353.2	✓	✓	✓	✓	NA	✓	NA	NA	✓
Orthophosphate SM4500-P	✓	✓	✓	✓	NA	✓	NA	NA	✓
Total Dissolved Solids 160.1	✓	✓	NA	✓	NA	✓	NA	NA	NA
Total Organic Carbon 415.1	✓	✓	✓	✓	NA	✓	NA	NA	✓
Total Suspended Solids 160.2	✓	✓	NA	✓	NA	✓	✓	NA	NA

Notes:

✓ Indicates that all quality control criteria were met for the parameter(s)N/A Indicates the validation criteria is not applicable to the analysis
If validation criteria were not met and the data were qualified, then details can be found at the page number indicated in the table.

DATA ASSESSMENT
METALS (Method 6010B)

I. Temperature

- A. Shipping cooler temperature was measured at 2 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance.

IV. Blanks

- A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance.

V. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

- A. MS/MSD analyses were not reported for this SDG. Validation qualifiers were not assigned.

VI. Laboratory Control Sample (LCS)

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. Limits of Quantitation (LOQ) were reviewed and found compliant.

METALS (Method 6020)

I. Temperature

- A. Shipping cooler temperature was measured at 2 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, low-level calibration check, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance. The laboratory flagged non-detected antimony results for antimony detected in a CCB less than quantitation limit. Validation qualifiers were not assigned.

V. MS/MSD

- A. MS/MSD analyses were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Serial Dilution

- A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

- A. LOQ were reviewed and found compliant.

MERCURY (Method 7470A)

I. Temperature

- A. Shipping cooler temperature was measured at 2 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration linearity, ICV, and CCV were reviewed and found to be in compliance.

IV. Blanks

- A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD analyses were not reported for this SDG. Validation qualifiers were not assigned.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ were reviewed and found compliant

ANIONS (Method 300.0 [9056])

I. Temperature

- A. Shipping cooler temperature was measured at 2 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank and CCB analysis results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. Field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ were reviewed and found compliant

pH (Method 9040C)

I. Temperature

- A. Shipping cooler temperature was measured at 2 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. Hydrogen ion activities (pH) were measured in the field at the time of sample collection and again at the laboratory. The paired measurements show good agreement.

III. Calibration

- A. pH meter calibration at the laboratory was documented using buffer solutions pH 4, 7, and 10.

IV. LCS

- A. The LCS sample pH was measured at the laboratory and the results were acceptable.

V. Duplicate

- A. The field duplicate sample was not submitted for this SDG.

ALKALINITY (Methods 310.2 / SM2320B)

I. Temperature

- A. Shipping cooler temperature was measured at 2 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision was acceptable.

CYANIDE (Methods 9014-9010C / SM4500-CN-C)

I. Temperature

- A. Shipping cooler temperature was measured at 2 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blanks were reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance. Cyanide amenable to chlorination is a difference measurement which the LCS calculation accounts for inversely.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ was reviewed and found compliant.

CONDUCTIVITY (Method 120.1)

I. Temperature

- A. Shipping cooler temperature was measured at 2 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. LCS

- A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VI. Other

- A. LOQ was reviewed and found compliant.

AMMONIA AS NITROGEN (Method 350.1)

I. Temperature

- A. Shipping cooler temperature was measured at 2 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank results were reviewed and found to be in compliance.

V. LCS

- A. The LCS results were reviewed and found to be in compliance

VI. MS/MSD

- A. MS/MSD were not reported for this SDG.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG.

VIII. Other

- A. LOQ was reviewed and found compliant.

NITRATE + NITRITE AS NITROGEN (Method 353.2)

I. Temperature

- A. Shipping cooler temperature was measured at 2°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

VI. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

ORTHOPHOSPHATE AS PHOSPHOROUS (Method SM4500-P)

I. Temperature

- A. Shipping cooler temperature was measured at 2°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision was compliant.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL DISSOLVED SOLIDS (Method 160.1)

I. Temperature

- A. Shipping cooler temperature was measured at 2 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD were not reported for this SDG.

V. LCS

- A. The LCS results were reviewed and found to be in compliance.

VI. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

TOTAL ORGANIC CARBON (Method 415.1)

I. Temperature

- A. Shipping cooler temperature was measured at 2 °C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

- A. Calibration coefficient of correlation and ICV were reviewed and found compliant.

IV. Blanks

- A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

- A. MS/MSD were not reported for this SDG.

VI. LCS

- A. The LCS results were reviewed and found to be in compliance

VII. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VIII. Other

- A. LOQ was reviewed and found compliant.

TOTAL SUSPENDED SOLIDS (Method 160.2)

I. Temperature

- A. Shipping cooler temperature was measured at 2°C upon receipt at the laboratory. Sample temperature was in compliance.

II. Holding Times

- A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

- A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

- A. MS/MSD were not reported for this SDG.

V. LCS

- A. The LCS results recovered within the acceptance limits.

VI. Duplicate

- A. A field duplicate sample was not submitted for this SDG. LCS duplicate precision results were found to be in compliance.

VII. Other

- A. LOQ was reviewed and found compliant.

DATA QUALIFICATION SUMMARY

**CCWS-62, Former STP Percolation Ditches, SDG L12070716, one sample:
MPL28-0712-1.**

Metals – Data Qualification Summary

No sample data were qualified in this SDG.

Anions – Data Qualification Summary

No sample data were qualified in this SDG.

Cyanide – Data Qualification Summary

No sample data were qualified in this SDG.

General and Wet Chemistry – Data Qualification Summary

No sample data were qualified in this SDG.

OVERALL ASSESSMENT OF DATA

I. Compliance with method and project requirements

- A. All analyses were performed within the analytical methods specifications and project requirements.

II. Usability

- A. Based on the quality control criteria reviewed, all unqualified data are usable for project purposes. No data results were rejected as unusable. Data qualifiers assigned by the laboratory in the analytical report include the “J” qualifier when analytes were identified but at concentrations less than the LOQ. Estimated results are usable for limited purposes.

COC No. A 30690

158 Starlite Drive
Marietta, OH 45750



Phone: 740-373-4071
Fax: 740-373-4835

CHAIN-OF-CUSTODY RECORD

Company Name: **Shaw / Zia**

Project Contact: **Mark Lyon**
Contact Phone #: **505-262-8900**

Turn Around Requirements: **NORMAL**
Location: **WSMR STP**

Project ID: **WSMR STP SWMU 82**

Sampler (print): **Allison Jenness**
Signature: *[Signature]*

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Metals - As, Pb, Cu, Ni, Zn, Cd, Hg, Sb, As, Ba, Bi, Cr, Mn, Co, Ni, Se	TSS - TDS	Anions (Cl, F, SO ₄)	VOCs	CN (Total, Free, Amenable)	NH ₃ TOC, NO ₃ -NO ₂	Na, K, Ca, Mg, Mn	Cond., pH, PO ₄	Al, B, Fe, Mn, Mo	Alkalinity	Vanadium, Ra-226 Ra-228	PCBs	SVOCs	Total Phenols	TOTAL # (LAB USE)	Program	
MPL4-0712-1		X	7-23-12	1155	W	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
MPL4-0712-MS		X	7-23-12	1155	W	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
MPL4-0712-MSB		X	7-23-12	1156	W	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
MPL1-0712-1		X	7-23-12	1558	W	19	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Matrix Spike	
MPL2-0712-1		X	7-24-12	1012	W	19	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
MPL3-0712-1		X	7-24-12	1232	W	19	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
MPL3-0712-2		X	7-24-12	1232	W	19	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
MPL3-0712-TB		X	7-24-12	1232	W	2	X																trip blank

Relinquished by: **Budg. Das**
Date: **7-24-12**
Time: **1700**

Relinquished by: *[Signature]*
Date: **7-24-12**
Time: **1700**

Microbac OVD
Received: 07/25/2012 11:12
By: ROSEMARY SCOTT

221000027089

Remarks:

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

DATA VALIDATION REPORT
MICROBAC LABORATORY SDG L12070803

Project / Site Name: Environmental Remediation Services at White Sands Missile Range (WSMR), NM; CCWS-62, Former STP Percolation Ditches

Project No.: 139791

Data Reviewer: M. Lyon, Shaw Environmental, Inc.

Review Date: August 30, 2012

Matrix: Groundwater; 4 groundwater samples, 1 field duplicate, and extra volume for MS/MSD

Parameters: Volatile Organic Compounds 8260B
Semivolatile Organic Compounds, Polycyclic Aromatic Hydrocarbons, 8270C
Polychlorinated Biphenyls 8082
Metals 6010B/6020/7470A
Anions 300.0
pH 9040C
Alkalinity 310.2
Cyanide 9014/9010C/SM4500-CN-C, G/SM4500-CN-I
Conductivity 120.1
Phenols 420.1
Ammonia-Nitrogen 350.1
Nitrate+Nitrite-Nitrogen 353.2
Orthophosphate SM4500-P-E-20th
Total Dissolved Solids 160.1/SM2540C
Total Organic Carbon 415.1
Total Suspended Solids 160.2
Uranium, Radium-226, Radium-228 (Subcontracted to GEL)

Validation Level: EPA Level III

Laboratory: Microbac Laboratories, Inc. Ohio Valley Division

Sample Delivery Group: L12070803

Sample Nos.: MPL4-0712-1 (MS/MSD requested), MPL2-0712-1, MPL3-0712-1, MPL3-0712-2 (Field Duplicate), MPL1-0712-1

Comments: MS/MSD requested on field sample MPL4-0712-1. Field duplicate submitted. A trip blank sample, MPL3-0712-TB, was submitted.

The data were reviewed and qualified according to the *Sampling and Analysis Plan/Quality Assurance Project Plan, Environmental Remediation Services, White Sands Missile Range, New Mexico October 2010*; *Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 4.2, 2010*; laboratory-specific statistical process control criteria, and the analytical method specific requirements.

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- * Laboratory control sample / blank spike
- * Field duplicate
- * Internal standard performance
- Target compound identification
- Tentatively identified compounds
- Compound quantitation
- Reported detection limits
- System performance
- * Overall data assessment

Inorganic and General Chemistry Parameters

- * Temperature
- * Holding times
- * Initial and continuing calibration
- * Blanks
- * Matrix spike/matrix spike duplicate
- * Laboratory control sample / blank spike
- * Field duplicate
- * Matrix duplicate
- ICP interference check sample
- CVAA / GFAA quality controls
- * ICP serial dilution
- Sample results verification
- Analyte quantitation
- Reported detection limits
- * Overall data assessment

DATA VALIDATION QUALIFIER DEFINITIONS

No qualifier indicates that the data are acceptable both qualitatively and quantitatively.

- U Not detected. The analyte was analyzed for but was not detected above the level of the associated value. The associated value is the Limit of Quantitation (LOQ).
- J Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is in determinable.
- J- Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined low due to associated quality control indicators.
- J+ Estimated. The analyte was detected and positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and the bias is determined high due to associated quality control indicators.
- N Tentatively identified. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
- UN Tentatively not detected, the LOQ is estimated. The analyte was analyzed for but was not detected above the reported LOQ. However, the reported LOQ is an estimate and may not be accurate or precise.
- NJ Tentatively identified. The reported concentration is an estimate. The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification and the associated numerical value represents the approximate concentration.
- R Rejected. The data are not usable. The presence or absence of the analyte cannot be confirmed.

DATA VALIDATION QUALIFIER REASON CODES

Reason Code	Data Quality Condition Resulting in Assigned Qualification
General Use	
FB	Field blank contamination
FD	Field duplicate evaluation criteria not met
HT	Holding time requirement was not met
PR	Preservation requirements not met
LCS	Laboratory control sample evaluation criteria not met
MB	Method blank or preparation blank contamination
RB	Rinsate blank contamination
TB	Trip blank contamination
SDL	Sample quantitation limit exceeds decision criteria and the analyte was not detected
Inorganic Methods	
CCB	Continuing calibration blank contamination
CCV	Continuing calibration verification evaluation criteria not met
D	Laboratory duplicate precision evaluation criteria not met
DL	Serial dilution results did not meet evaluation criteria
ICS	Interference check sample evaluation criteria not met
ICV	Initial calibration verification evaluation criteria not met
MS	Matrix spike recovery outside acceptance range
PDS	Post-digestion spike recovery outside acceptance range
MSA	Method of standard additions correlation coefficient < 0.995
PB	Preparation blank
Organic Methods	
CCAL	Continuing calibration evaluation criteria not met
ICAL	Initial calibration evaluation criteria not met
ID	Target compound identification criteria not met
IS	Internal standard evaluation criteria not met
MS/MSD	Matrix spike/matrix spike duplicate accuracy and/or precision criteria not met
SUR	Surrogate recovery outside acceptance range
TUNE	Instrument performance (tuning) criteria not met
P	The detected concentration difference between the primary and secondary column is greater than 25%.

**SAMPLE DELIVERY GROUP L12070803
LEVEL III DATA VALIDATION SUMMARY**

Analysis / Method	Temperature	Holding Times	Calibration	Blanks	MS/MSD	LCS	Duplicate	Serial Dilution	Other
Volatile Organics 8260B	✓	✓	✓	✓	✓	✓	✓	NA	✓
PAH 8270C	✓	✓	✓	✓	10	10	✓	NA	✓
PCB 8082	✓	✓	✓	✓	✓	✓	✓	NA	✓
Metals 6010B	✓	✓	✓	✓	✓	✓	✓	✓	✓
Metals 6020	✓	✓	✓	✓	14	✓	✓	✓	✓
Mercury 7470A	✓	✓	✓	✓	✓	✓	✓	NA	✓
Anions 300.0	✓	✓	✓	✓	✓	✓	✓	NA	✓
pH 9040C	✓	✓	✓	NA	NA	✓	✓	NA	✓
Alkalinity 310.2/SM2320B	✓	✓	✓	NA	✓	✓	✓	NA	✓
Cyanide; Total, Amenable, Dissociable 9014-9010C/SM4500-CN	✓	✓	✓	✓	✓	✓	✓	NA	✓
Conductivity 120.1	✓	✓	NA	NA	NA	✓	✓	NA	NA
Phenols 420.1	✓	✓	✓	✓	✓	✓	✓	NA	NA
Ammonia-N 350.1	✓	✓	✓	✓	22	✓	✓	NA	✓
Nitrate+Nitrite-N 353.2	✓	✓	✓	✓	NA	✓	✓	NA	✓
Orthophosphate SM4500-P	✓	✓	✓	✓	✓	✓	✓	NA	✓
Total Dissolved Solids 160.1	✓	✓	NA	✓	✓	✓	✓	NA	✓

Total Organic Carbon 415.1	✓	✓	✓	✓	✓	✓	✓	NA	✓
Total Suspended Solids 160.2	✓	✓	NA	✓	✓	✓	✓	NA	✓

Notes:

✓ Indicates that all quality control criteria were met for the parameter(s)

N/A Indicates the validation criteria is not applicable to the analysis

If validation criteria were not met and the data were qualified, then details can be found at the page number indicated in the table.

DATA ASSESSMENT

Volatile Organic Compounds (Method 8260B)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Instrument tune, initial calibration verification (ICV), second source check, and continuing calibration verification (CCV), were reviewed and found to be in compliance with exceptions. Bromomethane was out of percent difference compliance in one alternate source check and vinyl acetate was out of compliance in one CCV. Validation qualifiers were not assigned. The compounds were not detected in any samples.

IV. Blanks

A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance.

V. Surrogate Recoveries

A. Surrogate spike recoveries were reviewed and found to be in compliance.

VI. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

A. MS/MSD analyses were performed on WSMR groundwater sample MPL4-0712-1. Matrix spike percent recoveries and duplicate relative percent difference were found to be in compliance.

VII. Laboratory Control Sample (LCS)

A. The LCS results were reviewed and found to be in compliance. Four compounds recovered greater than the upper acceptance limit in the LCS analyzed July 27, 2012. All compounds were non-detect in the field samples. Validation qualifiers were not assigned.

VIII. Duplicate

A. A field duplicate sample, MPL3-0712-2 was submitted for this SDG. Compounds were not detected at concentrations greater than the applicable LOQ. Precision could not be evaluated.

IX. Other

A. Internal standard areas and retention times met criteria.

**Semi-volatile Organic Compounds Polycyclic Aromatic Hydrocarbons (PAH)
(Method 8270C)**

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration linearity, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance.

IV. Blanks

A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance.

V. Surrogate Recoveries

A. Surrogate spike recoveries were reviewed and found to be in compliance.

VI. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

A. MS/MSD analyses were performed on WSMR groundwater sample MPL4-0712-1. Matrix spike percent recoveries and duplicate relative percent difference (RPD) were in compliance with minor exceptions. Naphthalene precision slightly exceeded the RPD criteria. Naphthalene was not detected in the field samples. Those results are qualified with “UN” reason code MS/MSD.

VII. Laboratory Control Sample (LCS)

A. The LCS results were reviewed and found to be in compliance with exceptions. Naphthalene, Acenaphthylene, and 2-Methylnaphthalene recovered less than the lower acceptance limit in the LCS on July 28, 2012. The compounds were not detected in the field samples and results are qualified with “UN” for estimated detection level, reason code “LCS.” All field samples were re-extracted outside hold times and re-analyzed. The original results were confirmed and are reported.

VIII. Duplicate

A. A field duplicate sample, MPL3-0712-2 was submitted for this (SDG). There were no compounds detected at concentrations greater than the applicable LOQ.

IX. Internal Standards Performance

A. Internal standards retention times were reviewed and found to be in compliance.

Polychlorinated Biphenyls (PCB) (Method 8082A)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration linearity, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance.

IV. Blanks

A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance.

V. Surrogate Recoveries

A. Surrogate spike recoveries were reviewed and found to be in compliance.

VI. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

A. MS/MSD analyses were performed on WSMR groundwater sample MPL4-0712-1. Matrix spike percent recoveries and duplicate relative percent difference were found to be in compliance.

VII. Laboratory Control Sample (LCS)

A. The LCS results were reviewed and found to be in compliance.

VIII. Duplicate

A. A field duplicate sample, MPL3-0712-2 was submitted for this SDG. There were no compounds detected at concentrations greater than the applicable LOQ.

METALS (Method 6010B)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration linearity, initial calibration verification (ICV), and continuing calibration verification (CCV), were reviewed and found to be in compliance.

IV. Blanks

A. Initial calibration blank (ICB), continuing calibration blank (CCB), and method blank analysis results were reviewed and found to be in compliance.

V. Matrix Spike / Matrix Spike Duplicate (MS/MSD)

A. MS/MSD analyses were performed in the applicable analytical batch on WSMR groundwater sample MPL4-0712-1. Matrix spike percent recoveries were found to be in compliance. MSD recoveries for magnesium and sodium were slightly greater than the 120 percent upper limit. Calcium concentrations in the parent sample exceeded 5-times the spike level making the spike invalid. Data validation qualifiers were not assigned.

VI. Laboratory Control Sample (LCS)

A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. Field duplicate precision was compliant for analytes detected greater than the LOQ.

VIII. Serial Dilution

A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

A. Limits of Quantitation (LOQ) were reviewed and found compliant.

METALS (Method 6020)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration linearity, ICV, low-level calibration check, and CCV were compliant.

IV. Blanks

A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance with one exception. Antimony detected in multiple CCB greater than the detection limit but less than quantitation limit. Antimony was not detected in the field samples. The laboratory flagged the non-detect antimony results with “B.” No validation qualifiers assigned.

V. MS/MSD

A. MS/MSD analyses were performed in the applicable analytical batch on WSMR groundwater sample MPL4-0712-1. Matrix spike percent recoveries and duplicate relative percent difference were found to be in compliance except for selenium and silver. Selenium results are qualified “J+” reason code MS for recovery greater than the upper acceptance limit. Silver non-detect results are qualified “UN” reason code MS for low recovery of the MSD and MSD precision exceeding criteria.

VI. LCS

A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. Field duplicate precision was acceptable

VIII. Serial Dilution

A. Serial dilution results were reviewed and found to be in compliance.

IX. Other

A. LOQ were reviewed and found compliant.

MERCURY (Method 7470A)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration linearity, ICV, and CCV were reviewed and found to be in compliance.

IV. Blanks

A. ICB, CCB, and method blank analysis results were reviewed and found to be in compliance.

V. MS/MSD

A. MS/MSD analyses were performed in the applicable analytical batch on WSMR groundwater sample MPL4-0712-1. Matrix spike percent recoveries and duplicate relative percent difference were found to be in compliance.

VI. LCS

A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

A. A field duplicate sample, MPL3-0712-2 was submitted for this SDG. Mercury was not detected at concentrations greater than the applicable LOQ.

VIII. Other

A. LOQ were reviewed and found compliant

ANIONS (Method 300.0 [9056])

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

A. Method blank and CCB analysis results were reviewed and found to be in compliance.

V. MS/MSD

A. MS/MSD analyses were performed in the applicable analytical batch on WSMR groundwater sample MPL4-0712-1. Chloride in the parent sample was greater than 4-times the spike level negating evaluation of chloride recovery. Validation qualifiers were not assigned.

VI. LCS

A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

A. The field duplicate sample, MPL3-0712-2, was submitted for this SDG. Field duplicate precision was compliant when both sample and duplicate sample results were greater than the LOQ.

pH (Method 9040C)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. Hydrogen ion activities (pH) were measured in the field at the time of sample collection and again at the laboratory. Field and laboratory measurements showed good agreement, generally.

III. Calibration

A. pH meter calibration at the laboratory was documented using buffer solutions pH 4, 7, and 12.45.

IV. LCS

A. The LCS sample pH was measured at the laboratory and the results were acceptable.

V. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. Field duplicate precision was compliant.

ALKALINITY (Methods 310.2 / SM2320B)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration coefficient of determination, alternate source calibration verification, and CCV, were reviewed and found compliant.

IV. Blanks

A. Method blank results were reviewed and found to be in compliance.

V. MS/MSD

A. The MS/MSD showed total alkalinity recoveries less than the lower acceptance limit. Data validation qualifiers were not assigned.

VI. LCS

A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. Field duplicate precision was compliant.

CYANIDE (Methods 9014-9010C / SM4500-CN-C)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

A. Method blanks were reviewed and found to be in compliance.

V. MS/MSD

A. The MS/MSD was performed on field sample MPL4-0712-1. Recoveries and precision results were reviewed and found to be in compliance.

VI. LCS

A. The LCS results were reviewed and found to be in compliance. Cyanide amenable to chlorination is a difference measurement which the LCS calculation accounts for inversely.

VII. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. Field duplicate precision was compliant.

VIII. Other

A. LOQ was reviewed and found compliant.

CONDUCTIVITY (Method 120.1)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

A. Method blank results were reviewed and found to be in compliance.

IV. LCS

A. The LCS results were reviewed and found to be in compliance.

V. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. Field duplicate precision was compliant.

VI. Other

A. LOQ was reviewed and found compliant.

PHENOLS (Method 420.1)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

III. Calibration

A. Calibration coefficient of correlation was reviewed and found compliant.

III. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

IV. Blanks

A. Method blank results were reviewed and found to be in compliance.

V. MS/MSD

A. The MS/MSD results were reviewed and found to be in compliance.

V. LCS

A. The LCS results were reviewed and found to be in compliance.

VI. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. The analyte was not detected in either sample.

VI. Other

A. LOQ was reviewed and found compliant.

AMMONIA AS NITROGEN (Method 350.1)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

A. The MS/MSD results in sample MPL4-0712-1 showed recoveries slightly less than the lower acceptance limit. The analyte was not detected and those results are qualified “UN” reason code “MS.”

VI. LCS

A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. The analyte was not detected in either sample.

VIII. Other

A. LOQ was reviewed and found compliant

NITRATE + NITRITE AS NITROGEN (Method 353.2)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

A. The MS/MSD was performed on sample MPL4-0712-1. Analyte concentration in the parent sample was greater than 4-times the spike level. Recoveries were not evaluated and qualifiers were not assigned.

VI. LCS

A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. Field duplicate precision was compliant.

VIII. Other

A. LOQ was reviewed and found compliant.

ORTHOPHOSPHATE AS PHOSPHOROUS (Method SM4500-P)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration coefficient of correlation was reviewed and found compliant.

IV. Blanks

A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

A. The MS/MSD was performed on sample MPL4-0712-1. MS/MSD recoveries and precision were compliant.

VI. LCS

A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. Field duplicate precision was compliant.

VIII. Other

A. LOQ was reviewed and found compliant.

TOTAL DISSOLVED SOLIDS (Method 160.1)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

A. The MS/MSD was performed on sample MPL4-0712-1. MS/MSD recoveries and precision were compliant.

V. LCS

A. The LCS results were reviewed and found to be in compliance.

VI. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. Field duplicate precision was compliant and the RPD was calculated for the reported results. A LCS duplicate was also analyzed and results found to be in compliance.

VII. Other

A. LOQ was reviewed and found compliant.

TOTAL ORGANIC CARBON (Method 415.1)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Calibration

A. Calibration coefficient of correlation and ICV were reviewed and found compliant.

IV. Blanks

A. Method blank was reviewed and found to be in compliance.

V. MS/MSD

A. The MS/MSD was performed on sample MPL4-0712-1. MS/MSD recoveries and precision were compliant.

VI. LCS

A. The LCS results were reviewed and found to be in compliance.

VII. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. Field sample and duplicate results were less than the quantitation limit. The LCS duplicate MSD analyzed were found in compliance.

VIII. Other

A. LOQ was reviewed and found compliant.

TOTAL SUSPENDED SOLIDS (Method 160.2)

I. Temperature

A. Shipping coolers temperatures were measured between 0°C and 2°C upon receipt at the laboratory. Sample temperatures were in compliance.

II. Holding Times

A. The analysis holding times were reviewed and found to be in compliance.

III. Blanks

A. Method blank results were reviewed and found to be in compliance.

IV. MS/MSD

A. The MS/MSD was performed on sample MPL4-0712-1. MS/MSD recoveries and precision were compliant.

V. LCS

A. The LCS results were reviewed and found to be in compliance.

VI. Duplicate

A. A field duplicate sample, MPL3-0712-2, was submitted for this SDG. Field precision could not be calculated as both the parent sample and duplicate results were less than the quantitation limit. A LCS duplicate was also analyzed and results found to be in compliance.

VII. Other

A. LOQ was reviewed and found compliant.

DATA QUALIFICATION SUMMARY

CCWS-62, Former STP Percolation Ditches, Main Post Landfill Wells, four field samples MPL1-0712-1, MPL2-0712-1, MPL3-0712-1, MPL4-0712-1, and one field duplicate MPL3-0712-2. Extra sample volume was collected at MPL4 for MS/MSD.

Organic Compounds; VOC, PAH, and PCB – Data Qualification Summary

In the semi-volatile organic compound analysis for PAH naphthalene was non-detect and qualified as estimated due to matrix spike recovery outside of criteria.

Metals – Data Qualification Summary

Selenium and silver results were qualified J+ and UN respectively, for matrix spike recoveries exceeding criteria.

Anions – Data Qualification Summary

No sample data were qualified in this SDG.

Cyanide – Data Qualification Summary

No sample data were qualified in this SDG.

Phenolics – Data Qualification Summary

No sample data were qualified in this SDG.

General and Wet Chemistry – Data Qualification Summary

No sample data were qualified in this SDG.

OVERALL ASSESSMENT OF DATA

I. Compliance with method and project requirements

A. All analyses were performed within the analytical methods specifications and project requirements.

II. Usability

A. Based on the quality control criteria reviewed, all unqualified and qualified data are usable for project purposes. No data results were rejected as unusable. Data qualifiers assigned by the laboratory in the analytical report include the “J” and “UJ” qualifiers. Estimated results are usable for limited purposes.

III. Field Duplicate Precision

A. Field duplicate precision for the paired samples from MPL3 well are shown in the table below. RPD is only calculated when both sample results exceed the LOQ.

Method	Parameter	MPL3-0712-1		MPL3-0712-2		RPD
6010B	Aluminum	0.272		0.257		5.7%
6010B	Beryllium	0.002	U	0.002	U	NC
6010B	Boron	0.1	U	0.1	U	NC
6010B	Calcium	85.4		80		6.5%
6010B	Iron	0.395		0.373		5.7%
6010B	Magnesium	15.5		14.3		8.1%
6010B	Molybdenum	0.01	U	0.01	U	NC
6010B	Potassium	3.03		2.79		8.2%
6010B	Sodium	37.7		35.5		6.0%
6010B	Tin	0.5	U	0.5	U	NC
6010B	Vanadium	0.0115		0.011		4.4%
6010B	Zinc	0.0256		0.0289		12.1%
6020	Antimony	0.001	U	0.001	U	NC
6020	Arsenic	0.00489		0.00394		21.5%
6020	Barium	0.0465		0.0453		2.6%
6020	Cadmium	0.0006	U	0.0006	U	NC
6020	Chromium	0.00214		0.00215		0.5%
6020	Cobalt	0.001	U	0.001	U	NC
6020	Copper	0.002	U	0.002	U	NC
6020	Lead	0.001	U	0.001	U	NC
6020	Manganese	0.00888		0.00809		9.3%
6020	Nickel	0.00333	J	0.00303	J	NC
6020	Selenium	0.0236		0.0186		23.7%

6020	Silver	0.001	U	0.001	U	NC
6020	Thallium	0.0002	U	0.000121	J	NC
7470A	Mercury	0.0002	U	0.0002	U	NC
300.0	Chloride	58.3		57.6		1.2%
300.0	Fluoride	0.173	J	0.158	J	NC
300.0	Sulfate	110		109		0.9%
9040	pH	7.64		7.71		0.9%
310.2	Alkalinity, total	103		102		1.0%
9014	Cyanide	0.341		0.376		9.8%
120.1	Conductivity	648		662		2.1%
420.1	Phenols	0.00556	U	0.00556	U	NC
350.1	Ammonia, as N	0.100	U	0.100	U	NC
353.2	Nitrate-Nitrite, as N	7.48		7.49		0.1%
SM4500-P-E-20th	Orthophosphate	0.130		0.122		6.3%
160.1	Total Dissolved Solids	438		396		10.1%
415.1	Total Organic Carbon	0.684	J	0.691	J	NC
160.2	Total Suspended Solids	5.0	U	5.0	U	NC