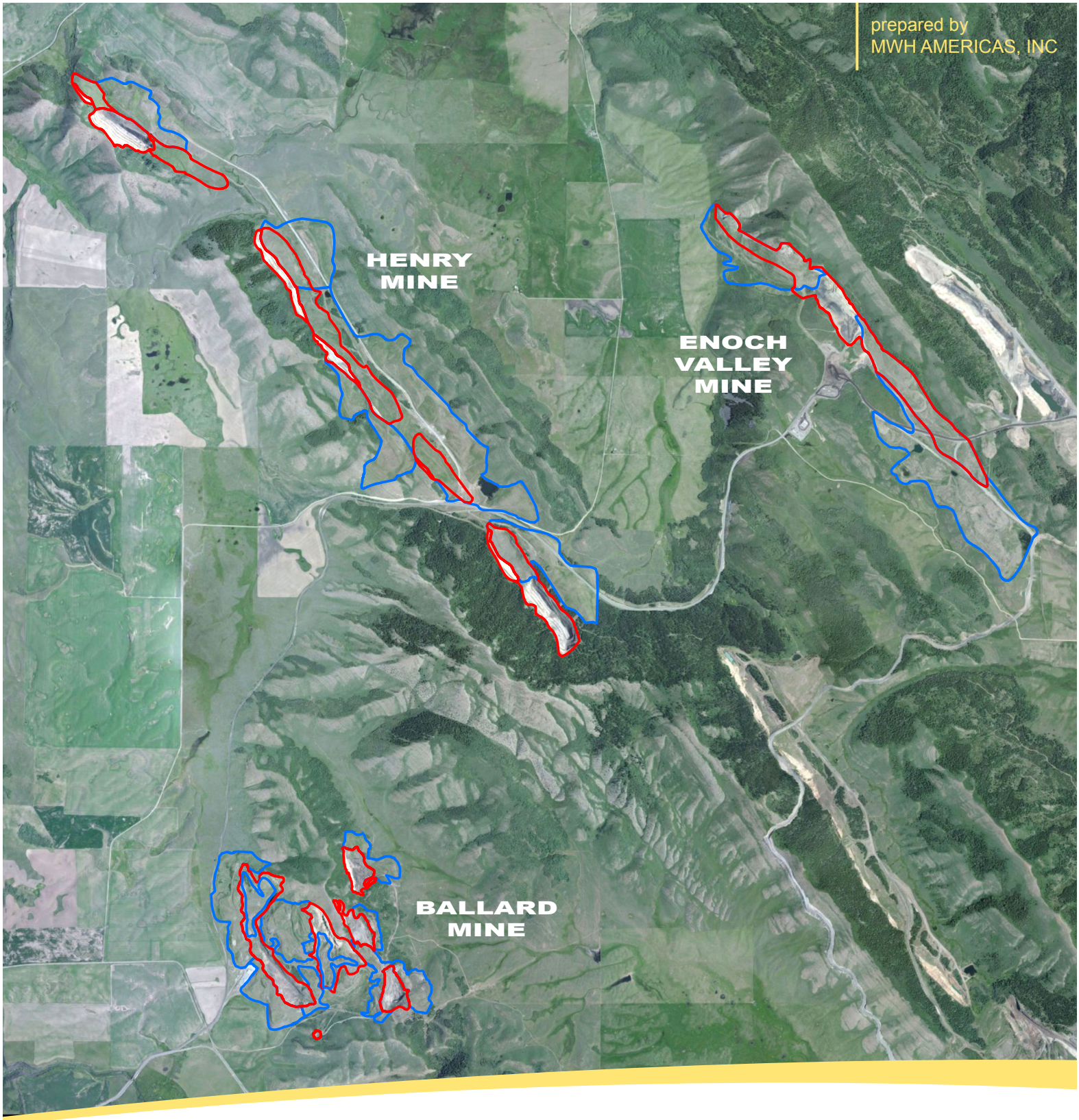


2015 DATA SUMMARY REPORT

Ballard, Enoch Valley, and Henry Mines Remedial Investigation Activities

FINAL
Revision 1

February 2016

prepared for
P4 PRODUCTION, LLC

MWH®
BUILDING A BETTER WORLD

2015 DATA SUMMARY REPORT

BALLARD, ENOCH VALLEY, AND HENRY MINES REMEDIAL INVESTIGATION ACTIVITIES

FINAL

Revision 1

FEBRUARY 2016

Prepared by:

MWH AMERICAS, INC.

Prepared for:

P4 PRODUCTION, LLC

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1

1.1 Report Description and Objectives 1-1

1.1.1 2015 Surface Water and Groundwater Sampling 1-1

1.2 Report Organization 1-2

2.0 SUMMARY 2015 Field activities 2-1

2.1 2015 Surface Water and Groundwater Sampling Activities 2-1

2.2 2015 Surface Water and Groundwater Program Changes from 2014 2-2

2.3 Work Plan Deviations 2-2

3.0 SUMMARY OF 2015 ANALYTICAL RESULTS BY MINE SITE 3-1

3.1 Surface Water Sampling – 2015 Analytical Results 3-1

3.2 Groundwater Sampling – 2015 Analytical Results 3-1

3.3 Third Party Data Validation 3-1

3.4 Conclusions 3-2

4.0 REFERENCES 4-3

LIST OF FIGURES

Figure 1-1 P4 Mines Vicinity Map

Figure 2-1 Media Sample Locations Ballard Mine Site

Figure 2-2 Media Sample Locations Enoch Valley Mine Site

Figure 2-3 Media Sample Locations Henry Mine Site

LIST OF TABLES

Table 3-1 Summary of 2015 Surface Water Result Exceedances Ballard Mine

Table 3-2 Summary of 2015 Surface Water Result Exceedances Enoch Valley Mine

Table 3-3 Summary of 2015 Surface Water Result Exceedances Henry Mine

Table 3-4 Summary of 2015 Groundwater Result Exceedances Ballard Mine

Table 3-5 Summary of 2015 Groundwater Result Exceedances Enoch Valley Mine

Table 3-6 Summary of 2015 Groundwater Result Exceedances Henry Mine

LIST OF APPENDICES

APPENDIX A – Field Notes and Field Forms
APPENDIX B – 2015 Surface Water and Groundwater Analytical Data
APPENDIX C – Laboratory Data Consultants (LDC) Third Party Data Verification Reports

ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order of Consent
A/Ts	Agencies and Tribes
BLM	Bureau of Land Management
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CO	Consent Order
COPC	constituents of potential concern
COPEC	constituents of potential ecological concern
CVS	calibration verification standards
DOI	Department of the Interior
DSR	Data Summary Report
FSP	field sampling plan
HASP	health and safety plan
ICAL	initial calibration
ICV	initial calibration verification
IDEQ	Idaho Department of Environmental Quality
IS	Internal standard
LCD	laboratory control duplicate
LCS	laboratory control sample
LDC	Laboratory Data Consultants
LTM	long-term monitoring
MWH	MWH Americas, Inc.
MS/MSD	matrix spike/matrix spike duplicate
P4	P4 Production L.L.C.
PCE	tetrachloroethene
QAPP	Quality Assurance Project Plan
QC	quality control
RI/FS	Remedial Investigation/Feasibility Study
RLs	reporting limits
SAP	Sampling and Analysis Plan
SOW	Statement of Work
SOP	Standard Operating Procedure

ACRONYMS AND ABBREVIATIONS CONTINUED

Tribes	The Shoshone-Bannock Tribes
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
VOC	volatile organic compound

1.0 INTRODUCTION

This Data Summary Report (DSR) was prepared by MWH Americas, Inc. (MWH) on behalf of P4 Production, LLC (P4), in accordance with the requirements of the Administrative Settlement Agreement and Order on Consent/Consent Order for Remedial Investigation/Feasibility Study (2009 CO/AOC; USEPA, 2009). The 2009 CO/AOC is a voluntary agreement between P4 and the United States Environmental Protection Agency (USEPA), the Idaho Department of Environmental Quality (IDEQ), the United States Department of Agriculture, United States Forest Service (USFS), the United States Department of the Interior (DOI), United States Bureau of Land Management (BLM), and the Shoshone-Bannock Tribes (Tribes). Collectively, the cooperating agencies are referred to as the Agencies and Tribes (A/Ts). This DSR supports the comprehensive mine-specific Remedial Investigation/Feasibility Studies (RI/FS) that are being conducted at each of P4's three historic phosphate mines: Ballard Mine, Henry Mine and Enoch Valley Mine, collectively known as the "Sites".

This DSR documents the most recent sampling events conducted in 2015 at the Sites and includes descriptions of the field activities conducted and summarizes the results from those sampling efforts. **Figure 1-1**, P4 Mines Vicinity Map, depicts the footprint of each Site and its geographic relationship with the other Sites. Executed field activities include surface water and groundwater sampling events for spring and fall 2015.

1.1 Report Description and Objectives

This report is intended to fulfill the requirements for reporting data consistent with a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) RI and Task 3c of the Statement of Work (SOW) attached to the 2009 CO/AOC. Consistent with the SOW, this DSR documents the investigative activities that were conducted during the 2015 field season and provides a summary of collected data. Complete data packages and field forms are provided as appendices to the DSR. In this DSR, data are presented with little to no interpretation as the combined data sets for each Site have been, or will be, evaluated in the individual Ballard, Henry, and Enoch Valley Mines RI and FS Reports. The purpose and objectives of the 2015 RI/FS monitoring activities are further discussed below.

1.1.1 2015 Surface Water and Groundwater Sampling

Based on the A/Ts' request made during the review of the *Proposed P4 Long-Term Surface Water and Groundwater Monitoring Plan Memo - Final Rev 1*; (MWH, 2014a), a comprehensive long-term monitoring (LTM) sampling and analysis plan (SAP) was prepared in early 2015 for the Sites' surface and groundwater monitoring activities. The revised SAP entitled *Sampling and Analysis Plan for Long-Term Monitoring of Surface Water and Groundwater Ballard, Henry, and Enoch Valley Mines – Final Revision 1* (*2015 LTM SAP;* MWH, 2015) was submitted to the A/Ts for final approval on April 10, 2015. The *2015 LTM SAP* is no longer tied to the previous A/T-approved SAPs, Field Sampling Plans

(FSPs), Quality Assurance Project Plan (QAPP), and Health and Safety Plan (HASP), but instead is a stand-alone document that will guide the surface water and groundwater LTM program for the Sites through the next five year period, unless superseded by another document. The objectives, methods, and procedures for surface water and groundwater sampling conducted in 2015, and reported herein, are presented in the *2015 LTM SAP*.

In addition to fulfilling objectives established in the *2015 LTM SAP,* the 2015 groundwater monitoring event included collection of one additional groundwater sample from a temporary well located near the Ballard Shop as further described in Section 2.0. This additional sample is a one-time collection event, pending results, and currently is not part of the LTM program for the Sites.

1.2 Report Organization

The content of this DSR is as follows:

- Section 1.0 – Introduction
- Section 2.0 – Summary of 2015 Field Activities
- Section 3.0 – Summary of 2015 Analytical Results by Mine Site
- Section 4.0 – References

2.0 SUMMARY 2015 FIELD ACTIVITIES

This section discusses the surface water and groundwater sampling programs and data collection activities during the 2015 field program at the Sites. Further evaluation of the data is reserved for the individual Site RI and FS Reports and not presented herein. The RI Report for the Ballard Mine entitled *Ballard Mine Remedial Investigation Report, Final Revision 2* (*Final Ballard RI Report;* MWH, 2014b) is complete and used data that were collected through 2012. The draft Henry RI Report, currently under development, uses data that were collected through 2014. Therefore, future data collected at Ballard and Henry Sites, including the 2015 presented herein, will be used as baseline data until the selected remedy for these Sites is in place and the trends of data collected pre- and post-remediation can be compared. The 2015 data collected at the Enoch Valley Site will be included in its RI Report because its preparation has not begun.

A summary of analyte exceedances from the spring and fall sampling rounds is organized by individual Site and is provided in Section 3.0. All field activity forms (including field sampling forms, chains of custody, sampling field note book copies, sampling parameter measurements, and any other relevant field data) are provided in **Appendix A**.

2.1 2015 Surface Water and Groundwater Sampling Activities

Surface water and groundwater sampling was conducted during the spring and fall of 2015 as described in the *2015 LTM SAP*. The surface water and groundwater sample locations for each Site are shown on **Figure 2-1** (Media Sample Locations Ballard Mine Site), **Figure 2-2** (Media Sample Locations Enoch Valley Mine Site) and **Figure 2-3** (Media Sample Locations Henry Mine Site).

Spring Sampling. Surface water and groundwater samples were collected from sampling locations at each Site between April 13 and 20, 2015, including the following numbers for each Site:

- Ballard Site: 16 surface water and 23 groundwater samples (one surface water location [MST094] was dry)
- Enoch Valley Site: 10 surface water and 14 groundwater samples (one surface water location [MST269] and three groundwater locations [MBW107, MBW112, and MMW012] were dry)
- Henry Site: seven surface water and five groundwater samples (one surface water location [MST051] and one groundwater location [MBW152] were dry)

Fall Sampling. In accordance with rationale set forth in the *2015 LTM SAP,* surface water samples were collected in the following numbers at each mine site:

- Ballard Site: five surface water samples
- Enoch Valley Site: two surface water samples (two surface water locations [MDS025 and MST144] were dry)

- Henry Mine: two surface water samples (two surface water locations [MWT144 and MST275] were dry)

Spring and fall surface water samples were collected using the protocols outlined in SOP-NW-9.1, *Collection of Surface Water Samples*. Surface water flow measurements were collected according to the methods presented in SOP-NW-9.2a, *Surface Water Flow Measurements Using Man-Made Portable Devices or Estimation Techniques*. Both of these Standard Operating Procedures (SOPs) are included in the *2015 LTM SAP*.

Spring groundwater samples were collected using the protocols outlined in SOP-NW-5.3, *Collection of Groundwater Quality Samples* and the SOP*, Low Stress Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells*. Both of these SOPs are included in the *2015 LTM SAP*. As described in the *2015 LTM SAP*, the LTM program for groundwater does not include fall sampling. Therefore, no groundwater samples were collected during the Fall 2015 sampling round.

Summaries of surface water and groundwater constituents of potential concern/constituents of potential ecological concern (COPC/COPEC) exceedances based on the appropriate regulatory standards for the 2015 program are provided in Sections 3.1 and 3.2.

2.2 2015 Surface Water and Groundwater Program Changes from 2014

One additional groundwater sample was collected during the 2015 spring sampling round from one temporary well located near the Ballard Shop (SB-07 for tetrachloroethene [PCE]) to address recommendations made by the A/Ts on the *RI Report for P4's Ballard Mine – Final Rev 2* (*Ballard Mine RI Report*; MWH, 2014b). This sample was initially collected as part of the 2014 spring sampling round; however, the sample was inadvertently lost by the laboratory upon receipt and the sample was never analyzed. Therefore, it was collected again during the spring 2015 sampling round to maximize sample efficiency. Collection of this groundwater sample was a one-time collection event, and pending the 2015 results is not currently part of the LTM program. The *Ballard Mine RI Report* provides details regarding the objectives of collecting this additional sample.

2.3 Work Plan Deviations

There were no deviations from the *2015 LTM SAP* for the spring or fall 2015 sampling events.

3.0 SUMMARY OF 2015 ANALYTICAL RESULTS BY MINE SITE

This section presents the exceedances of COPC/COPEC screening levels in the results from analyses of surface water and groundwater samples collected during the 2015 field activities. The screening levels included in this DSR are derived from promulgated federal and state chemical-specific primary and secondary standards. Evaluation of the COPCs/COPECs has been or will be evaluated in greater detail in the exposure scenarios presented in the Baseline Risk Assessments (BRAs) prepared for each Site. These BRAs evaluate and determine the risks posed by individual constituents and combined constituent exposures. The comprehensive results for all 2015 analytical data presented herein, as well as a copy of the screening levels in **Table B-2***,* are provided in **Appendix B**.

3.1 Surface Water Sampling – 2015 Analytical Results

Table 3-1 (Ballard Site), **Table 3-2** (Enoch Valley Site) and **Table 3-3** (Henry Site) present the exceedances of screening levels in surface water for the 2015 spring and fall events. The comprehensive results for all 2015 surface water constituents are provided in **Appendix B**.

3.2 Groundwater Sampling – 2015 Analytical Results

Table 3-4 (Ballard Site), **Table 3-5** (Enoch Valley Site) and **Table 3-6** (Henry Site) present the exceedances of screening levels by Site in groundwater for the 2015 spring event. The comprehensive results for all 2015 groundwater constituents are provided in **Appendix B**.

3.3 Third Party Data Validation

Third party data validation was performed on all laboratory analyses from the 2015 field program. Data validation is the process of evaluating the quality control (QC) parameters against the criteria established in the QAPP and qualifying those data points where the QC criteria is outside the established criteria. Level III data validation evaluates the following QC parameters:

- QAPP compliance
- Sample preservation and extraction and analytical holding times
- Method, trip, diffusion bag, and equipment rinseate blank sample results
- Reporting limits (RLs)
- Field duplicate sample results
- Tune standard results
- Initial calibration (ICAL), initial calibration verification (ICV), and continuing calibration verification standards (CVS) results

- Surrogate spike recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) sample results
- Laboratory control sample (LCS) and laboratory control duplicate (LCD) results
- Internal standard (IS) results.

In addition to the Level III data validation process, Level IV validation was conducted for 10 percent of the data in accordance with the QAPP. The following data review was conducted as part of the Level IV validation:

- Review of raw data from the instrument (i.e., chromatograms, quantitation reports, spectra)
- Back check of all calculations
- Review of sample preparation and analytical logs

A qualitative assessment also was conducted to evaluate whether the validated data were of sufficient quality to support the project objective (i.e., end use). All of the Level III and IV data validation reports prepared by Laboratory Data Consultants (LDC) showed that the overall assessment of the data was found to be acceptable. The complete validation reports from LDC are included as **Appendix** C.

3.4 Conclusions

This DSR presents data collected in 2015 to address LTM of surface water and groundwater at the Sites. No additional potential data gaps were discovered based on the 2015 data. The data and information presented in this DSR will eventually be combined with other Site characterization data to complete the evaluation of conceptual models, source areas, pathways, and receptors in the RI Report prepared for the Enoch Valley Site and during preparation of the upcoming feasibility studies for the Henry and Enoch Valley sites.

Please note, PCE which is a volatile organic compound (VOC) was collected at SB07 in the spring due to a prior detection of PCE. Exceedance data for the VOC analyte is presented in **Table 3-4**. PCE was detected in the groundwater collected from SB07 at a concentration almost double the detection in 2011 and the 2015 detection was above the screening level. As discussed in the *Ballard Mine RI Report* and the *Ballard Mine Feasibility Study Report Memorandum 1 – Site Background and Screening of Technologies – Draft Revision 0* (*Ballard FS Memo #1*, MWH, 2015b), several VOCs and semi-volatile organic compounds were detected in Ballard Shop Area soil and groundwater. As presented in *Ballard FS Memo #1 – Rev 0* contamination at the Ballard Shop will be addressed when the facility is no longer used, and it is therefore not further addressed in the Ballard FS.

4.0 REFERENCES

MWH, 2009a. *2009 and 2010 Surface Water Monitoring Sampling and Analysis Plan – Final Revision 2*, prepared for P4 Production L.L.C., May 2009.

MWH, 2009b. *2009 Groundwater Monitoring Sampling and Analysis Plan – Final Revision 3*, prepared for P4 Production L.L.C., August 2009.

MWH, 2010. *2010 Groundwater Monitoring Memorandum – Final Revision 2*, prepared for P4 Production L.L.C., May 2010.

MWH, 2011. *2011 Remedial Investigation/Feasibility Study Work Plan for P4's Ballard, Henry and Enoch Valley Mines – Final Revision 2,* prepared for P4 Production L.L.C., May 2011.

MWH, 2012. *2012 Surface and Groundwater Monitoring Programs – Final Rev 2*, prepared for P4 Production L.L.C., May 2012.

MWH, 2014a. *Proposed P4 Long-Term Surface Water and Groundwater Monitoring Plan – Final Rev 1*, prepared for P4 Production L.L.C., April 2014.

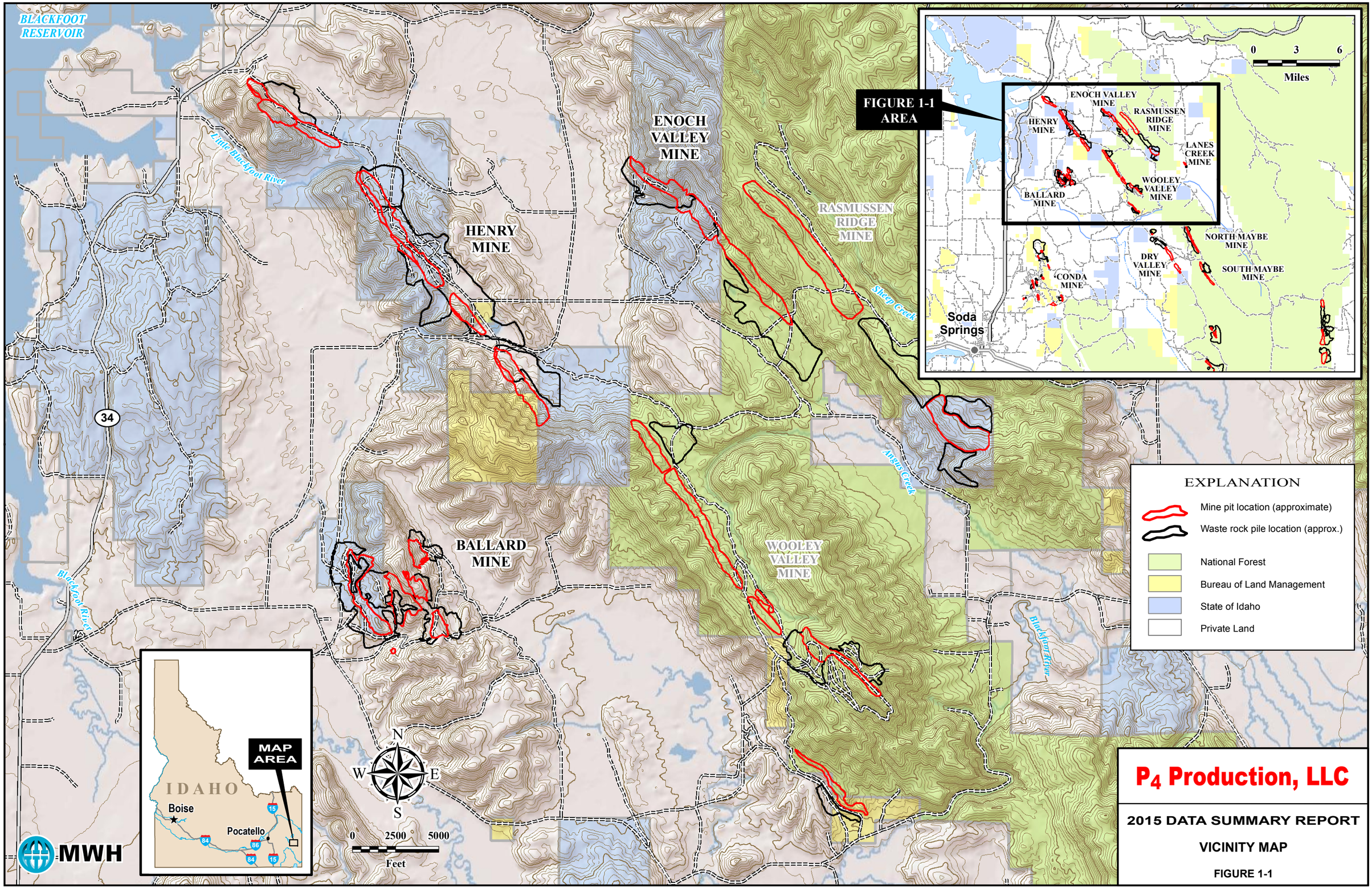
MWH, 2014b. *Remedial Investigation Report for P4's Ballard Mine – Final Revision 2,* prepared for P4 Production L.L.C., November 2014.

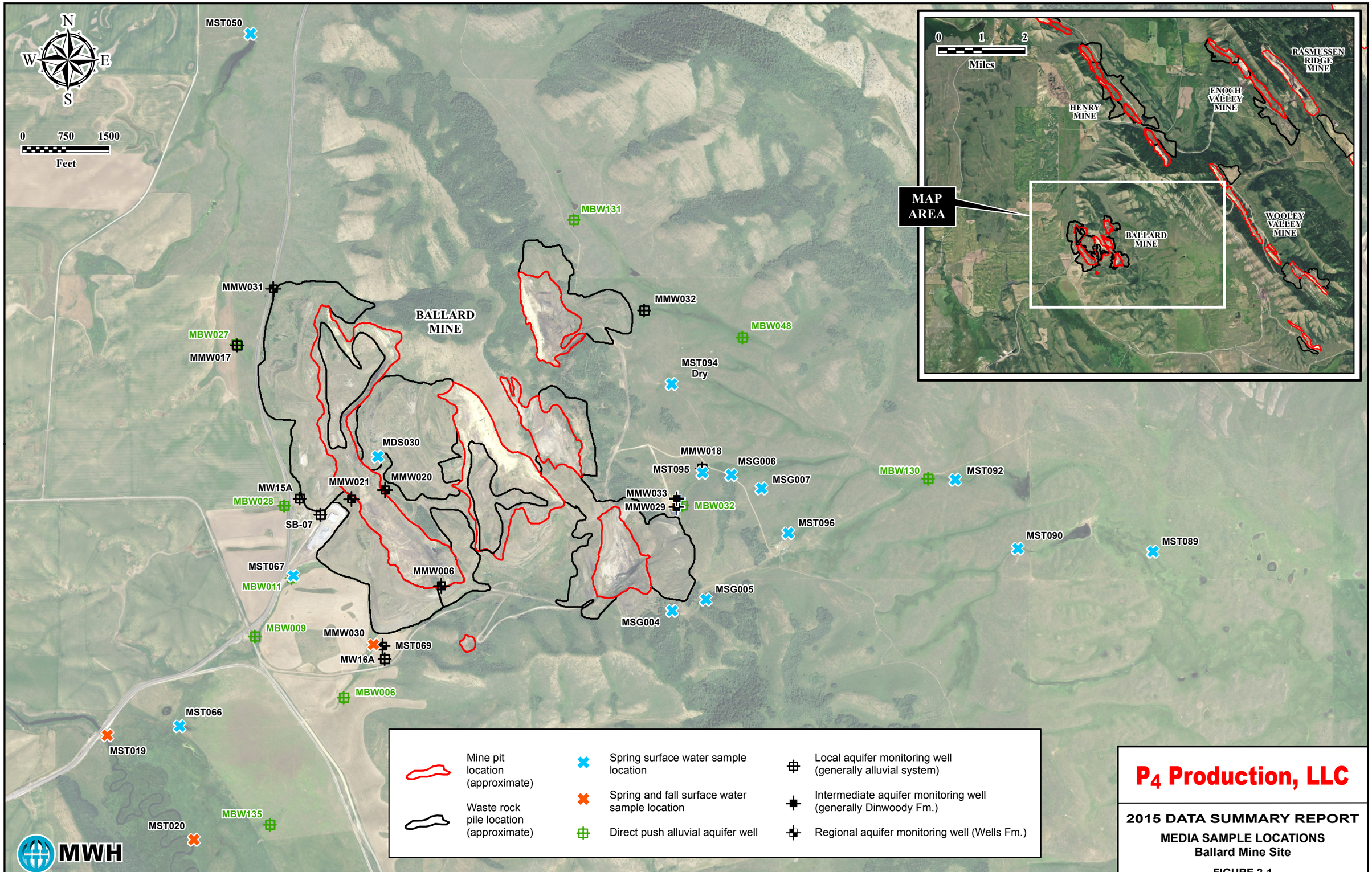
MWH, 2015a. *Sampling and Analysis Plan for Long-Term Surface Water and Groundwater Ballard, Henry, and Enoch Valley Mines – Final Revision 1*, prepared for P4 Production L.L.C., April 2015.

MWH, 2015b. *Ballard Mine Feasibility Study Report Memorandum 1 – Site Background and Screening of Technologie*s - *Draft Revision 0*, prepared for P4 Production L.L.C., March 2015.

USEPA, 2009. *Administrative Settlement Agreement and Order on Consent/Consent Order for Performance of Remedial Investigation and Feasibility Study at the Enoch, Henry, and Ballard Mine Sites in Southeastern Idaho.* United States Environmental Protection Agency, U.S. EPA Region 10, Idaho Department of Environmental Quality, United States Department of Agriculture, Forest Service Region 4, United States Department of the Interior, Bureau of Land Management, Shoshone-Bannock Tribes, in the Matter of Enoch Valley Mine, Henry Mine, Ballard Mine, P4 Production, L.L.C., Respondent. Effective Date of November 30, 2009.

FIGURES


BLACKFOOT RESERVOIR
Little Blackfoot River
Blackfoot River
Sheep Creek
Angus Creek
Blackfoot River
34
ENOCH VALLEY MINE
HENRY MINE
RASMUSSEN RIDGE MINE
BALLARD MINE
WOOLEY VALLEY MINE
FIGURE 1-1 AREA
0 3 6
Miles
ENOCH VALLEY MINE
HENRY MINE
RASMUSSEN RIDGE MINE
LANES CREEK MINE
WOOLEY VALLEY MINE
BALLARD MINE
NORTH MAYBE MINE
DRY VALLEY MINE
SOUTH MAYBE MINE
CONDA MINE
Soda Springs
EXPLANATION
Mine pit location (approximate)
Waste rock pile location (approx.)
National Forest
Bureau of Land Management
State of Idaho
Private Land
MAP AREA
IDAHO
Boise
Pocatello
15
84
86
N
W
E
S
0 2500 5000
Feet
MWH
P4 Production, LLC
2015 DATA SUMMARY REPORT
VICINITY MAP
FIGURE 1-1
DRAWN BY J. Kester
Date: 2/11/2016
J:\Industrial Projects\P4 Monsanto\GIS\MXDs\2015_DSR\Fig 1-1_MONSANTO_Vicinity Map_Dec2015.mxd



P_4 Production, LLC

2015 DATA SUMMARY REPORT

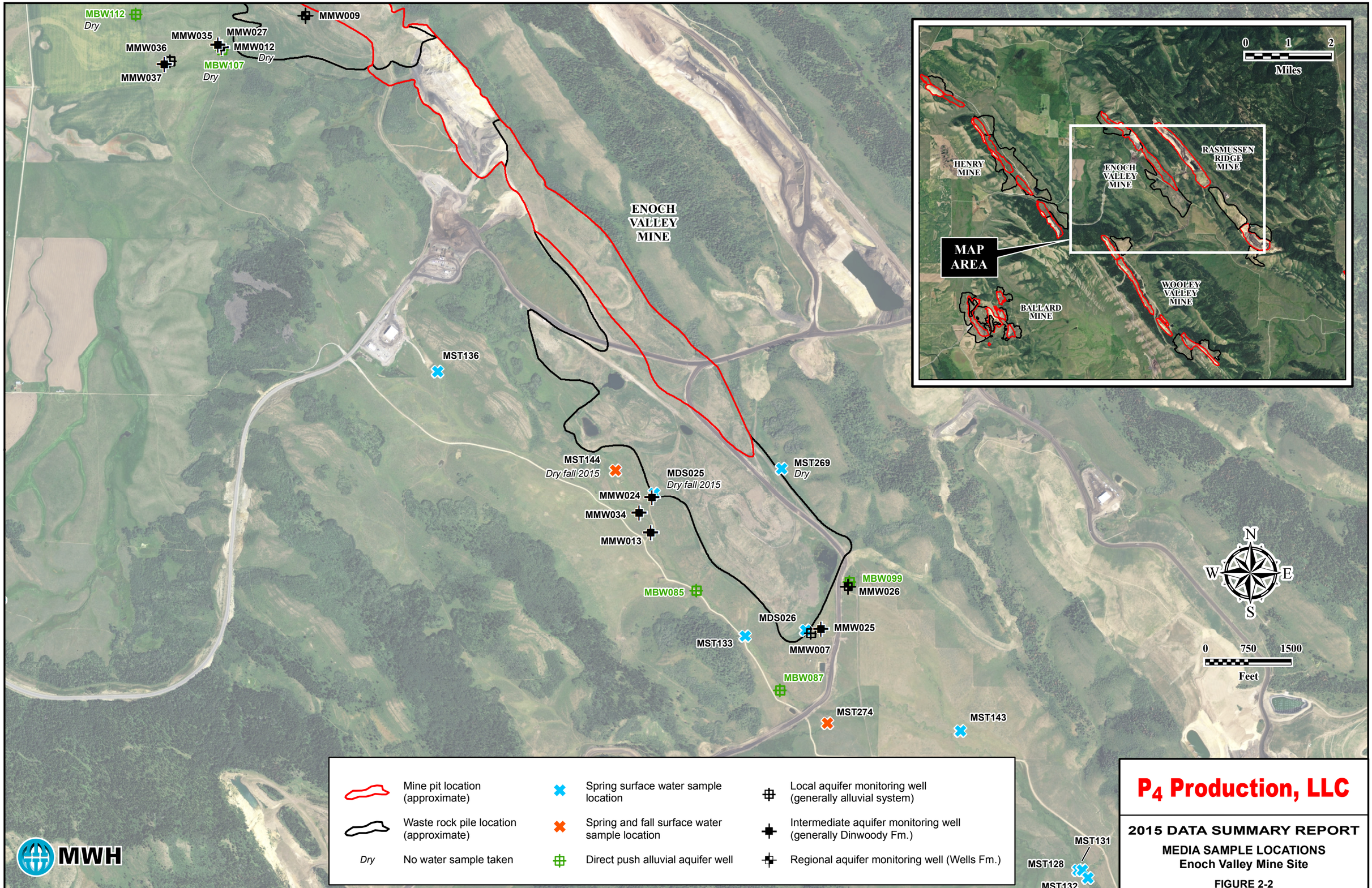
MEDIA SAMPLE LOCATIONS
Ballard Mine Site

FIGURE 2-1

DRAWN BY J. Kester

Date: 2/11/2016

J:\Industrial Projects\P4 Monsanto\GIS\MXDs\2015_DSR\Fig 2-1_MONSANTO_BallardMine_Dec2015.mxd



P4 Production, LLC

2015 DATA SUMMARY REPORT

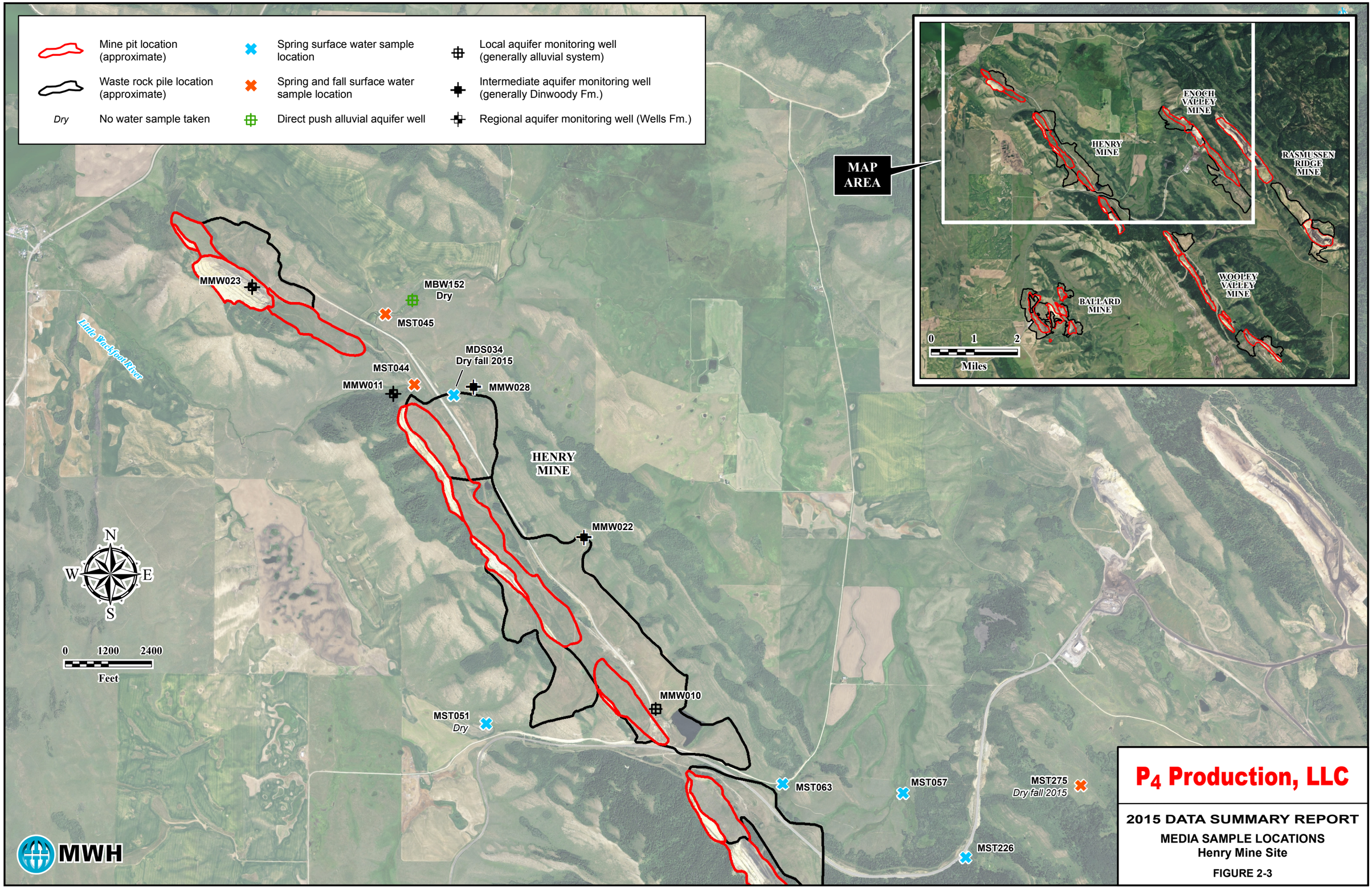
MEDIA SAMPLE LOCATIONS
Enoch Valley Mine Site

FIGURE 2-2

DRAWN BY J. Kester

Date: 2/11/2016

J:\Industrial Projects\P4 Monsanto\GIS\MXDs\2015_DSR\Fig 2-2_MONSANTO_EnochValleyMine_Dec2015.mxd



P_4 Production, LLC

2015 DATA SUMMARY REPORT

MEDIA SAMPLE LOCATIONS
Henry Mine Site

FIGURE 2-3

DRAWN BY J. Kester

Date: 2/11/2016

J:\Industrial Projects\P4 Monsanto\GIS\MXDs\2015_DSR\Fig 2-3_MONSANTO_HenryMine_Dec2015.mxd

TABLES

TABLE 3-1

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

	Location Identification	**MDS030**		**MDS030 Dup**		**MDS030 Avg**	
	Location Type	**Seep**		**Seep**		**Seep**	
	Date Collected	**4/15/2015**		**4/15/2015**		**4/15/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Selenium	0.005 mg/l	**0.717 D**	**0.681 D**	**0.733 D**	**0.656 D**	**0.725 D**	**0.6685 D**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-1

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

	Location Identification	**MDS030**		**MSG004**		**MSG004**	
	Location Type	**Seep**		**Spring**		**Spring**	
	Date Collected	**9/30/2015**		**4/15/2015**		**9/30/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0003	--	<0.0006	--
Selenium	0.005 mg/l	**0.905 D**	**1.03 D**	**0.032**	**0.0331**	**0.0183**	**0.0286**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-1

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

	Location Identification	**MSG005**		**MSG006**		**MSG007**	
	Location Type	**Spring**		**Spring**		**Spring**	
	Date Collected	**4/15/2015**		**4/17/2015**		**4/17/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Selenium	0.005 mg/l	**0.0107**	**0.012**	**0.236**	**0.222**	**0.0254**	**0.0858**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-1

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

	Location Identification	**MST019**		**MST019**		**MST019 Dup**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**4/20/2015**		**9/30/2015**		**9/30/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0006	--	<0.0006	--
Selenium	0.005 mg/l	**0.00272**	**0.00332**	**0.00524**	**0.00246**	**0.00176**	**0.00142**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-1

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

	Location Identification	**MST019 Avg**		**MST050**		**MST066**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**9/30/2015**		**4/19/2015**		**4/20/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0003	--	<0.0003	--
Selenium	0.005 mg/l	**0.0035**	**0.00194**	<0.0005	<0.0005	**0.00781**	**0.00932**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-1

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

	Location Identification	**MST067**		**MST069**		**MST069**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**4/17/2015**		**4/18/2015**		**9/30/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	**0.00151**	--	**0.000727**	--	<0.0006	--
Selenium	0.005 mg/l	**0.386**	**0.504**	**1.39**	**1.51**	**1.25 D**	**1.91 D**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-1

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

	Location Identification	**MST089**		**MST090**		**MST092**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**4/18/2015**		**4/18/2015**		**4/18/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Selenium	0.005 mg/l	**0.00128**	**0.00118**	<0.0005	<0.0005	**0.00187**	**0.00171**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-1

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

	Location Identification	**MST092 Dup**		**MST092 Avg**		**MST095**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**4/18/2015**		**4/18/2015**		**4/17/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Selenium	0.005 mg/l	**0.00172**	**0.00184**	**0.001795**	**0.001775**	**0.16**	**0.156**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-1

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

	Location Identification	**MST096**	
	Location Type	**Stream**	
	Date Collected	**4/17/2015**	
Analyte/Methods (Units)			
	Screening Levels		
Metals (mg/l)		**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--
Selenium	0.005 mg/l	**0.0264**	**0.0285**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-2

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - ENOCH VALLEY MINE
P4 RI/FS
(Page 1 of 5)

	Location Identification	**MDS025**		**MDS026**		**MDS026**	
	Location Type	**Seep**		**Seep**		**Seep**	
	Date Collected	**4/14/2015**		**4/16/2015**		**9/30/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	**0.000947**	--	**0.0059**	--	**0.000737**	--
Selenium	0.005 mg/l	**0.0303**	**0.0363**	**0.0227**	**0.0514**	**0.0421**	**0.0297**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

TABLE 3-2

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - ENOCH VALLEY MINE
P4 RI/FS
(Page 2 of 5)

	Location Identification	**MST128**		**MST131**		**MST132**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**4/16/2015**		**4/16/2015**		**4/16/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Selenium	0.005 mg/l	**0.00087 F**	**0.00145**	**0.00306**	**0.00212**	**0.00123**	**0.0016**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

TABLE 3-2

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - ENOCH VALLEY MINE
P4 RI/FS
(Page 3 of 5)

	Location Identification	**MST132 Dup**		**MST132 Avg**		**MST133**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**4/16/2015**		**4/16/2015**		**4/14/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Selenium	0.005 mg/l	**0.00174**	**0.00196**	**0.001485**	**0.00178**	**0.00303**	**0.00311**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

TABLE 3-2

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - ENOCH VALLEY MINE
P4 RI/FS
(Page 4 of 5)

	Location Identification	**MST136**		**MST143**		**MST144**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**4/14/2015**		**4/16/2015**		**4/14/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Selenium	0.005 mg/l	**0.0121**	**0.0107**	<0.0005	<0.0005	**0.446 D**	**0.465 D**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

TABLE 3-2

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - ENOCH VALLEY MINE
P4 RI/FS

	Location Identification	**MST274**		**MST274**	
	Location Type	**Stream**		**Stream**	
	Date Collected	**4/16/2015**		**9/30/2015**	
Analyte/Methods (Units)					
	Screening Levels				
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0006	--
Selenium	0.005 mg/l	**0.00506**	**0.00517**	**0.00512**	**0.00499**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

TABLE 3-3

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - HENRY MINE
P4 RI/FS
(Page 1 of 3)

	Location Identification	**MDS034**		**MST044**		**MST044**	
	Location Type	**Seep**		**Stream**		**Stream**	
	Date Collected	**4/19/2015**		**4/19/2015**		**9/30/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Selenium	0.005 mg/l	**0.00459**	**0.0072**	**0.00107**	**0.0013**	**0.00145**	**0.001**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

TABLE 3-3

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - HENRY MINE
P4 RI/FS
(Page 2 of 3)

	Location Identification	**MST045**		**MST045**		**MST057**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**4/19/2015**		**9/30/2015**		**4/19/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Selenium	0.005 mg/l	**0.00114**	**0.000841 F**	**0.000885 F**	**0.00103**	<0.0005	<0.0005

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

TABLE 3-3

SUMMARY OF 2015 SURFACE WATER RESULT EXCEEDANCES - HENRY MINE
P4 RI/FS
(Page 3 of 3)

	Location Identification	**MST063**		**MST226**		**MST275**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**4/19/2015**		**4/18/2015**		**4/14/2015**	
Analyte/Methods (Units)	**Screening Levels**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Selenium	0.005 mg/l	**0.00623**	**0.00651**	**0.00177**	**0.00225**	**0.00239**	**0.000586 F**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

TABLE 3-4

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MBW006		MBW009		MBW011	
Location Identification		**MBW006**		**MBW009**		**MBW011**	
Location Type		**Bore Hole Well**		**Bore Hole Well**		**Bore Hole Well**	
Date Collected		**4/14/2015**		**4/15/2015**		**4/15/2015**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	**0.00481 J+**	--	**0.0696**	--	**0.0812**
Selenium	0.05 mg/l	**0.396 D**	**0.371 D**	**0.00832**	**0.00938**	**0.553 D**	**0.386 D**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**446 D**	--	**385 D**	--	**165 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**364**	--	**836**	--	**494**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-4

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MBW027		MBW028		MBW032	
Location Identification		**MBW027**		**MBW028**		**MBW032**	
Location Type		**Bore Hole Well**		**Bore Hole Well**		**Bore Hole Well**	
Date Collected		**4/15/2015**		**4/17/2015**		**4/18/2015**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	**0.000383 F**	--	**0.000317 F**	--	**0.00076**
Manganese	0.05 mg/l	--	<0.001	--	**0.0402**	--	**0.022**
Selenium	0.05 mg/l	**0.874 D**	**0.969 D**	**1.14 D**	**1.06 D**	**4.24 D**	**3.97 D**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**341 D**	--	**534 D**	--	**980 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**870**	--	**1020**	--	**1400**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-4

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MBW032 Dup		MBW032 Avg		MBW048	
Location Identification		MBW032 Dup		MBW032 Avg		MBW048	
Location Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		4/18/2015		4/18/2015		4/18/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	**0.000843**	--	**0.000802**	--	<0.0003
Manganese	0.05 mg/l	--	**0.0293**	--	**0.02565**	--	**0.316 D**
Selenium	0.05 mg/l	**4.18 D**	**3.93 D**	**4.21 D**	**3.95 D**	**0.000798 F**	**0.000513 F**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**1000 D**	--	**990 D**	--	**5.57**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**1420**	--	**1410**	--	**106**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-4

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MBW130		MBW131		MBW135	
Location Identification		**MBW130**		**MBW131**		**MBW135**	
Location Type		**Bore Hole Well**		**Bore Hole Well**		**Bore Hole Well**	
Date Collected		**4/18/2015**		**4/18/2015**		**4/19/2015**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	**0.196**	--	**0.00804**	--	**0.106**
Selenium	0.05 mg/l	**0.000651 F**	**0.000596 F**	**0.00232**	**0.00309**	**0.000876 F**	**0.000663 F**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**9.49**	--	**3.12**	--	**49.9**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**130**	--	**126**	--	**222**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-4

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

Analyte/Methods (Units)	Location Identification / Location Type / Date Collected	MMW006 Monitoring Well 4/17/2015		MMW017 Monitoring Well 4/15/2015		MMW018 Monitoring Well 4/17/2015	
	Screening Levels						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	**0.00047 F**	--	<0.0003
Manganese	0.05 mg/l	--	<0.001	--	**0.00388 J+**	--	**0.0298**
Selenium	0.05 mg/l	**0.116**	**0.114**	**0.145**	**0.137**	**0.0287**	**0.0298**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**78.5 D**	--	**509 D**	--	**46.8**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**320**	--	**1080**	--	**268**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-4

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

Analyte/Methods (Units)	Location Identification / Location Type / Date Collected	MMW020 Monitoring Well 4/17/2015		MMW021 Monitoring Well 4/15/2015		MMW029 Monitoring Well 4/18/2015	
	Screening Levels						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	**0.00783**	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	**0.084**	--	<0.001	--	0.0013 FU
Selenium	0.05 mg/l	**0.0322**	**0.0306**	**0.0533**	**0.0581**	**0.707 D**	**0.701 D**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**283 D**	--	**45.9**	--	**698 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**766**	--	**354**	--	**1290**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-4

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MMW030		MMW031		MMW032	
Location Identification		**MMW030**		**MMW031**		**MMW032**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**4/18/2015**		**4/15/2015**		**4/17/2015**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	**0.0918**	--	<0.001	--	**0.00334 J+**
Selenium	0.05 mg/l	**0.000564 F**	**0.000604 F**	**0.0015**	**0.00126**	**0.0025**	**0.0025**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**15.3**	--	**3.27**	--	**5.48**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**214**	--	**178**	--	**200**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-4

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MMW033		MW15A		MW16A	
Location Identification		**MMW033**		**MW15A**		**MW16A**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**4/18/2015**		**4/17/2015**		**4/13/2015**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	**0.0437**	--	**0.00479 J+**	--	**1.99 D**
Selenium	0.05 mg/l	**0.000741 F**	**0.000679 F**	**1.95 D**	**2.39 D**	**0.0106**	**0.0109**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**26.5**	--	**673 D**	--	**828 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**238**	--	**1320**	--	**1420**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-4

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS

	Location Identification	**SB07**
	Location Type	**Temporary Well**
	Date Collected	**4/19/2015**
Analyte/Methods (Units)		
	Screening Levels	
Metals (mg/l)		**Total**
Cadmium	0.005 mg/l	--
Manganese	0.05 mg/l	--
Selenium	0.05 mg/l	--
Chemistry Parameters (mg/l)		
Sulfate (as SO_4)	250 mg/l	--
Total dissolved solids (Residue, filterable)	500 mg/l	--
Volatile Organic Compounds (mg/l)		
Tetrachloroethene (PCE)	0.005 mg/l	**0.0132**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-5

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - ENOCH VALLEY MINE
P4 RI/FS
(Page 1 of 5)

Analyte/Methods (Units)	Screening Levels	MBW085		MBW087		MBW099		MMW007	
Location Identification		**MBW085**		**MBW087**		**MBW099**		**MMW007**	
Location Type		**Bore Hole Well**		**Bore Hole Well**		**Bore Hole Well**		**Monitoring Well**	
Date Collected		**4/14/2015**		**4/16/2015**		**4/17/2015**		**4/16/2015**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/L	--	<0.0003	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/L	--	**0.0394**	--	**0.031**	--	**0.00578 J+**	--	**0.00828**
Selenium	0.05 mg/L	**0.0024**	**0.00192**	**0.00328**	**0.00151**	**0.00152**	**0.00153**	**0.00177**	**0.00204**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250 mg/L	**21.6**	--	**22.5**	--	**29.6**	--	**13.3**	--
Total dissolved solids (Residue, filterable)	500 mg/L	--	**204**	--	**340**	--	**202**	--	**150**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-5

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - ENOCH VALLEY MINE
P4 RI/FS
(Page 2 of 5)

Analyte/Methods (Units)	Screening Levels	MMW009		MMW013		MMW024		MMW025	
Location Identification		MMW009		MMW013		MMW024		MMW025	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		4/18/2015		4/14/2015		4/14/2015		4/20/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/L	--	<0.0003	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/L	--	**0.073**	--	**0.0136**	--	<0.001	--	**0.00126 F**
Selenium	0.05 mg/L	**0.00245**	<0.0005	**0.157**	**0.177**	**0.0864**	**0.0848**	**0.000526 F**	**0.000791 F**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250 mg/L	**63.4**	--	**171 D**	--	**253 D**	--	**12.6**	--
Total dissolved solids (Residue, filterable)	500 mg/L	--	**370**	--	**482**	--	**1190**	--	**116**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-5

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - ENOCH VALLEY MINE
P4 RI/FS
(Page 3 of 5)

	Location Identification	**MMW026**		**MMW027**		**MMW034**		**MMW034 Dup**	
	Location Type	**Monitoring Well**		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
	Date Collected	**4/16/2015**		**4/20/2015**		**4/14/2015**		**4/14/2015**	
Analyte/Methods (Units)	**Screening Levels**								
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Total**	**Total**
Cadmium	0.005 mg/L	--	<0.0003	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/L	--	<0.001	--	<0.001	--	0.00193 FU	--	0.00152 FU
Selenium	0.05 mg/L	**0.00186**	**0.00177**	**0.719 D**	**0.826 D**	**0.106**	**0.111**	**0.117**	**0.115**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250 mg/L	**23.5**	--	**322 D**	--	**153 D**	--	**145 D**	--
Total dissolved solids (Residue, filterable)	500 mg/L	--	**238**	--	**716**	--	**336**	--	**312**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-5

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - ENOCH VALLEY MINE
P4 RI/FS
(Page 4 of 5)

	Location Identification	**MMW034 Avg**		**MMW035**		**MMW036**		**MMW037**	
	Location Type	**Monitoring Well**		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
	Date Collected	**4/14/2015**		**4/20/2015**		**4/20/2015**		**4/20/2015**	
Analyte/Methods (Units)	**Screening Levels**								
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/L	--	<0.0003	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/L	--	**0.001725 F**	--	<0.001	--	**0.00277**	--	**0.00477**
Selenium	0.05 mg/L	**0.1115**	**0.113**	**1.27 D**	**1.27 D**	**0.0186**	**0.0192**	**0.0266**	**0.0264**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250 mg/L	**149 D**	--	**535 D**	--	**22**	--	**29.4**	--
Total dissolved solids (Residue, filterable)	500 mg/L	--	**324**	--	**1030**	--	**210**	--	**228**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-5

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - ENOCH VALLEY MINE
P4 RI/FS
(Page 5 of 5)

	Location Identification	**MMW037 Dup**		**MMW037 Avg**	
	Location Type	**Monitoring Well**		**Monitoring Well**	
	Date Collected	**4/20/2015**		**4/20/2015**	
Analyte/Methods (Units)	**Screening Levels**				
Metals (mg/l)		**Total**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/L	--	<0.0003	--	<0.0003
Manganese	0.05 mg/L	--	**0.00454**	--	**0.004655**
Selenium	0.05 mg/L	**0.0273**	**0.0252**	**0.02695**	**0.0258**
Chemistry Parameters (mg/l)					
Sulfate (as SO_4)	250 mg/L	**29.4**	--	**29.4**	--
Total dissolved solids (Residue, filterable)	500 mg/L	--	**230**	--	**229**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in an associated blank.

TABLE 3-6

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - HENRY MINE
P4 RI/FS
(Page 1 of 2)

Analyte/Methods (Units)	Location Identification / Location Type / Date Collected	MMW010 Monitoring Well 4/18/2015		MMW011 Monitoring Well 4/19/2015		MMW022 Monitoring Well 4/19/2015		MMW023 Monitoring Well 4/19/2015	
	Screening Levels								
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	**0.00443**	--	**0.000727**	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	**0.0152**	--	0.00101 FU	--	**0.0232**	--	**0.329 D**
Selenium	0.05 mg/l	**0.12**	**0.119**	**0.000623 F**	**0.000763 F**	**0.0471**	**0.0411**	**0.000662 F**	**0.000639 F**
Chemistry Parameters (mg/l)									
Sulfate (as SO_4)	250 mg/l	**562 D**	--	**142 D**	--	**274 D**	--	**209 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**1140**	--	**476**	--	**608**	--	**764**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
U Analyte considered not detected based on concentration in an associated blank.
J+ Data are estimated due to associated quality control data. Potential high bias.

TABLE 3-6

SUMMARY OF 2015 GROUNDWATER RESULT EXCEEDANCES - HENRY MINE
P4 RI/FS
(Page 2 of 2)

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	MMW028 Monitoring Well 4/19/2015		MMW028 Dup Monitoring Well 4/19/2015		MMW028 Avg Monitoring Well 4/19/2015	
	Screening Levels						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	**0.00277 J+**	--	**0.00253 J+**	--	**0.00265**
Selenium	0.05 mg/l	**0.00224**	**0.00335**	**0.00221**	**0.00217**	**0.002225**	**0.00276**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**71**	--	**70.7**	--	**70.85**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**316**	--	**306**	--	**311**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Shade indicates result exceeded Screening Level.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
U Analyte considered not detected based on concentration in an associated blank.
J+ Data are estimated due to associated quality control data. Potential high bias.

APPENDICES

APPENDIX A – FIELD NOTES AND FIELD FORMS

A-1 2015 Spring Groundwater and Surface Water Sampling

A-2 2015 Fall Surface Water Sampling

A-1 2015 Spring Surface Water and Groundwater Sampling

TABLE A-1
2015 SPRING SURFACE WATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Water Temp (deg. C)	Spec Cond (uS/cm) @ 25 deg. C	Cond (uS/cm)	D.O. (% sat.)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Air Temp (deg. c)	Discharge (cfs)	Comments	Date	Time
SW	MDS025	6.2	1405	902	34.4	4.29	6.72	-58.9	8.04	16.1	0.004		4/14/2015	1215
SW	MDS026	5.4	1669	1044	31.6	3.97	6.53	65	2.53	3.3	Flow coming from several locations along seep, approximately 20 feet wide. Can not measure.		4/16/2015	1230
SW	MDS030	5.9	884	562	9.4	8.63	7.23	4.9	2.98	-4.4	Seep daylighting in multiple places coming from under waste rock pile . Unable to measure flow.		4/15/2015	1230
SW	MDS034	5.1	760.8	471	42.9	5.42	7.78	86.7	6.31	7.2	Flow can not be measured, seeps from area 80ft x 50ft in grassy, marshy area.		4/19/2015	905
SW	MSG004	1.7	537.1	296.9	65.6	9.29	7.71	-43.3	3.58	-4.4	8 foot wide seep, unable to collect flow. Daylighting in multiple locations across the hill.		4/15/2015	1115
SW	MSG005	4.8	579.2	356.2	65	8.21	7.21	43	0.32	-4.4	0.0049		4/15/2015	1030
SW	MSG006	5.3	1219	759	53.7	6.78	7.22	97.2	1.08	8.3	Flow can not be measured. Daylights on hill side and flow through grassy area intermittently. Approximately 60 feet wide across hill side.		4/17/2015	1510
SW	MSG007	11.8	500.2	373.6	41.8	4.5	7.43	45.7	8.37	8.3	Spring flow can not be measured. Daylights at toe of hill in an area approximately 30ft wide and 40ft long. Hummocky.		4/17/2015	1525
SW	MST019	11.3	389.5	287.9	72.9	7.94	8.34	55.4	13.2	15	160	Flow from USGS station online, staff gauge 2.70 feet.	4/20/2015	1415
SW	MST020	11	374.7	274.6	87.8	9.71	8.34	54.9	12.8	15	160	No flow collected, river running too high to enter safely.	4/20/2015	1520
SW	MST044	8.6	695.4	477.6	93.6	10.9	8.34	72.8	1.39	7.2	4		4/19/2015	1010
SW	MST045	10.2	695.4	498.7	97.6	10.89	8.09	67.3	1.92	7.8	3.75		4/19/2015	1100
SW	MST050	19.6	627	563	8.8	0.79	7.07	-49.2	15.9	12.2	Flow could not be measured, marshy creek area spread out.		4/19/2015	1455
SW	MST051	DRY											4/14/2015	1611

TABLE A-1
2015 SPRING SURFACE WATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Water Temp (deg. C)	Spec Cond (uS/cm) @ 25 deg. C	Cond (uS/cm)	D.O. (% sat.)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Air Temp (deg. c)	Discharge (cfs)	Comments	Date	Time
SW	MST057	19.2	491.7	435.6	51.6	4.82	7.31	17.4	8.01	13.9	Flow too low to measure in marshy area.		4/19/2015	1330
SW	MST063	15.2	773	628	93.2	9.29	7.37	61.6	9.73	11.11	No channelized flow, large marshy area.		4/19/2015	1250
SW	MST066	20.9	501.2	462.2	8.1	7.06	8.27	79.1	11	14.4	0.0031		4/20/2015	1450
SW	MST067	2.2	1273	718	35.3	4.81	7.22	97	1.23	-1.7	0.0168		4/15/2015	840
SW	MST069	15.6	2006	1643	56.5	5.56	8.07	116.7	7.37	3.3	0.00371		4/18/2015	1535
SW	MST089	15.8	337.2	277.9	98.6	9.74	7.67	92.7	1.09	3.3	0.21		4/18/2015	1335
SW	MST090	17.4	393.7	336.4	80.1	7.67	7.89	976	0.71	3.3	0.1		4/18/2015	1435
SW	MST092	16.3	420.5	351	82.5	8.07	7.83	119.3	1.24	3.3	0.06		8/18/2015	1240
SW	MST094	DRY											4/14/2015	1657
SW	MST095	22.3	876	831	39.9	3.47	7.7	93	45.3	8.3	Flow can not be measured. Channel approximately 4-6 feet wide in thick grass with low gradient.		4/17/2015	1400
SW	MST096	15.5	487.6	399.6	44.6	4.43	7.8	8.21	4.16	10	0.001		4/17/2015	1600
SW	MST128	9.7	335.4	237.4	76.5	8.68	7.88	55.5	17.1	6.7	9		4/16/2015	1630
SW	MST131	9.7	266.1	188.2	77.1	8.73	7.68	61.5	48	6.7	4.43		4/16/2015	1550
SW	MST132	7.4	314	208.5	80.1	9.62	7.82	63.3	26.3	6.7	13.24		4/16/2015	1512

TABLE A-1
2015 SPRING SURFACE WATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Water Temp (deg. C)	Spec Cond (uS/cm) @ 25 deg. C	Cond (uS/cm)	D.O. (% sat.)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Air Temp (deg. c)	Discharge (cfs)	Comments	Date	Time
SW	MST133	10.2	257.8	184.8	74.1	8.31	7.67	-64.6	18.2	7.8	0.76		4/14/2015	1515
SW	MST136	10.3	226.7	162.4	55.2	6.2	6.7	-26.5	1.01	15.6	0.003		4/14/2015	1032
SW	MST143	3.2	149.5	87.4	67.2	8.99	6.61	NULL	6.61	6.7	0.066		4/16/2015	1415
SW	MST144	11.2	693	511	82.9	9.08	7.04	-10.2	122	16.1	0.0001		4/14/2015	1140
SW	MST226	6.3	263.8	169.8	61.1	7.5	7.26	114.1	1.86	3.3	0.0124		4/18/2015	1615
SW	MST269	DRY											4/14/2015	1540
SW	MST274	8.6	466.4	319.6	107.3	12.52	8.38	42.9	4.86	6.7	0.16		4/16/2015	1315
SW	MST275	11.4	147.8	108.9	83.2	9.22	7.66	-74.7	60.5	13.9	0.0114		4/14/2015	1320

cfs	cubic feet per second	NTU	Nephelometric Turbidity Units
deg. C	degrees Celsius	N/A	Parameter not required / not collected
g/L	grams per liter	SW	Surface Water
mg/l	milligrams per liter	uS/cm	microSiemens per centimeter
mV	millivolts	% sat.	percent saturation

TABLE A-2
2015 SPRING GROUNDWATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Elevation MP (ft-AMSL)	Static Water Level (ft BMP)	Elevation Static Water (ft-AMSL)	Purge Rate (L/min)	Cumulative Purge Vol. (L)	Water Temp (deg. C)	pH	ORP (mV)	D.O. (mg/L)	Spec Cond (uS/cm) @ 25 deg. C	Turbidity (NTU)	Sampling Device	Comments	Date	Time
GW	SB07	6389.1	41.23	6347.87	N/A	N/A	11.7	7.17	84.9	0.69	881	6.8	Bailer	purge dry and sample with bailer	4/19/2015	1657
GW	MBW006	6319.31	7.85	6311.46	0.25	5.25	6.1	6.98	228.4	8.13	1197	1.4	Peristaltic	low flow	4/14/2015	1055
GW	MBW009	6310.69	3.97	6306.72	0.10	3.90	5.2	6.7	15.5	4.21	1122	0.85	Peristaltic	low flow	4/15/2015	1611
GW	MBW011	6339.8	3.02	6336.78	N/A	N/A	5.2	6.67	18.6	1.63	707.6	18.9	Peristaltic	purge dry and sample	4/15/2015	1505
GW	MBW027	6313.33	11.37	6301.96	0.10	2.45	5.6	6.79	199.6	7.53	1240	1.9	Peristaltic	low flow	4/15/2015	1440
GW	MBW028	6339.99	8.35	6331.64	N/A	N/A	6.6	6.64	86.5	0.95	1327	3.3	Peristaltic	purge dry and sample	4/17/2015	945
GW	MBW032	6499.13	11.85	6487.28	0.25	13.00	5.5	6.76	222.3	9.72	1711	3.4	Peristaltic	purge and sample	4/18/2015	1215
GW	MBW048	6421.72	0.7	6421.02	0.09	3.15	4.4	6.68	53.3	0.33	210.5	3.01	Peristaltic	low flow	4/18/2015	1132
GW	MBW085	6639.57	1.87	6637.7	N/A	N/A	3.2	7.29	-62.1	7.68	356.5	15.7	Peristaltic	purge dry and sample	4/14/2015	1435
GW	MBW087	6587.3	1.19	6586.11	0.20	6.55	4.3	6.71	8.7	0.5	615.9	1.96	Peristaltic	low flow	4/16/2015	1133
GW	MBW099	6599.25	1.05	6598.2	N/A	N/A	4.8	8.11	233	8.1	318.1	4.1	Peristaltic	purge dry and sample	4/13/2015	815
GW	MBW107	6486.78	DRY												4/14/2015	930
GW	MBW112	6404	DRY												4/14/2015	952
GW	MBW130	6416.29	3.03	6413.26	N/A	N/A	6	6.99	175	2.43	225.6	8.81	Peristaltic	purge dry and sample	4/18/2015	1223
GW	MBW131	6468.52	3.38	6465.14	0.07	2.45	4	6.59	100	8.49	249.9	3.45	Peristaltic	low flow	4/18/2015	958
GW	MBW135	6290.56	3.16	6287.4	N/A	N/A	6.5	7.55	15	1	452.7	8.83	Peristaltic	purge dry and sample	4/19/2015	1550
GW	MBW152	6280	DRY												4/18/2015	1700
GW	MW15A	6364.37	23.11	6341.26	0.06	2.71	8.4	6.66	93.3	3.72	1635	2.12	Peristaltic	low flow	4/17/2015	1047
GW	MW16A	6346.71	9.95	6336.76	0.14	6.20	7	7.15	-58.5	0.17	1744	1.2	Peristaltic	low flow	4/13/2015	1810
GW	MMW006	6485.46	266.95	6218.51	0.20	22.00	9.7	7.26	251.5	5.68	499.4	2.3	Bladder Pump/Nitrogen	low flow	4/17/2015	1145
GW	MMW007	6619.89	35.84	6584.05	0.09	99	8.1	6.83	173	2.11	223.2	3.1	Bladder Pump	low flow	4/16/2015	1335
GW	MMW009	6789.2	215	6574.2	0.60	46.80	1625	6.91	0.4	0.02	6.28	3.3	Bladder Pump/Nitrogen	low flow	4/18/2015	1625
GW	MMW010	6462.62	5.6	6457.02	0.10	3.20	8.7	6.36	176.6	4.41	1540	4.5	Bladder Pump	low flow	4/18/2015	1735
GW	MMW011	6268.31	74.2	6194.11	0.20	8.60	10.9	7.07	190.3	6.99	833	2	Bladder Pump	low flow	4/18/2015	1350
GW	MMW012	6488.72	DRY												4/20/2015	900
GW	MMW013	6634.46	4.25	6630.21	0.80	20.00	6.4	6.66	222.5	10.36	651	3.2	Bladder Pump/Nitrogen	low flow	4/15/2015	1455
GW	MMW017	6313.86	39.86	6274	0.03	4.52	4.1	6.38	217.4	6.58	1394	1.4	Bladder Pump	low flow	4/15/2015	1400
GW	MMW018	6459.52	12.36	6447.16	0.15	3.30	8.9	6.96	247.6	6.24	141.9	1.7	Bladder Pump	low flow	4/17/2015	1410
GW	MMW020	6525.71	280.45	6245.26	N/A	26.00	9.3	6.64	179.1	0.17	1061	1.8	Bladder Pump/Nitrogen	low flow	4/17/2015	1310
GW	MMW021	6436.3	211.78	6224.52	0.30	16.50	6.6	7.04	198.8	5.78	626	1.7	Bladder Pump	low flow	4/15/2015	1036
GW	MMW022	6635.85	210.2	6425.65	0.17	20.60	8.4	6.8	201.3	4.34	923	3.2	Bladder Pump	low flow	4/19/2015	1110
GW	MMW023	6230.92	108.26	6122.66	0.90	23.70	9.4	6.88	-89	0.07	987	1.9	Bladder Pump	low flow	4/19/2015	1505
GW	MMW024	6704.05	61.38	6642.67	0.90	21.50	61.42	7.01	155.3	2.97	838	1.2	Bladder Pump/Nitrogen	low flow	4/14/2015	1245
GW	MMW025	6612.87	29.1	6583.77	0.40	10.00	8.1	7.9	137.2	2.05	291.7	3.5	Bladder Pump	purge and sample	4/20/2015	1415
GW	MMW026	6599.21	286.72	6312.49	0.65	29.00	10.2	7.49	69.5	0.1	418.9	1.8	Bladder Pump/Nitrogen	low flow	4/16/2015	1055
GW	MMW027	6491.07	108.64	6382.43	0.50	14.50	7.2	6.98	134.7	3.36	1058	2.1	Bladder Pump	low flow	4/20/2015	940
GW	MMW028	6316.91	79.76	6237.15	0.65	10.90	8.2	7.29	197.2	6.35	556	3	Bladder Pump	low flow	4/19/2015	1230
GW	MMW029	6498.67	19.71	6478.96	0.35	15.30	8.4	6.73	240.8	5.78	1651	1.3	Bladder Pump	low flow	4/18/2015	945
GW	MMW030	6355.25	26.58	6328.67	0.30	4.20	10.4	7.66	156.7	1.91	399.9	8.3	Bladder Pump	purge and sample	4/18/2015	1405
GW	MMW031	6346.42	98.68	6247.74	0.45	32.80	8	7.43	200.9	8.59	254.1	5	Bladder Pump	low flow	4/15/2015	1210
GW	MMW032	6446.39	22	6424.39	N/A	6.00	7.1	7.38	223	9.68	377	3.7	Bladder Pump	purge and sample	4/14/2015	1535
GW	MMW033	6489.84	11.64	6478.2	1.50	69.00	6.8	7.35	81.7	0.13	456.7	4.7	Bladder Pump	purge and sample	4/18/2015	1050
GW	MMW034	6640.31	12.91	6627.4	0.35	16.75	6.9	6.98	210.7	8.84	621	5	Bladder Pump/Nitrogen	low flow	4/14/2015	1405
GW	MMW035	6500.34	110.14	6390.2	0.50	14.50	7.5	6.79	148.1	2.26	1435	2.6	Bladder Pump/Nitrogen	low flow	4/20/2015	1028
GW	MMW036	6425.18	116.11	6309.07	0.40	11.50	8.5	7.35	168.6	7.74	416.6	2.5	Bladder Pump	low flow	4/20/2015	1235
GW	MMW037	6419.39	117	6302.39	0.60	21.00	8.3	7.36	149	8.09	421.4	1.8	Bladder Pump/Nitrogen	low flow	4/20/2015	1140

GW	Groundwater	L/min	liters per minute
deg. C	degrees Celsius	mg/l	milligrams per liter
ft-AMSL	feet above mean sea level	mV	millivolts
ft-bmp	feet below measuring point	N/A	Parameter not required / not collected
L	liters	NTU	Nephelometric Turbidity Units
		uS/cm	microSiemens per centimeter

2015 Surface Water Sampling Field Forms

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Arrival Time** 12:09

Field Personnel

T. Osborn
E. Yeager

Signatures

SITE DESCRIPTION

Station Name West Dump Seep **Station Number** MDS 025

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 4

Site & Stream Description Seep with brown / orange organic matter flowing through willows

Surface Water Characteristics (color, odor, appearance): clear with organic matter, No odor. oily sheen

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1504 SW MDS 025 - U, F **Sample Time:** 1215

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1215		
Water Temperature (°C)	6.2		
Specific Conductivity (µS/cm) @ 25° C	1405		
Conductivity (µS/cm)	902		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	34.4		
Dissolved Oxygen (mg/L)	4.29		
pH	6.72		
ORP (mV)	-58.9		
Turbidity (FTU)	8.04		
Air Temperature (~~°C~~) F	61°		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Time** 12:31 **Station Number** MD3025

Completed by: TO EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	5.03	0.75
2	7.35	0.75
3	6.98	0.65

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

TO

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 16 / 15 **Arrival Time** 1210

Field Personnel

T. Osborn **Signatures**

E. Yenger

SITE DESCRIPTION

Station Name South Dump Seep **Station Number** MDS026

Latitude N ° as file " **Longitude** W ° as file "

Elevation as file ft **Datum** NAD 27 **Photo Number** 13

Site & Stream Description snow covered, seep daylights in willows on side of dump.

Surface Water Characteristics (color, odor, appearance): oily sheen on water, organic smell

SAMPLE COLLECTION

Collection Method: (1L bottle), Horizontal-bottle, Swing-sampler, Other( ) (Up-stream) / Across-stream

Sample ID: 1504SWMDS026-U,F **Sample Time:** 1230

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1230		
Water Temperature (°C)	5.4		
Specific Conductivity (µS/cm) @ 25° C	1669		
Conductivity (µS/cm)	1044		
TDS (g/L)	—		TD
Dissolved Oxygen (% sat.)	31.6		
Dissolved Oxygen (mg/L)	3.97		
pH	6.53		
ORP (mV)	65.0		
Turbidity (FTU)	2.53		
Air Temperature (~~°C~~) °F	38		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 16 / 15 **Time** 1240 **Station Number** MPS026

Completed by: JLO · EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Flow coming from several locations along seep, approximately 20' wide. can not measure.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 15 / 15 **Arrival Time** 1215

Field Personnel

T. Osborn **Signatures**

E. Yeager

SITE DESCRIPTION

Station Name Pit #2 Upper Dump Seep **Station Number** MDS030

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 12

Site & Stream Description Seep out of toe of waste rock ~ 9" of fresh snow light wind

Surface Water Characteristics (color, odor, appearance): Clear odorless grass & organics in water

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504 SWMDS030-U, F + Dup. **Sample Time:** 1230

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1230	1230	
Water Temperature (°C)	5.9	5.2	
Specific Conductivity (µS/cm) @ 25° C	884	864	
Conductivity (µS/cm)	562	535	
TDS (g/L)	—	—	
Dissolved Oxygen (% sat.)	69.4	67.7	
Dissolved Oxygen (mg/L)	8.63	8.61	
pH	7.23	7.22	
ORP (mV)	4.9	3.8	
Turbidity (FTU)	2.98	6.48	
Air Temperature (~~°C~~ °F	24	24	

TO

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 15 / 15 **Time** 1215 **Station Number** MDS030

Completed by: TO EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

TO

Seep daylighting in multiple places coming from under waste rock pile unable to measure flow

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 04/19/15 **Arrival Time** 0900

Field Personnel

E. Yeager
T. Osborn

Signatures E Yeager

SITE DESCRIPTION

Station Name Henry Mine Dump Seep #3 **Station Number** MDS034

Latitude N on file " **Longitude** W on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 24

Site & Stream Description seep daylights at toe of dump, marshy, grassy area appx 80' wide x 50' across

Surface Water Characteristics (color, odor, appearance): sulfer smell, no color

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ) Up-stream Across-stream

Sample ID: 150HSWMDS034-U,F **Sample Time:** 0915

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	0905		
Water Temperature (°C)	5.1		
Specific Conductivity (µS/cm) @ 25° C	760.8		
Conductivity (µS/cm)	471.0		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	42.9		
Dissolved Oxygen (mg/L)	5.42		
pH	7.78		
ORP (mV)	86.7		
Turbidity (FTU)	6.31		
Air Temperature (~~°C~~)°F	45		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 04/19/15 **Time** 0930 **Station Number** MDS034

Completed by: E. Yeager T. Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

flow can not be measured, seeps from area 80' x 50' in grassy, marshy area

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 15 / 15 **Arrival Time** _____

Field Personnel

T. Osborn **Signatures**

E. Yeager

SITE DESCRIPTION

Station Name Holmgren Spring **Station Number** MSG004

Latitude N on file " **Longitude** W on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 10

Site & Stream Description Wide Seep coming out of hill side with willows + Aspen Trees ~8" New snow light snow & wind

Surface Water Characteristics (color, odor, appearance): Clear water odorless bog.

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504SWMSG004-U,F **Sample Time:** 11:15

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	11:15		
Water Temperature (°C)	1.7		
Specific Conductivity (µS/cm) @ 25° C	937.1		
Conductivity (µS/cm)	296.9		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	65.6		
Dissolved Oxygen (mg/L)	9.29		
pH	7.71		
ORP (mV)	-43.3		
Turbidity (FTU)	3.58		
Air Temperature (°C) °F	24		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 15 / 15 **Time** 11:15 **Station Number** MSG 004

Completed by: TD EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

X 0

8 ft. wide seep unable to collect flow
Day lighting in multiple locations across the hill

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 15 / 15 **Arrival Time** 10:60

Field Personnel

T. Osborn

E. Yeager

Signatures

SITE DESCRIPTION

Station Name Cattle Spring **Station Number** MSG 005

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 11

Site & Stream Description Water flowing out of ~2" pipe metal into larg circular trough ~8" New snow

Surface Water Characteristics (color, odor, appearance): Clear no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504SWMSG005-U, F+MS/MSD **Sample Time:** 10:30

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	10:30	10:30	10:30
Water Temperature (°C)	4.8°	4.9	4.6°
Specific Conductivity (µS/cm) @ 25° C	579.2	577.3	579.0
Conductivity (µS/cm)	356.2	355.6	354.1
TDS (g/L)	—	—	—
Dissolved Oxygen (% sat.)	65.0	60.0	59.4
Dissolved Oxygen (mg/L)	8.21	7.66	7.64
pH	7.21	7.22	7.23
ORP (mV)	43.0	39.3	42.3
Turbidity (FTU)	0.32	0.28	0.36
Air Temperature (°C)	24° F	24° F	24° F

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 15 / 15 **Time** 10:30 **Station Number** MS60D5

Completed by: TO EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	7.23	1
2	6.93	1
3	7.28	1

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

TO

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 17 /15 **Arrival Time** 1500

Field Personnel

E. Yeager **Signatures**

J. Pierson

SITE DESCRIPTION

Station Name southeast spring **Station Number** MSG006

Latitude N ° on file " **Longitude** W on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 18

Site & Stream Description spring daylights on side of hill next to road, flows through grassy area.

Surface Water Characteristics (color, odor, appearance): oily sheen, sulfer smell to water

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1504SWMSG006-U,F **Sample Time:** 1510

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1510		
Water Temperature (°C)	5.3		
Specific Conductivity (µS/cm) @ 25° C	1219		
Conductivity (µS/cm)	759		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	53.7		
Dissolved Oxygen (mg/L)	6.78		
pH	7.22		
ORP (mV)	97.2		
Turbidity (FTU)	1.08		
Air Temperature ~~(°C)~~ °F	47		

=8.33 °C
BVP 8/20/15

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 17 / 15 **Time** 1515 **Station Number** MS6006

Completed by: E. Yeager J. Pierson **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width n/a ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Flow can not be measured. Day lights on hill side and flows through grassy area intermittently appx. 60' wide across hill side.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date ~~05~~ 04 / 17 / 15 **Arrival Time** 1529

Field Personnel

E. Yeager **Signatures**

J. Pierson

SITE DESCRIPTION

Station Name south of south east spring **Station Number** MSG007

Latitude N on file " **Longitude** W on file "

Elevation — ft **Datum** NAD 27 **Photo Number** 19

Site & Stream Description spring daylights at toe of hill in grassy, hummocky area app. 30' wide and 40' long

Surface Water Characteristics (color, odor, appearance): oily sheen, organic sulfer smell, mossy growing in areas

SAMPLE COLLECTION

Collection Method: (1L bottle, Horizontal-bottle, Swing-sampler, Other( ). (Up-stream / Across-stream

Sample ID: 1504SWMSG007-U,F **Sample Time:** 1525

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1525		
Water Temperature (°C)	11.8		
Specific Conductivity (µS/cm) @ 25° C	500.2		
Conductivity (µS/cm)	373.6		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	41.8		
Dissolved Oxygen (mg/L)	4.50		
pH	7.43		
ORP (mV)	45.7		
Turbidity (FTU)	8.37		
Air Temperature (~~°C~~ F°)	47°		

=8.33°F BVP 8/20/15

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4/ 16/ 15 **Time** 1530 **Station Number** MSG007

Completed by: E. Yeager J. Pierson **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Spring flow can not be measured. Day lights at toe of hill in an area appx 30' wide x 40' long hummocky.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 20 / 15 **Arrival Time** 1400

Field Personnel

T. Osborn

E. Yeager

Signatures

SITE DESCRIPTION

Station Name Blackfoot River below Ballard Creek **Station Number** MST019

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** _____

Site & Stream Description ≈30 ft wide lined with willows and grass Basalt outcrop to the west of West Bank

Surface Water Characteristics (color, odor, appearance): Clear odorless water

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504SWMST019-F,U **Sample Time:** 1415

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1415		
Water Temperature (°C)	11.3		
Specific Conductivity (µS/cm) @ 25° C	389.5		
Conductivity (µS/cm)	287.9		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	72.9		
Dissolved Oxygen (mg/L)	7.94		
pH	8.34		
ORP (mV)	554		
Turbidity (FTU)	13.2		
Air Temperature ~~(°C)~~ F°	59°		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 20 / 15 **Time** 1420 **Station Number** MST 019

Completed by: TD, EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Flow will be taken from USGS station online

Depth = 2.70 ft 160 cfs from website

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4/20/15 **Arrival Time** 1510

Field Personnel

E. Yeager
T. Osborn

Signatures E Yeager

SITE DESCRIPTION

Station Name Blackfoot River below state Land Creek **Station Number** MST020

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 30

Site & Stream Description fast flowing stream 15-25 ft across cutbanks sluffing into stream west side bank lined with willows

Surface Water Characteristics (color, odor, appearance): odorless clear / light brown water

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ) Up-stream / Across-stream

Sample ID: 1504SWMST020-U,F **Sample Time:** 1520

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1520		
Water Temperature (°C)	11.0		
Specific Conductivity (µS/cm) @ 25° C	374.7		
Conductivity (µS/cm)	274.6		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	87.8		
Dissolved Oxygen (mg/L)	9.71		
pH	8.34		
ORP (mV)	54.9		
Turbidity (FTU)	12.8		
Air Temperature (°C)	59		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 20 / 15 **Time** 1530 **Station Number** MST020

Completed by: E. Yeager T. Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

no flow collected, River too High to enter safely. Will use USGS station by MST019.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4/19/15 **Arrival Time** 0950

Field Personnel

E. Yeager
T. Osborn

Signatures

SITE DESCRIPTION

Station Name Immediately below Henry mine (1997 #24) **Station Number** MST044

Latitude N on file " **Longitude** W on file "

Elevation — ft **Datum** NAD 27 **Photo Number** 25

Site & Stream Description 4-6 ft wide meandering stream rocky stream bottom surrounded by grassy fields + short 5-15 ft tall Basalt cliffs

Surface Water Characteristics (color, odor, appearance): Clear water odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1504SWMST044-U,F **Sample Time:** 1010

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1010		
Water Temperature (°C)	8.6°		
Specific Conductivity (µS/cm) @ 25° C	695.4		
Conductivity (µS/cm)	477.6		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	93.6		
Dissolved Oxygen (mg/L)	10.9		
pH	8.34		
ORP (mV)	72.8		
Turbidity (FTU)	1.39		
Air Temperature (~~°C~~) °F	45		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 ~~Sy~~ 19 / 15 **Time** 1015 **Station Number** ~~04~~ MST044

Completed by: E. Yeager T. Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 13.1 ft L.E.W. 21.0 ft Total Width 21.6 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
→ 4 - 10	12 - 15	0.4 - 0.7 → .5
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
13.1	1	0.2	-0.11				
13.6	2	0.4	-0.07				
14.1	3	0.6	-0.01				
14.6	4	0.5	0.01				
15.1	5	0.45	0.01				
15.6	6	0.6	0.07				
16.1	7	0.7	0.97				
16.6	8	0.5	1.61				
17.1	9	0.5	2.27				
17.6	10	0.8	1.61				
18.1	11	0.7	1.77				
18.6	12	0.85	0.47				
19.1	13	0.9	0.97				
19.6	14	0.9	1.27				
20.1	15	0.9	0.51				
20.6	16	0.8	-0.11				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 19 / 15 **Arrival Time** 1055

Field Personnel

T. Osborn **Signatures**

E. Yeager

SITE DESCRIPTION

Station Name Little Blackfoot River above Henry Creek **Station Number** MST045

Latitude N ° on File " **Longitude** W ° on File "

Elevation on file ft **Datum** NAD 27 **Photo Number** 26

Site & Stream Description 4 – 12 ft wide stream cutting through grassy fields with grassy / Muddy stream bottom

Surface Water Characteristics (color, odor, appearance): clear water odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504SWMST045 – F,U **Sample Time:** 1100

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1100		
Water Temperature (°C)	10.2°		
Specific Conductivity (µS/cm) @ 25° C	695.4		
Conductivity (µS/cm)	498.7		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	97.6		
Dissolved Oxygen (mg/L)	10.89		
pH	8.09		
ORP (mV)	67.3		
Turbidity (FTU)	1.92		
Air Temperature (~~°C~~) °F	46°		

10

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4/19/15 **Time** 1055 **Station Number** MST045

Completed by: TO, EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 1.7 ft L.E.W. 11.3 ft Total Width 32.6 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
1.7	1	0.4	-0.07				
2.2	2	0.6	0.11				
2.7	3	0.6	0.17				
3.2	4	0.6	0.07				
3.7	5	0.7	0.27				
4.2	6	0.7	0.57				
4.7	7	0.75	0.67				
5.2	8	0.80	0.87				
5.7	9	0.85	0.81				
6.2	10	0.85	0.90				
6.7	11	0.8	1.01				
7.2	12	0.8	0.77				
7.7	13	0.8	0.67				
8.2	14	1.0	0.41				
8.7	15	0.8	0.67				
9.2	16	0.8	0.61				
9.7	17	0.8	0.17				
10.2	18	0.85	0.41				
10.7	19	1.0	0.17				
11.2	20	0.8	0.07				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4/19/15 **Arrival Time** 1430

Field Personnel

T. Osborn **Signatures**

E. Yeager

SITE DESCRIPTION

Station Name Long Valley Creek below Ballard Mine **Station Number** MST050

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 29

Site & Stream Description Small seep / low flow creek to the North of muddy catch pond flow to the North west comdy. out of East part of Berm

Surface Water Characteristics (color, odor, appearance): muddy stagnant water odorless lots of surface bubbles / film

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504SWMST050-U,F **Sample Time:** 1440

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1455		
Water Temperature (°C)	19.6		
Specific Conductivity (µS/cm) @ 25° C	627		
Conductivity (µS/cm)	563		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	8.8		
Dissolved Oxygen (mg/L)	0.79		
pH	7.07		
ORP (mV)	-49.2		
Turbidity (FTU)	15.9		
Air Temperature (°C)	54		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 19 / 15 **Time** 1440 **Station Number** MST050

Completed by: E. Yeager T. Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3	TD					
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

No flow murphy creek

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Arrival Time** 16:11

Field Personnel

T. Osborn **Signatures**

SITE DESCRIPTION

Station Name East Fork Long Valley Creek below Henry Mine **Station Number** MST051

Latitude N ° on File " **Longitude** W ° on File "

Elevation on File ft **Datum** NAD 27 **Photo Number** 8

Site & Stream Description

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)			
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)			

NO

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4/14/15 **Time** 1611 **Station Number** MSTOS1

Completed by: TO EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 19 / 15 **Arrival Time** 1330

Field Personnel

T. Osborn **Signatures**

E. Yeager

SITE DESCRIPTION

Station Name West Fork Lone Pine Creek above Lone Pine Creek **Station Number** ~~MST057~~ MST057

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 28

Site & Stream Description Small seep in grassy field on East side of the West fork of upper lone Pine Creek

Surface Water Characteristics (color, odor, appearance): Small seep pooling in muddy / Marshy hole 2' by 6' and mainly inside grassy field

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504SWMST057-F,U **Sample Time:** 1345

Field Measurements

Parameter	Sample 1	Sample 2	Sample 3
Time	1345		
Water Temperature (°C)	19.2		
Specific Conductivity (µS/cm) @ 25° C	491.7		
Conductivity (µS/cm)	435.6		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	51.6	LO	
Dissolved Oxygen (mg/L)	4.82		
pH	7.31		
ORP (mV)	17.4		
Turbidity (FTU)	8.01		
Air Temperature (°C) °F	57°		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 19 / 15 **Time** 1350 **Station Number** MST057

Completed by: TD, EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3	TD					
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Flow too low to measure in marshy area

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4/19/15 **Arrival Time** 1213

Field Personnel

T. Osborn **Signatures**

E. Yeager

SITE DESCRIPTION

Station Name Strip Mine Creek below Henry Mine **Station Number** MST063

Latitude N ° on file " **Longitude** W on file ' "

Elevation on file ft **Datum** NAD 27 **Photo Number** 27

Site & Stream Description large Marshy area with thick mud and willows 20 ft off of Dirt road

Surface Water Characteristics (color, odor, appearance): Marshy area with strong peaty odor thick mud and alge growth

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504SWMST063 – F, U + MS/MSD **Sample Time:** 1245

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1250	1252	1254
Water Temperature (°C)	15.2	14.7	14.7
Specific Conductivity (µS/cm) @ 25° C	773	781	784
Conductivity (µS/cm)	628	628	629
TDS (g/L)	—	—	—
Dissolved Oxygen (% sat.)	93.2	80.3	69.0
Dissolved Oxygen (mg/L)	9.29	8.22	6.87
pH	7.37	7.34	7.32
ORP (mV)	61.6	59.7	56.7
Turbidity (FTU)	9.73	11.0	10.5
Air Temperature (~~°C~~) °F	52	52	52

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 19 / 15 **Time** 1230 **Station Number** MST063

Completed by: TO, EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

No channelized flow large Marshy area

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 20 / 15 **Arrival Time** 1440

Field Personnel

T. Osborn **Signatures**

E. Yemyur

SITE DESCRIPTION

Station Name Bellard Creek above Blackfoot River **Station Number** MST066

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 29

Site & Stream Description Marshy area with small ≈1-2ft channelized stream cutting through grass

Surface Water Characteristics (color, odor, appearance): muddy, organic smell

SAMPLE COLLECTION

Collection Method (1L bottle), Horizontal-bottle, Swing-sampler, Other( ) (Up-stream) / Across-stream

Sample ID: 1504SWMST066 - F, U **Sample Time:** ~~1445~~ 1445

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1450		
Water Temperature (°C)	20.4		
Specific Conductivity (µS/cm) @ 25° C	501.2		
Conductivity (µS/cm)	462.2		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	8.10		
Dissolved Oxygen (mg/L)	7.06		
pH	8.27		
ORP (mV)	79.1		
Turbidity (FTU)	11.0		
Air Temperature (~~°C~~) F	58		

RD

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4/20/15 **Time** 1450 **Station Number** MST066

Completed by: TO EZ **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	9.46	0.8
2	10.93	0.95
3	10.65	1.00

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

TO

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date ~~04~~/4/15 /15 **Arrival Time** 0830

Field Personnel

E. Yeager **Signatures** E Yeager

T. Osborn

SITE DESCRIPTION

Station Name Ballard Creek headwaters **Station Number** MST067

Latitude N ° on file " **Longitude** W on file ° "

Elevation on file ft **Datum** NAD 27 **Photo Number** 17

Site & Stream Description headwaters issuing in grassy field below ballard shop area

Surface Water Characteristics (color, odor, appearance): very slow moving ice on top in some locations, no color or odor

SAMPLE COLLECTION

Collection Method: (1L bottle), Horizontal-bottle, Swing-sampler, Other( ) (Up-stream), Across-stream

Sample ID: 150HSWMST067-U,F **Sample Time:** 0840

Field Measurements

Parameter	Sample 1	Sample 2	Sample 3
Time	0840		
Water Temperature (°C)	2.2		
Specific Conductivity (µS/cm) @ 25° C	1273		
Conductivity (µS/cm)	718		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	35.3		
Dissolved Oxygen (mg/L)	4.81		
pH	7.22		
ORP (mV)	97.0		
Turbidity (FTU)	1.23		
Air Temperature (~~°C~~) °F	29		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 04/15 /15 **Time** 0850 **Station Number** MST067

Completed by: EJ TD **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	2.13	1
2	1.98	1
3	2.20	1

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

TD

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 04 / 18 / 15 **Arrival Time** 1530

Field Personnel

T. Osborn **Signatures**

E. Yeager

SITE DESCRIPTION

Station Name Short Creek Below Ballard Mine **Station Number** MST069

Latitude N ° on file " **Longitude** W on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 1

Site & Stream Description small channel 1-3' wide down gradient from west rock stock pile

Surface Water Characteristics (color, odor, appearance): Clear, odorless water

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ) Up-stream / Across-stream

Sample ID: 1504SWMST069-UP **Sample Time:** 1540

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1535		
Water Temperature (°C)	15.6		
Specific Conductivity (µS/cm) @ 25° C	2000		
Conductivity (µS/cm)	1643		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	56.5	ND	
Dissolved Oxygen (mg/L)	5.56		
pH	8.07		
ORP (mV)	116.7		
Turbidity (FTU)	7.37		
Air Temperature (°C)	38° F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 18 / 15 **Time** 1545 **Station Number** MST069

Completed by: E. Yeager T. Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	~~1.85~~ 3.90	~~0.25~~ 0.40
2	4.13	0.45
3	4.23	0.45

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4/18/15 **Arrival Time** 1335

Field Personnel

E. Yeager
T. Osborn

Signatures E Yeager

SITE DESCRIPTION

Station Name Wooley Valley Creek, below North Fork Wooley Valley Creek **Station Number** MST089

Latitude N on file " **Longitude** W on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 22

Site & Stream Description Free flowing through grassy field some algae ~~growth~~ growth on stream bed

Surface Water Characteristics (color, odor, appearance): yellowish tint, no odor, warm to touch

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 15045WMST089-4,F + MS/MSD **Sample Time:** ~~1335~~ 1345
1350 MS
1400 MSD

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1340	1342	1344
Water Temperature (°C)	15.8	15.9	15.9
Specific Conductivity (µS/cm) @ 25° C	337.2	337.1	337.0
Conductivity (µS/cm)	277.9	278.3	278.6
TDS (g/L)	—	—	—
Dissolved Oxygen (% sat.)	98.6	99.1	101.3
Dissolved Oxygen (mg/L)	9.74	9.71	10.02
pH	7.67	7.68	7.68
ORP (mV)	92.7	92.1	91.2
Turbidity (FTU)	1.09	1.01	0.91
Air Temperature (~~°C~~ °F)	38	38	38

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 18 / 15 **Time** 1400 **Station Number** MST089

Completed by: E. Yeager, T. Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 3.0 ft L.E.W. 6.8 ft Total Width 7.9 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4 3.8	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
3.0	1	no flow					
3.4	2	0.3	0.02				
3.8	3	0.4	0.07				
4.2	4	0.5	0.57				
4.6	5	0.5	0.27				
5.0	6	0.4	0.07				
5.4	7	0.3	-0.07				
5.8	8	0.2	0.07				
6.2	9	0.1	no flow				
6.6	10	no flow					
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 18 / 15 **Arrival Time** 1435

Field Personnel

T. Osborn **Signatures**

E. Yeager

SITE DESCRIPTION

Station Name ~~Fork~~ Wooley Valley Creek, above North Fork Wooley Valley Creek **Station Number** MST090

Latitude N °N file " **Longitude** W °N file "

Elevation on file ft **Datum** NAD 27 **Photo Number** ~~20~~ 23

Site & Stream Description Narrow stream cutting through grassy Field / Barren small amounts of cow fecal matter around sample area

Surface Water Characteristics (color, odor, appearance): light brown / yellow water no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1504 SW MST090 – F, U **Sample Time:** 1440

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1443		
Water Temperature (°C)	~~14~~ 17.4		
Specific Conductivity (µS/cm) @ 25° C	393.7		
Conductivity (µS/cm)	336.4		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	80.1		
Dissolved Oxygen (mg/L)	7.67		
pH	7.89		
ORP (mV)	97.6		
Turbidity (FTU)	0.71		
Air Temperature (°C)	38° F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 18 / 15 **Time** 1445 **Station Number** MST090

Completed by: T. Osborn E. Yeager **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.68	4.0
2	1.60	5.0
3	1.36	4.0

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 18 / 15 **Arrival Time** 1235

Field Personnel

T. Osborn **Signatures**

E. Yenger

SITE DESCRIPTION

Station Name North fork Wooley Valley Creek above Wooley Valley Creek **Station Number** MST092

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 21

Site & Stream Description Small stream cutting through grassy Feild with large amounts of dry cow Fecal Matter

Surface Water Characteristics (color, odor, appearance): clear slow moving odorless water

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504SWMST092 – F, U + Dup **Sample Time:** 1245

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1240	1242	
Water Temperature (°C)	16.3	16.5	
Specific Conductivity (µS/cm) @ 25° C	420.5	419.8	
Conductivity (µS/cm)	351.0	351.2	
TDS (g/L)	—	—	
Dissolved Oxygen (% sat.)	82.5	78.9	
Dissolved Oxygen (mg/L)	8.07	7.69	
pH	7.83	7.83	
ORP (mV)	119.3	116.1	
Turbidity (FTU)	1.24	1.08	
Air Temperature (~~°C~~) °F	38	38	

= 3.33°C
BVP 4/20/15

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 18 / 15 **Time** 1300 **Station Number** MPJT092

Completed by: E. Yeager T. Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.61	~~[illegible]~~ 2.5
2	1.56	2.5
3	1.33	2.75

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Arrival Time** 16:57

Field Personnel

T. Osborn **Signatures**

SITE DESCRIPTION

Station Name Valley Cr., below Ballard Mine (spring-fed trib. #1 of N. Fork Wooley) **Station Number** MST094

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 9

Site & Stream Description Dry

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)			
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat.)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)			

Dry

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Time** 16:57 **Station Number** MST094

Completed by: TO EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 17 / 15 **Arrival Time** 1400

Field Personnel

E. Yeager **Signatures**

J. Pierson

SITE DESCRIPTION

Station Name Spring fed trib #2 of N. Fork Wolley Valley Cr. below Ballard Mine **Station Number** MST095

Latitude N on file ' " **Longitude** W on file ' "

Elevation — ft **Datum** NAD 27 **Photo Number** 19

Site & Stream Description intermittent flow through grassy ravean, daylights appx. 200 yards up hill

Surface Water Characteristics (color, odor, appearance): no color, no odor.

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504SWMST095-U,F **Sample Time:** 1425

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1440		
Water Temperature (°C)	22.3		
Specific Conductivity (µS/cm) @ 25° C	876 µS/cm		
Conductivity (µS/cm)	~~876~~ 831 µS/cm		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	39.9 %		
Dissolved Oxygen (mg/L)	3.47 mg/L		
pH	7.70		
ORP (mV)	93.0 mV		
Turbidity (FTU)	45.3 FTU		
Air Temperature ~~(°C)~~ °F	47 °F		

= 8.33°C
BVP 8/20/15

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 17 / 16 **Time** 1430 **Station Number** MST095

Completed by: E. Yeager, J. Pierson **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

*No flows available. Channel 4-6 ft wide in thick grass. Low gradient.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 17 / 15 **Arrival Time** 1600

Field Personnel

E Yeager **Signatures**

J. Pierson

SITE DESCRIPTION

Station Name Trib. of north fork Wooley Valley creek below Ballard mine **Station Number** MST 096

Latitude N on file " **Longitude** W on file "

Elevation — ft **Datum** NAD 27 **Photo Number** 20

Site & Stream Description loosing stream flows through grassy area and completely infiltrates soil

Surface Water Characteristics (color, odor, appearance): minimal flow, clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504SWMST096-U,F **Sample Time:** 1610

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1610		
Water Temperature (°C)	15.5		
Specific Conductivity (µS/cm) @ 25° C	487.6		
Conductivity (µS/cm)	399.6		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	44.6		
Dissolved Oxygen (mg/L)	4.43		
pH	7.80		
ORP (mV)	82.1		
Turbidity (FTU)	4.16		
Air Temperature (~~°C~~) °F	50		

=10°C PJP 8/20/15

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date ~~04~~ 17 / 15 **Time** 1630 **Station Number** MOJT096

Completed by: E. Yeager J. Pierson **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	9.06	0.35
2	12.06	0.43
3	12.15	0.44

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 16 / 15 **Arrival Time** 1610

Field Personnel

T. Osborn **Signatures**

E. Yeager

SITE DESCRIPTION

Station Name Angus Creek Above Rasmussen Creek **Station Number** MST 128

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** ~~109~~ no photo

Site & Stream Description free flowing through grassy field, snow melt directly into creek from yesterday storm

Surface Water Characteristics (color, odor, appearance): sediment laden, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1504 SW MST 128 - F, U **Sample Time:** 1630

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1630		
Water Temperature (°C)	9.7		
Specific Conductivity (µS/cm) @ 25° C	335.4		
Conductivity (µS/cm)	237.4		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	76.5		
Dissolved Oxygen (mg/L)	8.68		
pH	7.88		
ORP (mV)	55.5		
Turbidity (FTU)	17.1		
Air Temperature (~~°C~~) °F	44		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 16 / 15 **Time** 1640 **Station Number** MST 128

Completed by: E. Yeager T. Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 0.0 ft L.E.W. 5.6 ft Total Width 5.6 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0.0	1	~~xy~~ no flow					
0.5	2	no flow					
1.0	3	no flow					
1.5	4	0.1	-0.27				
2.0	5	0.3	-0.01				
2.5	6	1.8	1.07				
3.0	7	2.0	2.17				
3.5	8	2.1				2.68	1.97
4.0	9	2.1				2.41	1.37
4.5	10	2.0	1.11				
5.0	11	1.9	0.37				
5.5	12	0.15	-0.11				
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 16 / 15 **Arrival Time** ~~14~~ 1550

Field Personnel

T. Osborn

E. Yeager

Signatures [signature] E Yeager

SITE DESCRIPTION

Station Name Rasmussen Creek Above Angus creek **Station Number** MST 131

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 16

Site & Stream Description free flowing, silty bottom, snow melt directly into creek from storm yesterday

Surface Water Characteristics (color, odor, appearance): Sediment laden, silty

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504 SW MST 131 - F, U **Sample Time:** 1555

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1600		
Water Temperature (°C)	9.7		
Specific Conductivity (µS/cm) @ 25° C	266.1		
Conductivity (µS/cm)	188.2		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	77.1		
Dissolved Oxygen (mg/L)	8.73		
pH	7.68		
ORP (mV)	61.5		
Turbidity (FTU)	48.0		
Air Temperature (~~°C~~) °F	44		

TD

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 16/15 **Time** 1615 **Station Number** MST131

Completed by: E. Yeager T. Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 2.0 ft L.E.W. 9.5 ft Total Width 9.5 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10 (7.5)	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
2.0	1	no flow		16	9.5	no flow	
2.5	2	0.20	0.17				
3.0	3	0.40	0.17				
3.5	4	0.45	0.27				
4.0	5	0.90	0.27				
4.5	6	1.40	1.27				
5.0	7	1.30	1.77				
5.5	8	1.40	1.82				
6.0	9	0.60	0.87				
6.5	10	0.55	0.71				
7.0	11	0.70	0.17				
7.5	12	0.65	0.51				
8.0	13	0.70	0.47				
8.5	14	0.25	0.27				
9.0	15	0.10	0.07				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 16 / 15 **Arrival Time** 14:44

Field Personnel

T. Osborn **Signatures**

E. Yeager

SITE DESCRIPTION

Station Name Angus Creek Above No Name Creek and below Rasmussen Creek **Station Number** MST 132

Latitude N ° or file " **Longitude** W ° or file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 15

Site & Stream Description snow melt from yesterday's storm entering creek, free flowing, silt laden, can't see creek bed.

Surface Water Characteristics (color, odor, appearance): silt laden, no odor

SAMPLE COLLECTION

Collection Method: (1L bottle) Horizontal-bottle, Swing-sampler, Other( ) (Up-stream / Across-stream)

Sample ID: 1504 SW MST 132 – F, U + Dup. **Sample Time:** 1515 (2) 1525 (1)

Field Measurements

Parameter	Sample 1	Sample 2	Sample 3
Time	1512	1516	
Water Temperature (°C)	7.4	7.6	
Specific Conductivity (µS/cm) @ 25° C	314.0	313.6	
Conductivity (µS/cm)	208.5	209.1	
TDS (g/L)	—	—	
Dissolved Oxygen (% sat.)	80.1	80.2	
Dissolved Oxygen (mg/L)	9.62	9.58	
pH	7.82	7.77	
ORP (mV)	63.6	65.3	
Turbidity (FTU)	26.3	29.1	
Air Temperature ~~(°C)~~ °F	44	44	

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 16 / 15 **Time** 1530 **Station Number** MST 132

Completed by: E. Yeager, T. Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 5.1 ft L.E.W. 12.8 ft Total Width 15.5 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10 (7.7)	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
5.1	1	no flow		12.6	16	0.2	-0.17
5.6	2	0.1	-0.07				
6.1	3	0.25	0.07				
6.6	4	0.30	0.07				
7.1	5	1.9	1.27				
7.6	6	1.9	1.67				
8.1	7	1.9	2.17				
8.6	8	1.7	2.17				
9.1	9	~~1.8~~ 1.9	2.17				
9.6	10	1.9	1.71				
10.1	11	1.8	1.57				
10.6	12	1.75	1.07				
11.1	13	1.70	0.61				
11.6	14	0.3	-0.11				
12.1	15	0.5	-0.07				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Arrival Time** 15:00

Field Personnel

T. Osborn
E. Yeager

Signatures

SITE DESCRIPTION

Station Name Rasmussen Creek below Enoch Valley Mine **Station Number** MST 133

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 6

Site & Stream Description meandering stream through grassy field

Surface Water Characteristics (color, odor, appearance): Clear / gray water

SAMPLE COLLECTION

Collection Method: (1L bottle), Horizontal-bottle, Swing-sampler, Other( ) (Up-stream) / Across-stream

Sample ID: 1504SWMST133-U,F **Sample Time:** 15:15

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1515		
Water Temperature (°C)	10.2		
Specific Conductivity (µS/cm) @ 25° C	257.8		
Conductivity (µS/cm)	184.8		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	74.1		
Dissolved Oxygen (mg/L)	8.31		
pH	7.67		
ORP (mV)	-64.6		
Turbidity (FTU)	18.2		
Air Temperature (~~°C~~) °F	46°		

TD

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Time** 15 **Station Number** MST 133

Completed by: TD , EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
TD		

Flow by Meter

R.E.W. .4 ft L.E.W. 3.3 ft Total Width ~~3.4~~ TD 2.9 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
TD ~~1.0~~	~~1~~	~~0.2~~	~~-0.07~~				
0.4	2	0.2	-0.07				
0.8	3	0.35	0.01				
1.2	4	1.0	0.37				
1.6	5	1.05	0.87				
2.0	6	1.1	0.57				
2.4	7	0.15	-0.07				
2.8	8				TD		
3.2	9						
3.6	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Arrival Time** 10:32

Field Personnel

T. Osborn **Signatures**

E. Yeager

SITE DESCRIPTION

Station Name Rasmussen Creek Headwaters Near Enoch Valley Mine shop pond **Station Number** MST 136

Latitude N ° on File " **Longitude** W ° on File "

Elevation on File ft **Datum** NAD 27 **Photo Number** 2

Site & Stream Description Very slow moving creek, clear water headwaters

Surface Water Characteristics (color, odor, appearance): Clear water no odor grass + minor debris in creek

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ) Up-stream / Across-stream

Sample ID: 1504 SWMST 136 – U, F **Sample Time:** 10:45

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	10:45		
Water Temperature (°C)	10.3		
Specific Conductivity (µS/cm) @ 25° C	226.7		
Conductivity (µS/cm)	162.4		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	55.2		
Dissolved Oxygen (mg/L)	6.20		
pH	6.70		
ORP (mV)	-26.5		
Turbidity (FTU)	1.01		
Air Temperature (~~°C~~) °F	60		

TO

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Time** 10:59 **Station Number** MST136

Completed by: TO EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	11.73	0.8
2	12.78	1
3	12.66	0.9

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

TO

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 16 / 15 **Arrival Time** 1400

Field Personnel

T. Osborn **Signatures**

E. Yenger

SITE DESCRIPTION

Station Name East Fork Rasmussen Creek Above Rasmussen Creek **Station Number** MST 143

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 15

Site & Stream Description Free flowing through grassy field, snow melt from storm yesterday entering stream, areas ice clover

Surface Water Characteristics (color, odor, appearance): some areas iced over, yellowish color, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504SWMST143 – F, U **Sample Time:** 1415

Field Measurements

Parameter	Sample 1	Sample 2	Sample 3
Time	1415		
Water Temperature (°C)	~~5.01~~ 3.2		
Specific Conductivity (µS/cm) @ 25° C	~~150.1~~ 149.5		
Conductivity (µS/cm)	~~90.15~~ 87.4		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	~~70.16~~ 67.2		
Dissolved Oxygen (mg/L)	~~9.19~~ 8.99		
pH	~~7.05~~ 6.61		
ORP (mV)	—		
Turbidity (FTU)	~~6.01~~ 6.61		
Air Temperature (°C) °F	~~5.9~~ 44		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 16 / 15 **Time** 1440 **Station Number** MST 143

Completed by: E Yeager, T Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.53	3.25
2	1.88	3.25
3	2.08	3.75

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Arrival Time** 1130

Field Personnel

T. Osborn **Signatures**

E. Yeager

SITE DESCRIPTION

Station Name West Pond Creek headwaters below West Pond **Station Number** MST 144

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 3

Site & Stream Description headwater day lights on toe of ravine, low to no flow.

Surface Water Characteristics (color, odor, appearance): organic smell

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: 1504SWMST144-U, F **Sample Time:** 1140

Field Measurements

Parameter	Sample 1	Sample 2	Sample 3
Time	1140		
Water Temperature (°C)	11.2		
Specific Conductivity (µS/cm) @ 25° C	693		
Conductivity (µS/cm)	511		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	82.9	TU	
Dissolved Oxygen (mg/L)	9.08		
pH	7.04		
ORP (mV)	-10.2		
Turbidity (FTU)	122		
Air Temperature (°C)	61°		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 04 / 14 / 2015 **Time** 1145 **Station Number** MST144

Completed by: EYTO **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	~~91.45~~ 56.01	0.25
2	61.02	0.25
3	60.0	0.25

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 18 / 15 **Arrival Time** 1610

Field Personnel

E. Yeager
T. Osborn

Signatures E Yeager

SITE DESCRIPTION

Station Name Tributary to Lone Pine Creek **Station Number** MST2226

Latitude N on file " **Longitude** W on file "

Elevation — ft **Datum** NAD 27 **Photo Number** 23

Site & Stream Description Free flowing into ponded area before entering culvert, snow present

Surface Water Characteristics (color, odor, appearance): clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream, Across-stream

Sample ID: 1504SWMST2226-U,F **Sample Time:** 1615

Field Measurements

Parameter	Sample 1	Sample 2	Sample 3
Time	~~1610~~ 1615		
Water Temperature (°C)	6.3		
Specific Conductivity (µS/cm) @ 25° C	263.8		
Conductivity (µS/cm)	169.8		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	61.1		
Dissolved Oxygen (mg/L)	7.50		
pH	7.26		
ORP (mV)	114.1		
Turbidity (FTU)	1.86		
Air Temperature (~~°C~~) °F	38		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4/18/15 **Time** 1630 **Station Number** MST 226

Completed by: E. Yeager T. Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.58	0.5
2	1.33	0.5
3	1.35	0.5

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Arrival Time** 1540

Field Personnel

T. Osborn **Signatures**

SITE DESCRIPTION

Station Name East Fork Rasmussen Creek Headwaters **Station Number** MST269

Latitude N °on file " **Longitude** W °on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 7

Site & Stream Description

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements

Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)			
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat.)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)			

RJD

10

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Time** 1540 **Station Number** MST269

Completed by: EY TD **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 16 / 15 **Arrival Time** ~~1000~~ 1306

Field Personnel

T. Osborn

E. Yeager

Signatures

SITE DESCRIPTION

Station Name West Fork of Rasmussen Creek **Station Number** MST274

Latitude N ° on file " **Longitude** W ° on file "

Elevation on file ft **Datum** NAD 27 **Photo Number** 14

Site & Stream Description free flowing through grassy field, ~~[illegible]~~

Surface Water Characteristics (color, odor, appearance): no odor, clear, snow melt entering stream from yesterday storm

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1504SWMST274 - 4, F **Sample Time:** 1330

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1315		
Water Temperature (°C)	8.6		
Specific Conductivity (µS/cm) @ 25° C	466.4		
Conductivity (µS/cm)	319.6		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	107.3		
Dissolved Oxygen (mg/L)	12.52		
pH	8.38		
ORP (mV)	42.9		
Turbidity (FTU)	4.86		
Air Temperature ~~°C~~ °F	44		

TD

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 16 / 15 **Time** 1340 **Station Number** MST274

Completed by: E Yeager T Osborn **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 3.1 ft L.E.W. 8.1 ft Total Width 10.6 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10 5.0	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
3.1	1	no flow					
3.6	2	no flow					
4.1	3	0.25	-0.07				
4.6	4	0.20	-0.17				
5.1	5	0.35	0.07				
5.6	6	0.30	0.61				
6.1	7	0.30	0.37				
6.6	8	0.20	0.31				
7.1	9	0.1	-0.07				
7.6	10	0.1	-0.11				
8.1	11	~~tay~~ no flow					
~~8.6~~	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Arrival Time** 13:12

Field Personnel

T. Osborn **Signatures**

SITE DESCRIPTION

Station Name Tributary to Lone Pine Creek **Station Number** MST275

Latitude N 0°N File " **Longitude** W ° on File "

Elevation on file ft **Datum** NAD 27 **Photo Number** 5

Site & Stream Description small stream clear water green algal bulk up coming out of pond

Surface Water Characteristics (color, odor, appearance): clear, odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1504SWMST275-U, F **Sample Time:**

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	13:20		
Water Temperature (°C)	11.4°		
Specific Conductivity (µS/cm) @ 25° C	147.8		
Conductivity (µS/cm)	108.9		
TDS (g/L)	—	TO	
Dissolved Oxygen (% sat.)	83.2		
Dissolved Oxygen (mg/L)	9.22		
pH	7.66		
ORP (mV)	-74.7		
Turbidity (FTU)	60.5		
Air Temperature (°C)	57°		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2015 SW Sampling

Date 4 / 14 / 15 **Time** 1325 **Station Number** MST 275

Completed by: TD EY **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	3.13	0.9
2	2.60	1.0
3	2.65	0.8

Flow by Meter

R.E.W._____ft L.E.W._____ft Total Width_____ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

N/A

2015 Groundwater Sampling Field Forms

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/14/15 Well ID: MBW006

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 7.85 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: geopump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 0.84 L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1035	7.90			7.2	7.73	223.9	~~66.1~~ 8.2	1187	1.5
1040	7.95	0.25 L/min	1.50	6.1	7.00	236.5	~~65.5~~ 8.20	1197	2.4
1045	7.95	0.25	2.75	6.0	6.98	235.6	8.12	1198	1.6
1050	7.95	0.25	4.0	6.1	6.99	229.6	8.10	1197	1.5
1055	7.95	0.25	5.25	6.1	6.98	228.4	8.13	1197	1.4

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1055	7.95	0.25	5.25	6.1	6.98	228.4	8.13	1197	1.4

SAMPLE ID: 1504GWMBW006-U,F **TIME:** 1100

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/15/15 Well ID: MBW009

Task: Groundwater Sampling Field Crew: TO, EY

Measuring Point (MP): TOCN Water Level (WL): 3.97 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Peristaltic Pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 0.78L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 10.1 ft below MP Water Height: _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
15:41	4.90	0.3	0.3	5.1°	6.60	-0.9	0.61	1097	16.6
15:46	6.40	0.3	1.8	5.1°	6.61	-3.1	1.09	1106	11.8
15:52	8.15	air in hose		backed off pump rate					
15:56	8.15	0.1	2.3	5.2°	6.66	1.4	3.59	1118	3.83
16:01	8.15	0.1	2.8	5.1°	6.68	5.9	4.11	1120	2.42
16:06	8.15	0.125	3.4	5.2°	6.70	11.5	4.20	1122	1.14
16:11	8.15	0.1	3.9	5.2°	6.70	15.5	4.21	1122	0.85

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1611	8.15	0.1	3.9	5.2	6.70	15.5	4.21	1122	0.85

SAMPLE ID: 1504GWMBW009_F,U **TIME:** 1625

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 04/15/15 Well ID: MBW011

Task: Groundwater Sampling Field Crew: TD, EY

Measuring Point (MP): Toc Water Level (WL): 3.02 ft below MP

Sampling Method (see applicable calculations below): Purge ~~Dry~~ / Sample Device: peristaltic / tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): ~~n/a~~ Starting PSI = (½ WL + 20): ~~50~~

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

80% = 6ft below TOC

3-Volume Purge Sampling

Total Depth (TD): 14.83 ft below MP Water Height (H): ~~n/a~~ ft below MP Casing Radius (r): ~~n/a~~ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ~~n/a~~ gal Required Run Time: ~~n/a~~ min/ hr

H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1440	—		Start Pump			—			
1443	—	1.0	3	4.5	6.54	-3.0	0.76	689.3	—
1444			DRY						

Continue stabilization readings on additional pages if necessary

Recharge 1ft per 1min 10sec

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1505	—	—	—	5.2	6.67	18.6	1.63	707.6	18.9

SAMPLE ID: 1504GWMBW011-(U,F) TIME: 15:00

Final Low Flow Sampling Settings: PSI: — Charge: — sec Exhaust: — sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/15/15 Well ID: MBW027

Task: Groundwater Sampling Field Crew: J Pierson - A. Pettley

Measuring Point (MP): TOC N Water Level (WL): 11.37 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Geopump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(20' (0.03 L/ft)) = 1.2 L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1420	11.64	0.1	0.5 L	5.5	6.79	205.4	7.92	1277	6.2
1425	11.67	0.1	1.0	5.6	6.79	199.1	7.67	1268	3.0
1430	11.67	0.09	1.45 L	5.6	6.79	199.9	7.51	1260	2.3
1435	11.65	0.1	1.95 L	5.6	6.79	199.6	7.50	1253	2.1
1440	11.65	0.1	2.45	5.6	6.79	199.6	7.53	1240	1.9

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1440	11.65	0.1	2.45	5.6	6.79	199.6	7.53	1240	1.9

SAMPLE ID: 15046WMBW027-U,F **TIME:** 1445

Final Low Flow Sampling Settings: PSI: - Charge: - sec Exhaust: - sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/17/15 Well ID: MBW028

Task: Groundwater Sampling Field Crew: TD EY

Measuring Point (MP): TOC Water Level (WL): 8.35 ft below MP

Sampling Method (see applicable calculations below): Purged dry / Sample Device: Peristaltic / Dedicated tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____ 80% = 11.39' Below cable

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 19.74' ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr

H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
9:20	—	1.0	Start pump to get purge rate						
9:24	—	1.0	start pump to Dry out						
9:26	—	1.0	3	6.1	6.59	91.4	1.03	1219	9.53
9:31	Pumped		Dry						
9:45	—	1.0	—	6.6	6.64	86.5	.95	1327	3.30

18.4'

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
9:45	—	1	—	6.6	6.64	86.5	0.95	1327	3.30

SAMPLE ID: 1504GWMBW028-F,U TIME: 9:40

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

Recharging 30 sec per 1 foot

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/18 Well ID: MBW032

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC Water Level (WL): 11.85 ft below MP

Sampling Method (see applicable calculations below): Purge/Sample Device: Geopump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(1(0.03 L/ft) +0.5) = Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 0.8 L

3-Volume Purge Sampling

3
14.2
- 11.8
2.4
× 0.8
1.92

Total Depth (TD): 14.2 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

3
14.20
- 1.92
12.28'
↑
80% recovery

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1125	12.00	0.5	0.3 L	5.8	7.09	179.1	78.5%	1975	15.0
1130	12.15	0.4	2.3	5.3	6.88	190.7	11.04 mg/L	1766	31.6
1135	12.14	0.3	3.8	5.4	6.83	198.1	9.73	1741	3.4
1140	12.13	0.24	5	5.4	6.81	205.4	9.83	1732	2.5
1145	12.15	0.21	6	5.5	6.79	210.0	9.95	1725	2.8
1148	12.20	Cannot sustain low flow sampling							
1150	12.90	0.5	7.5	5.3	6.77	214.2	11.0	1721	13.8
1205	12.26	0.2	10.5	5.9	6.76	219.4	9.55	1743	20.2
1210	12.38	0.25	11.75	5.6	6.76	219.8	9.70	1718	7.1
1215	12.58	0.25	~~13~~ 13	5.5	6.76	222.3	9.72	1711	3.4

Continue stabilization readings on additional pages if necessary

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1215	12.58	0.25	13	5.5	6.76	222.3	9.72	1711	3.4

SAMPLE ID: 15046WMBW032-1-U,F / 15046WMBW032-2-U,F **TIME:** 1220 / 1225

Final Low Flow Sampling Settings: PSI: — Charge: — sec Exhaust: — sec

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/18/15 Well ID: MBW048

Task: Groundwater Sampling Field Crew: E. Yeager T. Osborn

Measuring Point (MP): TOC Water Level (WL): 0.7 ft below MP

Sampling Method (see applicable calculations below): low Flow ~~[illegible]~~ Device: peristaltic dedicated tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 7.5 0.03 0.45L Starting PSI = (½ WL + 20): ey

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 8.38 ft below MP Water Height (H): ~~.0~~ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr

H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1053	0.70	—	start pump						ey
1057	0.83	~~0.9~~ 0.09	—	5.0	6.87	72.5	0.63	206.0	6.66
1102	0.89	0.09	0.45	4.6	6.63	68.1	0.38	201.7	6.00
1107	0.90	0.09	0.90	4.5	6.61	59.7	0.38	201.2	6.60
1112	0.90	0.09	1.35	4.5	6.67	57.3	0.45	200.5	7.29
1117	0.90	0.09	1.80	4.5	6.69	55.8	0.40	202.2	5.42
1122	0.90	0.09	2.25	4.4	6.69	54.4	0.34	206.1	3.76
1127	0.90	0.09	2.70	4.4	6.69	53.9	0.35	207.3	3.17
1132	0.92	0.09	3.15	4.4	6.68	53.3	0.33	210.5	3.01
									ey

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1132	~~0.9~~ 0.92	0.09	3.15	4.4	6.68	53.3	0.33	210.5	3.01

SAMPLE ID: 1504 GW MBW048-U,F **TIME:** 1135

Final Low Flow Sampling Settings: PSI: — Charge: — sec Exhaust: — sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/14/15 Well ID: MBW085

Task: Groundwater Sampling Field Crew: TO EY

Measuring Point (MP): TOCM Water Level (WL): 1.87 ft below MP 80% = 3.58'

Sampling Method (see applicable calculations below): dry purge / sample Device: peristaltic / dedicated tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): ~~[illegible]~~ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): ~~11.85~~ 12.25 ft below MP Water Height (H): ~~[illegible]~~ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ~~[illegible]~~ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1355	1.87	0.5	0.5	3.1	7.02	-94.2	4.98	357.7	7.59
1358	—	0.75	2.25	2.9	6.91	-90.9	5.23	356.0	9.71
Dry 1403	—	0.75	6.0	3.6	6.80	-71.9	7.41	361.0	242

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1435	2.14	—	—	3.2	7.29	-62.1	7.48	356.5	15.7

SAMPLE ID: 1504GWMBW085-U,F **TIME:** 1435

Final Low Flow Sampling Settings: PSI: — Charge: — sec Exhaust: — sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/16/15 Well ID: MBW087

Task: Groundwater Sampling Field Crew: T. Osborne E. Yeager

Measuring Point (MP): TOCN Water Level (WL): 1.19 ft below MP (1.49)

Sampling Method (see applicable calculations below): Low flow Device: peristaltic / tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 0.53L Starting PSI = (½ WL + 20): —
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 11.9 ft below MP Water Height (H): ~~ft below MP~~ Casing Radius (r): ~~ft~~

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ~~gal~~ Required Run Time: ~~min/ hr~~
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1054	1.19	0.11	0.44	—	—	—	—	—	—
1058	1.37	0.175	0.790	4.3	[illegible]	62.1	4.96	613.4	39.8
1103	1.42	0.20	1.59	4.2	6.67	50.1	1.09	612.8	19.4
1108	1.39	0.15	~~0.75~~ 2.34	4.3	6.69	42.4	0.75	613.1	14.6
1113	1.42	0.175	3.21	4.3	6.71	33.2	0.63	615.0	7.37
1118	1.43	0.175	4.08	4.4	6.71	26.7	0.57	614.9	4.24
1123	1.43	0.175	4.95	4.3	6.71	16.1	0.54	616.7	2.68
1128	1.46	0.20	5.75	4.3	6.71	11.4	0.52	616.0	3.12
1133	1.46	0.20	6.55	4.3	6.71	8.7	0.50	615.9	1.96

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1133	1.46	0.20	6.55	4.3	6.71	8.7	0.50	615.9	1.96

SAMPLE ID: 1504GWMBW087-4, F **TIME:** 1135

Final Low Flow Sampling Settings: PSI: — Charge: — sec Exhaust: — sec

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/13/15 Well ID: MBW099

Task: Groundwater Sampling Field Crew: Tom Osborn/ E. Yeager

Measuring Point (MP): TOCN Water Level (WL): 1.05 ft below MP 80% = 4.30' bgs

Sampling Method (see applicable calculations below): Purge + Sample Device: peristaltic

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 17.29 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
4/13 1624	1.05		5	5	6.71	-27.0	7.79	352.0	7.11
1629	-		7	6	6.84	-37.3	7.16	341.3	9.13
4/17/15 800	3.49								
0805	3.54	0.1		4.4	8.74	218	8.75	333.0	3.5
0810	3.65	NA		4.9	8.00	229.4	8.10	324.4	3.3
0815	5.32	NA	8.5	4.8	8.11	233	8.10	318.1	4.1

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0815	5.32	NA	8.5	4.8	8.11	233	8.10	318.1	4.1

SAMPLE ID: 1504GWMBW099-U,F **TIME:** 0810

Final Low Flow Sampling Settings: PSI: NA Charge: NA sec Exhaust: NA sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/14/15 Well ID: MBW107

Task: Groundwater Sampling Field Crew: TO EY

Measuring Point (MP): TOCN Water Level (WL): DRY ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 39.29 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0930									

SAMPLE ID: _____ **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/14/15 Well ID: MBW112

Task: Groundwater Sampling Field Crew: TD EY

Measuring Point (MP): TOCN Water Level (WL): DRY ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 17.34 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5

Continue stabilization readings on additional pages if necessary

TD DRY

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0952									

SAMPLE ID: _____ **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/17/15 Well ID: MBW130

Task: Groundwater Sampling Field Crew: E. Yeager T. Osborn

Measuring Point (MP): TOC Water Level (WL): 3.03 ft below MP (7.40=80%)

Sampling Method (see applicable calculations below): purge dry/sample Device: peristaltic/ dedicated tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): ~~n/a~~ Starting PSI = (½ WL + 20): ~~n/a~~
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 24.9 ft below MP Water Height (H): ~~n/a~~ ft below MP Casing Radius (r): ~~n/a~~ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ~~n/a~~ gal Required Run Time: ~~n/a~~ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1630	start pump								
1631	—	0.5	—	6.2	7.56	58.4	1.82	234.7	13.3
1634	—	0.5	1.5	6.3	6.83	44.9	0.31	230.6	14.1
~~1637~~	~~—~~	~~0.5~~		~~6.0~~					
1638	—	1.0	change purge rate						
1639	—	1.0	—	5.8	6.74	45.1	1.29	214.2	11.4
1641	—	1.0	—	5.3	6.61	51.7	3.74	208.1	7.56
1643	DRY								

4/17/15

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1223	3.00	–	–	6.0	6.99	175.0	2.43	225.6	8.81

Sampled on 4/18/15

SAMPLE ID: 1504GWMBW130-F,U TIME: 1215

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of ____

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 04/18/15 Well ID: MBW131

Task: Groundwater Sampling Field Crew: E. Yeager T. Osborn

Measuring Point (MP): TOC Water Level (WL): 3.38 ft below MP (3.68 max)

Sampling Method (see applicable calculations below): low flow Device: peristaltic / dedicated tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 0.42L (7.0 0.03) Starting PSI = (½ WL + 20): —

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 7.85 ft below MP Water Height (H): ____ ft below MP Casing Radius (r): ____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ____ gal Required Run Time: ____ min/ hr

H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0923	3.55	Start pump		4.4	7.40	92.8	~~8.62~~	268.5	14.7
0928	3.59	.07	.35	4.1	6.65	97.1	~~62.5~~	260.2	12.0
0933	3.59	.07	.70	4.1	6.60	95.6	~~63.7~~	254.5	20.4
0938	3.59	.07	1.05	4.1	6.60	94.4	~~64.1~~	251.8	13.1
0943	3.59	.07	1.40	4.0	6.61	94.9	8.44	249.1	8.30
0948	3.61	.07	1.75	4.0	6.60	96.3	8.5	250.1	4.38
0953	3.64	.07	2.10	3.9	6.59	98.4	8.47	249.9	3.14
0958	3.64	.07	2.45	4.0	6.59	100.0	8.49	249.9	3.45

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0958	3.64	.07	2.45	4.0	6.59	100.0	8.49	249.9	3.45

SAMPLE ID: 1504GWMBW131 – F,U TIME: 10:00

Final Low Flow Sampling Settings: PSI: — Charge: — sec Exhaust: — sec

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 04/15/15 Well ID: MBW135

Task: Groundwater Sampling Field Crew: To, EY

Measuring Point (MP): TOCN Water Level (WL): 3.16 ft below MP 6.48 = 80%

Sampling Method (see applicable calculations below): Purge dry + Sample Device: peristaltic/tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): ~~ok~~ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 19.8 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ~~ok~~ _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1348	—	~~1.0~~ 1.0	—	start pump					
1351	—	1.0	3.0	5.7	7.53	-15.1	1.32	441.2	9.94
1356	—	1.0	8.0	6.2	7.51	-20.4	1.21	441.1	25.4
1358	purged dry								

04/15/15

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1550	3.47	—	—	6.5	7.55	15.0	1.00	452.7	8.83

sampled on 4/19/15

SAMPLE ID: 1504GWMBW135-U,F **TIME:** 1535

Final Low Flow Sampling Settings: PSI: — Charge: — sec Exhaust: — sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/18/15 Well ID: MBW152

Task: Groundwater Sampling Field Crew: TO, EY

Measuring Point (MP): _____ Water Level (WL): DRY ft below MP

Sampling Method (see applicable calculations below): purge dry/sample Device: peristaltic/Dedicated Tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): TD 14.45 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
Continue stabilization readings on additional pages if necessary									

DRY

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1700									

SAMPLE ID: 1504GWMBW152- **TIME:** _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/17/15 Well ID: MMW006

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 266.95 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(327'(0.03 L/ft)+0.5) = Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

20.6 L

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0925	266.95	0.2	1 L	7.3	8.60	190.5	9.03	494.1	1.5
0935	266.95	Use Freeze out line	2 L	8.2	7.51	230.3	5.62	495.4	1.8
0945	266.95	Frequently. Flow rate	3.25	9.9	7.40	235.7	6.17	498.0	1.8
0955	266.95	Fluctuating significantly	4.75	9.1	7.38	239.8	5.83	496.4	2.0
1005	266.95		7.25	9.3	7.33	244.0	5.81	~~470~~ 497.0	2.6
1015	266.95		8.25	9.1	7.34	243.8	5.15	497.0	2.3
1030	266.93		10.5	9.6	7.30	245.8	5.80	495.4	2.4
1045	266.93		12.9	9.8	7.28	247.4	5.79	495.1	2.4
1100	266.93		15.15	9.7	7.27	248.9	5.72	497.0	2.3
1115	266.93		17.45	9.7	7.27	249.8	5.79	498.8	2.5
1130	266.92		19.7	9.6	7.27	250.4	5.65	499.8	2.2
1145	266.91		22	9.7	7.26	251.5	5.68	499.4	2.3

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1145	266.91	–	22	9.7	7.26	251.5	5.68	499.4	2.3

SAMPLE ID: 1504GWMMW006-4L **TIME:** 1150

Final Low Flow Sampling Settings: PSI: 150 Charge: 10 sec Exhaust: 22 sec

Downloaded transducer data.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/16/15 Well ID: MMW007

Task: Groundwater Sampling Field Crew: A. Pettley J. Pierson

Measuring Point (MP): Top of gray disk Water Level (WL): 35.84 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(87'(0.03 L/ft) + 0.5) = 6.2 L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 93.7 ft below MP Water Height (H): 35.84 ft below MP Casing Radius (r): 0.167 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)	
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5	
1130	36.55		2 L	7.8	7.28	146.4	2.02	221.4	3.1	
1135	37.51	0.9 L/min	6.5	7.5	~~7.57~~ 7.11	147.9	1.83	221.9	3.7	
1145	~~4~~ 41.05	0.9	~~28~~ 15.5	7.4	6.91	149.5	1.65	221.4	2.1	
1155	45.48	0.9	24.5	7.5	6.87	152.4	1.63	221.2	3.1	
1210	52.75	0.95	38.75	7.5	6.85	156.0	1.60	221.8	6.1	Bubble on sensor
1225	55.86	0.95	53	7.3	6.84	159.1	1.66	223.0	2.4	
1240	60.85	0.95	67.25	7.5	6.83	161.4	1.66	221.7	3.2	
1255	66.43	0.95	81.50	7.5	6.82	164.5	1.76	221.3	4.4	
1310	70.00	0.9	95	7.3	6.80	167.0	1.93	222.7	2.5	
1325	70.60	0.09	96.35	8.8	6.83	171.7	1.93	223.1	3.1	Switch to low flow sampling method
1330	70.59	0.09	97.7	8.4	6.82	172.6	2.06	222.8	3.1	
1335	70.59	0.09	99.05	8.1	6.83	173.0	2.11	223.2	3.1	

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1335	70.59	0.09	~~99.05~~ 99	8.1	6.83	173.0	2.11	223.2	3.1

SAMPLE ID: ~~MMW~~ 1504GWMMW007-U,F TIME: 1340

Final Low Flow Sampling Settings: PSI: 40 Charge: 8 sec Exhaust: 7 sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/18/15 Well ID: MMW009

Task: Groundwater Sampling Field Crew: A. Pettley J. Pierson

Measuring Point (MP): Top of gray disc Water Level (WL): 215.00 ft below MP

Sampling Method (see applicable calculations below): Low flow Device: Bladder/Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(350'(0.03 L/ft) + 0.5) = 22L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1515	215.08		0.3	10.8	7.77	199.9	8.73	599	2.5
1530	215.20	0.6	9.3	9.3	6.94	-82.4	0.31	629	2.1
1545	215.15	0.6	~~9.7~~ 18.3	9.5	6.93	-81.0	0.15	627	2.7
1550	215.15	0.6	21.3	9.5	6.92	-63.0	0.12	628	2.6
1555	215.18	0.5	28.8	9.3	6.92	-43.0	0.09	628	3.0
~~1600~~ 1605	215.10	0.6	34.8	9.4	6.92	-19.2	0.06	628	3.3
1615	215.15	0.6	40.8	9.5	6.92	-8.3	0.04	629	3.2
1620	215.15	0.6	43.8	9.5	6.92	-3.4	0.03	628	3.3
1625	215.15	0.6	46.8	9.2	6.91	0.4	0.02	628	3.3

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1625	215.15	0.6	46.8	9.2	6.91	0.4	0.02	628	3.3

SAMPLE ID: 15046GWMMW009-U,F **TIME:** 1630

Final Low Flow Sampling Settings: PSI: 125 Charge: 17 sec Exhaust: 25 sec

Downloaded pressure and water level transducer data.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/18/15 Well ID: MMW010

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 5.60 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(29'(0.03 L/ft)+0.5) = 2.7 L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge ~~Rate~~ (gal or L/min)	Cumulative Purge ~~Vol~~ (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1710	5.85		0.5	8.1	6.52	182.7	3.94	1543	8.9
1715	5.83	0.14	1.2	8.8	6.40	172.6	4.37	1529	7.5
~~1725~~ 1720	5.86	0.1	1.7	7.9	6.37	171.4	4.09	1538	7.1
1725	~~5.83~~ 5.83	0.1	2.2	8.7	6.37	174.1	4.44	1539	5.0
1730	5.79	0.1	2.7	8.7	6.37	175.2	4.48	1536	4.9
~~1740~~ 1735	5.79	0.1	3.2	8.7	6.36	176.6	4.41	1540	4.5

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge ~~Rate~~ (gal or L/min)	Cumulative Purge ~~Vol~~ (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1735	5.79	0.1	3.2	8.7	6.36	176.6	4.41	1540	4.5

SAMPLE ID: 1504GWMMW010-U,F **TIME:** 1740

Final Low Flow Sampling Settings: PSI: 20 Charge: 3 sec Exhaust: 15 sec

Downloaded transducer data.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/19/15 Well ID: MMW011

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC N Water Level (WL): ~~75.20~~ 74.20 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / ~~Compressor~~ Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(112'(0.03L/ft)+0.5)= 7.7 L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft ~~74.35~~	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1315	~~75.35~~		0.5 L	11.0	7.75	182.9	8.85	789	2.1
1320	74.38	0.28	1.9	10.3	7.21	188.9	7.14	823	1.5
1325	74.38	0.25	3.2	10.1	7.13	189.0	6.90	833	1.6
1330	74.35	0.24	4.4	10.4	7.11	188.5	6.93	834	1.6
1335	74.35	0.22	5.5	9.8	7.09	189.9	7.00	834	1.6
1340	74.35	0.22	6.6	10.5	7.08	189.9	6.94	834	1.8
1345	74.35	0.2	7.6	10.6	7.07	190.5	~~7.07~~ 6.98	833	1.7
1350	74.38	0.2	8.6	10.9	7.07	190.3	6.99	833	2.0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1350	74.38	0.2	8.6	10.9	7.07	190.3	6.99	833	2.0

SAMPLE ID: 1504GWMMW011-U,F **TIME:** 1355

Final Low Flow Sampling Settings: PSI: 50 Charge: 6 sec Exhaust: 10 sec

Downloaded transducer data. Water level and barometric.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/20/15 Well ID: MMW012

Task: Groundwater Sampling Field Crew: A. Pettley J Pierson

Measuring Point (MP): Gray disc Water Level (WL): Dry ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0900	66.95 ft below gray disc to well bottom. No water.								

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)

SAMPLE ID: — **TIME:** —

Final Low Flow Sampling Settings: PSI: — Charge: — sec Exhaust: — sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/14/15 Well ID: MMW013

Task: Groundwater Sampling Field Crew: A Pettley - J Pierson

Measuring Point (MP): TOC Water Level (WL): 4.25 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2 (31' (0.03)) + 0.5 = 2.86 Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1435	4.33	0.8 L/min	4L	6.7	6.78	218.5	10.38	653	2.8
1440	4.35	0.8	8L	6.7	6.68	219.6	9.93	652	3.8
1445	4.35	0.8	12L	6.7	6.66	220.1	10.36	653	2.1
1450	4.37	0.8	16L	6.6	6.68	220.3	10.35	652	3.8
1455	4.38	0.8	20L	6.4	6.66	~~224.0~~ 222.5	10.36	651	3.2

Turbidity meter ~~[illegible]~~ PP coated with bubbles. Removing bubbles causes spike in DO.

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1455	4.38	0.8 L/min	20L	6.4	6.66	222.5	10.36	651	3.2

SAMPLE ID: 1504GWMMW013-U,F **TIME:** 1500

Final Low Flow Sampling Settings: PSI: 10 Charge: 10 sec Exhaust: 9 sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/15/15 Well ID: MMW017

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 39.86 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(56'(0.03 L/ft)+0.5) 4.36 L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1250	40.15	~~0.14~~	1.2 L	6.6	6.51	236.4	6.69	1383	1.3
1300	40.15	0.07 L/min	1.9	3.6	6.60	231.3	6.61	1400	1.2
~~1310~~ 1315	40.15	0.05	2.65	3.1	6.34	224.2	6.67	1408	1.3
1330	40.15	0.05	3.4	3.3	6.33	220.7	6.51	1400	1.3
1345	40.15	0.05	4.15	3.6	6.34	218.4	6.56	1399	1.4
1400	40.13	0.025	4.52	4.1	6.38	217.4	6.58	1394	1.4

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1400	40.13	0.025	4.52	4.1	6.38	217.4	6.58	1394	1.4

SAMPLE ID: 150406WMMW017-U,F **TIME:** 1400

Final Low Flow Sampling Settings: PSI: 30 Charge: 4 sec Exhaust: 29 sec

Downloaded transducer data.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/17/15 Well ID: MMW018

Task: Groundwater Sampling Field Crew: A Pettley - J Pierson

Measuring Point (MP): TOC N Water Level (WL): 12.36 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): $2(30^{ft}(0.03\frac{L}{ft}) + 0.5^{L}) =$ 2.8 L Starting PSI = (½ WL + 20): _____

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr

H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1350	12.56		0.7	8.5	7.12	247.9	6.73	412.4	1.7
1355	12.50	0.1	1.2	9.6	7.02	246.1	6.41	415.0	1.6
1400	12.54	0.15	1.9	9.1	6.99	246.3	6.26	415.4	1.5
1405	12.55	0.15	2.6	8.9	6.97	246.7	6.25	415.3	1.5
1410	12.55	0.15	3.3	8.9	6.96	247.6	6.24	414.9	1.7

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1410	12.55	0.15	3.3	8.9	6.96	247.6	6.24	414.9	1.7

SAMPLE ID: 1504GWMMW018-U,F **TIME:** 1415

Final Low Flow Sampling Settings: PSI: 20 Charge: 4 sec Exhaust: 27 sec

Sampled 1504GWMMW018-U,F-MS 1420

-MSD 1425

Downloaded transducer

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/17/15 Well ID: MMW020

Task: Groundwater Sampling Field Crew: A. Pettley J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 280.45 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(40ft(0.03L/ft) + 0.5) = 25.2 L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

	Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
	Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1235	~~1335~~ DP	280.41	Flow rates	3.0 L	9.1	7.15	238.9	5.97	739	1.4
1240	~~1340~~ DP	280.46	fluctuating	6.25	9.2	6.85	223.4	3.55	833	2.5
1245	~~1345~~ DP	280.43		9.25	9.2	6.67	192.1	0.61	1048	1.9
	1250	280.43		12.75	9.3	6.67	188.6	0.37	1060	1.5
	1255	280.43		16 L	9.3	6.66	185.1	0.27	1060	1.5
	1300	280.43		19.25	9.3	6.65	182.3	0.23	1061	1.4
	1305	280.43		22.5	9.3	6.64	180.5	0.20	1059	1.4
	1310	280.42		26	9.3	6.64	179.1	0.17	1061	1.8

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1310	280.42	–	26	9.3	6.64	179.1	0.17	1061	1.8

SAMPLE ID: 1504GWMMW020-U,F **TIME:** 1315

Final Low Flow Sampling Settings: PSI: 165 Charge: 21 sec Exhaust: 27 sec

Collected MS/MSD at MMW020. Sample times MS - 1320
MSD - 1325

Did not download transducer data; stuck.

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/15/15 Well ID: MMW021

Task: Groundwater Sampling Field Crew: J. Pierson - A. Pettley

Measuring Point (MP): TOC N Water Level (WL): 211.78 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder pump/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(242'(0.03 L/ft)+0.5L) Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 15.5 L

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)	
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5	
0945	211.89	0.3 L/min	1.5 L	6.1	7.83	162.2	7.33	623	43.2	Bubbles on sensor
0955	211.92	0.3	4.5	6.3	7.26	183.7	6.03	628	1.2	
1005	211.93	0.3	7.5	6.7	7.19	188.7	5.88	626	1.3	
1015	211.82	0.3	10.5	6.7	7.12	193.1	5.76	6260	2.6	
1025	211.93	0.3	13.5	6.4	7.07	196.3	5.73	628	2.9	
1035	211.83	0.3	16.5	6.6	7.04	198.8	5.78	6260	1.7	

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1036	211.83	0.3	16.5	6.6	7.04	198.5	5.78	6260	1.7

SAMPLE ID: ~~GW~~ DP 1504 GWMMW021-U,F **TIME:** 1040

Final Low Flow Sampling Settings: PSI: 115 Charge: 13 sec Exhaust: 20 sec

Downloaded transducer data

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/19/15 Well ID: MMW022

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 210.20 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(325'(0.03 L/ft) + 0.5) = 20.5 L Starting PSI = (½ WL + 20): _____

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr

H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0920	210.25	0.1 L/min	1 L	10.0	8.75	130.3	9.47	740	2.2
0930	210.30	0.19	2.9	8.3	7.48	170.9	8.03	888	3.9
0940	210.29	0.2	4.9	8.5	7.00	182.5	3.62	941	4.8
0950	210.29	0.17	~~5.6~~ 6.6	8.6	6.92	188.2	3.96	930	7.5
1000	210.29	0.17	~~6.3~~ 8.3	8.5	6.87	189.7	4.27	923	3.3
1010	210.29	0.18	10.1	8.5	6.85	192.6	4.30	923	3.3
1020	210.30	0.18	11.9	8.5	6.84	195.0	4.31	925	3.4
1030	210.28	0.17	13.6	8.4	6.83	197.0	4.31	924	3.5
1040	210.29	0.18	15.4	8.4	6.82	199.1	4.34	925	3.5
1050	210.29	0.18	17.2	8.4	6.81	200.8	4.32	926	3.8
1100	210.29	0.17	18.9	8.5	6.80	201.3	4.35	923	2.7
1110	210.30	0.17	20.6	8.4	6.80	201.3	4.34	923	3.2

Bubbles on turbi sensor

Continue stabilization readings on additional pages if necessary

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1110	210.30	0.17	20.6	8.4	6.80	201.3	4.34	923	3.2

SAMPLE ID: 1504GWMMW022-U,F **TIME:** 1115

Final Low Flow Sampling Settings: PSI: 110 Charge: 8 sec Exhaust: 25 sec

Downloaded transducer data

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/19/15 Well ID: MMW023

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 108.26 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(352'(0.03 L/ft)+0.5) =Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

22.1 L

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1440	108.35	0.9 L/min	1.2 L	9.6	7.50	-48.0	1.30	956	2.6
1445	108.38	0.9	5.7	9.6	7.11	-98.1	0.18	958	2.2
1450	108.35	0.9	10.2	9.3	7.01	-87.0	0.11	982	2.0
1455	108.35	0.9	14.7	9.4	6.93	-82.9	0.08	994	1.9
1500	108.35	0.9	19.2	9.3	6.90	-87.7	0.07	994	1.9
1505	108.40	0.9	23.7	9.4	6.88	-89.0	0.07	987	1.9

Continue stabilization readings on additional pages if necessary

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1505	108.40	0.9	23.7	9.4	6.88	-89.0	0.07	987	1.9

SAMPLE ID: 1504GWMMW023-U,F **TIME:** 1510

Final Low Flow Sampling Settings: PSI: 95 Charge: 10 sec Exhaust: 10 sec

Downloaded transducer data.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/14/15 Well ID: MMW024

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC Water Level (WL): 61.38 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder pump/compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(195' (0.03L/ft)) Starting PSI = (½ WL + 20): 42
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 11.7 L

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)	
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5	
1225	61.37	0.8 L/min	3.5 L	7.5	7.25	131.0	3.14	835	11.0	
1230	61.40	0.9	8.0	7.6	7.19	140.2	3.02	835	12.5	← Bubbles on sensor
1235	61.42	0.9	12.5	7.5	7.08	153.3	3.09	837	1.0	
1240	61.42	0.9	17.0	7.5	7.03	153.8	2.98	837	1.2	
1245	61.42	0.9	21.5	7.5	7.01	155.3	2.97	838	1.2	

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
~~1250~~ 1245	61.42	0.9	21.5	7.5	7.01	155.3	2.97	838	1.2

SAMPLE ID: 1504GWMMW024-U,F **TIME:** 1250

Final Low Flow Sampling Settings: PSI: 105 Charge: 17 sec Exhaust: 9 sec

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/16/15 Well ID: MMW025

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): Top of gray disk Water Level (WL): 29.10' ft below MP

Sampling Method (see applicable calculations below): _____ Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(195'(0.03 L/ft) + 0.5) Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 12.7 L

3-Volume Purge Sampling

80% of 170.9' = 136.72'
200' − 136.72 = 63.28'

Total Depth (TD): 200 ft below MP Water Height (H): 170.9 ft below MP Casing Radius (r): 0.167 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 3(3.1415 (0.167)²(170.9')(7.48) = ~~112~~ 336 gal = 1270 L gal Required Run Time: 15 min/hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft
H = 200' − 29.1' = 170.9'

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
Low flow not possible 1430	29.40								
~~29~~ 1435	29.70	0.9 L/min	3 L	7.7	7.79	168.3	1.35	292.1	1.6
1440	34.00	1.4	10 L	7.9	7.76	160.0	0.84	291.2	1.4
1450	38.75	1.3	23	7.8	7.74	152.1	0.80	290.9	1.4
1500	45.52	1.5	38	7.8	7.72	144.7	0.81	291.0	1.3
1510	54.98	1.5	53	7.7	7.71	138.9	0.81	291.0	1.3
1525	63.25	1.3	72.5	7.7	7.70	134.4	0.81	291.0	1.4
1540	71.30	1.5	102.5	7.7	7.69	131.8	0.82	290.9	1.3
1555	81.71	1.4	117.5	7.7	7.69	127.5	0.80	290.8	1.4
Attempted Low Flow sampling w/out success → 1610	84.31	0.1	119	7.7	7.69	126.1	1.10	290.9	1.4
1625	92.05	1.5	141.5	7.7	7.69	121.8	0.80	290.9	1.3
1640	100.96	1.4	162.5	7.7	7.68	121.0	0.85	290.7	1.4

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
4/20/15 1415	73.08	0.4	10	8.1	7.90	137.2	2.05	291.7	3.5

SAMPLE ID: 1504GWMMW025-U,F TIME: 1420 4/20/15

Final ~~Low Flow~~ GP Sampling Settings: PSI: 100 Charge: 16 sec Exhaust: 14 sec

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/16/15 Well ID: MMW025

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1655	108.85	1.1	179	7.8	7.68	117.7	0.96	290.7	1.5
~~1515~~ 1710	115.25	0.9	192.5	7.8	7.69	116.2	1.22	289.5	1.5
1725	121.90	1.0	207.5	7.8	7.69	120.4	1.35	289.5	1.4
4/19/15 ~~1555~~ 9p 1555	87.25	Needs to recover to 63.28' below gray disc							
4/20/15 1348	68.95	Will sample now; last well to sample for spring 2014.							
1355	69.51	1.0	2L	9.0	8.20	141.2	7.00	287.5	1.5
1400	70.74	.4	4	8.4	8.02	137.2	2.45	291.3	2.7
1405	71.54	.4	6	8.1	7.97	137.1	2.10	291.7	3.1
1410	72.38	0.4	8	8.1	7.93	137.0	2.00	291.5	3.8
1415	73.08	0.4	10	8.1	7.90	137.2	2.05	291.7	3.5

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/16/15 Well ID: MMW026

Task: Groundwater Sampling Field Crew: A Pettley - J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 286.72 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(345'(0.03 L/ft) + 0.5) Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 21.7 L

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1015	286.80		0.5	8.7	8.45	-74.5	0.84	419.0	1.3
1020	286.80	~~0.55~~ 0.8 gpm	4.0	10.0	7.79	-9.0	0.22	420.7	1.8
1025	286.73	0.7	7.5	10.4	7.73	14.5	0.14	419.7	1.6
1030	286.72	0.7	11	10.3	7.66	39.2	0.11	419.9	1.5
1035	286.72	0.8	15	10.3	7.61	48.7	0.10	419.4	1.6
1040	286.72	0.8	19	10.3	7.57	54.0	0.10	418.5	1.6
1045	286.72	0.7	22.5	10.3	7.53	61.0	0.09	419.2	1.6
1050	286.73	0.65	25.75	10.3	7.50	66.5	0.09	418.8	1.7
1055	286.73	0.65	29	10.2	7.49	69.5	0.10	418.9	1.8

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1055	286.73	0.65	29	10.2	7.49	69.5	0.10	418.9	1.8

SAMPLE ID: 1504GWMMW026-U,F **TIME:** 1100

Final Low Flow Sampling Settings: PSI: 205 Charge: 15 sec Exhaust: 17 sec

Downloaded transducer data.

Cut lock (did not know combo).

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: ~~4/20/14~~ 4/20/15 Well ID: MMW027

Task: Groundwater Sampling Field Crew: A. Pettley J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 108.64 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(115'(0.03L/ft)+0.5) = 7.9 Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0910	108.69	0.4 ~~0.5~~ 0.4	0	9.1	8.14	108.9	8.92	998	2.2
0915	108.69	0.4	2	7.2	7.51	119.9	4.85	1061	2.1
0920	108.73	0.5	4.5	7.2	7.21	119.7	3.54	1056	2.0
0925	108.74	0.5	7	7.2	7.15	122.8	3.44	1054	1.7
0930	108.78	0.5	9.5	7.2	7.07	127.8	3.40	1055	1.7
0935	108.78	0.5	12	7.2	7.02	131.5	3.37	1055	1.8
0940	108.78	0.5	14.5	7.2	6.98	134.7	3.36	1058	2.1

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0940	108.78	0.5	14.5	7.2	6.98	134.7	3.36	1058	2.1

SAMPLE ID: 1504GWMMW027-U, F **TIME:** 0945

Final Low Flow Sampling Settings: PSI: 70 Charge: 10 sec Exhaust: 15 sec

Download transducer data. Transducer may be above water level.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/19/15 Well ID: MMW028

Task: Groundwater Sampling Field Crew: A. Pettley J. Pierson

Measuring Point (MP): ~~Gray disc~~ TOC N Water Level (WL): 79.76 ft below MP

Sampling Method (see applicable calculations below): ~~2(90'(0.03 gal/ft)+0.5L)=~~ JP Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(90'(0.03 gal/ft)+0.5L)= 6.4L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
~~1215~~	~~79.60~~	~~JP~~	~~2L~~						
1215	79.76		2L	8.2	7.47	205.3	6.33	558	6.7
1220	79.74	0.5	4.5	8.5	7.38	202.8	6.45	557	3.3
1225	79.75	0.65	7.7	8.4	7.32	198.3	6.37	555	2.6
1230	79.74	0.65	10.9	8.2	7.29	197.2	6.35	556	3.0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1230	79.74	0.65	10.9	8.2	7.29	197.2	6.35	556	3.0

SAMPLE ID: 1504GWMMW028 ~~U,F~~ JP -1-U,F **TIME:** 1235

Final Low Flow Sampling Settings: PSI: 50 Charge: 15 sec Exhaust: 10 sec

Duplicate sample 1504GWMW028-2-U,F Time: 1240

~~Downloaded transducer data.~~ JP Could not connect to transducer. Possible bad transducer.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/18/15 Well ID: MMW029

Task: Groundwater Sampling Field Crew: A. Pettley · J. Pierson

Measuring Point (MP): Gray disc Water Level (WL): 19.71 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(55'(0.03 L/ft)+0.5) = 4.3L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): ~~150~~ 20P ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

~~H = 150'~~ 9P

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0910	19.90		2.6L	8.0	7.86	196.1	5.83	1569	1.2
0915	19.90	0.3 L/min	4.1	7.9	7.16	222.1	5.60	1580	1.3
0920	19.90	0.4	6.1	8.1	7.08	224.2	5.53	1583	1.3
0925	19.89	0.4	8.1	8.1	7.00	227.9	5.55	1585	1.3
0930	19.89	0.35	9.9	8.2	6.91	232.0	5.60	1600	1.2
0935	19.89	0.35	11.7	8.3	6.83	235.5	5.68	1622	1.2
0940	19.89	0.35	13.5	8.3	6.77	238.2	5.73	1639	1.2
0945	19.89	0.35	15.3	8.4	6.73	240.8	5.78	1651	1.3

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0945	19.89	0.35	15.3	8.4	6.73	240.8	5.78	1651	1.3

SAMPLE ID: 1504GWMMW029-U,L **TIME:** 0950

Final Low Flow Sampling Settings: PSI: 30 Charge: 8 sec Exhaust: 10 sec

Transducer data downloaded.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/13/15 Well ID: MMW030

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC North Water Level (WL): 26.58 ft below MP

Sampling Method (see applicable calculations below): Purge and sample Device: Bladder / Compressor
Bladder / Nitrogen

4 14 9
188.010
- 26.58
128.42
x 0.8
102.73

155
- 102.73
52.27

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 155 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1646			2 L	9.1	7.36	140.0	JP ~~9.8~~ 90%	411.3	14.7
1652	31.26	1.2 L/min		9.2	7.48	135.6	JP ~~2.6~~ 0.30	416.3	10.0
1702	36.09	1 L/min		9.2	7.50	127.1	0.28	417.1	7.7
1712	40.53			9.2	7.43	122.5	0.22	417.1	1.9
4/14/15 2033	153.25	Well pumped dry.							
4/18/15 1345	39.26	More than 80% recovery from purge							
1355	39.63		Restart 0.65	10.3	7.92	156.9	2.88	404.3	45.9
1400	40.36		2.7	9.9	7.77	156.3	1.96	400.4	21.8
1405	40.79	0.3	4.2	10.4	7.66	156.7	1.91	399.9	~~33.3~~ JP bubbles on sensor
									8.3

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1405	40.79	0.3	4.2	10.4	7.66	156.7	1.91	399.9	8.3

SAMPLE ID: 1504GWMMW030-U,L **TIME:** 1410 (4/18/15)

Final Low Flow Sampling Settings: PSI: 80 Charge: 7 sec Exhaust: 15 sec

Barometer and water level transducer data downloaded.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/15/15 Well ID: MMW031

Task: Groundwater Sampling Field Crew: A Pettley - J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 98.68 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(195'(0.03 L/ft)+0.5L) Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 12.7 L

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)	
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5	
1115	98.78	.45 L/min	1.5 L	7.6	7.77	164.9	8.91	254.6	2.2	
1125	98.80	0.45	6.0 L	7.9	7.61	178.4	8.06	254.0	2.6	
1135	98.80	0.43	10.3	7.9	7.56	184.3	8.50	254.8	<5	Bubbles on sensor. Removing bubbles increases DO reading
1145	98.80	0.45	14.8	7.9	7.56	184.8	8.08	254.2	3.2	
1155	98.80	0.45	19.3	7.9	7.40	202.8	8.68	254.4	<5	
1200	98.82	0.45	23.8	7.9	7.40	202.8	8.40	254.1	<5	
1205	98.82	0.45	28.3	8.0	7.41	201.9	8.57	254.0	<5	DO fluctuating due to formation of bubbles in flow through cell.
1210	98.82	0.45	32.8	8.0	7.43	200.9	8.59	254.1	<5	

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1210	98.82	0.45	32.8	8.0	7.43	200.9	8.59	254.1	<5

SAMPLE ID: 1504GWMMW031-U,F **TIME:** 1215

Final Low Flow Sampling Settings: PSI: 110 Charge: 8 sec Exhaust: 9 sec

Download transducer data

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/14/15 Well ID: MMW032

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC Water Level (WL): 22.00 ft below MP

Sampling Method (see applicable calculations below): Purge Dry and Sample Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): ~~2~~ 8P Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

30.60' = 80% recovery

3-Volume Purge Sampling

Total Depth (TD): 65 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1600	28.30	2.2 L/min	8 L	6.2	7.21	193.8	5.67	377.7	1.5
1610	36.00	1.8 L/min	26 L	6.2	6.92	199.5	5.59	373.2	1.0
1620	41.85	1.6 L/min	42 L	6.1	7.02	193.3	6.25	372.6	0.9
1630	50.11	1.7 L/min	59	6.1	7.10	191.9	6.54	372.7	0.9
1640	55.05	1.6 L/min	75	6.1	7.11	193.6	6.55	372.7	0.9
1650	59.45	1.2 L/min	87	5.7	7.07	193.0	6.67	372.7	1.8
1700	61.32	.7 L/min	94	6.0	7.04	189.0	6.22	383.2	30.0
1702	Well pumped dry.								
well recovered 4/17/15 → 1515	20.35	NA	1.0	7.2	7.46	217.9	9.71	379.2	5.0
1520	22.25	–	3.0	7.1	7.40	220.9	9.62	379.0	2.6
1535	23.79	–	6.0	7.1	7.38	223	9.68	377.0	3.7

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1535	23.79	–	6.0	7.1	7.38	223	9.68	377.0	3.7

SAMPLE ID: 1504GWMMW032-U-F **TIME:** 1540

Final Low Flow Sampling Settings: PSI: – Charge: – sec Exhaust: – sec

- No transducer in well.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/18/15 Well ID: MMW033

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): Gray disc Water Level (WL): 11.64 ft below MP

Sampling Method (see applicable calculations below): 3-Volume purge* Device: Bladder/compressor

*Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 10(150'(0.03 L/ft)+0.5) Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] ~~10 L~~ 50L

3-Volume Purge Sampling

Total Depth (TD): 150 ft below MP Water Height (H): 138.36 ft below MP Casing Radius (r): 0.167 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

H = 150' - 11.64' = 138.36' 138.36'(0.653 gal/ft) = 271 gal

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1005	13.78	1.5 L/min	1.5 L	7.0	7.66	109.9	0.28	469.7	1.9
1015	16.50	1.5	16.5	6.8	7.54	86.6	0.04	469.0	4.4
1025	20.32	1.5	31.5	6.8	7.47	78.0	0.01	467.7	4.7
1035	23.45	1.5	46.5	6.8	7.43	73.4	0.03	461.5	5.2
1040	25.11	1.5	54	6.8	7.40	76.6	0.05	459.0	4.6
1045	26.03	1.5	61.5	6.8	7.37	78.9	0.10	457.8	4.4
1050	27.53	1.5	69	6.8	7.35	81.7	0.13	456.7	4.7

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1050	27.53	1.5	69	6.8	7.35	81.7	0.13	456.7	4.7

SAMPLE ID: 15046WMMW033-U,L **TIME:** 1055

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

* See note in notebook on sampling method.

~~Downloaded transducer data.~~ No transducer in MMW033.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/14/15 Well ID: MMW034

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC Water Level (WL): 12.91 ft below MP

Sampling Method (see applicable calculations below): LOW Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(167'(0.03)= 10.02 L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)	
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5	
1315	13.08	0.3 L/min	1.0 L	7.6	7.39	~~-54.8~~ DP	3.01	625	1.1	
1320	13.10	0.3	2.5 L	7.6	7.13	~~-44.9~~ DP	7.79	622	1.7	
1325	13.11	0.3	4.0 L	7.6	7.10	~~-40.4~~ 193.5 DP	~~8.46~~ 8.46 DP	617	2.6	
1330	13.10	0.3	5.5 L	7.5	7.08	200.8	9.21	620	2.6	
1340	13.12	0.3	~~10.5~~ 8.5 DP	7.1	7.02	203.2	8.73	618	2.8	
1350	13.13	0.3	11.5	7.0	6.98	207.0	9.01	621	3.0	Bubbles causing increase in turbidity
1355	13.10	0.35	13.25	7.5	7.02	207.7	8.88	622	4.2	
1400	13.10	0.35	15	6.9	6.97	210.1	8.72	621	<5	
1405	13.10	0.35	16.75	6.9	6.98	210.7	8.84	621	<5	
~~14~~ DP										

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1405	13.10	0.35	16.75	6.9	6.98	210.7	8.84	621	<5

SAMPLE ID: 1504GWMMW034-1-U,F **TIME:** 1410

Final Low Flow Sampling Settings: PSI: 45 Charge: 9 sec Exhaust: 10 sec

Duplicate taken at MMW034 at 1355
1504GWMMW034-2-U,F

WELL SAMPLING FORM

Page: 1 of ____

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/20/15 Well ID: MMW035

Task: Groundwater Sampling Field Crew: A. Pettley J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 110.14 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(205'(0.03 L/ft) + 0.5) = 13.3 L Starting PSI = (½ WL + 20): ____

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): ____ ft below MP Water Height (H): ____ ft below MP Casing Radius (r): ____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ____ gal Required Run Time: ____ min/ hr

H=TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1000	110.19	0.5	0.5	9.7	7.26	153.4	4.00	1350	2.0
1005	110.20	0.5	3.0	7.5	6.87	155.6	1.95	1432	1.7
1010	110.19	0.5	5.5	7.4	6.81	153.7	2.23	1434	1.8
1015	110.19	0.5	8	7.4	6.80	152.2	2.21	1434	2.0
1020	110.19	0.5	10.5	7.4	6.79	150.2	2.17	1434	2.3
1025	110.19	0.5	13	7.5	6.79	149.2	2.17	1434	3.1
1028	110.19	0.5	14.5	7.5	6.79	148.1	2.26	1435	2.6

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1028	110.19	0.5	14.5	7.5	6.79	148.1	2.26	1435	2.6

SAMPLE ID: 1504GWMMW035-U,F **TIME:** 1030

Final Low Flow Sampling Settings: PSI: 100 Charge: 9 sec Exhaust: 11 sec

Downloaded transducer data.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/20/15 Well ID: MMW036

Task: Groundwater Sampling Field Crew: A. Pettley J. Pierson

Measuring Point (MP): Grey disc Water Level (WL): ~~116.21~~ 116.11 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Nitrogen

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(147'(0.03 L/ft) + 0.5L) = 9.8 L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1210	116.15		2	8.9	7.76	159.2	8.39	416.5	3.8
1215	116.13	0.3	3.5	8.8	7.41	161.5	7.52	417.7	3.9
1220	116.10	0.4	5.5	8.7	7.35	162.1	7.62	416.9	2.6
1225	116.10	0.4	7.5	8.5	7.32	162.4	7.67	416.4	2.2
1230	116.13	0.4	9.5	8.3	7.32	162.1	7.72	416.2	2.0
1235	116.11	0.4	11.5	8.5	7.35	168.6	7.74	416.6	2.5

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1235	116.11	0.4	11.5	8.5	7.35	168.6	7.74	416.6	2.5

SAMPLE ID: 1504GWMMW036-U,F **TIME:** 1240

Final Low Flow Sampling Settings: PSI: 90 Charge: 7 sec Exhaust: 20 sec

- MS 1504GWMMW036-U,F-MS Time: 1245
- MSD 1504GWMMW036-U,F-MSD Time: 1250
- Bubbles in air hose likely influencing DO; possibly due to a bladder pump malfunction.
- Downloaded transducer data.

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/20/15 Well ID: MMW037

Task: Groundwater Sampling Field Crew: A. Pettley J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 117.00 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/Nitrogen (Need 150 psi)

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2(318'(0.03 L/ft) + 0.5L) = 20.1 L Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1110	117.05	0.6	3	8.8	7.52	120.0	3.94	~~419.0~~ 418.9	2.5
1120	117.05	0.6	9	8.4	7.39	140.5	8.11	419.6	2.0
1130	117.10	0.6	15	8.3	7.37	144.5	8.12	421.4	1.9
1135	117.05	0.6	18	8.4	7.37	146.7	8.15	421.4	1.8
1140	117.10	0.6	21	8.3	7.36	149.0	8.09	421.4	1.8

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1140	117.10	0.6	21	8.3	7.36	149.0	8.09	421.4	1.8

SAMPLE ID: 15046WMMW037-1-U,F and 15046WMMW037-2-U,F **TIME:** 1145

Final Low Flow Sampling Settings: PSI: 150 Charge: 16 sec Exhaust: 17 sec

Download baro and water level transducer data

WELL SAMPLING FORM

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/13/15 Well ID: MW-16A

Task: Groundwater Sampling Field Crew: A. Pettley - J. Pierson

Measuring Point (MP): TOC south Water Level (WL): 9.95 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Peristaltic

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1725	9.95								
1735	Will not sustain low flow w/ draw down > 0.3 ft on lowest pump setting.								
1739	10.60		0.7L	6.7	7.44	-78.8	0.29	1546	1.5
1743	10.95		1.7L	6.7	7.40	-77.0	0.28	1573	1.6
1748	11.44		2.3L	6.7	7.29	-73.4	0.16	1652	2.2
1751	11.23	0.12 L/min	3.7L	7.2	7.29	-71.8	0.24	1689	1.2
1754	11.20	0.12		7.0	7.25	-66.0	0.25	1717	1.5
1755	11.20	DHW stabilize; convert back to low flow sampling method.							
1800	11.17	0.14	4.6L	7.0	7.20	-61.6	0.21	1734	1.1
1805	11.18	0.14	~~5.7L~~ 5.5	7.1	7.15	-59.2	0.18	1742	1.1
1810	11.19	0.14	6.2	7.0	7.15	-58.5	0.17	1744	1.2

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1810	11.19	0.14	6.2	7.0	7.15	-58.5	0.17	1744	1.2

SAMPLE ID: 1504GWMW16A-U,F **TIME:** 1815

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/17/15 Well ID: MW15A

Task: Groundwater Sampling Field Crew: E.Yeager T Osborn

Measuring Point (MP): TOC Water Level (WL): 23.11 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Peristaltic / Dedicated tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2.7L Starting PSI = (½ WL + 20): —

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 36.66 ft below MP Water Height (H): ~~ft below MP~~ Casing Radius (r): _____ ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: _____ gal Required Run Time: _____ min/ hr

H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1006	23.11	0.095	start pump for flow/purge rate						
1012	23.41	0.095	0.57	8.1	6.71	95.7	5.14	1620	2.72
1017	23.41	0.095	0.87	8.4	6.70	94.6	3.17	1624	1.44
1022	23.41	0.05	1.12	8.5	6.69	93.7	3.22	1634	1.69
1027	23.41	0.05	1.37	8.4	6.68	93.6	3.48	1635	1.16
1032	23.41	0.05	1.62	8.4	6.68	93.4	3.33	1632	1.67
1037	23.41	0.056	1.87	8.3	6.67	93.6	3.74	1638	1.53
1042	23.41	0.056	2.15	8.3	6.66	93.4	3.70	1631	2.10
1047	23.41	0.056	2.71	8.4	6.66	93.3	3.72	1635	2.12
~~1052~~									
~~1057~~									
~~1102~~									

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1047	23.41	0.056	2.71	8.4	6.66	93.3	3.72	1635	2.12

SAMPLE ID: 1504 GWMW15A - F, U **TIME:** 1050

Final Low Flow Sampling Settings: PSI: — Charge: — sec Exhaust: — sec

WELL SAMPLING FORM

Page: 1 of ____

Project No.: 10506883.010102 Client: P4 Spring 2015 Date: 4/19/15 Well ID: SB07

Task: Groundwater Sampling Field Crew: A. Pettley J. Pierson

Measuring Point (MP): TOC N Water Level (WL): 41.23' ft below MP

Sampling Method (see applicable calculations below): Purge and sample Device: Bailer

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

43.5 - 41.23 = 2.27

Total Depth (TD): 43.5 ft below MP Water Height (H): 2.27 ft ~~below MP~~ Casing Radius (r): 0.083 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 3(3.1415 (0.083')^2(2.27') 7.48 = 0.37 gal (3) = 1.11 gal = 4.2L gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1636	Bailer	–	4.2	11.7	7.17	84.9	0.69	881	6.80
1657	41.45	Recovered >80%							
Continue stabilization readings on additional pages if necessary									

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)

SAMPLE ID: 1504-SB07 **TIME:** 1700

Final Low Flow Sampling Settings: PSI: – Charge: – sec Exhaust: – sec

Pace Analytical™ ~~Wait~~ microbac
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Monsanto Co.	Report To:	Molly Prickett	Attention:	~~Accounts Payable~~ Betty VanPelt
Address:	1853 Highway 34	Copy To:		Company:	MWH ~~Monsanto Co.~~
	Soda Springs, ID 83276			Address:	2890 E. Cottonwood Pkwy 300
Email To:	~~rachel.a.roskelley@monsanto.com~~	Purchase Order No.:	~~4511169352~~	~~Pace Quote Reference~~	SLC UT 84124
Phone:	208-547-1248 Fax:	Project Name:	~~Blackfoot Bridge SW~~	Pace Project Manager:	~~Lori Castille~~ 801-617-3200
Requested Due Date/TAT:	~~7 business days~~ Standard	Project Number:	~~Profile 2~~	~~Pace Profile #:~~	~~26709~~

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Filtered (Y/N)

Requested Ana

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL WP
WIPE	AR
AIR	OT
OTHER	TS
TISSUE	

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	pH, Conductivity, Alkalin	Total Metals (Se only)	Diss Metals plus Mercur	Chloride, Fluoride, Sulfa	Nitrate, Nitrite, N+N	Ammonia	Total Phosphorous	TSS, TDS	Cation/Anion Balance
1	1504-SB07 *	W	G	4/19/15	1700																		X			
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										

Additional Comments:

Total Metals: Se only

Diss Metals to include: Al, As, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Se, Zn
Ca, Mg, K, Na, Hardness

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[signature]	4/20/15	1200	Fed EX		

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM / DD / YY)

* PCE only 8260B

e-File(ALLQ020rev.3,31Mar05))22Jun2005

Pace Analytical™ microbac
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:

Company:	Monsanto Co.
Address:	1853 Highway 34
	Soda Springs, ID 83276
Email To:	rachel.a.roskelley@monsanto.com
Phone:	208-547-1248 Fax:
Requested Due Date/TAT:	7 business days

Section B Required Project Information:

Report To:	Molly Prickett
Copy To:	
Purchase Order No.:	4511169352
Project Name:	Blackfoot Bridge SW
Project Number:	Profile 9

Section C Invoice Information:

Attention:	~~Accounts Payable~~ Betty Vanlett
Company:	MWH ~~Monsanto Co.~~
Address:	2890 E. Cottonwood Pkwy #3
Pace Quote Reference:	SLC UT 84121
Pace Project Manager:	Lori Castille 801-617-3200
Pace Profile #:	26709

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_ID

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL WP
WIPE	AR
AIR	OT
OTHER	TS
TISSUE	

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	pH, Conductivity, Alkalinity	Total Metals plus Mercury	Diss Metals plus Mercury	Chloride, Fluoride, Sulfate 200.0	N+N	Ammonia	Total Phosphorous	TSS, TDS E160.1	Cation/Anion Balance	Pace Project No. Lab I.D.
1	1504GWMBW087-U	W	G	4/16/15	1135														X						X		
2	1504GWMBW087-F				1135															X	X						
3	1504GWMBW028-U			4/17/15	0940														X						X		
4	1504GWMBW028-F				0940															X	X						
5	1504GWMW15A-U				1050														X						X		
6	1504GWMW15A-F				1050															X	X						
7	1504GWMBW131-U			4/18/15	1000														X						X		
8	1504GWMBW131-F				1000															X	X						
9	1504GWMBW048-U				1135														X						X		
10	1504GWMBW048-F				1135															X	X						
11	1504GWMBW130-U				1215														X						X		
12	1504GWMBW130-F				1215															X	X						
13	1504GWMBW135-U			4/19/15	1535														X						X		
14	1504GWMBW135-F				1535															X	X						
15																											

Additional Comments:

Total Metals: Al, As, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Se, Zn SW6020A

Diss Metals to include: Al, As, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Se, Zn 6020A

Ca, Mg, K, Na, Hardness

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[illegible]	4/20/15	1200	FedEx		

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM / DD / YY)

e-File(ALLQ020rev.3,31Mar05))22Jun2005

Pace Analytical™ microbac
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 4

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Monsanto Co.	Report To:	Molly Prickett	Attention:	Betty VanPett ~~Accounts Payable~~
Address:	1853 Highway 34	Copy To:	~~Matt Wright~~	Company:	MWH ~~Monsanto Co.~~
	Soda Springs, ID 83276			Address:	2890 E. Cottonwood Pkwy 300
Email To:	molly.prickett@monsanto.com	Purchase Order No.:	~~4511169352~~	~~Pace Quote Reference:~~	SLC UT 84121
Phone:	208-547-1248	Project Name:	~~Blackfoot Bridge POC~~	~~Pace Project Manager:~~	~~Lori Castille~~
Requested Due Date/TAT:	Standard ~~7 business days~~	Project Number:	~~Profile 8~~	~~Pace Profile #:~~	~~26709~~

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Filtered (Y/N)

Requested Ana

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	pH/Cond/Alkalinity	TDS, TSS	Chloride, Fluoride, Sulfa	Total Metals	Diss Metals	Diss Hardness
1	1504SWMDS026-U	W	G	4/16/15	1230														X		X		
2	1504SWMDS026-F				1230															X		X	X
3	1504SWMST274-U				1330														X		X		
4	1504SWMST274-F				1330															X		X	X
5	1504SWMST143-U				1415														X		X		
6	1504SWMST143-F				1415															X		X	X
7	1504SWMST132-2-U				1515														X		X		
8	1504SWMST132-2-F				1515															X		X	X
9	1504SWMST132-1-U				1525														X		X		
10	1504SWMST132-1-F				1525															X		X	X
11	1504SWMST131-U				1600														X		X		
12	1504SWMST131-F				1600															X		X	X
13	1504SWMST128-U				1630														X		X		
14	1504SWMST128-F				1630															X		X	X
15	1504SWMST067-U			4/17/15	0840														X		X		

Additional Comments:

6020A
Total Metals include: Al, Sb, Cd, Cr, Fe, Mn, Ni, Se, Zn

Diss Metals to include: Al, Sb, Ca, Cd, Cr, Fe, K, Mg, Mn, Na, Ni, Se, Zn

Ca, Mg 6010C
Cd, Se 6020A

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[signature]	4/20/15	1200	FedEx		

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM / DD / YY)

Pace Analytical™ Microbac
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company:	Monsanto Co.
Address:	1853 Highway 34
	Soda Springs, ID 83276
Email To:	rachel.a.roskelley@monsanto.com
Phone: 208-547-1248 Fax:	
Requested Due Date/TAT:	7 business days standard

Section B Required Project Information:

Report To:	Molly Prickett
Copy To:	
Purchase Order No.:	4511169352
Project Name:	Blackfoot Bridge SW
Project Number:	Profile 2

Section C Invoice Information:

Attention:	Accounts Payable Betty Vanlett
Company:	MWH Monsanto Co.
Address:	2890 E. Cottonwood Pkwy 300 SLC UT 84121
Pace Quote Reference:	
Pace Project Manager:	Lori Castille
Pace Profile #:	26709

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL WP
WIPE	AR
AIR	OT
OTHER	TS
TISSUE	

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Filtered (Y/N)	pH, Conductivity, Alkalin.	Total Metals (Se only)	Diss Metals plus Mercur.	Chloride, Fluoride, Sulfa.	Nitrate, Nitrite, N+N	Ammonia DISS Hardness	Total Phosphorous	TSS, TDS E340	Cation/Anion Balance E1100.1	
1	1504SWMST067-F	W	G	4/17/15	1840															X	X		X					
2	1504SWMST095-U				1425														X						X			
3	1504SWMST095-F				1425															X	X		X					
4	1504SWMSG006-U				1510														X				X		X			
5	1504SWMSG006-F				1510															X	X		X					
6	1504SWMSG007-U				1525														X						X			
7	1504SWMSG007-F				1525															X	X		X					
8	1504SWMST096-U				1610														X				X		X			
9	1504SWMST096-F				1610															X	X		X					
10	1504SWMST092-U			4/18/15	1345														X						X			
11	1504SWMST092-F				1345															X	X		X					
12	1504SWMST089-U				1345														X						X			
13	1509SWMST089-F				1345															X	X		X					
14	1509SWMST089-U-MS				1350														X						X			
15	1509SWMST089-F-MS				1350															X	X		X					

Additional Comments:

Total Metals: Se only 6020A

Diss Metals to include: Al, As, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Se, Zn

Ca, Mg, K, Na, Hardness

Ca, Mg 6010C
Cd, Se 6020A

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[illegible]	4/20/15	1200	FedEx		

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER:
SIGNATURE of SAMPLER: DATE Signed (MM / DD / YY)

Pace Analytical™ microbac
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company:	Monsanto Co.
Address:	1853 Highway 34
	Soda Springs, ID 83276
Email To:	rachel.a.roskelley@monsanto.com
Phone: 208-547-1248 Fax:	
Requested Due Date/TAT:	~~7 business days~~ standard

Section B Required Project Information:

Report To:	Molly Prickett
Copy To:	
Purchase Order No.:	~~4511169352~~
Project Name:	~~Blackfoot Bridge SW~~
Project Number:	Profile 2

Section C Invoice Information:

Attention:	Accounts Payable Beth VanPelt
Company:	~~Monsanto Co.~~ MWH
Address:	2890 E. Cottonwood Pkwy 380 SLC UT 84121
~~Pace Quote Reference~~	
~~Pace Project Manager:~~	~~Lori Castille~~ 8016173200
~~Pace Profile #:~~	~~26709~~

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL WP
WIPE	AR
AIR	GT
OTHER	TS
TISSUE	

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Filtered (Y/N)	pH, Conductivity, Alkalin.	Total Metals (Se only)	Diss Metals plus Mercur.	Chloride, Fluoride, Sulfa.	Nitrate, Nitrite, NH3N	Ammonia	Total Phosphorous	TSS, TDS	Cation/Anion Balance
1	1504SWMST089-U-MSD	W	G	04/18/15	1400															X						X	
2	1504SWMST089-F-MSD				1400																X	X		X			
3	1504SWMST090-U				1440															X						X	
4	1504SWMST090-F				1440																X	X		X			
5	1504SWMST069-U				1540															X						X	
6	1504SWMST069-F				1540																X	X		X			
7	1504SWMST226-U				1615															X						X	
8	1504SWMST226-F				1615																X	X		X			
9	1504SWMDS034-U			04/19/15	0915															X						X	
10	1504SWMDS034-F				0915																X	X		X			
11	1504SWMST044-U				1010															X						X	
12	1504SWMST044-F				1010																X	X		X			
13	1504SWMST045-U				1100															X						X	
14	1504SWMST045-F				1100																X	X		X			
15	1504SWMST063-U				1245															X						X	

Requested Ana

Additional Comments:

Total Metals: Se only 6020A

Diss Metals to include: Al, As, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Se, Zn
Ca, Mg, K, Na, Hardness

Ca, Mg 6010C
Cd, Se 6020A

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[illegible]	4/20/15	1200	FedEx		

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER:
SIGNATURE of SAMPLER: DATE Signed (MM / DD / YY)

Pace Analytical™ microbac
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company:	Monsanto Co.
Address:	1853 Highway 34
	Soda Springs, ID 83276
Email To:	rachel.a.roskelley@monsanto.com
Phone: 208-547-1248 Fax:	
Requested Due Date/TAT:	~~7 business days~~ Standard

Section B Required Project Information:

Report To:	Molly Prickett
Copy To:	
Purchase Order No.:	4511469352
Project Name:	Blackfoot Bridge SW
Project Number:	Profile 2

Section C Invoice Information:

Attention:	Accounts Payable Betty VanPelt
Company:	MWH ~~Monsanto Co.~~
Address:	2890 E. Cottonwood PKW 300 SLC UT 84121
Pace Quote Referenc	
Pace Project Manager:	Lori Castille 801-1017-3200
Pace Profile #:	26709

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL WP
WIPE	AR
AIR	OT
OTHER	TS
TISSUE	

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED DATE	COLLECTED TIME	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analyses: pH, Conductivity, Alkalin.	Total Metals (Se only)	Diss Metals plus Mercury	Chloride, Fluoride, Sulfate	Nitrate, Nitrite, N-N	Ammonia	Total Phosphorous	TSS, TDS	Cation/Anion Balance	Filtered (Y/N)
1	1504SWMST063-F	W	G	04/19/15	1245																X	X		X					
2	1504SWMST063-U +MS/MSD				1245															X						X			
3	1504SWMST063-F +MS/MSD				1245																X	X		X					
4	~~1504SWMST075-U~~ 1504SWMST057-U				1345															X						X			
5	1504SWMST057-F				1345																X	X		X					
6	1504SWMST050-U				1440									X						X						X			
7	1504SWMST050-F				1440																X	X		X					
8																													
9																													
10																													
11																													
12																													
13																													
14																													
15																													

Requested Ana

Additional Comments:

Total Metals: Se only 6020A

Diss Metals to include: Al, As, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Se, Zn

Ca, Mg, K, Na, Hardness

Ca, Mg 6010C
Cd, Se 6020A

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[illegible]	4/21/15	1300	FedEx		

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM / DD / YY)

Pace Analytical™ www.pacelabs.com

Microbac
Email to: betty.vanpelt@mwhglobal.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 3

Section A Required Client Information:

Company:	Monsanto Co.
Address:	1853 Highway 34
	Soda Springs, ID 83276
Email To:	~~rachel.a.roskelley@monsanto.com~~
Phone: ~~208-547-1248~~	Fax:
Requested Due Date/TAT:	7 business days

Section B Required Project Information:

Report To:	Molly Prickett
Copy To:	
Purchase Order No.:	~~4511169352~~
Project Name:	~~S. Rasmussen/Bollar~~
Project Number:	~~Profile 3~~

Section C Invoice Information:

Attention:	Accounts Payable
Company:	Monsanto Co.
Address:	
Pace Quote Referenc	
Pace Project Manager:	~~Lori Castille~~
Pace Profile #:	~~26709~~

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL WP
WIPE	AR
AIR	OT
OTHER	TS
TISSUE	

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Filtered (Y/N)	Requested Analysis: pH, Conductivity, Alkalin.	Total metals Cd Mn Se	Diss Metals Se	Chloride, Fluoride, Sulfate	TDS (E160.1)
1	1504GWMMW018-F	W	G	4/17/15	1415			8.9												X	X		
2	1504GWMMW018-U-MS				1420			8.9											X			X	
3	1504GWMMW018-F-MS				1420			8.9												X	X		
4	1504GWMMW018-U-MSD				1425			8.9											X			X	
5	1504GWMMW018-F-MSD				1425			8.9												X	X		
6	1504GWMMW032-U				1540			7.1											X			X	
7	1504GWMMW032-F				1540			7.1												X	X		
8	1504GWMMW029-U			4/18/15	0950			8.4											X			X	
9	1504GWMMW029-F				0950			8.4												X	X		
10	1504GWMMW033-U				1055			6.8											X			X	
11	1504GWMMW033-F				1055			6.8												X	X		
12	1504GWMBW032-1-U				1220			5.5											X			X	
13	1504GWMBW032-1-F				1220			5.5												X	X		
14	1504GWMBW032-2-U				1225			5.5											X			X	
15	1504GWMBW032-2-F				1225			5.5												X	X		

Additional Comments:

Total Metals include: ~~Al, Sb, Ca, Cd, Cr, Fe, K, Mg, Mn, Ni, Se, Zn~~

Diss Metals to include: ~~Al, Sb, Ca, Cd, Cr, Fe, K, Mg, Mn, Na, Ni, Se, Zn~~

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[illegible]	4/20/15	1200	FEDEX		

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM / DD / YY)

Pace Analytical™ www.pacelabs.com

Microbac
Email to: Betty.vanpelt@mwhglobal.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company:	Monsanto Co.
Address:	1853 Highway 34
	Soda Springs, ID 83276
Email To:	rachel.a.roskelley@monsanto.com
Phone:	208-547-1248
Requested Due Date/TAT:	7 business days

Section B Required Project Information:

Report To:	Molly Prickett
Copy To:	
Purchase Order No.:	4511169352
Project Name:	S. Rass HOA Operational
Project Number:	Profile 6

Section C Invoice Information:

Attention:	Accounts Payable
Company:	Monsanto Co.
Address:	
Pace Quote Reference	
Pace Project Manager:	Lori Castille
Pace Profile #:	26709

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Section D Required Client Information

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL WP; WIPE AR; AIR OT; OTHER TS; TISSUE

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE)	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Filtered (Y/N)	pH, Alk, cond, TDS	Sulfate, Chloride, Fluoride	Total Metals plus Mercury	Diss Metals plus Mercury	Nitrat+Nitrite	Requested Analysis	Pace Project No. Lab I.D.
1	1504GWMMW026-U	W	G	4/16/15	1100			10.2		X	X	X							X		X				
2	1504GWMMW026-F			4/16/15	1100		10.2	~~8.1~~												X		X			
3	1504GWMMW007-U			4/16/15	1340			8.1											X		X				
4	1504GWMMW007-F			4/16/15	1340			8.1												X		X			
5	1504GWMBW099-U			4/17/15	0810			4.8											X		X				
6	1504GWMBW099-F				0810			4.8												X		X			
7	1504GWMMW006-U				1150			9.7											X		X				
8	1504GWMMW006-F				1150			9.7												X		X			
9	1504GWMMW020-U				1315			9.3											X		X				
10	1504GWMMW020-F				1315			9.3												X		X			
11	1504GWMMW020-U-MS				1320			9.3											X		X				
12	1504GWMMW020-F-MS				1320			9.3												X		X			
13	1504GWMMW020-U-MSD				1325			9.3											X		X				
14	1504GWMMW020-F-MSD				1325			9.3												X		X			
15	1504GWMMW018-U				1415			8.9											X		X				

Preservatives: Unpreserved; H_2SO_4; HNO_3; HCl; NaOH; $Na_2S_2O_3$; Methanol; Other

Requested Analysis: pH, Alk, cond, TDS; Sulfate, Chloride, Fluoride; Total Metals plus Mercury; Diss Metals plus Mercury; Nitrat+Nitrite; Cd, Mn, Se

Additional Comments:

Total Metals to include: ~~Al, Sb, As, Ba, Be, Cd, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Ni, K, Se, Ag, Na, Tl, Zn~~ Cd, Mn, Se

Diss Metals to include: ~~Al, Sb, As, Ba, Be, Cd, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Ni, K, Se, and Hardness~~

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[illegible]	4/20/15	1200	FedEx		

SAMPLE CONDITIONS: Temp in °C; Received on Ice Y/N; Custody Sealed Cooler Y/N; Samples Intact Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM / DD / YY)

Pace Analytical™ www.pacelabs.com

Microbac

Email to: betty.van pelt@mwhglobal.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company:	Monsanto Co.
Address:	1853 Highway 34
	Soda Springs, ID 83276
Email To:	~~rachel.a.roskelley@monsanto.com~~
Phone: ~~208-547-1248~~	Fax:
Requested Due Date/TAT:	~~7 business days~~

Section B Required Project Information:

Report To:	Molly Prickett
Copy To:	
Purchase Order No.:	~~4514169352~~
Project Name:	~~S. Rasmussen/Bollar~~
Project Number:	~~Profile 3~~

Section C Invoice Information:

Attention:	Accounts Payable
Company:	Monsanto Co.
Address:	
Pace Quote Referenc	
Pace Project Manager:	~~Lori Castille~~
Pace Profile #:	26709

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Filtered (Y/N)

Requested Ana

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL WP
WIPE	AR
AIR	OT
OTHER	TS
TISSUE	

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE)	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	pH, Conductivity, Alkalin:	Total metals Cd Mn Se	Diss Metals	Chloride, Fluoride, Sulfate	TDS (E 160.1)
1	1504GWMMW030-U	W	G	4/13/15	1410			10.4											X			X
2	1504GWMMW030-F				1410			10.4												X	X	
3	1504GWMMW009-U				1630			9.2											X			X
4	1504GWMMW009 ~~2U~~ -F				1630			9.2												X	X	
5	1504GWMMW010-U				1740			8.7											X			X
6	1504GWMMW010-F				1740			8.7												X	X	
7	1504GWMMW022-U			4/14/15	1115			8.4											X			X
8	1504GWMMW022-F				1115			8.4												X	X	
9	1504GWMMW028-1-U				1235			8.2											X			X
10	1504GWMMW028-1-F				1235			8.2												X	X	
11	1504GWMMW028-2-U				1240			8.2											X			X
12	1504GWMMW028-2-F				1240			8.2												X	X	
13	1504GWMMW011-U				1355			10.9											X			X
14	1504GWMMW011-F				1355			10.9												X	X	
15	~~1504GWMMW023-U~~			~~1510~~	~~1505~~			~~9.4~~											X			X

Additional Comments:

Total Metals include: ~~Al, Sb, Ca,~~ Cd, ~~Cr, Fe, K, Mg,~~ Mn, ~~Ni,~~ Se, ~~Zn~~

Diss Metals to include: ~~Al, Sb, Ca, Cd, Cr, Fe, K, Mg, Mn, Na, Ni,~~ Se, ~~Zn~~

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[illegible]	4/20/15	1200	FedEx		

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM / DD / YY)

Pace Analytical™ Microbac Lab
www.pacelabs.com
Email to: betty.vanpelt@mwhglobal.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 2

Section A Required Client Information:

Company:	Monsanto Co.
Address:	1853 Highway 34
	Soda Springs, ID 83276
Email To:	rachel.a.roskelley@monsanto.com
Phone: ~~208-547-1248~~ Fax:	
Requested Due Date/TAT:	7 business days

Section B Required Project Information:

Report To:	Molly Prickett
Copy To:	
Purchase Order No.:	~~4511169352~~
Project Name:	~~S. Rasmussen/Bollar~~
Project Number:	~~Profile 3~~

Section C Invoice Information:

Attention:	Accounts Payable
Company:	Monsanto Co.
Address:	
Pace Quote Referenc	
Pace Project Manager:	~~Lori Castille~~
Pace Profile #:	~~26709~~

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL WP
WIPE	AR
AIR	OT
OTHER	TS
TISSUE	

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Filtered (Y/N)	pH, Conductivity, Alkali	Total metals Cd Mn Se	Diss Metals	Chloride, Fluoride, Sulfate	TDS	SO4 (E 160.1)			
1	1504GWMW16A-U	WG	G	4/13/15	1815			7.0												X			X				
2	1504GWMW16A-F			4/13/15	1815			7.0													X			X			
3	1504GWMBW006-U			4/14/15	1100			6.1												X			X				
4	1504GWMBW006-F			4/14/15	1100			6.1													X			X			
5	1504GWMMW024-U			4/14/15	1250			7.5												X			X				
6	1504GWMMW024-F			4/14/15	1250			7.5													X			X			
7	1504GWMMW034-1-U			4/14/15	1410			6.9												X			X				
8	1504GWMMW034-1-F			4/14/15	1410			6.9													X			X			
9	1504GWMMW034-2-U			4/14/15	1355			6.9												X			X				
10	1504GWMMW034-2-F			4/14/15	1355			6.9													X			X			
11	1504GWMMW013-U			4/14/15	1500			6.4												X			X				
12	1504GWMMW013-F			4/14/15	1500			6.4													X			X			
13	1504GWMMW021-U			4/15/15	1040			6.6												X			X				
14	1504GWMMW021-F			4/15/15	1040			6.6													X			X			
15	1504GWMMW031-U			4/15/15	1215			8.0												X			X				

Additional Comments:

Total Metals include: Al, Sb, Ca, Cd, Cr, Fe, K, Mg, Mn, Ni, Se, Zn

Diss Metals to include: Al, Sb, Ca, Cd, Cr, Fe, K, Mg, Mn, Na, Ni, Se, Zn

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[signature] MWH	4/16/15	0900			

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Aaron Pettley

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM / DD / YY): 4/16/15

Pace Analytical™ www.pacelabs.com

Microbac Lab
Email to: betty.vanpelt@mwhglobal.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 2

Section A Required Client Information:

Company:	Monsanto Co.
Address:	1853 Highway 34
	Soda Springs, ID 83276
Email To:	~~rachel.a.roskelley@monsanto.com~~
Phone:	~~208-547-1248~~
Requested Due Date/TAT:	7 business days

Section B Required Project Information:

Report To:	Molly Prickett
Copy To:	
Purchase Order No.:	~~4511169352~~
Project Name:	~~S. Ross HOA Operational~~
Project Number:	~~Profile 6~~

Section C Invoice Information:

Attention:	Accounts Payable
Company:	Monsanto Co.
Address:	
Pace Quote Referenc	
Pace Project Manager:	~~Lori Castille~~
Pace Profile #:	~~26709~~

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Section D Required Client Information

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW, WATER WT, WASTE WATER WW, PRODUCT P, SOIL/SOLID SL, OIL OL, WIPE WP, AIR AR, OTHER OT, TISSUE TS

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE)	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Filtered (Y/N)	pH, Alk, cond, TDS	Sulfate, Chloride, Fluoride	Total Metals plus Mercury	Diss Metals plus Mercury	Nitrate/Nitrite	Pace Project No. Lab I.D.
1	1504GWMMW031-F			4/15/15	1215			8.0		X	X	X								X	X			
2	1504GWMMW017-U			4/15/15	1400			4.1											X		X			
3	1504GWMMW017-F			4/15/15	1400			4.1												X		X		
4	1504GWMBW027-U			4/15/15	1445			5.6											X		X			
5	1504GWMBW027-F			4/15/15	1445			5.6												X		X		
6																								
7																								
8																								
9																								
10																								
11																								
12																								
13																								
14																								
15																								

Requested Ana

Additional Comments:

Total Metals to include: Al, Sb, As, Ba, Be, Cd, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Ni, K, Se, Ag, Na, Tl, Zn

Diss Metals to include: Al, Sb, As, Ba, Be, Cd, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Ni, K, Se, ~~and Hardness~~

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[signature] MWH	4/16/15	0900			

SAMPLE CONDITIONS

Temp in °C	Received on Ice Y/N	Custody Sealed Cooler Y/N	Samples Intact Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Aaron Pettley

SIGNATURE of SAMPLER: [signature] DATE Signed (MM / DD / YY): 4/16/15

Pace Analytical
www.pacelabs.com

microbac

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company:	Monsanto Co.
Address:	1853 Highway 34
	Soda Springs, ID 83276
Email To:	rachel.a.roskelley@monsanto.com
Phone: 208-547-1248	Fax:
Requested Due Date/TAT:	~~7 business days~~ Standard

Section B Required Project Information:

Report To:	Molly Prickett
Copy To:	
Purchase Order No.:	4511169352
Project Name:	S. Rasmussen/Bollar
Project Number:	Profile 3

Section C Invoice Information:

Attention:	Betty VanPelt ~~Accounts Payable~~
Company:	MWH ~~Monsanto Co.~~
Address:	2890 E. Cottonwood Pky #300 SLC UT 84121
Pace Quote Reference:	
Pace Project Manager:	~~Lori Castille~~
Pace Profile #:	~~26709~~

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL WP
WIPE	AR
AIR	OT
OTHER	TS
TISSUE	

Preservatives: Unpreserved, H_2SO_4, HNO_3, HCl, NaOH, $Na_2S_2O_3$, Methanol, Other

Requested Analyses: pH, Conductivity, Alkalin. / Total metals / Diss Metals / Chloride, Fluoride, Sulfa. / TDS / ~~Total Calcium~~ / ~~Diss Ca~~ / ~~Hardness~~ / ~~Sol~~

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	pH, Conductivity, Alkalin.	Total metals	Diss Metals	Chloride, Fluoride, Sulfa.	TDS	~~Total Calcium~~	~~Diss Ca~~	~~Hardness~~	~~Sol~~	
1	1504GWMBW085-U	W	G	4/14/15	1435																						
2	1504GWMBW085-F																						X		X		
3	1504GWMBW011-U			4/15/15	1500																	X		X			
4	1504GWMBW011-F				1500																		X		X		
5	1504GWMBW009-U				1625																	X		X			
6	1504GWMBW009-F				1625																		X		X		
7																											
8																											
9																											
10																											
11																											
12																											
13																											
14																											
15																											

Additional Comments:

Total Metals include: Al, Sb, Ca, Cd, Cr, Fe, K, Mg, Mn, Ni, Se, Zn

Diss Metals to include: Al, Sb, Ca, Cd, Cr, Fe, K, Mg, Mn, Na, Ni, Se, Zn

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[signature]	4/16/15	1000	Fed Ex		

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: [signature]

SIGNATURE of SAMPLER: [signature] DATE Signed (MM / DD / YY): 4/16/15

CHAIN OF CUSTODY RECORD/LAB WORK REQUEST

Chain of Custody ID —
Cooler Number —
Cooler ID
Page 2 of 3
Air Bill No.

LABORATORY microbac

MWH Phone: (801) 617-3200 Fax: (801) 617-4200
MWH Contact Betty VanPelt
Project Monsanto Spring 2015
Project Number 105068883.010102
Date Due Standard TAT
Samplers Signature EY TO
Samplers Name (Printed) [illegible]

Lab ID No. (Lab Only)	Sample ID	Date Collected	Time Collected	Sample Number	Matrix[a]	Sampling Technique[b]	Total Se SW6020A	Diss Ca, Se SW6020A	Diss Ca, Mg SW6010B	Diss SO4 E300.0	TDS E160.1	Diss. Hardness			
	1504SWMST069-U	04/13/15	1740	—	WS	G	X				X				
	1504SWMST069-F		1740					X	X	X		X			
	1504SWMST136-U	4/14/15	1045				X				X				
	1504SWMST136-F		1045					X	X	X		X			
	1504SWMST144-U		1140				X				X				
	1504SWMST144-F		1140					X	X	X		X			
	1504SWMDS025-U		1215				X				X				
	1504SWMDS025-F		1215					X	X	X		X			
	1504SWMST275-U		1320				X				X				
	1504SWMST275-F		1320					X	X	X		X			
	1504SWMST133-U		1515				X				X				
	1504SWMST133-F		1515					X	X	X		X			
	1504SWMSG005-U+MS/MSD	4/15/15	1030				X				X				
	1504SWMSG005-F+MS/MSD	4/15/15	1030					X	X	X		X			

[a] Matrix:
SO - Soil
SE - Sediment
WS - Surface Water
WG - Ground Water
LF - Product
AA - Air
SW - Wipe
EP/TCLP Leachate
WQ - Trip Blank
EB - Equipment Blanks
WW - Wastewater

[b] Sampling Technique:
Composite=C
Grab=G
Hand Auger=HA
Submersible Pump=SP
Bladder Pump=BP
Bailer=B
GeoProbe=PR

SPECIAL INSTRUCTIONS:

Relinquished by/Affiliation	Date	Time
[illegible]	4/16/15	1000

Received by/Affiliation	Date	Time
FedEx		

LABORATORY USE ONLY

SAMPLES WERE:
1 Shipped or hand delivered
Notes:
2 Ambient or Chilled
Notes:
3 Temperature _____
4 Received Broken/Leaking (Improperly Sealed)
Y N
Notes:
5 Properly Preserved
Y N
Notes:
6 Received Within Holding Times
Y N
Notes:

COC Tape Was:
1 Present on Outer Package
Y N NA
2 Unbroken on Outer Package
Y N NA
3 Present on Sample
Y N NA
4 Unbroken on Sample
Y N NA
Notes:

Discrepancies Between Sample Labels and COC Record?
Y N
Notes:

Pace Analytical™ microbac
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 3 of 3

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Monsanto Co.	Report To:	Molly Prickett	Attention:	Betty VanPelt ~~Accounts Payable~~
Address:	1853 Highway 34	Copy To:		Company:	MWH ~~Monsanto Co.~~
	Soda Springs, ID 83276			Address:	2890 E Cottonwood Pkwy #300 SLC UT 84121
Email To:	~~rachel.a.roskelley@monsanto.com~~	Purchase Order No.:	~~4511169352~~ Spring 2015 SW GW	Pace Quote Reference:	
Phone:	~~208-547-1248~~ Fax:	Project Name:	~~S. Rasmussen/Bollar~~	Pace Project Manager:	~~Lori Castille~~ 801-617-3200
Requested Due Date/TAT:	7 business days	Project Number:	~~Profile 3~~	Pace Profile #:	~~26709~~

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER_SPILL___

SITE LOCATION: ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Filtered (Y/N)

Requested Ana

Section D Required Client Information

SAMPLE ID
One Character per box.
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL WP
WIPE	AR
AIR	OT
OTHER	TS
TISSUE	

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	pH, Conductivity, Alkalinity	Total metals 6020A Se	Diss Metals 6020A Se, Se	Chloride, Fluoride, Sulfate	TDS E160.1	Diss. Hardness	Diss. Ca, Mg, Sr, Na, Cl		
1	1504SWMSG004-U	SW	G	04/15/15	1115														X			X				
2	1504SWMSG004-F				1115															X	X		X	X		
3	1504SWMDS030-1-U				1230														X			X				
4	1504SWMDS030-1-F				1230															X	X		X	X		
5	1504SWMDS030-2-U				1230														X			X				
6	1504SWMDS030-2-F				1230															X	X		X	X		
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										

Additional Comments:

Total Metals include: Al, Sb, Ca, Cd, Cr, Fe, K, Mg, Mn, Ni, Se, Zn

Diss Metals to include: Al, Sb, Ca, Cd, Cr, Fe, K, Mg, Mn, Na, Ni, Se, Zn

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[signature]	4/16/15	1000			

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: [signature]

SIGNATURE of SAMPLER: [signature] DATE Signed (MM / DD / YY): 4/16/15

e-File(ALLQ020rev.3,31Mar05))22Jun2005

Monsanto
Spring Sampling 2015

J. Pierson
A. Pettley

4/13/15

0700 MWH Monsanto team leaving Farmington for Soda Springs Idaho
Aaron, Joel, Emily, Tom.

0940 Arrived in Soda Springs to meet with Molly P. from Monsanto.

1000 Arrived at the Monsanto Plant to receive Safety training.

1150 Leaving for Ballard mine office

1218 At mine office to talk with Chris.

1245 Arrived at the Fox Ranch, start to unload equipment.

1345 Calibration
PRO DSS YSI Water Quality meter. # 4993
- pH 7 reading 6.94 @ 16.2 c No cal needed.
- model 10102030 P+ Series.
- pH 7 - 7.04 @ 16.2 c No cal
- SPC 1413 @ 16.2 c No cal (Pro DSS)
- SPC 1413 @ 16.3 c = 13.51 (Pro DSS)
- ORP 220 - @ 16.0 c 226.2 No cal
P+, Series.
- NTU 40 = 13.8 c = 50.5 Need cal.
- Professional plus = 16.4 c ORP 232.8 mV

Monsanto
Spring Sampling 2015

J. Pierson
A. Pettley

4/13/15

1420 Pro DSS 10102030 reading
- NTU 0 @ 0.9 NTUs No cal.
- NTU 40 @ 50.1 NTU No cal
- NTU 100 @ 100.5 NTUs No cal
- 79.8 % DO. 606.8 BP. Temp. 16.3 c

1530 Arrived at Degerstrom's Shop to pickup buggy wipes, wheel chalks, gas can, and 4.5 gal. of gas. Jerry Taylor provided material.

1640 Started work at MMW-030. DTW = 26.58'. Started pumping well

1646 Temp 9.1 c, pH 7.36, ORP 140.0, D.O. 9.0 mg/L, SPC 411.3, NTU's 14.7. Vol 2 L.

1650 Note: This well will not hold a low flow rate and has historically sampled by purge and sample method. This method will be used this sampling event as well.

1715 Leaving well MMW030, still purging.

1725 Arrived at MW-16A DTW = 9.95,

1735 Starting parameters will not sustain flow rate to meet low flow criteria. pH 7.44, temp 6.7 c, ORP -78.8, D.O. 0.29, SC 1546, NTU 1.5,

J. Peirson
A. Pettley

4/13/15

1755 Water levels stabilize at 11.2 ft from TOC south at a flow rate of 0.14 L/min

1810 Dtw 11.19 ft Purge Rate 0.14 L/min
Purge Vol 6.2 L Temp 7.0°C
pH 7.15 ORP -58.5 mV
DO 0.17 mg/L SPC 1744 µS/cm
Turbidity 1.2 NTU

1840 Sign out from mine office

2130 Leave for Ballard area MMW-030
still purging from earlier today.

2210 Arrived at MMW-030. pump not pumping batt. dead on controller. Halt purge for the evening.

J. Peirson
A. Pettley

4/14/15

0715 Checking calibration for instrument YSI, Pro DSS #4993

- pH 4 reading = 3.97 @ 19.7°C No cal made
- pH 7 reading = 7.04 @ 19.9°C no cal made
- pH 10 reading = 10.07 @ 20.1°C no cal made
- SPC 1413 = 1415 @ 19.7°C Cal'd to 1413
- ORP 220 = 219.5 @ 20.2°C no cal
- NTU "0" = 0.0 @ 10.1°C no cal
- NTU 40 = 51 @ 19.3°C no cal.
- NTU 100 = 100.5 @ 19.3°C no cal

Baro 29.80" Hg = 756 mm Hg
DO, 7.49 mg/L

0840 Arrived at Monsanto Mine office to sign in.

0920 Arrived at the Digerstrom stop to talk w/ Jerry about road maint. near MMW 025. Also load (1) Nitrogen tank in truck.

1000 At MMW 030 DtW = 73.08'
Set up nitrogen tank and geocontrol 2
Start purge

1030 At MBW 006 DtW = 7.85'

1035 Start geo pump, begining parameters = Temp 7.2°C, pH 7.73, ORP 223.9, D.O. 8.2, SC 1187, NTU 1.5, flow .25 L/min,

Monsanto
2015 Sampling
Spring

Cloudy, Windy ~55°F
J. Pierson
A. Pettley

4/14/15

1055 Final readings 7.95' ~~bgs~~ gp below TOC N
0.25 L/min 5.25 L purged 6.1 °C
pH 6.98 228.4 mV DO 8.13 mg/L
SPC 1197 µS/cm Turbidity 1.4 NTU
1100 Sample 1504GWMBW006-U,F
1115 At MMW030; retrieve geocontrol
1130 At ranch shop; drop off broken geocontrol at ranch shop; RMA 81668; Unit # 1012107-3
1200 No access to MMW025 and MMW007
1215 At MMW024; DtW 61.38' below TOC
1220 Compressor on
1225 61.37' BTOC 0.8 L/min 3.5 L total
Temp 7.5°C pH 7.25 ORP 131.0 mV
DO 3.14 mg/L SPC 835 µS/cm Turb. 11.0 NTU
1245 61.42' below TOC 0.9 L/min 21.5 L total
Temp 7.5°C pH 7.01 ORP 155.3 mV
DO 2.97 mg/L SPC 838 µS/cm Turb 1.2 NTU
1250 Sample 1504GWMMW024-U,F
1305 At MMW034 DtW 12.91' below TOC
1311 ~~Begin~~ gp Compressor on
1315 beginning parameters = Temp 7.6°C, pH 7.~~13~~ 39, ORP ~~-41.9~~ -54.8, D.O. ~~7.79~~ 3.01, SPC 625, NTUs 1.1
Vol 1.0 L.
1405 Ending parameters DtW 13.10' below TOC Purge Rate 0.35 L/min
16.75 L total Temp 6.9°C pH 6.98 ORP 210.7 mV
DO 8.84 mg/L SPC 621 µS/cm Turb. <5

Monsanto
2015 Spring
Sampling

34°F Snow
J Pierson
A. Pettley

4/14/15
~~toll~~ gp

1410 Collect 1504GWMMW034-1-U,F and 1504GWMMW034-2-U,F (time stamp 1355)
1420 At MMW013; DtW 4.25' below TOC
1430 Compressor on
1435 Beginning parameters DtW 4.33' below TOC 0.8 L/min
Purge rate 0.8 L/min Temp 6.7°C pH 6.78
ORP 218.5 mV DO 10.38 mg/L SPC 653 Turb. 2.8 NTU
1455 Ending parameters DtW 4.38' below TOC 0.8 L/min
Temp 6.4°C pH 6.66 ORP 222.5 mV
DO 10.36 mg/L SPC 651 µS/cm Turb. 3.2 NTU
1500 Collect 1504GWMMW013-U,F
1530 Swap out radio at mine office
1555 At MMW032 DtW 22.00' below TOC
1557 Compressor on
1600 Starting parameters at MMW032
Temp 6.2°C, pH 7.21, ORP 193.8, D.O. 5.67, SPC 377.7, NTUs 1.5, 8 L @ 2.2 L/min.
Note: this well purges dry, see historical data. Purge/sample method.
1702 MMW032 purged dry; ≈ 95 L total volume removed
1725 At MMW030 DtW 90.00' below TOC
Set up bladder pump and nitrogen tank
1745 Sign out at mine office

J. Pierson,
A. Pettley

4/14/15

2030 At MMW030

2033 DtW 153.25' below TOC

Well pumped dry; geocontrol removed from site.

J. Pierson
A. Pettley

4/15/15

0650 Checking calibration on YSI Pro DSS # 4993.

- D.O. reading 7.38 mg/L / 759.5 mmHg @ 19.5°C
  - Baro = 30.00 "Hg. ~~at~~ no calibrated to 762 mmHg. New reading 7.34 mg/L D.O.
- NTU 0 @ 18.8° reading 0.0 no cal needed.
- NTU 40 reading = 50.0 @ 19.0°C no cal.
- NTU 100 reading = 95.6 no cal needed
  NTU off slope by 5 NTUs per cal. Solution.
- pH 4 reading = 3.95, calibrated to 4.00, No reading 3.99 @ 16.0°C.
- pH 7 reading = 7.05 calibrated to 7.00 New reading 7.00 @ 16.0°C
- pH 10 reading = 10.01, accept cal at 10.00 - 19.8°C - good.
- SpC mS reading = 1410 @ 20°C no cal.
- ORP 220 reading = 220.5 @ 20°C no cal

0820 At farm shop to pick up sample bottles

0830 Sign in to mine office

0905 At MMW021 DtW 211.78' below TOC

Fitting for bladder pump broke; cut off end of tubing and replaced fitting

0935 compressor connected/on

Monsanto
2015 spring
Sampling

24°F snow
J. Pierson
A. Pettley

4/15/15

0945 Begining parameters = Temp 6.1°C,
pH 7.83, ORP 162.2, D.O. 7.33, SPC 623,
Turb 43.2, 1.5 L, .3 L/min DtW = 211.89
1036 Ending parameters Temp 6.6°C
pH 7.04 ORP 198.8 mV DO 5.78 mg/L SPC 626
Turb. 1.7 NTU 16.5 L 0.3 L/min DtW 211.83' to TOC
1105 At MMW031 DtW 98.68' below TOC
1110 Compressor connected/on
1115 Starting MMW031 parameters = Temp 7.6°C
pH 7.77 ORP 164.9 mV DO 8.91 mg/L SPC 254.6 µS/cm
Turb. 2.2 NTU 1.5 L 0.45 L/min DtW 98.78'
1210 Ending parameters Temp 8.0°C pH 7.43
ORP 200.9 mV DO 8.59 mg/L SPC 254.1 µS/cm
Turb <5 NTU 32.8 L 0.45 L/min DtW 98.82
1215 Collect sample 1504GWMMW031-U,F
Note 1040 Collected sample 1504GWMMW021-U,F
1240 At MMW017; DtW 39.86' below TOC
1245 Compressor connected/on
1250 Beginning parameters = Temp 6.6°C pH 6.51
ORP 236.4 mV DO 6.69 mg/L SPC 1383 µS/cm
Turb. 1.3 NTU 1.2 L 0.7 L/min DtW 40.15' below TOC
1400 Ending parameters = Temp 4.1°C pH 6.38
ORP 217.4 mV DO 6.58 mg/L SPC 1394 µS/cm
Turb. 1.4 NTU 4.52 L 0.025 L/min DtW 40.13 below TOC
1400 Collect sample 1504GWMMW017-U,F

Monsanto
2015 Spring
Sampling

32°F cloudy
J. Pierson
A. Pettley

4/15/15

1410 At MBW027; DtW 11.37' below TOC N
1420 Beginning parameters; Temp 5.5°C pH 6.79
ORP 205.4 mV DO 7.92 mg/L SPC 1277 µS/cm
Turb. 6.2 NTU 0.5 L ~~0.01~~ 0.1 L/min
11.64 ft below TOC
Note; 1415 Emily K called to note that
~~MBW0~~ MBW135 was purged dry.
1440 Ending parameters; Temp 5.6°C pH 6.79
ORP 199.6 mV DO 7.53 mg/L SPC 1240 µS/cm
Turb 1.9 NTU 2.45 L 0.1 L/min 11.65 ft below TOC
1445 Collect sample 1504GWMBW027-U,F
1515 To Daegerstrom Shop; Load Nitrogen tanks
1600 Discuss access to MMW025;
1630 At mine office to check out

Monsanto sampling

J Peirce
A Pettey

4/16/15

0650 Calibration check on YSI, PRO DSS, #4993

- D.O. reading 7.40 mg/L @ 19.5 and 766.4 "Hg No cal. Needed BARO is correct.
- pH 4 reading 3.99 @ 19.9°C, No cal Needed
- pH 7 reading 7.03 @ 12.2°C, No Cal. Needed.
- pH 10 reading = 10.7 @ 19.8°C no cal Need
- SPC 1413 reading = 1411 @ 20.0°C No cal Needed
- ORP 220mV reading = 220.2 @ 20.2°C No cal. Need
- 0 NTU reading = 0.0 NTU @ 20.4°C
- 40 NTU reading = 49.5 - No cal. Has read so historically
- 100 NTU reading = 92.9 NTU @ 20.1°C Need cal.
- Calibrated NTU 0 to 0 now reading = reading 0.0 NTU
- cal 124 NTU reading 126 cal to 124 - reading 124. finished cal.

0830 Check in at mine office and pick up radio

0900 At ~~Dagerstrom~~ Rasmussen Valley; No Access to MMW025 and MMW007

0910 At Dagerstrom shop; discuss digging out access road

0930 At MMW026; Combination lock cut

0945 DtW 286.72' from TOC

0953 ~~Compr~~ Nitrogen attached/on

1000 Water not able to make it past tubing; replace fitting on connection to bladder pump

1015 Starting parameters; Temp 8.7°C pH 8.45
ORP -74.5mV DO 0.84 mg/L SPC 419 mS/cm
Turb. 1.3 NTU 0.5L 0.8 L/min DtW 286.86' below TOC

1055 Ending parameters; Temp 10.2°C pH 7.49
ORP 69.5mV DO 0.10 mg/L SPC 418.9 mS/cm
Turb. 1.8 NTU 29 L 0.65 L/min
DtW 286.73' below TOC

1115 At MMW~~025~~ 007 DtW 35.84' below ~~TOC At~~ top of gray disk

1130 Compressor connected/on
Starting parameters; Temp 7.8°C pH 7.28
ORP 146.4mV DO 2.02 mg/L SPC 221.4 mS/cm
Turb 3.1 NTU 2 L 0.9 L/min
DtW 36.55' below ~~TOC At~~ top of gray disk

1325 DtW 70.60' below TOC; switch to low flow sampling method

Note: 1100 Collect sample 1504GWMMW026-U,F

1335 Ending parameters Temp 8.1°C pH 6.83
ORP 173.0mV DO 2.11 mg/L SPC 223.2 mS/cm
Turb. 3.1 NTU 99.0 L 0.09 L/min
DtW 70.59' below ~~TOC~~ top of gray disk

1340 Collect sample 1504GWMMW~~025~~ 007 -U,F

1410 At MMW025; DtW 29.10' below ~~TOC~~ top of gray disk

1430 Beginning parameters; Temp 7.7°C pH 7.79
ORP 168.3 DO 1.35 SPC 292.1

Turb. 1.6 NTU 3L 0.9 L/min
DtW 29.70' below gray disk
1700 Low flow sampling is not possible at MMW025; set up compressor and geocontrol to run during the night to purge well. Will return to sample when water levels recover.

4/17/15
0600 Calibration check on YSI PRO DSS, # 4993
- D.O. reading 7.00 mg/L @ 767.4 mmHg. 22.7 °C, no cal. needed.
- pH 4 reading = 4.02 @ 23°C - no cal needed
- pH 7 reading = 7.04 @ 22.8°C no cal needed
- pH 10 reading = 10.16 @ 22.9°C need cal. cal. reading = 10.00 @ 22.8°C
- SPC 1413 reading = 1413 @ 22.5°C No cal.
- ORP 220 mv reading = 204 @ 22.7°C calibrated to 220 mv. Now reading 220.3 mv. good.
- 0 NTU reading = 0 NTU @ 22°C
0800 at MBW099; DtW 3.49' below TOC
0815 Sampled 1504GWMBW099-U,F,
Final parameters = Temp 4.8°C, pH 8.11, ORP 233, D.O. 8.10, SPC 318.1, NTU 4.1, Total vol 8.5 L, WL 5.32
Note: ~~0800~~ 0810 Collect sample 1504GWMBW099-U,F
0905 At MMW006; DtW 266.95 below TOC
0921 Nitrogen connected/on
0925 Beginning readings Temp 7.3°C pH 8.60
ORP 190.5 mV DO 9.03 mg/L SPC 494.1 µS/cm
Turb 1.5 NTU ~~1L~~ 1L 0.2 L/min
DtW 266.95' below TOC

Monsanto
2015 Spring
Sampling

Sunny ~ 45°F

J. Pierson
A. Pettley

4/17/15

1030 DO stable at 5.8 mg/L; when freeze out line is purged the DO drops to approximately 4.6 mg/L.

1145 Ending parameters; Temp 9.7°C pH 7.26
ORP 251.5 mV DO 5.68 mg/L SPC 499.4 mS/cm
Turb. 2.3 NTU 22 L – L/min
DtW 266.91' below TOC

1150 Collect sample 1504GWMMW006-U,L

1220 At MMW020; ~~top~~ Transducer string caught;
DtW; 280.45' below TOC
Did not download transducer data

1230 Nitrogen connected/on

1235 Beginning parameters; Temp 9.1°C pH 7.15
ORP 238.9 mV DO 5.97 mg/L SPC 739 uS/cm
Turb 1.4 NTU 3.0 L – L/min
DtW 280.41' below TOC N

1310 Ending parameters; Temp 9.3°C pH 6.64
ORP 179.1 mV DO 0.17 mg/L SPC 1061 uS/cm
Turb 1.8 26 L – L/m
DtW 280.42' below TOC

1315 Collect samples 1504GWMMW020-U,F

1320 1504GWMMW020-U,F-MS

1325 1504GWMMW020-U,F-MSD

1340 At MMW018; DtW 12.36' below TOC N

1346 Compressor connected/on

Monsanto
2015 Spring
Sampling.

Sunny

J. Pierson
A. Pettley

4/17/15

1350 At MMW018 begining paramaters:
Temp 8.5°C, pH 7.12, ORP 247.9,
D.O. 6.73, SPC 412.4, NTU 1.7,
Vol 0.7 L, DTW 12.56.

1410 Ending parameters; Temp 8.9°C pH 6.96
ORP 247.6 mV DO 6.24 mg/L SPC 414.9 uS/cm
Turb. 1.7 NTU 3.3 L 0.15 L/min
DtW 12.55' below TOC N

1415 Collect sample 1504GWMMW018-U,F

1420 Sample 1504GWMMW018-U,F-MS

1425 Sample 1504GWMMW018-U,F-MSD
Note: ~~[illegible]~~ downloaded transducer

1510 Returned to MMW032 to check Waterlevel and sample well.
DTW = 20.35' TOC N, well has recovered to >80%. WL higher than original level on purge day date.

1515 Started ~~pumping~~ pumping to capture parameters.

1535 Sampled 1504GWMMW032-U-F
final parameters = WL 23.29', Vol 6.0,
Temp 7.1°C, pH 7.38, ORP 223, D.O. 9.68,
SPC 377.0, NTU 3.7. No transducer in well.

1630 Helped SW team with sampling MBW130

1710 Leaving the Site for the day.

Monsanto
2015 Spring
Sampling

J Powers
A. Pettley

4/18/15

- 0700 ~~D.O.~~ Calibration check on YSI, PRO DS #4993.
- D.O. reading 7.35 mg/L @ 20.5°C, 765 mmHg, no calibration needed.
- pH 4 reading 3.85 @ 20.1°C cal. to 4.0. now reading = 4.00 @ 20.1°C.
- pH 7 reading = 7.17 @ 20.0°C, calibrated to 6.99 = good
- pH 10 reading 10.03 @ 19.7°C, no cal.
- SPC 1413 reading 1405 @ 20.0°C, calibrated to 1413. Now reading 1414 @ 20.0°C.
- ORP 220 mV reading = 228.9 @ 20.1°C. Calibrated to 220 - cal good.
- NTU 0 reading = 0.1 @ 20.3°C, no cal.
- NTU 124 reading = 123.7 @ 20.4°C no cal. needed.

0820 Sign in to mine office
0830 At farm shop for supplies
0900 At MMW029; DtW 19.71' below gray disk
0905 Compressor connected/on
0910 Initial parameters; Temp 8.0°C pH 7.86
ORP 196.1 DO 5.83 mg/L SPC 1569 µS/cm
Turb 1.2 NTU 2.6 L 0.4 L/min
DtW 19.90' below gray disk

Monsanto
Spring 2015
Sampling

Sunny
~ 50°F
J. Powers
A. Pettley

4/18/15

0945 Ending parameters; Temp 8.4°C pH 6.73
ORP 240.8 mV DO 5.78 mg/L SPC 1651 µS/cm
Turb. 1.3 NTU 15.3 L 0.35 L/min
DtW 19.89' below gray disk
0950 Collect sample; 1504GWMMW029-U,L
1000 At MMW033; DtW 11.64' below gray disc
1004 Compressor connected/on

Note: Permission was given by Monsanto to sample 10x the low flow volume and establish stable parameters in the spring 2012 sampling round. This criteria was used. This well will not hold low flow method and is too large to pump dry with a bladder pump.

1005 Initial parameters; Temp 7.0°C pH 7.66
ORP 109.9 mV DO 0.28 mg/L SPC 469.7 µS/cm
Turb. 1.9 NTU 1.5 L 1.5 L/min
DtW 13.78' below gray disc
1050 Ending parameters; Temp 6.9°C pH 7.35
ORP 81.7 mV DO 0.13 mg/L SPC 456.7 µS/cm
Turb. 4.7 NTU 69 L 1.5 L/min
DtW 27.53' below gray disc
1055 Collect sample 1504GWMMW033-U,L
1114 At MBW032; DtW 11.85' below TOC
1116 Pump on

4/18/15

1123 Well nearly dry; tubing extended to bottom before water is pumped to surface

1125 Initial parameters; Temp 5.8°C pH 7.09
ORP 179.1 mV DO 78.5% (≈ 10.5 mg/L)
SPC 1975 µS/cm Turb. 15.0 NTU 0.3 L
0.5 L/min DtW 12.00' below TOC

1148 Cannot sustain low flow sampling; begin to purge well.

1154 MBW032 dry; needs to recover to 12.28' below TOC to sample

1205 Water level recovery to 12.28' below TOC.

1215 Ending parameters; Temp 5.5°C pH 6.76
ORP 222.3 mV DO ~~6.7~~ 9.72 mg/L SPC 1711 µS/cm
Turb. 3.4 NTU 13 L 0.25 L/min
DTW 12.58' below TOC

1220 Collect sample 1504GWMBW032-1-U,F

1225 Collect sample 1504GWMBW032-2-U,F

1245 Download transducer data at MMW015A

1300 Two gates to Henry mine locked; no access

1305 Dagerstrom shop closed; no one available by radio

1345 At MMW030; DtW 39.26' below TOC
80% recovery is 52.27' below TOC

1350 Nitrogen attached/on

1405 Final parameters; Temp 10.4°C pH 7.66
ORP 156.7 mV DO 1.91 mg/L SPC 399.9 µS/cm

4/18/15

Turb. 8.3 NTU 4.2 L 0.3 L/min
DtW 40.79' below gray disk

1410 Collect sample 1504GWMMW030-U,F

1500 At MMW009; DtW 215.00' below grey disc

1512 Compressor Nitrogen connected/on

1515 Initial parameters; Temp 10.8°C pH 7.77
ORP 199.9 mV DO 8.73 SPC 599 µS/cm
Turb. 2.5 NTU 0.3 L 0.2 L/min
DtW 215.08' below gray disc

1625 Final parameters; Temp 9.2°C pH 6.91
ORP 0.4 mV DO 0.02 mg/L SPC 628 µS/cm
Turb. 3.3 NTU 46.8 L 0.6 L/min
DtW 215.15' below gray disc

1630 Collect sample 1504GWMMW009-U,F

1700 At MMW010; DtW 5.60' below TOC N

1705 Compressor connected/on

1710 Initial parameters; Temp 8.1°C pH 6.52
ORP 182.7 mV DO 3.94 mg/L SPC 1543 µS/cm
Turb 8.9 NTU 0.5 L - L/min
DtW 5.85' below TOC N

1735 Final Parameters; Temp 8.7°C pH 6.36
ORP 176.6 mV DO 4.41 mg/L SPC 1540 µS/cm
Turb. 4.5 NTU 3.2 L 0.1 L/min
DtW 5.79' below TOC N

1740 Collect sample 1504GWMMW010-U,F

1810 Sign out at mine office

Monsanto
Spring 2015
Sampling

J. Pierson
A. Pettley

4/19/15

0700 Calibrated YSI, PRO DS #4993.
- D.O. reading = 7.75 mg/L @ 767.2 mm Hg, cal. to 764.5 now reading 7.73 mg/L
- pH 4 reading = 3.99 @ 17.8°C no cal.
- pH 7 reading = 6.97 @ 18.1°C No cal.
- pH 10 reading = 9.95 @ 15.0°C No cal.
- SPC 1413 reading = 1412 @ 19.9°C No cal.
- ORP 220mv reading = 226.9 @ 17.9°C Cal. to 220 mv. Cal hold 220mv @ 17.9°C. good.
- NTU 0 reading = 0.8 NTUs @ 5.7°C No cal needed.
- NTU 124 reading = 123.1 @ 16.3°C No cal needed.

0800 Leave for Monsanto office.
0820 At Monsanto office and Fox Shop.
0900 Arrived at MMW022
DTW = 210.20' below TOC N
0910 Compressor connected/on
0920 Initial parameters; Temp 10.0°C pH 8.75
ORP 130.3 mV DO 9.47 mg/L SPC 740 µS/cm
Turb. 22 NTU 1 L 0.1 L/min
DtW 210.25' below TOC N
1110 Final parameters; Temp 8.4°C pH 6.90
ORP 201.3 mV DO 4.34 mg/L SPC 923 µS/cm

Monsanto
Spring 2015
Sampling

J Pierson
A Pettley

4/19/15

Turb. 3.2 NTU 20.6 L 0.17 L/min
DtW 210.30' below TOC N
1115 Collect sample; 1504GWMMW022-U,F
1205 At MMW028; DtW 79.76' below ~~gray disc~~ TOC N gp
1212 Compressor connected/on
1215 Initial parameters; Temp 8.2°C pH 7.47
ORP 205.3 mV DO 6.33 mg/L SPC 558 µS/cm
Turb. 6.7 NTU 2 L 1 L/min
DtW 79.76' below TOC N
1230 Final parameters; Temp 8.2°C pH 7.29
ORP 197.2 mV DO 6.35 mg/L SPC 556 µS/cm
Turb. 3.0 NTU 10.9 L 0.65 L/min
DtW 79.74' below TOC N
1235 Collect sample 1504GWMMW028-1-U,F
1240 Collect sample 1504GWMMW028-2-U,F
1305 At MMW011; DtW 74.20' below TOC N
1313 Nitrogen connected/on
1315 Initial parameters; Temp 11.0°C pH 7.75
ORP 182.9 mV DO 8.85 mg/L SPC 789 µS/cm
Turb. 21 NTU 0.5 L - L/min
DtW 74.35' below TOC N
1350 Final parameters; Temp 10.9°C pH 7.07
ORP 190.3 mV DO 6.99 mg/L SPC 833 µS/cm
Turb. 2.0 NTU 8.6 L 0.2 L/min
DtW 74.38' below TOC N

Monsanto
Spring 2015
sampling

4/19/15

J. Pierson
A. Pettley

1355 Collect sample 1504GWMMW011-U,F
1430 At MMW023; DtW 108.26' below TOC N
1437 Compressor connected/on
1440 Initial parameters; Temp 9.6°C pH 7.50
ORP -48.0 DO 1.30 mg/L SPC 956 mS/cm
Turb 2.6 NTU 1.2 L 0.9 L/min
DtW 108.35' below TOC N
1505 Final parameters; Temp 9.4°C pH 6.88
ORP -89.0 DO 0.07 mg/L SPC 987 mS/cm
Turb. 1.9 NTU 23.7 L 0.9 L/min
DtW 108.40' below TOC N
1510 Collect sample 1504GWMMW023-U,F
1550 At MMW025; well has not recovered 80% since being pumped dry around 2300 on 4/16/15.
- DtW 87.25' below gray disk
- Well needs to recover to 63.28' below gray disc.
1615 At SB07; DtW 41.23' below TOC N
1636 Initial parameters; Temp 11.7°C pH 7.17
ORP 84.9 mV DO 0.69 mg/L SPC 881 mS/cm
Turb. 6.80 NTU
1657 >4.2 L removed, WL recovered > 80% to 41.45' below TOC N
1700 Sample for VOC 1504-SB07
1715 Sign out at mine office

Monsanto
Spring sampling
2015

4/20/15

J. Pierson
A. Pettley

0700 Calibrated YSI, PRO DS #4993
- D.O. reading 7.63 mg/L @ 18.0°C and 761.4 mm Hg. Local baro 30.00" Hg. No cal. Needed
- pH 4 reading = 4.03 @ 16.8°C No cal.
- pH 7 reading = 6.99 @ 18.3°C No cal.
- pH 10 reading = 9.99 @ 18.5°C No cal
- SPC 1413 reading = 1426 @ 19.7°C calc. to 1413. Now reading 1414 good.
- ORP 220 mV reading = 220.3 mV @ 19.1°C No cal. Needed.
- ONTU reading = 0 @ 23.1°C No cal. Needed.
- 124 NTU reading = 123.5 NTUs @ 19.0°C. No cal. Needed.
0820 Sign in to mine office
0856 At MMW012; DtW Dry; bottom is 60.95' to bottom.
0902 At MMW027; DtW 108.64' below TOC N
0908 Compressor on
0910 Geocontroller on.
Initial parameters; Temp 9.1°C pH 8.14
ORP 108.9 DO 8.92 mg/L SPC 998 mS/cm
Turb 2.2 NTU 0L 0.4 L/min
DtW 108.62' below TOC N

0940 Final parameters; Temp 7.2°C pH 6.98
ORP 134.7 mV DO 3.36 mg/L SPC 1058 µS/cm
Turb 2.1 NTU 14.5 L 0.5 L/min
DtW 108.78' below TOC N
0945 Collect sample 1504GWMMW027-U,F
0954 At MMW035; DtW 110.14' below TOC N
0959 Compressor on / Geocontroller on
1000 Initial parameters; Temp 9.7°C pH 7.26
ORP 153.4 mV DO 4.00 mg/L SPC 1350 µS/cm
Turb. 2.0 NTU 0.5 L 0.5 L/min
DtW 110.19' below TOC N
1028 ~~1030~~ Final parameters; Temp 7.5°C pH 6.79
ORP 148.1 mV DO 2.26 mg/L SPC 1436 µS/cm
Turb. 2.6 NTU 14.5 L 0.5 L/min
DtW 110.19' below TOC N
1030 Collect sample 1504GWMMW035-U,F
1046 At MMW037; DtW
Lock is difficult to open but will open w/ effort
No bollards to protect MMW037 casing
1053 Compressor on
1102 No water to surface w/ 120 psi; switch to Nitrogen and 150 psi
1110 Initial parameters; Temp 8.8°C pH 7.52
ORP 120.0 mV DO 3.94 mg/L SPC 418.9
Turb 2.5 NTU 3 L 0.6 L/min
DtW 117.05' below TOC N

1140 Final parameters; Temp 8.3°C pH 7.36
ORP 149.0 mV DO 8.09 mg/L SPC 421.4 µS/cm
Turb. 1.8 NTU 2 L 0.6 L/min
DtW 117.10' below TOC N
1145 Collect samples 1504GWMMW037-1-U,F
~~1150~~ 1148 1504GWMMW037-2-U,F
1203 At MMW036; DtW 116.21' below TOC
1210 Nitrogen connected/on
Initial parameters; Temp 8.9°C pH 7.76
ORP 159.2 mV DO 8.39 mg/L SPC 416.5 µS/cm
Turb. 3.8 NTU 2 L 0.3 L/min
DtW 116.15' below ~~TOC N~~ gray disc
1235 Final parameters; Temp 8.5°C pH 7.35
ORP 168.6 mV DO 7.74 mg/L SPC 416.6 µS/cm
Turb 2.5 NTU 11.5 L 0.4 L/min
DTW 116.11' below gray disc
1240 Collect samples 1504GWMMW036-U,F
1245 Collect sample 1504GWMMW036-U,F-MS
1250 Collect sample 1504GWMMW036-U,F-MSD
1345 At MMW025; DtW 68.95' below gray disk
1353 Compressor on
1355 Collect sample today even though water level has not recovered to 63.28' below gray disc
1415 Final parameters; Temp 8.1°C pH 7.90
ORP 137.2 mV DO 2.05 mg/L SPC 291.7 µS/cm

Monsanto
Spring 2015
Sampling

J. Pierson
A. Pettley

4/20/15

Turb. 3.5 NTU 10L. 0.4 L/min

DTW 73.08' below gray disc.

1420 Collect sample 1504GWMMW025-U,F

1530 Wash off compressor

1600 At farm shop to pack materials, drop off Monsanto equipment

1710 At Dagerstrom shop to drop off nitrogen tanks, gas can, buggy whip, fire chalks, and shovels.

1745 Sign out at mine office.

E. Yeager
T. Osborn

04/13/15 Spring 2015 SW-GW.
1000 arrive on site, orientation
1230 mine office, sign in
1300 shop, organize equipment
1530 Daegerstrom, pick up flags, checks
1600 arrive @ MBW099
WL 1.05', TD 17.29'
1619 ~~Start~~ start pump 1L/min
1624 T °C 5
pH 6.71
ORP mV -27.0
DO mg/L 7.79
SC uS/cm 352.0
Turb NTU 7.11

1629 T°C 6
pH 6.84
ORP mV -37.3
DO mg/L 7.16
SC uS/cm 341.3
Turb NTU 9.13

1631 Dry pump
1715 arrive @ MST069
T°C 13.3
SC @ 25°C 2036

04/13/15 ② cont.
cond uS/cm 1574
DO % sat 68.4
DO mg/L 7.08
pH 8.22
ORP mV -83.5
Turb NTU 4.26
1740 sample 1504SWMST069,4-F
1840 sign out at mine office

04/13/15

04/14/15 GW-SW sampling
0715 calibrate/check YSI
pH 4.0 = 3.93 no cal needed
pH 7.0 = 7.06 no cal needed
pH 10.0 = 10.16 ~~[illegible]~~ cal needed, 10.0
re check pH 7.0, pH 6.99
SC 1413 us/cm = 1410 @ 19.6°C no cal
ORP 220 mv = 227 @ 20.3°C no cal
DO = 29.8 in Hg DO%
Set Barom. to 29.8 in Hg
84.1 % DO
7.79 DO
0930 arrive @ MBW107, Dry TD 39.29'
0952 arrive @ MBW112, Dry TD 17.34'
1030 arrive @ MST136
H_2O T °C 10.3
SC us/cm @ 25 226.7
cond 162.4
DO% 55.2
DO mg/L ~~6.20~~ 6.20
pH 6.70
ORP mv -26.5
Turb 1.01
Air T °F 60°
1130 arrive @ MST144
1140 sample time

04/14/15 (2) cont.
H_2O T °C 11.2
SC us/cm @ 25° 693
cond us/cm 511
DO% 82.9
DO mg/L 9.08
pH 7.04
ORP mv -10.2
Turb NTU 122
Air T °F 60
1210 arrive @ MDS025
1215 sample time
H_2O T °C 6.2
SC @ 25 us/cm 1405
cond us/cm 902
DO% 34.4
DO mg/L 4.29
pH ~~6.75~~ 6.72
ORP mv -58.9
Turb NTU 8.04
Air T °F 61
1312 arrive @ MST275
1320 sample time
H_2O T °C 11.4
SC @ 25 us/cm 147.0
cond us/cm 108.9

04/14/15 (3) cont.

DO% 83.2
DO mg/L 9.22
pH 7.66
ORP mV -74.7
Turb NTU 60.5
Air T °F 57

1342 arrive @ MBW085, WL 1.87' kgs
1435 sample time

Final parameters

H2O T °C 3.2
pH 7.29
ORP mV -62.1
DO mg/L 7.68
SC µS/cm 356.5
Turb 15.7

1500 arrive @ MST133
1515 sample time

H2O T °C 10.2
SC µS/cm @ 25 257.8
Cond µS/cm 184.8
DO% 74.1
DO mg/L 8.31
pH 7.67
ORP mV -6.46
Air T °F 46

04/14/15

1540 arrive @ MST269, DRY
~~sample time @~~
H2O T °C
SC µS/cm @ 25
cond µS/cm
DO%
DO mg/L
pH
ORP mV
Air T °F

1611 arrive @ MST051, Dry
1700 arrive @ MST094, Dry
1735 sign out at mine office

ej 04/14/15

E. Yeager
T. Osborn
snow 25°

04/15/15

0700 calibrate YSI

soda springs barometer 30.00 in Hg
cal = 762.0 mm Hg 18.1°C
84.4 DO%
8.16 DO mg/L

cal ph 3 point with pH 4, 7, 10
pH 10 = 9.97 pH 19.6°C
SPC calibrated 1414 µS/cm
ORP 223.6 mV

0840 sign in at mine office
0930 looked for MBW130, buried in snow. Could not loccate
1009 arrive @ MSG005 + MS/MSD
H_2O T°C 4.8 1030 samp time
SC µS/cm @25° 579.2
cond µS/cm 356.2
DO% 65.0
DO mg/L 8.21
pH 7.21
ORP mV 43.0
Air T °F 24 0.32 Turb 0.32
1100 arrive @ MSG004
1115 sample time
H_2O T°C 1.7
SC µS/cm @25° 537.1

04/15/15 ② cont.
cond µS/cm 296.9
DO% 65.6
DO mg/L 9.29
pH 7.71
ORP mV -43.3
Air T°F 24 24
Turb NTU 3.58
1215 arrive @ MDS030 + DUP
1230 sample time
H_2O T°C 5.2
SC µS/cm @25° 864
cond µS/cm 535
DO% 67.7
DO mg/L 8.61
pH 7.22
ORP mV 3.0
Turb NTU 6.48
Air T°F ~~30~~ 24°
1310 arrive @ MBW027 give bottles to GW team.
1336 arrive @ MBW135
1348 start pump
1358 pumped dry
1415 arrive @ MBW011
1440 start pump

04/15/15 (3)
1444 dry
1500 sample recharged to 80%
H2O T°C 5.2
pH 6.67
ORP mV 18.6
DO mg/L 1.63
SC µS/cm 707.6
Turb NTU 18.9
1524 arrive @ MBW009
1541 begin pump
1611 parameters stable
1625 sample time
WL 8.15' bgs
purge rate 0.1 L/min
cumulative 3.9L
T°C 5.2
pH 6.70
ORP 15.5 mV
DO 4.21 mg/L
SC µS/cm 1122
Turb 0.85 NTU
1646 sign out at mine office

04/15/15

T. Osborn
E. Yeager
4/16/15 Sun, 30's
0700 Calibrate YSI
Barometer is 30.20 readings = 30.177 in Hg
pH 4 = 4.03 No cal Needed
pH 7 = 7.00 No cal Needed
pH 10 = 9.99 No cal Needed
Conductivity 1413 = 1410 µS/cm No cal needed
ORP 220 = 223.1 mV No cal needed
Barometer 30.20 = 30.177 in Hg
DO = 78.9 % no cal needed
DO = 7.16 mg/L no cal needed
0815 at mine plant to pack coolers (3 total)
0900 shipped 3 coolers overnight to microbac.
0931 sign in at mine office
0956 arrive @ MST133 for flow
1040 arrive @ MBW087, WL 1.19'
1054 begin pump
1133 stable parameters
WL 1.46'
purge rate 0.20 L/min
total purge 6.55L
T°C 4.3
pH 6.71
ORP mV 8.7

4/16/15 ② cont
DO mg/L 0.50
SC µS/cm 615.9
Turb NTU 1.96
1200 arrive @ MDE026
1230 sample time
H_2O °C T 5.4
SC µS/cm @ 25° 1469
cond µS/cm 1044
DO % 31.6
DO mg/L 3.97
pH 6.53
ORP mV 65.0
Turb NTU 2.53
Air T °F 38.
1306 arrive @ MST 274
sample time 1330
~~H_2O T °C~~
~~pH~~
~~ORP mV~~
~~DO mg/L~~
~~SC µS/cm~~
H_2O °C T 8.6
SC µS/cm @ 25° 426.4
cond µS/cm 319.6
DO % 107.3
DO mg/L 12.52
pH 8.38
ORP mV 42.9
Turb NTU 4.86
Air T °F 44°

4/16/15 ③ cont.
1400 arrive @ MST 143
1415 sample time
H_2O °C T 3.2
SC µS/cm 149.5
cond µS/cm 87.4
DO % 67.2
DO mg/L 8.99
pH 6.61
ORP mV —
Turb NTU 6.61
Air T °F 44
1444 arrive @ MST 132
1515 sample time + DUP
H_2O °C T 7.6
SC µS/cm 313.6
cond µS/cm 209.1
DO % 80.2
DO mg/L 9.58
pH 7.77
ORP mV 65.3
Turb NTU 29.1
Air T °F 44
~~1550~~ 1550 arrive @ MST 131
1555 sample time
H_2O °C T 9.7

04/16/15 (4) cont
SC µS/cm @25° 266.1
Cond µS/cm 188.2
DO% 77.1
DO mg/L 8.73
pH 7.68
ORP mV 61.5
Turb NTU 48.0
air T °F 44°
1610 arrive @ MST128
1630 sample time
H2O T°C 9.7
SC µS/cm @25° 335.4
cond µS/cm 237.4
DO% 76.5
DO mg/L 8.68
pH 7.88
ORP mV 55.5
Turb NTU 17.1
air T °F 44
1830 sign out

ej 04/16/15

04/17/15
0600 Calibrate YSI
Soda Springs barometer 30.20 No cal Needed
DO = 85.8 % @ 22.9 C°
DO = 7.88 mg/L @ 22.9C° no cal needed
pH 4 = 4.05 @ 22.9 C° no cal Needed
pH 7 = 7.03 @ 22.7°C no cal Needed
pH 10 = 9.97 23° C no Call Needed
Conductivity 1413 = 1408 @ 23°C. no Cal
ORP 220 = 218 22.9°C no call
0824 arrive @ MST067
H2O T°C 2.2 840 sample
SC µS/cm @25° 1273
Cond µS/cm 718
DO% 35.3
DO mg/L 4.81
pH 7.22
ORP mV 97.0
Turb NTU 1.23
air T° F 29°
0900 arrive @ MBW028 WL 8.35'
0920 Start Pump
~~0945 chg~~
0931 dry
0940 recharge to 80% 11.39'
take sample

04/17/15 ② cont.
0945 Final parameters
H_2O T°C 6.6
pH 6.64
ORPmV 86.5
DOmg/L 0.95
SC us/cm 1327
Turb NTU 3.30
1000 arrive @ MW15A WL = 23.11'
1006 start low flow
1047 final parameters stable
WL 23.41' bgs
purge rate 0.056 L/min
cumulative purge 2.71L
Temp °C 8.4
pH 6.66
ORPmV 93.3
DO mg/L 3.72
SC us/cm 1635
Turb 2.12
1050 sample time
1145 in town to ship 1 cooler
1330 leave plant
1400 arrive @ MST095
1425 sample time
H_2O T°C 22.3

04/17/15 ③ cont.
SC us/cm @ 25° 876
cond us/cm 831
DO% 39.9
DO mg/L 3.47
pH 7.70
ORPmV 93.0
Turb 45.3
Air T °F 47
1500 arrive @ MS6006
1510 sample time
H_2O T°C 5.3
SC us/cm @ 25°C 1219
cond us/cm 759
DO% 53.7
DO mg/L 6.78
pH 7.22
ORPmV 97.2
Turb 1.08
Air T°F 47
1520 arrive @ MS6007
1525 sample time
H_2O T°C 11.8
SC us/cm @ 25° 500.2
cond us/cm 373.6
DO% 41.8
DO mg/L 4.50
pH 7.43
ORPmV 45.7
Turb 8.37
Air T°F 47°

04/17/15 (4) cont.
1000 arrive @ MST096
1010 sampletime
H2OT °C 15.5
SC us/cm @25° 487.6
Cond us/cm 399.6
DO% 44.6
DO mg/L 4.43
pH 7.80
ORP mV 82.1
Turb 4.16
AirT °F 50.
arrive @ MBW130
1630 Start pump
1643 well dry

ej 04/17/15

4/18/15
0700 Calibrate YSI
Barometric Pressure 764.5 = 765.1 no cal needed
DO = 6.98 mg/L No Cal Needed
DO = 78.2 %
pH 4 = 4.06 20°C
pH 7 = 7.02 20.1°C
pH 10 = 10.01 19.8°C
SPC 1413 = 1408 µS/cm 20.1°C
ORP 220 = 223.2 mV 20.1°C
0820 sign in at mine office
0900 arrive @ MBW131 WL = 3.38'
0920 start pump
0958 parameters stabalize
WL = 3.64'
purge rate 0.07 L/min
cumulative purge 2.45L
T°C 4.0
pH 6.59
ORP mV 100.0
DO mg/L 8.49
SC us/cm 249.9
Turb 3.45
1045 arrive @ MBW048, WL = 0.7'
1053 Start pump
parameters stable

04/18/15 ② cont.
~~sa~~ sample time
WL 0.92'
purge rate L/min 0.09
cumulative purge L 3.15
Temp °C 4.4
pH 6.68
ORP mV 53.3
DO mg/L 0.33
SC uS/cm 210.5
Turb NTU 3.10
1207 arrive @ MBW130 WL=3.00'
1215 sample, recovered +80%
WL=3.00'
T °C 6.0
pH 6.99
ORPmV 175.0
DO mg/L 2.43
SC ~~uS/cm~~ uS/cm 225.6
TURB 8.81
1233 arrive @ MST092
1245 sample time + DUP
H2OT °C 16.5
SC uS/cm @25° 419.8
Cond uS/cm 351.2
DO% 78.9

04/18/15 ③
DO mg/L 7.69
pH 7.83
ORPmV 116.1
TURB 1.08
AirT °F 38
arrive @ ~~MST090~~ MST089
Sample time 1345 + MS/MSD
H2O T °C 15.9
SC uS/cm @25°C 337.0
cond uS/cm 278.6
DO% 101.3
DO mg/L 10.02
pH 7.68
ORPmV 91.2
TURB 0.91
AirT °F 38
1435 arrive @ MST090
1440 sample time
H2OT °C 17.4 TURB 0.71
SC uS/cm @25° 393.7 AirT °F 38
Cond uS/cm 336.4
DO% 80.1
DO mg/L 7.67
pH 7.89
ORP mV 97.6

04/18/15 (4)

1528 arrive @ MST069 to resample. 1st sample out of lab range on TDS.

1540 sample time

H2O T °C 15.6

SC µS/cm @ 25°C 2006

cond µS/cm 1643

DO % 56.5

DO mg/L 5.56

pH 8.07

ORP mV 116.7

Turb 7.37

Air T °F 38°

1610 arrive MST226

1615 sample time

H2O T °C 6.3

SC µS/cm @ 25° 263.8

cond µS/cm 169.8

~~TDS~~ DO % 61.1

DO mg/L 7.50

pH 7.26

ORP mV 114.1

Turb 1.86

Air T °F 38

1700 arrive @ MPW152, dry.

1810 sign out ~~04/18/15~~

04/19/15

0700 Calibrate YSI

Soda Springs Barometer 30.10 in Hg

DO = 84.6% vs cal = 767.1 mm Hg

DO = 8.07 mg/L

No cell needed

pH 4 = 4.05 @ 18.4

pH 7 = 7.01 @ 18.4

pH 10 = 9.98 @ 18.2

Conductivity 1413 = 1409 µS/cm

ORP 220 = Calibrated 220.1 mV

0830 sign in at mine office

0900 Arrive @ MDS034

0915 sample time

H2O T °C 5.1

SC µS/cm @ 25° 760.8

cond µS/cm 471.0

DO % 42.9

DO mg/L 5.42

pH 7.78

ORP mV 86.7

Turb 6.31

Air T °F 45

0950 arrive @ MST044

1010 sample time

H2O T °C 8.6

SC µS/cm 1095.4

04/19/15 (2)
cond us/cm 477.6
DO% 93.6
DO mg/L 10.9
pH 8.34
ORP mV 72.8
Turb 1.39
Air T °F 45
1055 arrive @ MST045
1100 sample time
H_2O T °C 10.2
SC us/cm @ 25° 695.4
cond us/cm 498.7
DO% 97.6
DO mg/L 10.89
pH 8.09
ORP mV 67.3
Turb 1.92
Air T °F 46
1213 arrive @ MST063
1245 sample time + ms/msd
H_2O T °C 14.7
SC us/cm @ 25° 784
cond us/cm 629
DO% 69.0
DO mg/L 6.87

4/19/15 (3)
pH 7.32
ORP mV 56.7
Turb 10.5
Air T °F 52
1330 arrive @ MST057
1345 sample time
H_2O T °C 19.2
SC us/cm @ 25° 491.7
cond us/cm 435.6
DO% 51.6
DO mg/L 4.82
pH 7.31
ORP mV 17.4
Turb 8.0
Air T °F 57
1430 arrive @ MST050
1440 sample time
H_2O T °C 19.6
SC us/cm @ 25° 627
cond us/cm 563
DO% 8.8
DO mg/L 0.79
pH 7.07
ORP mV -49.2
Turb 15.9
Air T °F 54

04/19/15 (4)
1530 arrive @ MBW135
1535 WL= 3.47' sample 80%
Temp °C 6.5
pH 7.55
ORPmV 15.0
DOmg/L 1.0
SCuS/cm 452.7
Turb 8.83

1615 AT SB07; DTW 41.23' below TOCN
1636 Initial parameters; Temp 11.7°C
pH 7.17. ORP 84.9 mV DO 0.69 mg/L
SPC 881 uS/cm Turb. 6.80 NTU
1657 > 4.2 L removed, WL recovered
> 80% to 41.45' below TOCN
1700 Sample For VOC 1504-SB07
1715 Sign out at mine office

04/20/15
0700 Calibrate YSI
Soda springs Barometer 30.00 = 30.082
no cal needed
DO = 81.2%
DO = 7.61 mg/L
pH 4 = 4.05 17.9°C
pH 7 = 7.06 17.9°C
pH 10 = 10.00 18.0°C
Conductivity 1413 = 1415 µS/cm
ORP 220 = 217.0
0910 leave for FedEx
1130 Ship 7 coolers from Riverdale fedex.
1352 sign in to mine office grab radio
1400 arrive @ MST019
1415 Sample time
H2OT °C 11.3
SCuS/cm @25° 389.5
Condu S/cm 287.9
DO% 70.9
DOmg/L 7.94
pH 8.34
ORPmV 55.4
Turb 13.2
Air T°F 59
~~arrived~~

04/20/15 (2) cont.
1435 arrive @ MST006
H_2O T°C 20.9 1435 sample time
SC µS/cm @ 25° 501.2
cond µS/cm 462.2
DO% 8.10
DO mg/L 7.06
pH 8.27
ORP mV 79.1
TURB 11.0
Air T°F 59
1511 arrive @ MST020
1520 sample time
H_2O T°C 11.0
SC µS/cm @ 25° 374.7
cond µS/cm 274.6
DO% 87.8
DO mg/L 9.71
pH 8.34
ORP mV 54.9
TURB 12.8
Air T°F 59

A-2 2015 Fall Surface Water Sampling

TABLE A-3
2015 FALL SURFACE WATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

Matrix	Station ID	Water Temp (deg. C)	Spec Cond (uS/cm) @ 25 deg. C	Cond (uS/cm)	D.O. (% sat.)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Air Temp (deg. c)	Discharge (cfs)	Comments	Date	Time
SW	MDS025	DRY											9/30/2015	1120
SW	MDS026	8.96	1846	1275	48.4	5.57	6.9	19.2	0.89	16.1	Flow not available; seep 40-50 feet wide with multiple shallow channels through saturated grassy soil		9/30/2015	1055
SW	MDS030	10.23	907	651	77.5	8.49	7.3	32.1	63.22	23.3	No flows available. Spring daylights over a 10 ft by 30 ft area with no channelized flows.		9/30/2015	1520
SW	MDS034	DRY											9/30/2015	1220
SW	MSG004	16.32	606	505	19.4	1.95	7.98	16.5	98.5	23.2	Flow not available. Spring daylights over aproximately 20 ft wide area with diffuse flow and no distinct channels.		9/30/2015	1440
SW	MST019	15.35	361	294	109.9	10.99	8.19	29	2.75	23.2	58	Next to USGS stream flow station. Staff gauge 1.94 ft.	9/30/2015	1606
SW	MST020	15.19	375	305	108	10.9	8.47	24.3	2.73	22	62		9/30/2015	1720
SW	MST044	16.11	805	668	100	9.8	8.68	38	0.94	22.8	1.85		9/30/2015	1240
SW	MST045	16.76	821	692	155.2	14.95	8.67	34.5	1.12	23	1.69		9/30/2015	1325
SW	MST069	13.53	2160	1684	92.3	9.46	8.16	26.4	30.42	23.1	No flows available. Too shallow for Marsh McBirney and too much grass for bucket test and very low gradient.		9/30/2015	1550
SW	MST144	DRY											9/30/2015	1133
SW	MST274	7.22	521	344	10.7	1.28	6.73	14.3	3.19	16.1	Flow not available, too shallow for Marsh McBirney flow meter and too disperse for a bucket measurement. Saturated soil 6 to 8 ft across with 3 to 4 ft of shallow channelized flows.		9/30/2015	1015
SW	MST275	DRY											9/30/2015	1148

cfs	cubic feet per second	NTU	Nephelometric Turbidity Units
deg. C	degrees Celsius	N/A	Parameter not required / not collected
g/L	grams per liter	SW	Surface Water
mg/l	milligrams per liter	uS/cm	microSiemens per centimeter
mV	millivolts	% sat.	percent saturation

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1120

Field Personnel

Emily Yeager **Signatures**

~~Tom Osburn~~ Joel Pierson

SITE DESCRIPTION

Station Name West Dump Seep **Station Number** MDS 025

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 3 ~~3~~ QP

Site & Stream Description Dry

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

QP

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: ~~1509SW MDS025-U,F~~ QP **Sample Time:** ~~1125~~ QP

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)			
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat.)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)			

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1125 **Station Number** MDS 025

Completed by: EY, ~~TO~~ JP **Checked by:** EY, ~~TO~~ JP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

* Dry.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1050

Field Personnel

Emily Yeager **Signatures**

~~Tom Osborn~~ Joel Pierson

SITE DESCRIPTION

Station Name South Dump Seep **Station Number** MDS 026

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 2

Site & Stream Description Seep on side of hill 40-50 feet wide w/ multiple small puddles

Surface Water Characteristics (color, odor, appearance): Wide area w/ multiple ponds w/ leaves and other organic matter; no odor; slight yellow tint

SAMPLE COLLECTION

Collection Method (1L bottle), Horizontal-bottle, Swing-sampler, Other( ) (Up-stream)/ Across-stream

Sample ID: 1509SW MDS026-U,F **Sample Time:** 1055

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1055		
Water Temperature (°C)	8.96 °C		
Specific Conductivity (µS/cm) @ 25° C	~~1846 µS/cm~~	1846 µS/cm	
Conductivity (µS/cm)	1275 µS/cm		
TDS (g/L)	1.199 g/L		
Dissolved Oxygen (% sat.)	48.4 %	DO readings suspect due to meter malfunction	
Dissolved Oxygen (mg/L)	5.57 mg/L		
pH	6.90		
ORP (mV)	19.2 mV		
Turbidity ~~(FTU)~~ NTU	0.89 NTU		
Air Temperature (°C)	16.1 °C		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1055 **Station Number** MDS 026

Completed by: EY, ~~TO~~ JP **Checked by:** EY, ~~TO~~ JP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

JP

* Flow not available; seep 40-50 ft wide w/ multiple shallow channels through saturated grassy soil.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1515

Field Personnel

Emily Yeager **Signatures** [signature]

~~Tom Osburn~~ Joel Pierson [signature]

SITE DESCRIPTION

Station Name Pit #2 Upper Dump Seep **Station Number** MDS030

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 10

Site & Stream Description Seep daylighting in a depression, brush and grass surrounding seep 6-8 ft wide

Surface Water Characteristics (color, odor, appearance): clear; slight organic smell; some decomposed material in stagnant water

SAMPLE COLLECTION

Collection Method: (1L bottle) Horizontal-bottle, Swing-sampler, Other( ). (Up-stream) Across-stream

Sample ID: 1509SWMDS030-U,L **Sample Time:** 1520

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1520		
Water Temperature (°C)	10.23 °C		
Specific Conductivity (µS/cm) @ 25° C	~~0.907 mS/cm~~	907 mS/cm	
Conductivity (µS/cm)	651 mS/cm		
TDS (g/L)	0.589 g/L		
Dissolved Oxygen (% sat.)	77.5 %	DO readings suspect due to meter malfunction	
Dissolved Oxygen (mg/L)	8.49 mg/L		
pH	7.30		
ORP (mV)	32.1 mV		
Turbidity ~~(FTU)~~ NTU	63.22 NTU		
Air Temperature (°C)	23.3 °C		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1520 **Station Number** MDS030

Completed by: EY, ~~TO~~ JP **Checked by:** EY, ~~TO~~ JP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

* No flows available. Spring daylights over a 10 ft × 30 ft area w/ no channelized flows.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1220

Field Personnel

Emily Yeager **Signatures**

~~Tom Osborn~~ Joel Pierson

SITE DESCRIPTION

Station Name Henry Mine Dump Seep #3 **Station Number** MDS034

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 6 only

Site & Stream Description DRY

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)			
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat.)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)			

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1220 **Station Number** MD0034

Completed by: EY, TOUP **Checked by:** EY, TOUP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1430

Field Personnel

Emily Yeager **Signatures**

~~Tom Osborn~~ Joel Pierson

SITE DESCRIPTION

Station Name Holmgren Spring **Station Number** MSG004

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 9

Site & Stream Description seep 20 ft wide, shaded in brush, saturated soil and grassy area

Surface Water Characteristics (color, odor, appearance): strong organic smell, low flow, sampling disturbed sediment, somewhat clear befor sampling

SAMPLE COLLECTION

Collection Method: (1L bottle) Horizontal-bottle, Swing-sampler, Other( ), (Up-stream) / Across-stream

Sample ID: 1509SWMSG004-U,F **Sample Time:** 1440

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1440		
Water Temperature (°C)	16.32 °C		
Specific Conductivity (µS/cm) @ 25° C	~~0.606 mS/cm~~	606 µS/cm	
Conductivity (µS/cm)	505 µS/cm		
TDS (g/L)	0.394 g/L		
Dissolved Oxygen (% sat.)	19.4 %	DO readings suspect due to meter malfunction	
Dissolved Oxygen (mg/L)	1.95 mg/L		
pH	7.98		
ORP (mV)	16.5 mV		
Turbidity ~~(FTU)~~ NTU	89.50 NTU		
Air Temperature (°C)	23.2 °C		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1440 **Station Number** MSG004

Completed by: EY, ~~JO~~ JP **Checked by:** EY, ~~JO~~ JP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

JP

* Flow not available. Spring daylights over approximately 20 ft wide area w/ diffuse flow and no distinct channels.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1606

Field Personnel

Emily Yeager **Signatures**

~~Tom Osborn~~ Joel Pierson

SITE DESCRIPTION

Station Name Blackfoot River below Ballard Creek **Station Number** MST019

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 12

Site & Stream Description River channel 20-40 ft wide; algea and under water plants prevalent

Surface Water Characteristics (color, odor, appearance): Clear; slight organic odor;

SAMPLE COLLECTION

Collection Method: ~~1L bottle~~, Horizontal-bottle, Swing-sampler, Other Kemmerrer sampler, Up-stream / Across-stream

Sample ID: 1509SWMST019-1,2-U,F **Sample Time:** 1615

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1615	1615	
Water Temperature (°C)	15.35 °C	15.14 °C	
Specific Conductivity (µS/cm) @ 25° C	361 µS/cm	360 µS/cm	
Conductivity (µS/cm)	294 µS/cm	293 µS/cm	
TDS (g/L)	0.234 g/L	0.235 g/L	
Dissolved Oxygen (% sat.)	109.9 %	110.8 %	
Dissolved Oxygen (mg/L)	10.99 mg/L	11.13 mg/L	DO readings suspect due to meter malfunction
pH	8.19	8.18	
ORP (mV)	29.0 mV	29.9 mV	
Turbidity ~~(FTU)~~ NTU	2.75 NTU	1.74 NTU	
Air Temperature (°C)	23.2 °C	23.2 °C	

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1615 **Station Number** MST019

Completed by: EY, ~~TO~~ JP **Checked by:** EY, ~~TO~~ JP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

* Next to USGS gauge at 1615 on 9/30/15. Staff gage showing 1.94 ft.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1711

Field Personnel

Emily Yeager **Signatures**

~~Tom Osborn~~ Joel Pierson

SITE DESCRIPTION

Station Name Blackfoot River below State Land Creek **Station Number** MST020

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 13

Site & Stream Description Cut bank of 30-40 ft wide river; algea and underwater plants; unshaded; decomposing grass along shore

Surface Water Characteristics (color, odor, appearance): clear; slight organic smell;

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Kemmerer sampler). Up-stream / Across-stream

Sample ID: 1509SWMST020-U,F + MS/MSD **Sample Time:** 1720

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1720	1725	1730
Water Temperature (°C)	15.19°C	14.83°C	14.85°C
Specific Conductivity (µS/cm) @ 25° C	375 µS/cm	362 µS/cm	361 µS/cm
Conductivity (µS/cm)	305 µS/cm	292 µS/cm	291 µS/cm
TDS (g/L)	0.244 g/L	0.236 g/L	0.235 g/L
Dissolved Oxygen (% sat.)	108.0%	109.2%	109.6%
Dissolved Oxygen (mg/L)	10.90 mg/L	11.03 mg/L	11.08 mg/L
pH	8.47	8.16	8.18
ORP (mV)	24.3 mV	37.5 mV	36.9 mV
Turbidity (~~FTU~~) NTU	2.73 NTU	2.24 NTU	2.00 NTU
Air Temperature (°C)	22.0°C	22.0°C	22.0°C

→ DO readings suspect due to meter malfunction

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1720 **Station Number** MST020

Completed by: EY, ~~TO~~ JP **Checked by:** EY, ~~TO~~ JP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. ~~49~~ 51 ft L.E.W. 6 ft Total Width 49 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement ~~0.2~~ 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
4.0	1	0.3	0.02 ft/s	16 34.0	16	1.6	1.17 ft/s
6.0	2	1.0	0.09	17 36.0	17	1.6	1.38
8.0	3	1.0	0.18	18 38.0	18	1.65	0.93
10.0	4	1.45	0.23	19 40.0	19	1.7	0.74
12.0	5	1.0	0.77	20 42.0	20	1.5	0.77
14.0	6	1.1	0.84	44.0	21	1.2	0.60
16.0	7	1.25	0.46	46.0	22	0.9	0.51
18.0	8	~~1.4~~ 1.9	0.96	48.0	23	0.7	0.24
20.0	9	1.9	1.01				
22.0	10	1.9	1.75				
24.0	11	1.7	2.04				
26.0	12	1.7	1.47				
28.0	13	1.6	1.20				
30.0	14	1.6	1.27				
32.0	15	1.6	1.23				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1233

Field Personnel

Emily Yeager **Signatures**

~~Tom Osburn~~ Joel Pierson

SITE DESCRIPTION

Station Name Immediately Below Henry Mine (1997 #24) **Station Number** MST044

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 7

Site & Stream Description Stream 6-10 ft wide, some underwater plants and algea; no shade

Surface Water Characteristics (color, odor, appearance): Clear, free flowing in a small channel; odor observe from disturbed sediment organic smell

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1509SWMST044-U,F **Sample Time:** 1240

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1240		
Water Temperature (°C)	16.11 °C		
Specific Conductivity (µS/cm) @ 25° C	~~0.805 mS/cm~~	805 µS/cm	
Conductivity (µS/cm)	668 µS/cm		
TDS (g/L)	0.522 g/L		
Dissolved Oxygen (% sat.)	100% (fluctuating)	DO readings suspect due to meter malfunction	
Dissolved Oxygen (mg/L)	9.8 mg/L (fluctuating)		
pH	8.68		
ORP (mV)	38.0		
Turbidity (FTU)	0.94 NTU		
Air Temperature (°C)	22.8 °C		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1240 **Station Number** MST044

Completed by: EY, ~~TO~~ JP **Checked by:** EY, ~~TO~~ JP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. ~~3.5~~ 2.5 ft L.E.W. 7.9 ft Total Width 7.9 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

	Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
		Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
2.5	~~3.5~~ 2.5	1	0.35	0.06 ft/s				
3.0	~~4.0~~	2	0.45	0.12				
3.5	~~4.5~~	3	0.6	0.13				
4.0	~~5.0~~	4	0.6	0.61				
4.5	~~5.5~~	5	0.55	1.25				
5.0	~~6.0~~	6	0.75	1.42				
5.5	~~6.5~~	7	0.7	0.03				
6.0	~~7.0~~	8	0.7	0.41				
6.5	~~7.5~~	9	0.65	1.12				
	7.0	10	0.65	0.56				
	7.5	11	0.2	0.54				
		12						
		13						
		14						
		15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1325

Field Personnel

Emily Yeager **Signatures**

~~Tom Osborn~~ Joel Peterson

SITE DESCRIPTION

Station Name Little Blackfoot River above Henry Creek **Station Number** MST045

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 8

Site & Stream Description 10-12 ft wide w/ some saturated grassy soil adjacent to stream; extensive algea/underwater plants, clear

Surface Water Characteristics (color, odor, appearance): clear; slight odor of organic decomposition from disturbed sediment, up to 1.5 ft sediment

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1509SW MST045-U,F **Sample Time:** 1330

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1330		
Water Temperature (°C)	16.76 °C		
Specific Conductivity (µS/cm) @ 25° C	~~0.821 mS/cm~~ 821 µS/cm	821 µS/cm	
Conductivity (µS/cm)	692 µS/cm		
TDS (g/L)	0.533 g/L		
Dissolved Oxygen (% sat.)	155.2%	DO readings suspect	
Dissolved Oxygen (mg/L)	14.95 mg/L	due to meter malfunction	
pH	8.67		
ORP (mV)	~~-123.1 mV~~ 34.5		
Turbidity ~~(FTU)~~ NTU	~~34.~~ 1.12 NTU		
Air Temperature (°C)	23.0 °C		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1330 **Station Number** MST045

Completed by: EY, ~~TO~~ JP **Checked by:** EY, ~~TO~~ JP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 0 ft L.E.W. 10.5 ft Total Width 10.5 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0 ft	1	0.95	0.07 ft/s				
1.0	2	1.1	0.05				
2.0	3	1.3	0.06				
3.0	4	1.2	0.04				
4.0	5	1.25	0.09				
5.0	6	1.2	0.21				
6.0	7	1.3	0.14				
7.0	8	1.3	0.35				
8.0	9	1.1	0.24				
9.0	10	0.95	0.16				
10.0	11	0.85	0.23				
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1545

Field Personnel

Emily Yeager **Signatures**

~~Tom Osborn~~ Joel Pierson

SITE DESCRIPTION

Station Name Short Creek below Ballard Mine **Station Number** MST069

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 11

Site & Stream Description Low flows; grassy marshy area; 0.5-1.5 ft wide; 2-3 in deep.

Surface Water Characteristics (color, odor, appearance): Clear, decomposing grass in channel; some algea; organic smell

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1509SWMST069-U,F **Sample Time:** 1550

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1550		
Water Temperature (°C)	13.53 °C		
Specific Conductivity (µS/cm) @ 25° C	~~2160 µS/cm~~	2160 µS/cm	
Conductivity (µS/cm)	1684 µS/cm		
TDS (g/L)	1.402 g/L		
Dissolved Oxygen (% sat.)	92.3%	DO readings suspect due to meter malfunction	
Dissolved Oxygen (mg/L)	9.46 mg/L		
pH	8.16		
ORP (mV)	26.4 mV		
Turbidity ~~(FTU)~~ NTU	30.42 NTU		
Air Temperature (°C)	23.1 °C		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1550 **Station Number** MST069

Completed by: EY, ~~TO~~ JP **Checked by:** EY, ~~TO~~ JP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

JP

* No flows available. Too shallow for Marsh McBerney and too much grass for bucket test and very low gradient.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1133

Field Personnel

Emily Yeager **Signatures**

~~Tom Osborn~~ Joel Pierson

SITE DESCRIPTION

Station Name West Pond Creek headwaters; below W. Pond **Station Number** MST 144

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 4

Site & Stream Description Dry

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)		JP	
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat.)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)			

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1133 **Station Number** MST 144

Completed by: EY, ~~TO~~ JP **Checked by:** EY, ~~TO~~ JP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

* Dry.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1010

Field Personnel

Emily Yeager **Signatures**

~~Tom Osborn~~ Joel Pherson

SITE DESCRIPTION

Station Name West Fork of Rasmussen Creek **Station Number** MST 274

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 1

Site & Stream Description Stream 3-5 ft across just below 10-15 ft high; cow pasture; 2-3 in deep

Surface Water Characteristics (color, odor, appearance): Some algae, slight oily sheen grassy, shallow channel.

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ), Up-stream / Across-stream

Sample ID: 1509SWMST274-U,F **Sample Time:** 1015

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1015		
Water Temperature (°C)	7.22°C		
Specific Conductivity (µS/cm) @ 25° C	~~0.521 mS/cm~~	521 mS/cm	
Conductivity (µS/cm)	344 mS/cm		
TDS (g/L)	0.339 g/L		
Dissolved Oxygen (% sat.)	10.7%	DO readings suspect due to meter malfunction	
Dissolved Oxygen (mg/L)	1.28 mg/L		
pH	6.73		
ORP (mV)	14.3 mV		
Turbidity ~~(FTU)~~ NTU	3.19 NTU		
Air Temperature (°C)	16.1°C		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1015 **Station Number** MST274

Completed by: EY, ~~AO~~ JP **Checked by:** EY, ~~AO~~ JP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

JP

Flow not available; Too shallow for Marsh-McBirney flow meter and too disperse for a bucket measurement. Saturated soil 6-8 ft across w/ 3-4 ft of shallow channelized flows.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Arrival Time** 1148

Field Personnel

Emily Yeager **Signatures**

~~Tom Osborn~~ Joel Pierson

SITE DESCRIPTION

Station Name Tributary to Lone Pine Creek **Station Number** MST275

Latitude N on file **Longitude** W on file

Elevation on file ft **Datum** NAD 27 **Photo Number** 5

Site & Stream Description Dry

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other( ). Up-stream / Across-stream

Sample ID: **Sample Time:**

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)			
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat.)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)			

JP

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2015 SW Sampling

Date 09 / 30 / 2015 **Time** 1148 **Station Number** MST275

Completed by: EY, ~~TO~~ JP **Checked by:** EY, ~~TO~~ JP

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft **L.E.W.** _____ ft **Total Width** _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

JP

* Dry

COC No. A 47638

158 Starlite Drive
Marietta, OH 45750

MICROBAC®

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Toll Free: 800-373-4071

Company Name: MWH

Project Contact: Betty VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: standard

Location: Monsanto

Project ID: Monsanto Fall SW

Sampler (print): E. Yeager

Signature: E Yeager

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

ADDITIONAL REQUIREMENTS

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Se SW6020A	TDS E160.1	Diss Cd, Se SW6020A	Diss Ca, Mg, V SW6010B	Diss SO4 E300.0	Diss Hardness										TOTAL # (LAB USE)
1509SWMST274-U		X	09/30/15	1015	W	4/2		X	X														
1509SWMST274-F				1015		2				X	X	X	X										
1509SWMDS026-U				1055				X	X														
1509SWMDS026-F				1055						X	X	X	X										
1509SWMST044-U				1240				X	X														
1509SWMST044-F				1240						X	X	X	X										
1509SWMST045-U				1330				X	X														
1509SWMST045-F				1330						X	X	X	X										
1509SWMFG004-U				1440				X	X														
1509SWMFG004-F				1440						X	X	X	X										
1509SWMDS030-U				1520				X	X														
1509SWMDS030-F				1520						X	X	X	X										
1509SWMST069-U				1550				X	X														
1509SWMST069-F				1550						X	X	X	X										
1509SWMST019-1-U				1615				X	X														
1509SWMST019-1-F				1615						X	X	X	X										
1509SWMST019-2-U				1615				X	X														
1509SWMST019-2-F				1615						X	X	X	X										
1509SWMST020-U				1720				X	X														
1509SWMST020-F				1720						X	X	X	X										

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
E Yeager	10/01/15	0900					

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

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

COC No. A 47639

158 Starlite Drive
Marietta, OH 45750

MICROBAC®

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Toll Free: 800-373-4071

Company Name: MWH

Project Contact: Betty Van Pelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto

Project ID: Monsanto Fall SW

Sampler (print): E. Yeager

Signature: [signature]

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other

ADDITIONAL REQUIREMENTS

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Se SW6020A	TDS E160.1	Diss Cd, Se SW6020A	Diss Ca, Mg, V SW6010B	Diss SO4 E300.0	Diss Hardness	TOTAL # (LAB USE)
1509SWMST020-U-MS		X	9/30/15	1720	W	2		X	X					
1509SWMST020-F-MS		↓	↓	1720	↓	↓				X	X	X	X	
1509SWMST020-U-MSD		↓	↓	1720	↓	↓		X	X					
1509SWMST020-F-MSD		↓	↓	1720	↓	↓				X	X	X	X	

10/01/15

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	10/01/15	0900					

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

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

04/20/15 (2) cont.
1435 arrive @ MST066
H2OT°C 20.9 1435 sample time
SC µS/cm @25° 501.2
cond µS/cm 462.2
DO% 8.10
DO mg/L 7.06
pH 8.27
ORP mV 79.1
Turb 11.0
Air T°F 59
1511 arrive @ MST020
1525 sample time
H2OT°C 11.0
SC µS/cm @25° 374.7
cond µS/cm 274.6
DO% 87.8
DO mg/L 9.71
pH 8.34
ORP mV 54.9
Turb 12.0
Air T°F 59

E. Yeager
J. Pierson

09/30/15 Fall SW sampling
0930 EY, JP leave SLC
0900 sign in at mine office
0920 Calibration ~~check~~ cp
pH 4 → 3.75 → 4.0
pH 7 → 7.13 → 7.0
pH 10 → 9.91 → 10.0
Calibration check pH 7 → 7.10 OK
- Conductivity 1409 mS/cm → 1400 mS/cm OK
- DO reading 0.01 %; calibration unsuccessful; DO readings not likely valid.

1015 At MST 274; sample time 1015

Temp	7.22°C	DO%	10.7%
Cond	344 µS/cm	DO mg/L	1.28 mg/L
TDS	0.339 g/L	pH	6.73
Spc Cond	0.521 mS/cm	pH mV	-18.5
		ORP	14.3

Turbidity 3.19 NTU

1050 At MDS026; sample time 1055

Temp	8.96°C	DO%	48.4%
Spc Cond	1.846 mS/cm	DO mg/L	5.57 mg/L
Cond	1275 mS/cm	pH	6.90
TDS	1.199 g/L	pH mV	–
Turb	0.89 NTU	ORP	19.2 NTU

1120 At MDS025; Dry; no sample.
1133 At MST 144; Dry; no sample.

E. Yeager
J. Pierson

9/30/15 Fall SW Sampling

1148 At MST275; Dry; no sample.

1220 at MDS034, Dry; no sample

1233 At MST044; sample time 1240.

Temp 16.11°C DO% 100% (fluctuating)
Spc Cond 0.805 mS/cm DO mg/L 9.8 (fluctuating)
Cond 668 µS/cm pH 8.68
TDS 0.522 g/L pH mV -124.8
Turb 0.94 NTU ORP 38.0

- Flow rate w/ Marsh McBurney Flow meter

~~1235~~

1325 At MST045; sample time 1330

Temp 16.76°C DO% 155.2%
Spc Cond 0.821 mS/cm DO mg/L 14.95 mg/L
Cond 692 µS/cm pH 8.67
TDS 0.533 g/L pH mV -123.1 mV
Turb 1.12 NTU ORP 34.5

- Flow rate w/ Marsh McBurney

1430 At MSG004; sample time 1440

Temp 16.32°C DO% 19.4%
Spc Cond 0.606 mS/cm DO mg/L 1.95 mg/L
Cond 505 µS/cm pH 7.98
TDS 0.394 g/L pH mV -85.4 mV
Turb 89.50 NTU ORP 16.5

E. Yeager
J. Pierson

9/30/15 Fall SW Sampling

1515 At MDS030; sample time 1520.

Temp 10.23°C DO% 77.5%
Spc Cond 0.907 mS/cm DO mg/L 8.49 mg/L
Cond 651 µS/cm pH 7.30
TDS ~~0.394 g/L~~ 0.589 g/L pH mV –
Turb 63.22 NTU ORP 32.1 mV

1545 At MST069; sample time 1550.

Temp 13.53°C DO% 92.3%
Spc Cond 2.160 mS/cm DO mg/L 9.46 mg/L
Cond 1684 µS/cm pH 8.16
TDS 1.402 g/L pH mV -95.4
Turb 30.42 NTU ORP 26.4

1606 At MST019; sample time 1615

Temp 15.35°C DO% 109.9%
Spc Cond 0.361 mS/cm DO mg/L 10.99 mg/L
Cond 294 µS/cm pH 8.19
TDS 0.234 g/L pH mV -97.3 mV
Turb 2.75 NTU ORP 29.0

- Duplicate sample collected at MST019.
- Temp 15.14°C DO% ~~114.5%~~ 110.8%
Spc Cond 0.360 mS/cm DO mg/L ~~11.65~~ 11.13 mg/L
Cond 293 µS/cm pH 8.18
Turb 1.74 NTU pH mV -96.7 mV
TDS 0.235 g/L ORP 29.9 mV

- Flows note measured USGS staff gage showing 1.94 ft

E. Yeager
J. Pierson

9/30/15 Fall SW sampling

1711 At MST020; sample time 1720.

Temp	15.19 °C	DO%	108.0 %
Spc Cond	0.375 mS/cm	DO mg/L	10.90 mg/L
Cond.	305 µS/cm	pH	8.47
TDS	0.244 g/L	pH mV	-112.1 mV
Turb	2.73 NTU	ORP	24.3

- Flow rate w/ Marsh McBurney
- MS sample at MST020

Temp	14.83 °C	DO%	109.2%
Spc Cond	0.362 mS/cm	DO mg/L	11.03 mg/L
Cond	292 µS/cm	pH	8.16
TDS	0.236 g/L	pH mV	-95.5 mV
Turb	2.24 NTU	ORP	37.5

- MSD sample at MST020

Temp	14.85 °C	DO%	109.6%
Spc Cond	0.361 mS/cm	DO mg/L	11.08 mg/L
Cond	291 µS/cm	pH	8.18
TDS	0.235 g/L	pH mV	-96.5 mV
Turb	2.00 NTU	ORP	36.9

1830 1980 or 0110 for combination in field leading to MST020; Gate in middle of field

1837 Drop off materials at shop.

1850 Sign out at mine office.

APPENDIX B - 2015 SURFACE WATER AND GROUNDWATER ANALYTICAL DATA

B-1 2015 Surface Water and Groundwater Analyte List

B-2 Applicable or Relevant and Appropriate Requirements (ARARs)

B-3 2015 Surface Water Analytical Data

B-4 2015 Groundwater Analytical Data

B-1 2015 Surface Water and Groundwater Analyte List

TABLE B-1
2015 SURFACE WATER AND GROUNDWATER
ANALYTE LIST

Category	Fraction	Analytes (Analytical Method)
Surface Water		
Streams , Seeps, and Springs,	Unfiltered Filtered Filtered Filtered Filtered Unfiltered Unfiltered	Se (EPA 6020A) Cd, Se (EPA 6020A) V (EPA 6010B) Ca, Mg (EPA 6010B)[a] SO_4 (EPA 300.0) TDS (EPA 160.1) Field Parameters[b]
Groundwater		
Monitoring Wells and Direct Push Borehole Wells[c]	Unfiltered[d] Filtered Filtered Unfiltered Unfiltered	Cd, Mn, Se (EPA 6020A) Se (EPA 6020A) SO_4 (EPA 300.0) TDS (EPA 160.1) Field Parameters[b]
Location ID: SB07[e]	Unfiltered	PCE

Notes:

[a]Hardness is calculated on filtered fractions of Ca and Mg

[b]Field Parameters are listed on Table 3 and Table 5 of the *2014 Long-Term Surface Water and Groundwater Memo*.

[c]Borehole Monitoring Wells (direct push) are differentiated from “regular or standard” monitoring wells based on their methods and means of completion. In general, they have a smaller diameter and a shorter pre-packed screened interval than the regular monitoring wells.

[d]Direct-push monitoring wells may be sampled for dissolved or dissolved and total fractions depending on turbidity (see *2010 Groundwater SAP*).

[e]This sample was an one- time collection event and not currently part of the long term monitoring program.

BN – base neutral
Ca - Calcium
Cd - Cadmium
ID - identification
Mg – Magnesium
Mn – Manganese
PCE - Tetrachloroethene
Se - Selenium
SO_4 - Sulfate
TDS - Total Dissolved Solids
V - Vanadium

B-2 2015 Screening Levels

TABLE B-2 SCREENING LEVELS							
Analyte		**GW Levels (mg/l)**	**Source[a]**		**SW Levels (mg/l)**	**Source[b, c]**	**Notes**
Aluminum		0.2	Secondary MCL		0.087	NRWQC	aquatic life CCC
Antimony		0.006	Primary MCL		0.0056	IDAPA 58.01.02	human health w&o
Arsenic		0.01	Primary MCL		0.01	IDAPA 58.01.02	human health w&o
Barium		2	Primary MCL		--		
Beryllium		0.004	Primary MCL		--		
Boron		--			--		
Cadmium		0.005	Primary MCL		0.0006	IDAPA 58.01.02	aquatic life CCC
Chloride		250	Secondary MCL		--		
Chromium		0.1	Primary MCL		0.011	IDAPA 58.01.02	aquatic life CCC
Cobalt		--			--		
Copper		1.3	Primary MCL		0.011	IDAPA 58.01.02	aquatic life CCC
Fluoride		4	Primary MCL		--		
Iron		0.3	Secondary MCL		0.3	NRWQC	organoleptic effects
Lead		0.015	Primary MCL		0.0025	IDAPA 58.01.02	aquatic life CCC
Manganese		0.05	Secondary MCL		0.05	NRWQC	human health
Mercury		0.002	Primary MCL		0.00077	NRWQC	aquatic life CCC
Molybdenum		--			--		
Nickel		--			0.052	IDAPA 58.01.02	aquatic life CCC
Nitrate		10	Primary MCL		--		
Nitrite		1	Primary MCL		--		
Selenium		0.05	Primary MCL		0.005	IDAPA 58.01.02	aquatic life CCC
Silver		0.1	Secondary MCL		0.0034	IDAPA 58.01.02	aquatic life CCC
Sulfate		250	Secondary MCL		--		
TDS		500	Secondary MCL		--		
Thallium		0.002	Primary MCL		0.00024	IDAPA 58.01.02	aquatic life CCC
Uranium		0.03	Primary MCL		--		
Vanadium		--			--		
Zinc		5	Secondary MCL		0.12	IDAPA 58.01.02	aquatic life CCC
pH		6.5-8.5	Secondary MCL		6.5-9	NRWQC	aquatic life CCC
Tetrachloroethene (PCE)		0.005	Primary MCL				

Notes for Screening Levels

CCC chronic criteria
GW groundwater
MCL maximum contamination limit
mg/L milligram per liter
SW surface water

[a] USEPA primary and secondary Maximum Contaminant Level (MCL), National Primary Drinking Water Regulations
[b] State of Idaho Surface Water Quality for Aquatic Life (IDAPA 58.01.02); Chronic Criteria (CCC) or Water & Organi
[c] National Recommended Water Quality Criteria (USEPA, 2015); Freshwater Standards for Chronic Criteria (CCC)

B-3 2015 Surface Water Analytical Data

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS
(Page 1 of 17)

Analyte/Methods (Units)	Screening Levels	MDS025		MDS026		MDS026	
Location Identification		MDS025		MDS026		MDS026	
Location Type		Seep		Seep		Seep	
Date Collected		4/14/2015		4/16/2015		9/30/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	**0.000947**	--	**0.0059**	--	**0.000737**	--
Calcium	--	**281**	--	**293**	--	**378**	--
Magnesium	--	**78.7**	--	**74**	--	**85.9**	--
Selenium	0.005 mg/l	**0.0303**	**0.0363**	**0.0227**	**0.0514**	**0.0421**	**0.0297**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**1030**	--	**1040**	--	**1300**	--
Sulfate (as SO_4)	--	**791 D**	--	**719**	--	**713 D**	--
Total dissolved solids (Residue, filterable)	--	--	**1350**	--	**1310**	--	**1490**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MDS030		MDS030 Dup		MDS030 Avg	
Location Identification		MDS030		MDS030 Dup		MDS030 Avg	
Location Type		Seep		Seep		Seep	
Date Collected		4/15/2015		4/15/2015		4/15/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Calcium	--	**157 J**	--	**155 J**	--	**156**	--
Magnesium	--	**17.6 J**	--	**17.1 J**	--	**17.35**	--
Selenium	0.005 mg/l	**0.717 D**	**0.681 D**	**0.733 D**	**0.656 D**	**0.725 D**	**0.6685 D**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**465**	--	**459**	--	**462**	--
Sulfate (as SO_4)	--	**141 D**	--	**137 D**	--	**139 D**	--
Total dissolved solids (Residue, filterable)	--	--	**558**	--	**574**	--	**566**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MDS030		MDS034		MSG004	
Location Identification		MDS030		MDS034		MSG004	
Location Type		Seep		Seep		Spring	
Date Collected		9/30/2015		4/19/2015		4/15/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0003	--	<0.0003	--
Calcium	--	**188**	--	**113**	--	**80.5 J**	--
Magnesium	--	**20.1**	--	**36.4**	--	**25.8 J**	--
Selenium	0.005 mg/l	**0.905 D**	**1.03 D**	**0.00459**	**0.0072**	**0.032**	**0.0331**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**553**	--	**431**	--	**307**	--
Sulfate (as SO_4)	--	**165 D**	--	**16.2**	--	**52.6**	--
Total dissolved solids (Residue, filterable)	--	--	**602**	--	**514**	--	**330**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MSG004		MSG005		MSG006	
Location Identification		MSG004		MSG005		MSG006	
Location Type		Spring		Spring		Spring	
Date Collected		9/30/2015		4/15/2015		4/17/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0003	--	<0.0003	--
Calcium	--	**98.1**	--	**80.6**	--	**219**	--
Magnesium	--	**30.2**	--	**21.1**	--	**45.3**	--
Selenium	0.005 mg/l	**0.0183**	**0.0286**	**0.0107**	**0.012**	**0.236**	**0.222**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**369**	--	**288**	--	**734**	--
Sulfate (as SO_4)	--	**59.3**	--	**35.4**	--	**475**	--
Total dissolved solids (Residue, filterable)	--	--	**344**	--	**352**	--	**920**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MSG007		MST019		MST019	
Location Identification		MSG007		MST019		MST019	
Location Type		Spring		Stream		Stream	
Date Collected		4/17/2015		4/20/2015		9/30/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0006	--
Calcium	--	**66**	--	**56.2**	--	**62.6**	--
Magnesium	--	**18.5**	--	**10.7**	--	**15.3**	--
Selenium	0.005 mg/l	**0.0254**	**0.0858**	**0.00272**	**0.00332**	**0.00524**	**0.00246**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**241**	--	**185**	--	**219**	--
Sulfate (as SO_4)	--	**88.4**	--	**10.7**	--	**10.1**	--
Total dissolved solids (Residue, filterable)	--	--	**292**	--	**144**	--	**204**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Location Type Date Collected	MST019 Dup Stream 9/30/2015		MST019 Avg Stream 9/30/2015		MST020 Stream 4/20/2015	
	Screening Levels						
Metals (mg/l)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0003	--
Calcium	--	**61.6**	--	**62.1**	--	**54.1**	--
Magnesium	--	**14.9**	--	**15.1**	--	**10.5**	--
Selenium	0.005 mg/l	**0.00176**	**0.00142**	**0.0035**	**0.00194**	**0.00335**	**0.0033**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**215**	--	**217**	--	**178**	--
Sulfate (as SO_4)	--	**10.1**	--	**10.1**	--	**10.9**	--
Total dissolved solids (Residue, filterable)	--	--	**202**	--	**203**	--	**192**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MST020		MST044		MST044	
Location Identification		MST020		MST044		MST044	
Location Type		Stream		Stream		Stream	
Date Collected		9/30/2015		4/19/2015		9/30/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0003	--	<0.0006	--
Calcium	--	**60.2**	--	**75.4**	--	**67.9**	--
Magnesium	--	**14.2**	--	**24.4**	--	**30.6**	--
Selenium	0.005 mg/l	**0.00135**	**0.00152**	**0.00107**	**0.0013**	**0.00145**	**0.001**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**209**	--	**289**	--	**296**	--
Sulfate (as SO_4)	--	**10**	--	**101**	--	**154 D**	--
Total dissolved solids (Residue, filterable)	--	--	**206**	--	**398**	--	**448**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MST045		MST045		MST050	
Location Identification		MST045		MST045		MST050	
Location Type		Stream		Stream		Stream	
Date Collected		4/19/2015		9/30/2015		4/19/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0006	--	<0.0003	--
Calcium	--	**73.1**	--	**80.9**	--	**66.3**	--
Magnesium	--	**23.7**	--	**33.5**	--	**14.2**	--
Selenium	0.005 mg/l	**0.00114**	**0.000841 F**	**0.000885 F**	**0.00103**	<0.0005	<0.0005
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**280**	--	**340**	--	**224**	--
Sulfate (as SO_4)	--	**107**	--	**155 D**	--	**24.8**	--
Total dissolved solids (Residue, filterable)	--	--	**380**	--	**462**	--	**270**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MST057		MST063		MST066	
Location Identification		**MST057**		**MST063**		**MST066**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**4/19/2015**		**4/19/2015**		**4/20/2015**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Calcium	--	**67.7**	--	**108**	--	**58**	--
Magnesium	--	**12.3**	--	**21.2**	--	**16.7**	--
Selenium	0.005 mg/l	<0.0005	<0.0005	**0.00623**	**0.00651**	**0.00781**	**0.00932**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**220**	--	**357**	--	**213**	--
Sulfate (as SO_4)	--	**11.1**	--	**55.3**	--	**32.3**	--
Total dissolved solids (Residue, filterable)	--	--	**224**	--	**406**	--	**260**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MST067		MST069		MST069	
Location Identification		MST067		MST069		MST069	
Location Type		Stream		Stream		Stream	
Date Collected		4/17/2015		4/18/2015		9/30/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	**0.00151**	--	**0.000727**	--	<0.0006	--
Calcium	--	**200**	--	**373**	--	**490**	--
Magnesium	--	**57.9**	--	**78.9**	--	**90**	--
Selenium	0.005 mg/l	**0.386**	**0.504**	**1.39**	**1.51**	**1.25 D**	**1.91 D**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**737**	--	**1260**	--	**1590**	--
Sulfate (as SO_4)	--	**552**	--	**1150**	--	**981 D**	--
Total dissolved solids (Residue, filterable)	--	--	**992**	--	**1770**	--	**1900**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MST089		MST090		MST092	
Location Identification		**MST089**		**MST090**		**MST092**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**4/18/2015**		**4/18/2015**		**4/18/2015**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Calcium	--	**46.6**	--	**57.1**	--	**65.1**	--
Magnesium	--	**7.96**	--	**8.5**	--	**9.54**	--
Selenium	0.005 mg/l	**0.00128**	**0.00118**	<0.0005	<0.0005	**0.00187**	**0.00171**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**149**	--	**178**	--	**202**	--
Sulfate (as SO_4)	--	**11.3**	--	**6.43**	--	**46.6**	--
Total dissolved solids (Residue, filterable)	--	--	**190**	--	**224**	--	**246**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Location Type Date Collected	MST092 Dup Stream 4/18/2015		MST092 Avg Stream 4/18/2015		MST095 Stream 4/17/2015	
	Screening Levels						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Calcium	--	**63.8**	--	**64.45**	--	**127**	--
Magnesium	--	**9.21**	--	**9.375**	--	**30.2**	--
Selenium	0.005 mg/l	**0.00172**	**0.00184**	**0.001795**	**0.001775**	**0.16**	**0.156**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**197**	--	**199.5**	--	**443**	--
Sulfate (as SO_4)	--	**46.9**	--	**46.75**	--	**257**	--
Total dissolved solids (Residue, filterable)	--	--	**242**	--	**244**	--	**584**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MST096		MST128		MST131	
Location Identification		**MST096**		**MST128**		**MST131**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**4/17/2015**		**4/16/2015**		**4/16/2015**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Calcium	--	**67.6**	--	**44.9**	--	**31.4**	--
Magnesium	--	**11.1**	--	**7.69**	--	**5.94**	--
Selenium	0.005 mg/l	**0.0264**	**0.0285**	**0.00087 F**	**0.00145**	**0.00306**	**0.00212**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**214**	--	**144**	--	**103**	--
Sulfate (as SO_4)	--	**95.1**	--	**19.8**	--	**16.3**	--
Total dissolved solids (Residue, filterable)	--	--	**296**	--	**190**	--	**164**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Location Type Date Collected	MST132 Stream 4/16/2015		MST132 Dup Stream 4/16/2015		MST132 Avg Stream 4/16/2015	
	Screening Levels						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Calcium	--	**41.5**	--	**40.6**	--	**41.05**	--
Magnesium	--	**7.28**	--	**7.18**	--	**7.23**	--
Selenium	0.005 mg/l	**0.00123**	**0.0016**	**0.00174**	**0.00196**	**0.001485**	**0.00178**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**134**	--	**131**	--	**132.5**	--
Sulfate (as SO_4)	--	**18.6**	--	**18.5**	--	**18.55**	--
Total dissolved solids (Residue, filterable)	--	--	**180**	--	**180**	--	**180**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MST133		MST136		MST143	
Location Identification		**MST133**		**MST136**		**MST143**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**4/14/2015**		**4/14/2015**		**4/16/2015**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Calcium	--	**31.6**	--	**37.8**	--	**11.8**	--
Magnesium	--	**4.8**	--	**7.1**	--	**3.44**	--
Selenium	0.005 mg/l	**0.00303**	**0.00311**	**0.0121**	**0.0107**	<0.0005	<0.0005
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**98.7**	--	**124**	--	**43.7**	--
Sulfate (as SO_4)	--	**12.5**	--	**28.5**	--	**3.42**	--
Total dissolved solids (Residue, filterable)	--	--	**160**	--	**174**	--	**92**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MST144		MST226		MST274	
Location Identification		**MST144**		**MST226**		**MST274**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**4/14/2015**		**4/18/2015**		**4/16/2015**	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0003	--	<0.0003	--	<0.0003	--
Calcium	--	**104**	--	**35.7**	--	**66.4**	--
Magnesium	--	**26.4**	--	**6.51**	--	**10.1**	--
Selenium	0.005 mg/l	**0.446 D**	**0.465 D**	**0.00177**	**0.00225**	**0.00506**	**0.00517**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**368**	--	**116**	--	**208**	--
Sulfate (as SO_4)	--	**239 D**	--	**11.1**	--	**40**	--
Total dissolved solids (Residue, filterable)	--	--	**476**	--	**118**	--	**252**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

TABLE B-3

SUMMARY OF 2015 SURFACE WATER RESULTS
P4 RI/FS

	Location Identification	**MST274**		**MST275**	
	Location Type	**Stream**		**Stream**	
	Date Collected	**9/30/2015**		**4/14/2015**	
Analyte/Methods (Units)	**Screening Levels**				
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0003	--
Calcium	--	**101**	--	**8.84**	--
Magnesium	--	**12.6**	--	**2.26**	--
Selenium	0.005 mg/l	**0.00512**	**0.00499**	**0.00239**	**0.000586 F**
Chemistry Parameters (mg/l)					
Hardness (as $CaCO_3$)	--	**303**	--	**31.4**	--
Sulfate (as SO_4)	--	**40.4**	--	**2.06**	--
Total dissolved solids (Residue, filterable)	--	--	**292**	--	**110**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.

B-4 2015 Groundwater Analytical Data

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MBW006		MBW009		MBW011	
Location Identification		MBW006		MBW009		MBW011	
Sample Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		4/14/2015		4/15/2015		4/15/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	**0.00481 J+**	--	**0.0696**	--	**0.0812**
Selenium	0.05 mg/l	**0.396 D**	**0.371 D**	**0.00832**	**0.00938**	**0.553 D**	**0.386 D**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**446 D**	--	**385 D**	--	**165 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**364**	--	**836**	--	**494**
Volatile Organic Compounds (mg/l)							
Tetrachloroethene (PCE)	0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MBW027		MBW028		MBW032	
Location Identification		MBW027		MBW028		MBW032	
Sample Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		4/15/2015		4/17/2015		4/18/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	**0.000383 F**	--	**0.000317 F**	--	**0.00076**
Manganese	0.05 mg/l	--	<0.001	--	**0.0402**	--	**0.022**
Selenium	0.05 mg/l	**0.874 D**	**0.969 D**	**1.14 D**	**1.06 D**	**4.24 D**	**3.97 D**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**341 D**	--	**534 D**	--	**980 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**870**	--	**1020**	--	**1400**
Volatile Organic Compounds (mg/l)							
Tetrachloroethene (PCE)	0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	Screening Levels	MBW032 Dup Bore Hole Well 4/18/2015		MBW032 Avg Bore Hole Well 4/18/2015		MBW048 Bore Hole Well 4/18/2015	
Metals (mg/l)			**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium		0.005 mg/l	--	**0.000843**	--	**0.000802**	--	<0.0003
Manganese		0.05 mg/l	--	**0.0293**	--	**0.02565**	--	**0.316 D**
Selenium		0.05 mg/l	**4.18 D**	**3.93 D**	**4.21 D**	**3.95 D**	**0.000798 F**	**0.000513 F**
Chemistry Parameters (mg/l)								
Sulfate (as SO_4)		250 mg/l	**1000 D**	--	**990 D**	--	**5.57**	--
Total dissolved solids (Residue, filterable)		500 mg/l	--	**1420**	--	**1410**	--	**106**
Volatile Organic Compounds (mg/l)								
Tetrachloroethene (PCE)		0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification / Sample Type / Date Collected	MBW085 Bore Hole Well 4/14/2015		MBW087 Bore Hole Well 4/16/2015		MBW099 Bore Hole Well 4/17/2015	
	Screening Levels						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	**0.0394**	--	**0.031**	--	**0.00578 J+**
Selenium	0.05 mg/l	**0.0024**	**0.00192**	**0.00328**	**0.00151**	**0.00152**	**0.00153**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**21.6**	--	**22.5**	--	**29.6**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**204**	--	**340**	--	**202**
Volatile Organic Compounds (mg/l)							
Tetrachloroethene (PCE)	0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Screening Levels	MBW130		MBW131		MBW135	
Location Identification		MBW130		MBW131		MBW135	
Sample Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		4/18/2015		4/18/2015		4/19/2015	
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	**0.196**	--	**0.00804**	--	**0.106**
Selenium	0.05 mg/l	**0.000651 F**	**0.000596 F**	**0.00232**	**0.00309**	**0.000876 F**	**0.000663 F**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**9.49**	--	**3.12**	--	**49.9**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**130**	--	**126**	--	**222**
Volatile Organic Compounds (mg/l)							
Tetrachloroethene (PCE)	0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	MMW006 Monitoring Well 4/17/2015		MMW007 Monitoring Well 4/16/2015		MMW009 Monitoring Well 4/18/2015	
	Screening Levels						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	<0.001	--	**0.00828**	--	**0.073**
Selenium	0.05 mg/l	**0.116**	**0.114**	**0.00177**	**0.00204**	**0.00245**	<0.0005
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**78.5 D**	--	**13.3**	--	**63.4**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**320**	--	**150**	--	**370**
Volatile Organic Compounds (mg/l)							
Tetrachloroethene (PCE)	0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification / Sample Type / Date Collected	MMW010 Monitoring Well 4/18/2015		MMW011 Monitoring Well 4/19/2015		MMW013 Monitoring Well 4/14/2015	
	Screening Levels						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	**0.00443**	--	**0.000727**	--	<0.0003
Manganese	0.05 mg/l	--	**0.0152**	--	0.00101 FU	--	**0.0136**
Selenium	0.05 mg/l	**0.12**	**0.119**	**0.000763 F**	**0.000763 F**	**0.157**	**0.177**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**562 D**	--	**142 D**	--	**171 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**1140**	--	**476**	--	**482**
Volatile Organic Compounds (mg/l)							
Tetrachloroethene (PCE)	0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	Screening Levels	MMW017 Monitoring Well 4/15/2015		MMW018 Monitoring Well 4/17/2015		MMW020 Monitoring Well 4/17/2015	
Metals (mg/l)			**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium		0.005 mg/l	--	**0.00047 F**	--	<0.0003	--	**0.00783**
Manganese		0.05 mg/l	--	**0.00388 J+**	--	**0.0298**	--	**0.084**
Selenium		0.05 mg/l	**0.145**	**0.137**	**0.0287**	**0.0298**	**0.0322**	**0.0306**
Chemistry Parameters (mg/l)								
Sulfate (as SO_4)		250 mg/l	**509 D**	--	**46.8**	--	**283 D**	--
Total dissolved solids (Residue, filterable)		500 mg/l	--	**1080**	--	**268**	--	**766**
Volatile Organic Compounds (mg/l)								
Tetrachloroethene (PCE)		0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	Screening Levels	MMW021 Monitoring Well 4/15/2015		MMW022 Monitoring Well 4/19/2015		MMW023 Monitoring Well 4/19/2015	
Metals (mg/l)			**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium		0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese		0.05 mg/l	--	<0.001	--	**0.0232**	--	**0.329 D**
Selenium		0.05 mg/l	**0.0533**	**0.0581**	**0.0471**	**0.0411**	**0.000662 F**	**0.000639 F**
Chemistry Parameters (mg/l)								
Sulfate (as SO_4)		250 mg/l	**45.9**	--	**274 D**	--	**209 D**	--
Total dissolved solids (Residue, filterable)		500 mg/l	--	**354**	--	**608**	--	**764**
Volatile Organic Compounds (mg/l)								
Tetrachloroethene (PCE)		0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	MMW024 Monitoring Well 4/14/2015		MMW025 Monitoring Well 4/20/2015		MMW026 Monitoring Well 4/16/2015	
	Screening Levels						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	<0.001	--	**0.00126 F**	--	<0.001
Selenium	0.05 mg/l	**0.0864**	**0.0848**	**0.000526 F**	**0.000791 F**	**0.00186**	**0.00177**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**253 D**	--	**12.6**	--	**23.5**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**1190**	--	**116**	--	**238**
Volatile Organic Compounds (mg/l)							
Tetrachloroethene (PCE)	0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	Screening Levels	MMW027 Monitoring Well 4/20/2015		MMW028 Monitoring Well 4/19/2015		MMW028 Dup Monitoring Well 4/19/2015	
Metals (mg/l)			**Dissolved**	**Total**	**Dissolved**	**Total**	**Total**	**Total**
Cadmium		0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese		0.05 mg/l	--	<0.001	--	**0.00277 J+**	--	**0.00253 J+**
Selenium		0.05 mg/l	**0.719 D**	**0.826 D**	**0.00224**	**0.00335**	**0.00221**	**0.00217**
Chemistry Parameters (mg/l)								
Sulfate (as SO_4)		250 mg/l	**322 D**	--	**71**	--	**70.7**	--
Total dissolved solids (Residue, filterable)		500 mg/l	--	**716**	--	**316**	--	**306**
Volatile Organic Compounds (mg/l)								
Tetrachloroethene (PCE)		0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	MMW028 Avg Monitoring Well 4/19/2015		MMW029 Monitoring Well 4/18/2015		MMW030 Monitoring Well 4/18/2015	
	Screening Levels						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	**0.00265**	--	0.0013 FU	--	**0.0918**
Selenium	0.05 mg/l	**0.002225**	**0.00276**	**0.707 D**	**0.701 D**	**0.000564 F**	**0.000604 F**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**70.85**	--	**698 D**	--	**15.3**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**311**	--	**1290**	--	**214**
Volatile Organic Compounds (mg/l)							
Tetrachloroethene (PCE)	0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	Screening Levels	MMW031 Monitoring Well 4/15/2015		MMW032 Monitoring Well 4/17/2015		MMW033 Monitoring Well 4/18/2015	
Metals (mg/l)			**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium		0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese		0.05 mg/l	--	<0.001	--	**0.00334 J+**	--	**0.0437**
Selenium		0.05 mg/l	**0.0015**	**0.00126**	**0.00206**	**0.0025**	**0.000741 F**	**0.000679 F**
Chemistry Parameters (mg/l)								
Sulfate (as SO_4)		250 mg/l	**3.27**	--	**5.48**	--	**26.5**	--
Total dissolved solids (Residue, filterable)		500 mg/l	--	**178**	--	**200**	--	**238**
Volatile Organic Compounds (mg/l)								
Tetrachloroethene (PCE)		0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	MMW034 Monitoring Well 4/14/2015		MMW034 Dup Monitoring Well 4/14/2015		MMW034 Avg Monitoring Well 4/14/2015	
	Screening Levels						
Metals (mg/l)		**Dissolved**	**Total**	**Total**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	0.00193 FU	--	0.00152 FU	--	**0.001725 F**
Selenium	0.05 mg/l	**0.106**	**0.111**	**0.117**	**0.115**	**0.1115**	**0.113**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**153 D**	--	**145 D**	--	**149 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**336**	--	**312**	--	**324**
Volatile Organic Compounds (mg/l)							
Tetrachloroethene (PCE)	0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	MMW035 Monitoring Well 4/20/2015		MMW036 Monitoring Well 4/20/2015		MMW037 Monitoring Well 4/20/2015	
	Screening Levels						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	<0.001	--	**0.00277**	--	**0.00477**
Selenium	0.05 mg/l	**1.27 D**	**1.27 D**	**0.0186**	**0.0192**	**0.0266**	**0.0264**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**535 D**	--	**22**	--	**29.4**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**1030**	--	**210**	--	**228**
Volatile Organic Compounds (mg/l)							
Tetrachloroethene (PCE)	0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	MMW037 Dup Monitoring Well 4/20/2015		MMW037 Avg Monitoring Well 4/20/2015		MW15A Monitoring Well 4/17/2015	
	Screening Levels						
Metals (mg/l)		**Total**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--	<0.0003	--	<0.0003
Manganese	0.05 mg/l	--	**0.00454**	--	**0.004655**	--	**0.00479 J+**
Selenium	0.05 mg/l	**0.0273**	**0.0252**	**0.02695**	**0.0258**	**1.95 D**	**2.39 D**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**29.4**	--	**29.4**	--	**673 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**230**	--	**229**	--	**1320**
Volatile Organic Compounds (mg/l)							
Tetrachloroethene (PCE)	0.005 mg/l	--	--	--	--	--	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

TABLE B-4

SUMMARY OF 2015 GROUNDWATER RESULTS
P4 RI/FS

Analyte/Methods (Units)	Location Identification Sample Type Date Collected	MW16A Monitoring Well 4/13/2015		SB07 Temporary Monitoring Point 4/19/2015
	Screening Levels			
Metals (mg/l)		**Dissolved**	**Total**	**Total**
Cadmium	0.005 mg/l	--	<0.0003	--
Manganese	0.05 mg/l	--	**1.99 D**	--
Selenium	0.05 mg/l	**0.0106**	**0.0109**	--
Chemistry Parameters (mg/l)				
Sulfate (as SO_4)	250 mg/l	**828 D**	--	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**1420**	--
Volatile Organic Compounds (mg/l)				
Tetrachloroethene (PCE)	0.005 mg/l	--	--	**0.0132**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.
D Sample dilution required for analysis; reported values reflect the dilution.
F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.
J Data are estimated due to associated quality control data.
J+ Data are estimated due to associated quality control data. Potential high bias.
U Analyte considered not detected based on concentration in associated blank.

APPENDIX C - LABORATORY DATA CONSULTANTS (LDC) THIRD PARTY VERIFICATION REPORTS

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

MWH Americas, Inc.
2890 East Cottonwood Parkway Suite 300
Salt Lake City, UT 84121
ATTN: Ms. Betty VanPelt

May 19, 2015

SUBJECT: Monsanto, P4 Background, Data Validation

Dear Ms. VanPelt,

Enclosed is the final validation report for the fraction listed below. This SDG was received on May 4, 2015. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #34210:

SDG #	Fraction
L15041399	Tetrachloroethene

The data verification was performed under Stage 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

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

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

Sincerely,

Christina Rink
Project Manager/Chemist

HC

Attachment 1

2B/4

LDC #34210 (MWH Americas, Inc.-Salt Lake City, UT / Monsanto, P4 Background)

LDC	SDG#	DATE REC'D	(3) DATE DUE	TCE (8260B)																																	
Matrix: Water/Soil				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	L15041399	05/04/15	05/26/15	1	0																																
Total	A/CR			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Shaded cells indicate Stage 4 review (all other cells are Stage 2B review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs L:\MWH\Monsanto P4\34210ST.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

LDC Report Date: May 18, 2015

Parameters: Tetrachloroethene

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L15041399

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
1504-SB07	L15041399-01	Water	04/19/15

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Tetrachloroethene by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Stage 4 data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, percent relative standard deviations (%RSD) were less than or equal to 15.0%.

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

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) were less than or equal to 20.0%.

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

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

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

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

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

XII. Compound Quantitation

All compound quantitations met validation criteria.

XIII. Target Compound Identifications

All target compound identifications met validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Monsanto, P4 Production LLC
Tetrachloroethene - Data Qualification Summary - SDG L15041399

No Sample Data Qualified in this SDG

Monsanto, P4 Production LLC
Tetrachloroethene - Laboratory Blank Data Qualification Summary - SDG L15041399

No Sample Data Qualified in this SDG

Monsanto, P4 Production LLC
Tetrachloroethene - Field Blank Data Qualification Summary - SDG L15041399

No Sample Data Qualified in this SDG

LDC #: 34210A1
SDG #: L15041399
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

~~Level III~~ Stage 4

Date: 5/8/15
Page: 1 of 1
Reviewer:
2nd Reviewer:

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

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	% RSD ≤ 15 ICV ≤ 20
IV.	Continuing calibration	A	CCV ≤ 20
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	insufficient Amt
IX.	Laboratory control samples	A	LCS 115
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504-SB07	L15041399-01	Water	04/19/15
2				
3				
4				
5				
6				

Notes:

	WG520707-MB						

LDC #: 34210A1

VALIDATION FINDINGS CHECKLIST

Reviewer: FT
2nd Reviewer: CM

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?			✓	
Was a curve fit used for evaluation?		✓		
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.			✓	
Was a MS/MSD analyzed every 20 samples of each matrix?			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 34210A1

VALIDATION FINDINGS CHECKLIST

Reviewer: FT
2nd Reviewer: OV

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XII. Compound quantitation/RLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?			✓	
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XVII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

LDC #: 34210A1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FT
2nd Reviewer: CQ

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

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

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (20 std)	Recalculated RRF (20 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL ~~Cal~~ F7	4/7/15	(1st internal standard)						
			AA (2nd internal standard)	0.348	0.348	0.32749	0.32749	7.35149	7.35
			(3rd internal standard)						
			(4th internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						

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

LDC #: 34210A1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: FT
2nd Reviewer: 92

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

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

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	CCV 11:21	4/23/15	(1st internal standard)					
			AN (2nd internal standard)	0.32749	0.338	0.338	3.2	3.2
			(3rd internal standard)					
			(4th internal standard)					
2			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					

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

LDC #: 34210A 1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: FT
2nd reviewer: [illegible]

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: # 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	25.0	24.3479	97.4	97.4	0
1,2-Dichloroethane-d4		23.8699	95.5	95.5	
Toluene-d8		24.0256	96.1	96.1	
Bromofluorobenzene		24.8802	99.5	99.5	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

LDC #: 34210A 1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: FT
2nd Reviewer: CZ

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

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

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS ID: LCS 110

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Tetrachloroethene ~~1,1-Dichloroethene~~	20.0	20.0	21.0	20.9	105	105	104	104	0.734	0.734
Trichloroethene										
Benzene										
Toluene										
~~Chlorobenzene~~										

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

LDC #: 34210A1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT
2nd reviewer: CN

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

Y N N/A Were all reported results recalculated and verified for all level IV samples?

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

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. #1, A-A

Conc. = $\frac{\cancel{13.2374}\ 74255\ \text{Fl}\ (25)}{428216\ (0.32749)}$

=

13.2 ug/L

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

MWH Americas, Inc.
2890 East Cottonwood Parkway Suite 300
Salt Lake City, UT 84121
ATTN: Ms. Betty VanPelt

February 11, 2016

SUBJECT: Revised Monsanto, P4 Background, Data Validation

Dear Ms. VanPelt,

Enclosed are the revised validation reports for the fractions listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project #34243:

SDG #	Fraction
L15041237, L15041292, L15041295	Metals, Wet Chemistry

- Client sample ID for laboratory sample L15041237-03 revised to 1504GWMBW006-U.

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

Sincerely,

Christina Rink
Project Manager/Chemist

HC

Attachment 1

2B/4

LDC #34243 (MWH Americas, Inc.-Salt Lake City, UT / Monsanto, P4 Background)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Se (6020A)		(3) Metals (6020A)		Diss. Se (6020A)		Diss. Cd,Se (6020A)		Diss. Ca,Mg (6010C)		Hard. (2340B)		SO_4 (300.0)		TDS (2540C)																			
Matrix: Water/Soil				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	L15041237	05/08/15	06/01/15	-	-	10	0	10	0	-	-	-	-	-	-	10	0	10	0																		
B	L15041292	05/08/15	06/01/15	3	0	-	-	-	-	3	0	3	0	3	0	3	0	3	0																		
C	L15041295	05/08/15	06/01/15	-	-	3	0	3	0	-	-	-	-	-	-	3	0	3	0																		
Total	T/CR			3	0	13	0	13	0	3	0	3	0	3	0	16	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70

Shaded cells indicate Stage 4 review (all other cells are Stage 2B review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs L:\MWH\Monsanto P4\34243ST.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: February 11, 2016

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041237

Sample Identification	Collection Date	Laboratory Sample Identification
1504GWMMW16A-U	04/13/15	L15041237-01
1504GWMBW006-U	04/14/15	L15041237-03
1504GWMMW024-U	04/14/15	L15041237-05
1504GWMMW034-1-U	04/14/15	L15041237-07
1504GWMMW034-2-U	04/14/15	L15041237-09
1504GWMMW013-U	04/14/15	L15041237-11
1504GWMMW021-U	04/15/15	L15041237-13
1504GWMMW031-U	04/15/15	L15041237-15
1504GWMMW017-U	04/15/15	L15041237-17
1504GWMMW027-U	04/15/15	L15041237-19
1504GWMMW16A-F	04/13/15	L15041237-02
1504GWMMW006-F	04/14/15	L15041237-04
1504GWMMW024-F	04/14/15	L15041237-06
1504GWMMW034-1-F	04/14/15	L15041237-08
1504GWMMW034-2-F	04/14/15	L15041237-10
1504GWMMW013-F	04/14/15	L15041237-12
1504GWMMW021-F	04/15/15	L15041237-14
1504GWMMW031-F	04/15/15	L15041237-16
1504GWMMW017-F	04/15/15	L15041237-18
1504GWMMW027-F	04/15/15	L15041237-20
1504GWMMW027-FMS	04/15/15	L15041237-20MS
1504GWMMW027-FMSD	04/15/15	L15041237-20MSD

Introduction

This data review covers 22 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.00133 mg/L	1504GWMMW16A-U 1504GWMBW006-U 1504GWMMW024-U 1504GWMMW034-1-U 1504GWMMW034-2-U 1504GWMMW013-U 1504GWMMW021-U 1504GWMMW031-U 1504GWMMW017-U 1504GWMMW027-U

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines. No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1504GWMBW006-U	Manganese	0.00481 mg/L	0.00481J+ mg/L
1504GWMMW034-1-U	Manganese	0.00193 mg/L	0.00193U mg/L
1504GWMMW034-2-U	Manganese	0.00152 mg/L	0.00152U mg/L
1504GWMMW017-U	Manganese	0.00388 mg/L	0.00388J+ mg/L

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

For 1504GWMMW027-FMS/MSD, no data were qualified for Selenium percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041237

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15041237

SDG	Sample	Analyte	Modified Final Concentration	A or P	Reason Code
L15041237	1504GWMBW006-U	Manganese	0.00481J+ mg/L	A	11
L15041237	1504GWMMW034-1-U	Manganese	0.00193U mg/L	A	11
L15041237	1504GWMMW034-2-U	Manganese	0.00152U mg/L	A	11
L15041237	1504GWMMW017-U	Manganese	0.00388J+ mg/L	A	11

Metals - Field Blank Data Qualification Summary - SDG L15041237

No Sample Data Qualified in this SDG

LDC #: 34243A4~~a~~b

SDG #: L15041237

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/11/15

Page: 1 of 2

Reviewer: JO

2nd Reviewer: AL

METHOD: Metals (EPA SW 846 Method 6020A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/13-15/15
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	SW	MSD-(21,22)
VIII.	Duplicate sample analysis	N	
IX.	ICP Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	Not Reviewed
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504GWMMW16A-U	L15041237-01	Water	04/13/15
2	1504GWMMW006-U	L15041237-03	Water	04/14/15
3	1504GWMMW024-U	L15041237-05	Water	04/14/15
4	1504GWMMW034-1-U	L15041237-07	Water	04/14/15
5	1504GWMMW034-2-U	L15041237-09	Water	04/14/15
6	1504GWMMW013-U	L15041237-11	Water	04/14/15
7	1504GWMMW021-U	L15041237-13	Water	04/15/15
8	1504GWMMW031-U	L15041237-15	Water	04/15/15
9	1504GWMMW017-U	L15041237-17	Water	04/15/15
10	1504GWMMW027-U	L15041237-19	Water	04/15/15
11	1504GWMMW16A-F	L15041237-02	Water	04/13/15
12	1504GWMMW006-F	L15041237-04	Water	04/14/15
13	1504GWMMW024-F	L15041237-06	Water	04/14/15
14	1504GWMMW034-1-F	L15041237-08	Water	04/14/15
15	1504GWMMW034-2-F	L15041237-10	Water	04/14/15

LDC #: 34243A4b

SDG #: L15041237

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/11/15

Page: 2 of 2

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
16	1504GWMMW013-F	L15041237-12	Water	04/14/15
17	1504GWMMW021-F	L15041237-14	Water	04/15/15
18	1504GWMMW031-F	L15041237-16	Water	04/15/15
19	1504GWMMW017-F	L15041237-18	Water	04/15/15
20	1504GWMMW027-F	L15041237-20	Water	04/15/15
21	1504GWMMW027-FMS	L15041237-20MS	Water	04/15/15
22	1504GWMMW027-FMSD	L15041237-20MSD	Water	04/15/15
23				
24				
25				
26				
27				

Notes:

LDC #: 34243A4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: SD
2nd reviewer: CL

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
11-20	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
QC: 21-20	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___

Comments: Mercury by CVAA if performed

LDC #:34243A4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JD
2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 864 Method 6010/6020/7000)
Soil preparation factor applied: ____
Sample Concentration units, unless otherwise noted: mg/L
Associated Samples: 1-10 (11)

					Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (mg/L)	Action Level	2	4	5	9							
Mn		0.00133		0.00665	0.00481J+	0.00193U	0.00152U	0.00388J+							

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 34243A4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JD
2nd Reviewer: [illegible]

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

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

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

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for samples?

LEVEL IV ONLY:

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	21/22	W	Se		137		All	No Qual: >4X (16)

Comments:

Report# 34243A6_RV1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: February 11, 2016

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041237

Sample Identification	Collection Date	Laboratory Sample Identification
1504GWMMW16A-U	04/13/15	L15041237-01
1504GWMBW006-U	04/14/15	L15041237-03
1504GWMMW024-U	04/14/15	L15041237-05
1504GWMMW034-1-U	04/14/15	L15041237-07
1504GWMMW034-2-U	04/14/15	L15041237-09
1504GWMMW013-U	04/14/15	L15041237-11
1504GWMMW021-U	04/15/15	L15041237-13
1504GWMMW031-U	04/15/15	L15041237-15
1504GWMMW017-U	04/15/15	L15041237-17
1504GWMMW027-U	04/15/15	L15041237-19
1504GWMMW16A-F	04/13/15	L15041237-02
1504GWMMW006-F	04/14/15	L15041237-04
1504GWMMW024-F	04/14/15	L15041237-06
1504GWMMW034-1-F	04/14/15	L15041237-08
1504GWMMW034-2-F	04/14/15	L15041237-10
1504GWMMW013-F	04/14/15	L15041237-12
1504GWMMW021-F	04/15/15	L15041237-14
1504GWMMW031-F	04/15/15	L15041237-16
1504GWMMW017-F	04/15/15	L15041237-18
1504GWMMW027-F	04/15/15	L15041237-20

Introduction

This data review covers 20 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the method noted below:

- EPA Method 300.0 for Sulfate and Standard Method 2540-C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

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

Wet Chemistry - Data Qualification Summary - SDG L15041237

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L15041237

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L15041237

No Sample Data Qualified in this SDG

LDC #: 34243A6

SDG #: L15041237

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/11/15

Page: 1 of 2

Reviewer: JD

2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (~~EPA Method 160.1~~ SM 2540-C)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/13-15/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	Neg Blank
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A~~N~~	~~CS~~ SD MS/D= Non-Client = Not Reviewed
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	Not Reviewed
X.	Sample result verification	N	
XI	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504GWMMW16A-U	L15041237-01	Water	04/13/15
2	1504GWM~~M~~B W006-U	L15041237-03	Water	04/14/15
3	1504GWMMW024-U	L15041237-05	Water	04/14/15
4	1504GWMMW034-1-U	L15041237-07	Water	04/14/15
5	1504GWMMW034-2-U	L15041237-09	Water	04/14/15
6	1504GWMMW013-U	L15041237-11	Water	04/14/15
7	1504GWMMW021-U	L15041237-13	Water	04/15/15
8	1504GWMMW031-U	L15041237-15	Water	04/15/15
9	1504GWMMW017-U	L15041237-17	Water	04/15/15
10	1504GWMMW027-U	L15041237-19	Water	04/15/15
11	1504GWMMW16A-F	L15041237-02	Water	04/13/15
12	1504GWMMW006-F	L15041237-04	Water	04/14/15
13	1504GWMMW024-F	L15041237-06	Water	04/14/15
14	1504GWMMW034-1-F	L15041237-08	Water	04/14/15
15	1504GWMMW034-2-F	L15041237-10	Water	04/14/15
16	1504GWMMW013-F	L15041237-12	Water	04/14/15
17	1504GWMMW021-F	L15041237-14	Water	04/15/15

LDC #: 34243A6

SDG #: L15041237

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/12/15

Reviewer: 3D

2nd Reviewer: a

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID	Lab ID	Matrix	Date
18	1504GWMMW031-F	L15041237-16	Water	04/15/15
19	1504GWMMW017-F	L15041237-18	Water	04/15/15
20	1504GWMMW027-F	L15041237-20	Water	04/15/15
21				
22				
23				
24				
25				

Notes:

LDC #: 34243A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JD
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1-10	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
11-20	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 34243A6

VALIDATION FINDINGS WORKSHEET
Negative Blanks

Reviewer: JD
2nd Reviewer: al

METHOD: Inorganics, Method See Cover
The absolute value of the negative blank conentrations listed below exceeded the RL

#	Blank ID	Analyte	Negative Blank Concentration	RL	Associated Samples	Qualifications
		TDS	-10.0 mg/L	10.0 mg/L	6, 9-10	No Qual. (>10X RL) (UL)

Comments:

Report# 34243B4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 19, 2015

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010C

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L15041292

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMSG004-F	04/15/15	L15041292-02
1504SWMDS030-1-F	04/15/15	L15041292-04
1504SWMDS030-2-F	04/15/15	L15041292-06

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010C ICP: Calcium and Magnesium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

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

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1504SWMDS030-1-F	Calcium Magnesium	16.30 (≤10) 13.80 (≤10)	All samples in SDG L15041292	J (all detects) J (all detects)	A

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041292

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L15041292	1504SWMSG004-F 1504SWMDS030-1-F 1504SWMDS030-2-F	Calcium Magnesium	J (all detects) J (all detects)	A	Serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG L15041292

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L15041292

No Sample Data Qualified in this SDG

LDC #: 34243B4~~b~~a

SDG #: L1501292

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B ~~4~~ SD

Date: 5/11/15

Page: 1 of 1

Reviewer: SD

2nd Reviewer: a

METHOD: Metals (EPA SW 846 Method 6010C)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/15/15
II.	Instrument Calibration	A	
III.	ICP Interference Check Sample (ICS) Analysis	A	
IV.	Laboratory Blanks	A	
V.	Field Blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	MSD=Non Client Sample (L15041560-06)
VII.	Duplicate sample analysis	N	
VIII.	ICP Serial Dilution	SW	
IX.	Laboratory control samples	A	LCS
X.	Field Duplicates	N	Not Reviewed
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

~~**Stage 4~~ SD

	Client ID	Lab ID	Matrix	Date
1	1504SWMSG004-F ~~**~~ SD	L15041292-02	Water	04/15/15
2	1504SWMDS030-1-F ~~**~~ ↓	L15041292-04	Water	04/15/15
3	1504SWMDS030-2-F	L15041292-06	Water	04/15/15
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

Notes:

LDC #: 34243B46

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: SD
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 34243B4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: SD
2nd Reviewer: OL

METHOD: Trace Metals (EPA SW 846 Method 6010C/6020A/7471B)

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

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >50X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
	2	W	Ca	16.30	All	J/UJ/A (det) (18)
			Mg	13.80		J/UJ/A (det) (18)

Comments:

Report# 34243B4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 19, 2015

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041292

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMSG004-U	04/15/15	L15041292-01
1504SWMDS030-1-U	04/15/15	L15041292-03
1504SWMDS030-2-U	04/15/15	L15041292-05
1504SWMSG004-F	04/15/15	L15041292-02
1504SWMDS030-1-F	04/15/15	L15041292-04
1504SWMDS030-2-F	04/15/15	L15041292-06

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

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

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

Selenium results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L15041398-01) is representative of client's sample matrix.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041292

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15041292

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L15041292

No Sample Data Qualified in this SDG

LDC #: 34243B4~~5~~b

SDG #: L15041292

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B 4 SD

Date: 5/11/15

Page: 1 of 1

Reviewer: JD

2nd Reviewer: a

METHOD: Metals (EPA SW 846 Method 6020A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/15/15
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MS/D = 1504GWMBW009FMS/D (SDG: L1504 1295)
VIII.	Duplicate sample analysis	N	
IX.	ICP Serial Dilution	SW	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	Not Reviewed
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet ~~** Stage 4~~ SD; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504SWMSG004-U ~~**~~	L15041292-01	Water	04/15/15
2	1504SWMDS030-1-U ~~**~~	L15041292-03	Water	04/15/15
3	1504SWMDS030-2-U	L15041292-05	Water	04/15/15
4	1504SWMSG004-F ~~**~~	L15041292-02	Water	04/15/15
5	1504SWMDS030-1-F ~~**~~	L15041292-04	Water	04/15/15
6	1504SWMDS030-2-F	L15041292-06	Water	04/15/15
7				
8				
9				
10				
11				
12				

Notes:

LDC #: 34243B4c

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: JD
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
4-6	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 34243B4a

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: SD
2nd Reviewer: al

METHOD: Trace Metals (EPA SW 846 Method 6010C/6020A/7471B)

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

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >50X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
	Non-client sample (L15041398-01)	W	Se	37.00	All	No Qual. (Non-client sample) (18)

Comments:

Report# 34243B6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 20, 2015

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041292

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMSG004-U	04/15/15	L15041292-01
1504SWMDS030-1-U	04/15/15	L15041292-03
1504SWMDS030-2-U	04/15/15	L15041292-05
1504SWMSG004-F	04/15/15	L15041292-02
1504SWMDS030-1-F	04/15/15	L15041292-04
1504SWMDS030-2-F	04/15/15	L15041292-06

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the method noted below:

- Standard Method 2340B for Hardness, EPA Method 300.0 for Sulfate, and Standard Method 2540-C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 7 days for method 2540C, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

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

Wet Chemistry - Data Qualification Summary - SDG L15041292

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L15041292

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L15041292

No Sample Data Qualified in this SDG

LDC #: 34243B6

SDG #: L15041292

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4 JD

Date: 5/11/15

Page: 1 of 1

Reviewer: JD

2nd Reviewer: [illegible]

METHOD: (Analyte) Hardness (SM2340B), Sulfate (EPA Method 300.0), TDS (~~EPA Method 160.1~~ SM2540C)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/15/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks JD	~~A~~ SW	Neg Blank
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	~~N~~ A	~~LCS~~ JD MSD = Non-Client = Not Reviewed
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCSD
IX.	Field duplicates	N	Not Reviewed
X.	Sample result verification	N	
XI	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

**Stage 4 JD

JD

	Client ID	Lab ID	Matrix	Date
1	1504SWMSG004-U **	L15041292-01	Water	04/15/15
2	1504SWMDS030-1-U **	L15041292-03	Water	04/15/15
3	1504SWMDS030-2-U	L15041292-05	Water	04/15/15
4	1504SWMSG004-F **	L15041292-02	Water	04/15/15
5	1504SWMDS030-1-F **	L15041292-04	Water	04/15/15
6	1504SWMDS030-2-F	L15041292-06	Water	04/15/15
7				
8				
9				
10				
11				
12				
13				
14				

Notes:

LDC #: 34243B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JD
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1-3	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
4-6	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 hardness
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 34243B6

VALIDATION FINDINGS WORKSHEET
Negative Blanks

Page: 1 of 1
Reviewer: JD
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover
The absolute value of the negative blank conentrations listed below exceeded the RL

#	Blank ID	Analyte	Negative Blank Concentration	RL	Associated Samples	Qualifications
		TDS	-10.0 mg/L	10.0 mg/L	1-3	No Qual. (>10X RL) (11)

Comments:

NEGBLANK.4SW.wpd

Report# 34243C4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 19, 2015

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041295

Sample Identification	Collection Date	Laboratory Sample Identification
1504GWMBW085-U	04/14/15	L15041295-01
1504GWMBW011-U	04/15/15	L15041295-03
1504GWMBW009-U	04/15/15	L15041295-05
1504GWMBW085-F	04/14/15	L15041295-02
1504GWMBW011-F	04/15/15	L15041295-04
1504GWMBW009-F	04/15/15	L15041295-06
1504GWMBW009-FMS	04/15/15	L15041295-06MS
1504GWMBW009-FMSD	04/15/15	L15041295-06MSD

Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

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

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

Selenium results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (L15041398-01) is representative of client's sample matrix.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041295

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15041295

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L15041295

No Sample Data Qualified in this SDG

LDC #: 34243C4~~b~~b

SDG #: L15041295

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/11/15

Page: 1 of 1

Reviewer: JD

2nd Reviewer: G

METHOD: Metals (EPA SW 846 Method 6020A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/14 - 15/15
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MS/D = (7,8)
VIII.	Duplicate sample analysis	N	
IX.	ICP Serial Dilution	SW	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504GWMBW085-U	L15041295-01	Water	04/14/15
2	1504GWMBW011-U	L15041295-03	Water	04/15/15
3	1504GWMBW009-U	L15041295-05	Water	04/15/15
4	1504GWMBW085-F	L15041295-02	Water	04/14/15
5	1504GWMBW011-F	L15041295-04	Water	04/15/15
6	1504GWMBW009-F	L15041295-06	Water	04/15/15
7	1504GWMBW009-FMS	L15041295-06MS	Water	04/15/15
8	1504GWMBW009-FMSD	L15041295-06MSD	Water	04/15/15
9				
10				
11				
12				

Notes:

LDC #: 34243C4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: SD
2nd reviewer: a

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
4-6	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC-7-8	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 34243B4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: JD
2nd Reviewer: AL

METHOD: Trace Metals (EPA SW 846 Method 6010C/6020A/7471B)

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

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >50X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
	Non-client Sample (L15041398-01)	W	Se	37.00	All	~~J/UJ/A~~ (det) (18) No Qual (non client)

Comments:

Report# 34243C6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 20, 2015

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041295

Sample Identification	Collection Date	Laboratory Sample Identification
1504GWMBW085-U	04/14/15	L15041295-01
1504GWMBW011-U	04/15/15	L15041295-03
1504GWMBW009-U	04/15/15	L15041295-05
1504GWMBW085-F	04/14/15	L15041295-02
1504GWMBW011-F	04/15/15	L15041295-04
1504GWMBW009-F	04/15/15	L15041295-06
1504GWMBW085-UDUP	04/14/15	L15041295-01DUP
1504GWMBW011-UDUP	04/15/15	L15041295-03DUP

Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the method noted below:

- EPA Method 300.0 for Sulfate and Standard Method 2540-C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

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

Wet Chemistry - Data Qualification Summary - SDG L15041295

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L15041295

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L15041295

No Sample Data Qualified in this SDG

LDC #: 34243C6

SDG #: L15041295

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/11/15

Page: 1 of 1

Reviewer: JO

2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (~~EPA Method 160.1~~ SM 2540 C)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/15/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	Neg Blank
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	~~N~~ A	~~ES~~ 30 MSD = Non-Client = Not Reviewed
VII.	Duplicate sample analysis	A	
VIII.	Laboratory control samples	A	LCS10
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504GWMBW085-U	L15041295-01	Water	04/14/15
2	1504GWMBW011-U	L15041295-03	Water	04/15/15
3	1504GWMBW009-U	L15041295-05	Water	04/15/15
4	1504GWMBW085-F	L15041295-02	Water	04/14/15
5	1504GWMBW011-F	L15041295-04	Water	04/15/15
6	1504GWMBW009-F	L15041295-06	Water	04/15/15
7	1504GWMBW085-UDUP TDS	L15041295-01DUP	Water	04/14/15
8	1504GWMBW011-UDUP	L15041295-03DUP	Water	04/15/15
9				
10				
11				
12				
13				
14				

Notes:

LDC #: 54243C6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JD
2nd reviewer: G

All circled methods are applicable to each sample.

Sample ID	Parameter
1-3	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
4-6	pH TDS Cl F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC: 7-8	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 34243C6

VALIDATION FINDINGS WORKSHEET
Negative Blanks

Page: 1 of 1
Reviewer: JQ
2nd Reviewer: a

METHOD: Inorganics, Method See Cover
The absolute value of the negative blank conentrations listed below exceeded the RL

#	Blank ID	Analyte	Negative Blank Concentration	RL	Associated Samples	Qualifications
		TDS	-10.0 mg/L	10.0 mg/L	1-3	No Qual. (>10X RL) (11)

Comments:

NEGBLANK.4SW.wpd

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

MWH Americas, Inc.
2890 East Cottonwood Parkway Suite 300
Salt Lake City, UT 84121
ATTN: Ms. Betty VanPelt

May 21, 2015

SUBJECT: Monsanto, P4 Background, Data Validation

Dear Ms. VanPelt,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on May 11, 2015. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #34255:

SDG #	Fraction
L15041393, L15041394, L15041354	Metals, Wet Chemistry

The data verification was performed under Stage 2B & 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- QAPP Addendum, MWH 2009, to the project SAP, April, 2004
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

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

Sincerely,

Christina Rink
Project Manager/Chemist

HC

Attachment 1

2B/4

LDC #34255 (MWH Americas, Inc.-Salt Lake City, UT / Monsanto, P4 Background)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Se (6020A)		(3) Metals (6020A)		Diss. Se (6020A)		Diss. Cd,Se (6020A)		Diss. Ca,Mg (6010C)		Hard. (2340B)		SO_4 (300.0)		TDS (2540C)																			
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	L15041393	05/11/15	06/02/15	-	-	2	0	2	0	-	-	-	-	-	-	2	0	2	0																		
A	L15041393	05/11/15	06/02/15	-	-	5	0	5	0	-	-	-	-	-	-	5	0	5	0																		
B	L15041394	05/11/15	06/02/15	-	-	18	0	18	0	-	-	-	-	-	-	18	0	18	0																		
C	L15041354	05/11/15	06/02/15	1	0	-	-	-	-	1	0	1	0	1	0	1	0	1	0																		
C	L15041354	05/11/15	06/02/15	5	0	-	-	-	-	5	0	5	0	5	0	5	0	5	0																		
Total	T/CR			6	0	25	0	25	0	6	0	6	0	6	0	31	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136

Shaded cells indicate Stage 4 review (all other cells are Stage 2B review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs L:\MWH\Monsanto P4\34255ST.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 21, 2015

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041393

Sample Identification	Collection Date	Laboratory Sample Identification
1504GWMBW087-U**	04/16/15	L15041393-01
1504GWMBW028-U**	04/17/15	L15041393-03
1504GWMMW15A-U**	04/17/15	L15041393-05
1504GWMBW131-U**	04/18/15	L15041393-07
1504GWMBW048-U**	04/18/15	L15041393-09
1504GWMBW130-U	04/18/15	L15041393-11
1504GWMBW135-U	04/19/15	L15041393-13
1504GWMBW087-F**	04/16/15	L15041393-02
1504GWMBW028-F**	04/17/15	L15041393-04
1504GWMMW15A-F**	04/17/15	L15041393-06
1504GWMBW131-F**	04/18/15	L15041393-08
1504GWMBW048-F**	04/18/15	L15041393-10
1504GWMBW130-F	04/18/15	L15041393-12
1504GWMBW135-F	04/19/15	L15041393-14

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 14 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.00130 mg/L	1504GWMBW087-U** 1504GWMBW028-U** 1504GWMMW15A-U** 1504GWMBW131-U** 1504GWMBW048-U** 1504GWMBW130-U 1504GWMBW135-U

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines. No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1504GWMMW15A-U**	Manganese	0.00479 mg/L	0.00479J+ mg/L

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041393

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15041393

SDG	Sample	Analyte	Modified Final Concentration	A or P	Reason Code
L15041393	1504GWMMW15A-U**	Manganese	0.00479J+ mg/L	A	11

Metals - Field Blank Data Qualification Summary - SDG L15041393

No Sample Data Qualified in this SDG

LDC #: 34255A4b

SDG #: L15041393

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 5/12/15

Page: 1 of 1

Reviewer: JD

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/16-19/15
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MS/D = 1504GWMMW011-F (SDG-L15041394)
VIII.	Duplicate sample analysis	N	
IX.	ICP Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	Not Reviewed
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	~~A~~	Only reviewed for Stage 4
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; **Stage 4; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504GWMBW087-U**	L15041393-01	Water	04/16/15
2	1504GWMBW028-U**	L15041393-03	Water	04/17/15
3	1504GWMMW15A-U**	L15041393-05	Water	04/17/15
4	1504GWMBW131-U**	L15041393-07	Water	04/18/15
5	1504GWMBW048-U**	L15041393-09	Water	04/18/15
6	1504GWMBW130-U	L15041393-11	Water	04/18/15
7	1504GWMBW135-U	L15041393-13	Water	04/19/15
8	1504GWMBW087-F**	L15041393-02	Water	04/16/15
9	1504GWMBW028-F**	L15041393-04	Water	04/17/15
10	1504GWMMW15A-F**	L15041393-06	Water	04/17/15
11	1504GWMBW131-F**	L15041393-08	Water	04/18/15
12	1504GWMBW048-F**	L15041393-10	Water	04/18/15
13	1504GWMBW130-F	L15041393-12	Water	04/18/15
14	1504GWMBW135-F	L15041393-14	Water	04/19/15
15				

LDC #: 34255A4b

VALIDATION FINDINGS CHECKLIST

Reviewer: SD
2nd Reviewer: CN

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

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

LDC #: 34255A46

VALIDATION FINDINGS CHECKLIST

Reviewer: SD
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 34255A4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: JO
2nd reviewer: ar

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
8-14	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 34255A4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JD
2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 864 Method 6010/6020/7000) Soil preparation factor applied: ____
Sample Concentration units, unless otherwise noted: mg/L Associated Samples: 1-7 (11)

					Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Level	3										
Mn		0.00130		0.0065	0.00479J+										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 34255A46

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: JD
2nd Reviewer: a

METHOD: Trace Metals (See cover)

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

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV 10:14	ICP/MS (Initial calibration)	Cd	49.3 ug/L	50 ug/L	98.6%R	98.6%R	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV 17:59	ICP/MS (Continuing calibration)	Mn	0.05088 mg/L	0.05 mg/L	102%R	102%R	Y
	CVAA (Contining calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments:

LDC #: 34255A4b

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: JD
2nd Reviewer: [illegible]

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

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

$\%R = \frac{Found}{True} \times 100$

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

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

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

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

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

$\%D = \frac{|I-SDR|}{I} \times 100$

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

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICS AB 12:27	ICP interference check	Se	100.2 ug/L	100 ug/L	100%R	100%R	Y
LCS 16:43	Laboratory control sample	Cd	0.1251 mg/L	0.125 mg/L	100%R	100%R	↓
MS 16:49	Matrix spike	Mn	(SSR-SR) 0.1208 mg/L	0.125 mg/L	96.6%R	96.6%R	↓
MSD 16:52	Duplicate	Se	121 ug/L	117.7 ug/L	2.77%RPD	2.75%RPD	Y*
SER 17:15	ICP serial dilution	Mn	7.15 ug/L	7.74 ug/L	7.62%D	7.65%D	Y*

Comments: *Rounding

TOTCLC.4SW

LDC #: 34255A46

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JD
2nd reviewer: G

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

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for (1) Mn were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

Recalculation: $\frac{(12.4\ \mu g/L)(50\ ml)(1)}{(20\ ml)} = 31.0\ \mu g/L \times \frac{1\ mg}{1000\ \mu g} = 0.03\ mg/L$

RD = Raw data concentration (RD = 12.4 µg/L)
FV = Final volume (ml) (FV = 50 ml)
In. Vol. = Initial volume (ml) or weight (G) (In V = 20 ml)
Dil = Dilution factor (Dil = 1x)

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Mn 5/1 (17:05)	0.0310	0.0310	Y
	2	Ca 5/1 (17:27)	0.000317	0.000317	
	3	Se 5/2 (8:38)	2.39	2.39	
	4	Mn 5/1 (17:40)	0.00804	0.00804	
	5	Se 5/1 (17:46)	0.000513	0.000513	
	8	Se 5/1 (17:08)	0.00328	0.00328	
	9	Se 5/2 (8:35)	1.14	1.14	
	10	Se 5/2 (8:42)	1.95	1.95	
	11	Se 5/1 (17:43)	0.00232	0.00232	
	12	Se 5/1 (17:52)	0.000798	0.000798	

Note:

Report# 34255A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 20, 2015

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041393

Sample Identification	Collection Date	Laboratory Sample Identification
1504GWMBW087-U**	04/16/15	L15041393-01
1504GWMBW028-U**	04/17/15	L15041393-03
1504GWMMW15A-U**	04/17/15	L15041393-05
1504GWMBW131-U**	04/18/15	L15041393-07
1504GWMBW048-U**	04/18/15	L15041393-09
1504GWMBW130-U	04/18/15	L15041393-11
1504GWMBW135-U	04/19/15	L15041393-13
1504GWMBW087-F**	04/16/15	L15041393-02
1504GWMBW028-F**	04/17/15	L15041393-04
1504GWMMW15A-F**	04/17/15	L15041393-06
1504GWMBW131-F**	04/18/15	L15041393-08
1504GWMBW048-F**	04/18/15	L15041393-10
1504GWMBW130-F	04/18/15	L15041393-12
1504GWMBW135-F	04/19/15	L15041393-14
1504GWMBW131-UDUP	04/18/15	L15041393-07DUP

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the method noted below:

- EPA Method 300.0 for Sulfate and Standard Method 2540-C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

Sulfate results were outside the QC limits; results were not qualified since the original sample (1504GWMMW020-F) was greater than 4X the spike amount.

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

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

Wet Chemistry - Data Qualification Summary - SDG L15041393

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L15041393

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L15041393

No Sample Data Qualified in this SDG

LDC #: 34255A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/12/15

SDG #: L15041393 Stage 2B/4 Page: 1 of 1

Laboratory: Microbac Laboratories Reviewer: JD

2nd Reviewer: [illegible]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (~~EPA Method 160.1~~ SM 2540C)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/16-19/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks JD	~~A~~ SW	Neg Blank
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MS/D = 1504SWMS6-005MS/D (SDG: L15041354) *See BELOW
VII.	Duplicate sample analysis	A	DUP = 1504SWMS6-005DUP (SDG: L15041354) *See Below
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	Not Reviewed
X.	Sample result verification	~~N~~ A	Not reviewed for Stage 2B.
XI	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Stage 4

	Client ID		Lab ID	Matrix	Date
1	1504GWMBW087-U **	TDS	L15041393-01	Water	04/16/15
2	1504GWMBW028-U **		L15041393-03	Water	04/17/15
3	1504GWMMW15A-U **		L15041393-05	Water	04/17/15
4	1504GWMBW131-U **		L15041393-07	Water	04/18/15
5	1504GWMBW048-U **		L15041393-09	Water	04/18/15
6	1504GWMBW130-U		L15041393-11	Water	04/18/15
7	1504GWMBW135-U		L15041393-13	Water	04/19/15
8	1504GWMBW087-F **	SO4	L15041393-02	Water	04/16/15
9	1504GWMBW028-F **		L15041393-04	Water	04/17/15
10	1504GWMMW15A-F **		L15041393-06	Water	04/17/15
11	1504GWMBW131-F **		L15041393-08	Water	04/18/15
12	1504GWMBW048-F **		L15041393-10	Water	04/18/15
13	1504GWMBW130-F		L15041393-12	Water	04/18/15
14	1504GWMBW135-F		L15041393-14	Water	04/19/15
15	1504GWMBW131-UDUP	TDS	L15041393-07DUP	Water	04/18/15
16					
17					

DUP: 1504GWMMW020-F DUP (SDG: L15041394)
1504GWMMW018-F DUP (SDG: L15041394)

MS/D: 1504GWMMW020-F MSD
1504GWMMW018-F MSD (SDG: L15041394)

~~DUP~~ JD

LDC #: 34255 A2

VALIDATION FINDINGS CHECKLIST

Reviewer: JSD
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See Cover)

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

LDC #: 34255A6

VALIDATION FINDINGS CHECKLIST

Reviewer: 30
2nd Reviewer: 02

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

LDC #: 34255A0

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JD
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1-7	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
8-14	pH TDS Cl F NO_3 NO_2 (SO4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC:15	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 34255A6

VALIDATION FINDINGS WORKSHEET
Negative Blanks

Page: 1 of 1
Reviewer: SD
2nd Reviewer: OL

METHOD: Inorganics, Method See Cover
The absolute value of the negative blank conentrations listed below exceeded the RL

#	Blank ID	Analyte	Negative Blank Concentration	RL	Associated Samples	Qualifications
		TDS	-10.0 mg/L	10.0 mg/L	7	No Qual. (>10X RL) (11)

Comments:

LDC #: 34255A6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: SD
2nd Reviewer: OL

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

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

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

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 90-110? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for samples?

LEVEL IV ONLY:

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	1504GWMMW020-F (SDG: L15041394)	W	Sulfate	40	36.6		13-14	No Qual. (SO4>4X)

Comments:

LDC #: 34255A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: JD
2nd Reviewer: 9

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of SO_4 was recalculated. Calibration date: 4/21/15

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

%R = Found X 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	SO_4	s1	1.00	0.119	*0.996881*	0.996529	Y
		s2	5	0.621			
		s3	20	2.628			
		s4	40	5.511			
		s5	60	8.804			
		s6	120	19.265			
ICV 16:46 Calibration verification	SO_4	Found 39.899 ug/L	True 40 ug/L		99.7%R	99.7%R	Y
CCV 22:41 Calibration verification	SO_4	39.14 ug/L	40 ug/L		97.85%R	97.82%R	Y*
Calibration verification							

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

*Rounding

LDC #: 34255A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: JD
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

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

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

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

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	TDS	526 mg/L	500 mg/L	105%R	105%R	Y
MS 18:51	Matrix spike sample	SO_4	(SSR-SR) 43.07 mg/L	40 mg/L	108%R	108%R	↓
DUP	Duplicate sample	TDS	132 mg/L	126 mg/L	4.65% RPD	Not Reported	↓

Comments:

TOTCLC.6

LDC #: 34255A10

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: SD
2nd reviewer: [illegible]

METHOD: Inorganics, Method See Cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for (8) SO4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{A-b}{m}$

Recalculation: $\frac{3.126-(-0.0238)}{0.1402} = 22.5$ mg/L

A = 3.126
b = -0.0238
m = 0.1402

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	TDS	340	340	Y
	2		1020	1020	
	3		1320	1320	
	4		126	126	
	5		106	106	
	8	SO4	22.5	22.5	Y
	9		534	535	Y*
	10		673	673	Y
	11		3.12	3.12	Y
	12		5.57	5.58	Y*

Note: *Rounding

RECALC.6

Report# 34255B4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 20, 2015

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041394

Sample Identification	Collection Date	Laboratory Sample Identification
1504GWMMW018-U	04/17/15	L15041394-01
1504GWMMW032-U	04/17/15	L15041394-07
1504GWMMW029-U	04/18/15	L15041394-09
1504GWMMW033-U	04/18/15	L15041394-11
1504GWMBW032-1-U	04/18/15	L15041394-13
1504GWMBW032-2-U	04/18/15	L15041394-15
1504GWMMW026-U	04/16/15	L15041394-17
1504GWMMW007-U	04/16/15	L15041394-19
1504GWMBW099-U	04/17/15	L15041394-21
1504GWMMW006-U	04/17/15	L15041394-23
1504GWMMW020-U	04/17/15	L15041394-25
1504GWMMW030-U	04/18/15	L15041394-31
1504GWMMW009-U	04/18/15	L15041394-33
1504GWMMW010-U	04/18/15	L15041394-35
1504GWMMW022-U	04/19/15	L15041394-37
1504GWMMW028-1-U	04/19/15	L15041394-39
1504GWMMW028-2-U	04/19/15	L15041394-41
1504GWMMW011-U	04/19/15	L15041394-43
1504GWMMW018-F	04/17/15	L15041394-02
1504GWMMW032-F	04/17/15	L15041394-08
1504GWMMW029-F	04/18/15	L15041394-10
1504GWMMW033-F	04/18/15	L15041394-12
1504GWMBW032-1-F	04/18/15	L15041394-14
1504GWMBW032-2-F	04/18/15	L15041394-16
1504GWMMW026-F	04/16/15	L15041394-18

Sample Identification	Collection Date	Laboratory Sample Identification
1504GWMMW007-F	04/16/15	L15041394-20
1504GWMBW099-F	04/17/15	L15041394-22
1504GWMMW006-F	04/17/15	L15041394-24
1504GWMMW020-F	04/17/15	L15041394-26
1504GWMMW030-F	04/18/15	L15041394-32
1504GWMMW009-F	04/18/15	L15041394-34
1504GWMMW010-F	04/18/15	L15041394-36
1504GWMMW022-F	04/19/15	L15041394-38
1504GWMMW028-1-F	04/19/15	L15041394-40
1504GWMMW028-2-F	04/19/15	L15041394-42
1504GWMMW011-F	04/19/15	L15041394-44
1504GWMMW018-U-MS	04/17/15	L15041394-03
1504GWMMW018-U-MSD	04/17/15	L15041394-05
1504GWMMW020-U-MS	04/17/15	L15041394-27
1504GWMMW020-U-MSD	04/17/15	L15041394-29
1504GWMMW018-F-MS	04/17/15	L15041394-04
1504GWMMW018-F-MSD	04/17/15	L15041394-06
1504GWMMW020-F-MS	04/17/15	L15041394-28
1504GWMMW020-F-MSD	04/17/15	L15041394-30
1504GWMMW011-FMS	04/19/15	L15041394-44MS
1504GWMMW011-FMSD	04/19/15	L15041394-44MSD

Introduction

This data review covers 46 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Manganese	0.00151 mg/L	1504GWMMW018-U 1504GWMMW032-U 1504GWMMW029-U 1504GWMMW033-U 1504GWMBW032-1-U 1504GWMBW032-2-U 1504GWMMW026-U 1504GWMMW007-U 1504GWMBW099-U
PB (prep blank)	Manganese	0.00130 mg/L	1504GWMMW028-1-U 1504GWMMW028-2-U 1504GWMMW011-U

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines. No samples were qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1504GWMMW032-U	Manganese	0.00334 mg/L	0.00334J+ mg/L
1504GWMMW029-U	Manganese	0.00130 mg/L	0.00130U mg/L
1504GWMBW099-U	Manganese	0.00578 mg/L	0.00578J+ mg/L
1504GWMMW028-1-U	Manganese	0.00277 mg/L	0.00277J+ mg/L
1504GWMMW028-2-U	Manganese	0.00253 mg/L	0.00253J+ mg/L
1504GWMMW011-U	Manganese	0.00101 mg/L	0.00101U mg/L

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041394

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15041394

SDG	Sample	Analyte	Modified Final Concentration	A or P	Reason Code
L15041394	1504GWMMW032-U	Manganese	0.00334J+ mg/L	A	11
L15041394	1504GWMMW029-U	Manganese	0.00130U mg/L	A	11
L15041394	1504GWMBW099-U	Manganese	0.00578J+ mg/L	A	11
L15041394	1504GWMMW028-1-U	Manganese	0.00277J+ mg/L	A	11
L15041394	1504GWMMW028-2-U	Manganese	0.00253J+ mg/L	A	11
L15041394	1504GWMMW011-U	Manganese	0.00101U mg/L	A	11

Metals - Field Blank Data Qualification Summary - SDG L15041394

No Sample Data Qualified in this SDG

LDC #: 34255B4b

SDG #: L15041394

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/12/15

Page: 1 of 2

Reviewer: JSD

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/16 - 19/15
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MS/D = (37.38)(39,40)(41,42)(43,44)(45,46)
VIII.	Duplicate sample analysis	N	
IX.	ICP Serial Dilution	A	SER = 1504GWMBW087-F (SDG: L15041393)
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504GWMMW018-U	L15041394-01	Water	04/17/15
2	1504GWMMW032-U	L15041394-07	Water	04/17/15
3	1504GWMMW029-U	L15041394-09	Water	04/18/15
4	1504GWMMW033-U	L15041394-11	Water	04/18/15
5	1504GWMBW032-1-U	L15041394-13	Water	04/18/15
6	1504GWMBW032-2-U	L15041394-15	Water	04/18/15
7	1504GWMMW026-U	L15041394-17	Water	04/16/15
8	1504GWMMW007-U	L15041394-19	Water	04/16/15
9	1504GWMBW099-U	L15041394-21	Water	04/17/15
10	1504GWMMW006-U	L15041394-23	Water	04/17/15
11	1504GWMMW020-U	L15041394-25	Water	04/17/15
12	1504GWMMW030-U	L15041394-31	Water	04/18/15
13	1504GWMMW009-U	L15041394-33	Water	04/18/15
14	1504GWMMW010-U	L15041394-35	Water	04/18/15
15	1504GWMMW022-U	L15041394-37	Water	04/19/15

LDC #: 34255B4b

SDG #: L15041394

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/12/15

Page: 2 of 2

Reviewer: JD

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
16	1504GWMMW028-1-U	L15041394-39	Water	04/19/15
17	1504GWMMW028-2-U	L15041394-41	Water	04/19/15
18	1504GWMMW011-U	L15041394-43	Water	04/19/15
19	1504GWMMW018-F	L15041394-02	Water	04/17/15
20	1504GWMMW032-F	L15041394-08	Water	04/17/15
21	1504GWMMW029-F	L15041394-10	Water	04/18/15
22	1504GWMMW033-F	L15041394-12	Water	04/18/15
23	1504GWMBW032-1-F	L15041394-14	Water	04/18/15
24	1504GWMBW032-2-F	L15041394-16	Water	04/18/15
25	1504GWMMW026-F	L15041394-18	Water	04/16/15
26	1504GWMMW007-F	L15041394-20	Water	04/16/15
27	1504GWMBW099-F	L15041394-22	Water	04/17/15
28	1504GWMMW006-F	L15041394-24	Water	04/17/15
29	1504GWMMW020-F	L15041394-26	Water	04/17/15
30	1504GWMMW030-F	L15041394-32	Water	04/18/15
31	1504GWMMW009-F	L15041394-34	Water	04/18/15
32	1504GWMMW010-F	L15041394-36	Water	04/18/15
33	1504GWMMW022-F	L15041394-38	Water	04/19/15
34	1504GWMMW028-1-F	L15041394-40	Water	04/19/15
35	1504GWMMW028-2-F	L15041394-42	Water	04/19/15
36	1504GWMMW011-F	L15041394-44	Water	04/19/15
37	1504GWMMW018-U-MS All	L15041394-03 MS	Water	04/17/15
38	1504GWMMW018-U-MSD ↓	L15041394-05 MSD	Water	04/17/15
39	1504GWMMW020-U-MS All	L15041394-27 MS	Water	04/17/15
40	1504GWMMW020-U-MSD ↓	L15041394-29 MSD	Water	04/17/15
41	1504GWMMW018-F-MS ~~Se~~ All	L15041394-04 MS	Water	04/17/15
42	1504GWMMW018-F-MSD JD ↓	L15041394-06 MSD	Water	04/17/15
43	1504GWMMW020-F-MS Se	L15041394-28 MS	Water	04/17/15
44	1504GWMMW020-F-MSD ↓	L15041394-30 MSD	Water	04/17/15
45	1504GWMMW011-FMS	L15041394-44MS	Water	04/19/15
46	1504GWMMW011-FMSD All	L15041394-44MSD	Water	04/19/15
47				
48				
49				
50				

LDC #: 34257B4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: JD
2nd reviewer: G

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-18	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
19-36	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC: 37-46	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 34255B4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JD
2nd Reviewer: CL

METHOD: Metals (EPA SW 864 Method 6010/6020/7000) Soil preparation factor applied: ____

Sample Concentration units, unless otherwise noted: mg/L Associated Samples: 1-9

					Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Level	2	3	9								
Mn		0.00151		0.00755	0.00334J+	0.00130U	0.00578J+								

Sample Concentration units, unless otherwise noted: mg/L Associated Samples: 16-18

					Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Level	16	17	18								
Mn		0.00130		0.0065	0.00277J+	0.00253J+	0.00101U								

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

Report# 34255B6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 20, 2015

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041394

Sample Identification	Collection Date	Laboratory Sample Identification
1504GWMMW018-U	04/17/15	L15041394-01
1504GWMMW032-U	04/17/15	L15041394-07
1504GWMMW029-U	04/18/15	L15041394-09
1504GWMMW033-U	04/18/15	L15041394-11
1504GWMBW032-1-U	04/18/15	L15041394-13
1504GWMBW032-2-U	04/18/15	L15041394-15
1504GWMMW026-U	04/16/15	L15041394-17
1504GWMMW007-U	04/16/15	L15041394-19
1504GWMBW099-U	04/17/15	L15041394-21
1504GWMMW006-U	04/17/15	L15041394-23
1504GWMMW020-U	04/17/15	L15041394-25
1504GWMMW030-U	04/18/15	L15041394-31
1504GWMMW009-U	04/18/15	L15041394-33
1504GWMMW010-U	04/18/15	L15041394-35
1504GWMMW022-U	04/19/15	L15041394-37
1504GWMMW028-1-U	04/19/15	L15041394-39
1504GWMMW028-2-U	04/19/15	L15041394-41
1504GWMMW011-U	04/19/15	L15041394-43
1504GWMMW018-F	04/17/15	L15041394-02
1504GWMMW032-F	04/17/15	L15041394-08
1504GWMMW029-F	04/18/15	L15041394-10
1504GWMMW033-F	04/18/15	L15041394-12
1504GWMBW032-1-F	04/18/15	L15041394-14
1504GWMBW032-2-F	04/18/15	L15041394-16
1504GWMMW026-F	04/16/15	L15041394-18

Sample Identification	Collection Date	Laboratory Sample Identification
1504GWMMW007-F	04/16/15	L15041394-20
1504GWMBW099-F	04/17/15	L15041394-22
1504GWMMW006-F	04/17/15	L15041394-24
1504GWMMW020-F	04/17/15	L15041394-26
1504GWMMW030-F	04/18/15	L15041394-32
1504GWMMW009-F	04/18/15	L15041394-34
1504GWMMW010-F	04/18/15	L15041394-36
1504GWMMW022-F	04/19/15	L15041394-38
1504GWMMW028-1-F	04/19/15	L15041394-40
1504GWMMW028-2-F	04/19/15	L15041394-42
1504GWMMW011-F	04/19/15	L15041394-44
1504GWMMW018-U-MS	04/17/15	L15041394-03
1504GWMMW018-U-MSD	04/17/15	L15041394-05
1504GWMMW032-UDUP	04/17/15	L15041394-07DUP
1504GWMBW099-UDUP	04/17/15	L15041394-21DUP
1504GWMMW020-U-MS	04/17/15	L15041394-27
1504GWMMW020-U-MSD	04/17/15	L15041394-29
1504GWMMW018-F-MS	04/17/15	L15041394-04
1504GWMMW018-F-MSD	04/17/15	L15041394-06
1504GWMMW018-FDUP	04/17/15	L15041394-02DUP
1504GWMMW020-F-MS	04/17/15	L15041394-28
1504GWMMW020-F-MSD	04/17/15	L15041394-30

Introduction

This data review covers 47 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the method noted below:

- EPA Method 300.0 for Sulfate and Standard Method 2540-C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

Sulfate results were outside the QC limits; results were not qualified since the original sample (1504GWMMW020-F) was greater than 4X the spike amount.

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

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

Wet Chemistry - Data Qualification Summary - SDG L15041394

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L15041394

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L15041394

No Sample Data Qualified in this SDG

LDC #: 34255B6

SDG #: L15041394

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/12/15

Page: 1 of 1

Reviewer: SD

2nd Reviewer: ar

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (~~EPA Method 160.1~~ SM 2540C)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/16/15 - 4/19/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MS/D = (37,38) (41,42) (43,44) (46,47)
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	Not Reviewed
X.	Sample result verification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504GWMMW018-U TDS	L15041394-01	Water	04/17/15
2	1504GWMMW032-U	L15041394-07	Water	04/17/15
3	1504GWMMW029-U	L15041394-09	Water	04/18/15
4	1504GWMMW033-U	L15041394-11	Water	04/18/15
5	1504GWMBW032-1-U	L15041394-13	Water	04/18/15
6	1504GWMBW032-2-U	L15041394-15	Water	04/18/15
7	1504GWMMW026-U	L15041394-17	Water	04/16/15
8	1504GWMMW007-U	L15041394-19	Water	04/16/15
9	1504GWMBW099-U	L15041394-21	Water	04/17/15
10	1504GWMMW006-U	L15041394-23	Water	04/17/15
11	1504GWMMW020-U	L15041394-25	Water	04/17/15
12	1504GWMMW030-U	L15041394-31	Water	04/18/15
13	1504GWMMW009-U	L15041394-33	Water	04/18/15
14	1504GWMMW010-U	L15041394-35	Water	04/18/15
15	1504GWMMW022-U	L15041394-37	Water	04/19/15
16	1504GWMMW028-1-U	L15041394-39	Water	04/19/15
17	1504GWMMW028-2-U	L15041394-41	Water	04/19/15

LDC #: 34255B6

SDG #: L15041394

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/12/15

Reviewer: 3D

2nd Reviewer: a

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID		Lab ID	Matrix	Date
18	1504GWMMW011-U	TDS	L15041394-43	Water	04/19/15
19	1504GWMMW018-F	SO4	L15041394-02	Water	04/17/15
20	1504GWMMW032-F		L15041394-08	Water	04/17/15
21	1504GWMMW029-F		L15041394-10	Water	04/18/15
22	1504GWMMW033-F		L15041394-12	Water	04/18/15
23	1504GWMBW032-1-F		L15041394-14	Water	04/18/15
24	1504GWMBW032-2-F		L15041394-16	Water	04/18/15
25	1504GWMMW026-F		L15041394-18	Water	04/16/15
26	1504GWMMW007-F		L15041394-20	Water	04/16/15
27	1504GWMBW099-F		L15041394-22	Water	04/17/15
28	1504GWMMW006-F		L15041394-24	Water	04/17/15
29	1504GWMMW020-F		L15041394-26	Water	04/17/15
30	1504GWMMW030-F		L15041394-32	Water	04/18/15
31	1504GWMMW009-F		L15041394-34	Water	04/18/15
32	1504GWMMW010-F		L15041394-36	Water	04/18/15
33	1504GWMMW022-F		L15041394-38	Water	04/19/15
34	1504GWMMW028-1-F		L15041394-40	Water	04/19/15
35	1504GWMMW028-2-F		L15041394-42	Water	04/19/15
36	1504GWMMW011-F		L15041394-44	Water	04/19/15
37	1504GWMMW018-U-MS	TDS	L15041394-03 MS	Water	04/17/15
38	1504GWMMW018-U-MSD		L15041394-05 MSD	Water	04/17/15
39	1504GWMMW032-UDUP	TDS	L15041394-07DUP	Water	04/17/15
40	1504GWMBW099-UDUP	TDS	L15041394-21DUP	Water	04/17/15
41	1504GWMMW020-U-MS	TDS	L15041394-27 MS	Water	04/17/15
42	1504GWMMW020-U-MSD		L15041394-29 MSD	Water	04/17/15
43	1504GWMMW018-F-MS	SO4	L15041394-04 MS	Water	04/17/15
44	1504GWMMW018-F-MSD		L15041394-06 MSD	Water	04/17/15
45	1504GWMMW018-FDUP	SO4	L15041394-02DUP	Water	04/17/15
46	1504GWMMW020-F-MS	SO4	L15041394-28 MS	Water	04/17/15
47	1504GWMMW020-F-MSD		L15041394-30 MSD	Water	04/17/15
48					
49					
50					
51					

LDC #: 34255B60

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JD
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1-18	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
A-36	pH TDS Cl F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
DC:37-42	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
DC:43-47	pH TDS Cl F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 34255B6

VALIDATION FINDINGS WORKSHEET
Negative Blanks

Page: 1 of 1
Reviewer: JD
2nd Reviewer: al

METHOD: Inorganics, Method See Cover
The absolute value of the negative blank conentrations listed below exceeded the RL

#	Blank ID	Analyte	Negative Blank Concentration	RL	Associated Samples	Qualifications
		TDS	-10.0 mg/L	10.0 mg/L	15-18	No Qual. (>10X RL) (11)

Comments:

LDC #: 34255B6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JO
2nd Reviewer: G

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

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

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

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 90-110? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for samples?

LEVEL IV ONLY:

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	46/47	W	Sulfate	40	36.6		19, 25-36	No Qual. (SO4>4X)

Comments:

Report# 34255C4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 20, 2015

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010C

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L15041354

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMST136-F**	04/14/15	L15041354-02
1504SWMST144-F**	04/14/15	L15041354-04
1504SWMDS025-F**	04/14/15	L15041354-06
1504SWMST275-F**	04/14/15	L15041354-08
1504SWMST133-F**	04/14/15	L15041354-10
1504SWMSG005-F	04/15/15	L15041354-14
1504SWMSG005-F-MS	04/15/15	L15041354-15MS
1504SWMSG005-F-MSD	04/15/15	L15041354-16MSD

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010C ICP: Calcium and Magnesium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

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

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium results were outside the QC limits; results were not qualified since the original sample (1504SWMSG005-F) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

X(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041354

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15041354

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L15041354

No Sample Data Qualified in this SDG

LDC #: 34255C4a

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

SDG #: ~~L1501354~~ L15041354

Laboratory: Microbac Laboratories

Date: 5/12/15

Page: 1 of 1

Reviewer: SD

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010C)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/14-15/15
II.	Instrument Calibration	A	
III.	ICP Interference Check Sample (ICS) Analysis	A	
IV.	Laboratory Blanks	A	
V.	Field Blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MS/D = (2.8)
VII.	Duplicate sample analysis	N	
VIII.	ICP Serial Dilution	A	
IX.	Laboratory control samples	A	LCS
X.	Field Duplicates	N	Not reviewed
XI.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XII.	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	1504SWMST136-F**	L15041354-02**	Water	04/14/15
2	1504SWMST144-F**	L15041354-04**	Water	04/14/15
3	1504SWMDS025-F**	L15041354-06**	Water	04/14/15
4	1504SWMST275-F**	L15041354-08**	Water	04/14/15
5	1504SWMST133-F**	L15041354-10**	Water	04/14/15
6	1504SWMSG005-F	L15041354-14	Water	04/15/15
7	1504SWMSG005-F-MS	L15041354-15 MS	Water	04/15/15
8	1504SWMSG005-F-MSD	L15041354-16 MSD	Water	04/15/15
9				
10				
11				
12				
13				
14				

Notes:

LDC #: 34255C4m

VALIDATION FINDINGS CHECKLIST

Reviewer: 3D
2nd Reviewer: OV

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

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

LDC #: 34255C4a

VALIDATION FINDINGS CHECKLIST

Reviewer: SD
2nd Reviewer: CV

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 34255C4G

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: SD
2nd reviewer: AV

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-6	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
2C:7-8	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___

Comments: Mercury by CVAA if performed

LDC #: 34255C4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JD
2nd Reviewer: a

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

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

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

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for samples?

LEVEL IV ONLY:

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	7/8	W	Ca	145			All	No Qual. (Ca > 4X)

Comments:

LDC #: 34255C4a

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: JD
2nd Reviewer: GL

METHOD: Trace Metals (See cover)

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

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV 11:15	ICP (Initial calibration)	Ca	10.011 mg/L	10 mg/L	100%R	100%R	Y
	ICP/MS (Initial calibration)						
	CVAA (Initial calibration)						
CCV 12:38	ICP (Continuing calibration)	Mg	9.988 mg/L	10 mg/L	99.9%R	99.9%R	Y
	ICP/MS (Continuing calibration)						
	CVAA (Contining calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments:

LDC #: 34255C49

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: SD
2nd Reviewer: [illegible]

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

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

$\%R = \frac{Found}{True} \times 100$

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

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

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

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

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

$\%D = \frac{|I-SDR|}{I} \times 100$

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

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB 11:34	ICP interference check	Mg	250.04 mg/L	250 mg/L	100%R	100%R	Y
LCS 12:49	Laboratory control sample	Ca	6.20 mg/L	6.25 mg/L	99.2%R	99.2%R	↓
MS 13:30	Matrix spike	Mg	(SSR-SR) 6.829 mg/L	6.25 mg/L	109%R	109%R	↓
MSD 13:33	Duplicate	Ca	70.637 mg/L	71.665 mg/L	1.45%RPD	1.44%RPD	Y*
SER 13:16	ICP serial dilution	Mg	3.78 mg/L	3.84 mg/L	1.56%D	1.50%D	Y*

Comments: * Rounding

TOTCLC.4SW

LDC #: 34255C4q

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JSP
2nd reviewer: [illegible]

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

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for (S) Ca were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

RD = 25.293 mg/L
FV = 50 ml
In. V = 40 ml

Recalculation: $\frac{(25.293\ mg/L)(50ml)}{(40ml)} = 31.6\ mg/L$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Ca	37.8	37.8	Y
	2	Mg	26.4	26.4	
	3	Ca	281	281	
	4	Mg	2.26	2.26	
	5	Ca	31.6	31.6	Y

Note:

RECALC.4SW

Report# 34255C4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 20, 2015

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041354

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMST136-U**	04/14/15	L15041354-01
1504SWMST144-U**	04/14/15	L15041354-03
1504SWMDS025-U**	04/14/15	L15041354-05
1504SWMST275-U**	04/14/15	L15041354-07
1504SWMST133-U**	04/14/15	L15041354-09
1504SWMSG005-U	04/15/15	L15041354-11
1504SWMST136-F**	04/14/15	L15041354-02
1504SWMST144-F**	04/14/15	L15041354-04
1504SWMDS025-F**	04/14/15	L15041354-06
1504SWMST275-F**	04/14/15	L15041354-08
1504SWMST133-F**	04/14/15	L15041354-10
1504SWMSG005-F	04/15/15	L15041354-14
1504SWMSG005-U-MS	04/15/15	L15041354-12
1504SWMSG005-U-MSD	04/15/15	L15041354-13
1504SWMSG005-F-MS	04/15/15	L15041354-15
1504SWMSG005-F-MSD	04/15/15	L15041354-16

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

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

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

Selenium results were outside the QC limits; results were not qualified since the original sample (1504SWMST136-F**) was less than 50 times the lower limits of quantitation.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041354

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15041354

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L15041354

No Sample Data Qualified in this SDG

LDC #: 34255C4b

SDG #: L15041354

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 5/12/15

Page: 1 of 2

Reviewer: SD

2nd Reviewer: G

METHOD: Metals (EPA SW 846 Method 6020A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/14-15/15
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MS/D = (13,14) (15,16)
VIII.	Duplicate sample analysis	N	
IX.	ICP Serial Dilution	SW	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	Not Reviewed
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID		Lab ID	Matrix	Date
1	1504SWMST136-U**	Se	L15041354-01	Water	04/14/15
2	1504SWMST144-U**		L15041354-03	Water	04/14/15
3	1504SWMDS025-U**		L15041354-05	Water	04/14/15
4	1504SWMST275-U**		L15041354-07	Water	04/14/15
5	1504SWMST133-U**		L15041354-09	Water	04/14/15
6	1504SWMSG005-U		L15041354-11	Water	04/15/15
7	1504SWMST136-F**	Cd, Se	L15041354-02	Water	04/14/15
8	1504SWMST144-F**		L15041354-04	Water	04/14/15
9	1504SWMDS025-F**		L15041354-06	Water	04/14/15
10	1504SWMST275-F**		L15041354-08	Water	04/14/15
11	1504SWMST133-F**		L15041354-10	Water	04/14/15
12	1504SWMSG005-F		L15041354-14	Water	04/15/15
13	1504SWMSG005-U-MS	Se	L15041354-12 MS	Water	04/15/15
14	1504SWMSG005-U-MSD		L15041354-13 MSD	Water	04/15/15
15	1504SWMSG005-F-MS	Cd, Se	L15041354-15 MS	Water	04/15/15

LDC #: 34255C4b

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 5/12/15

SDG #: L15041354

Page: 2 of 2

Laboratory: Microbac Laboratories

Reviewer: JD

2nd Reviewer: a

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
16	1504SWMSG005-F-MSD Cd, Se	L15041354-16 MSD	Water	04/15/15
17				
18				
19				
20				
21				

Notes:

LDC #: 34255C4b

VALIDATION FINDINGS CHECKLIST

Reviewer: JSD
2nd Reviewer: [illegible]

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

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

LDC #: 34255C4D

VALIDATION FINDINGS CHECKLIST

Reviewer: SD
2nd Reviewer: CW

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 34255C46

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: SD
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-6	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
7-12	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
QC:13-14	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
QC:15-16	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___

Comments: Mercury by CVAA if performed

LDC #: 34255C4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: SD
2nd Reviewer: a

METHOD: Trace Metals (EPA SW 846 Method 6010C/6020A/7471B)

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

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >50X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
	7	W	Se	15.10	All	No Qual. (Se < 50X MDL)

Comments:

SerDil.wpd

LDC #: 34255C46

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: JD
2nd Reviewer: a

METHOD: Trace Metals (See cover)

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

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV 10:14	ICP/MS (Initial calibration)	Cd	49.3 ug/L	50 ug/L	98.6 %R	98.6 %R	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV 13:56	ICP/MS (Continuing calibration)	Se	0.0492 mg/L	0.05 mg/L	99.8 %R	99.8 %R	Y
	CVAA (Contining calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments:

LDC #: 34255C4D

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: JSD
2nd Reviewer: [illegible]

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

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

$\%R = \frac{Found}{True} \times 100$

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

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

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

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

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

$\%D = \frac{|I-SDR|}{I} \times 100$

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

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICS AB 12:27	ICP interference check	Cd	97.99 ug/L	100 ug/L	98 %R	98 %R	Y
LCS 12:49	Laboratory control sample	Se	0.1208 mg/L	0.125 mg/L	96.6 %R	96.6 %R	
MS 13:27	Matrix spike	Cd	(SSR-SR) 0.1274 mg/L	0.125 mg/L	102 %R	102 %R	
MSD 13:30	Duplicate	Se	55.042 ug/L	54.365 ug/L	1.24 %RPD	1.24 %RPD	
SER 13:11	ICP serial dilution	Se	5.57 ug/L	4.84 ug/L	15.08 %D	15.10 %D	Y*

Comments:

LDC #: 34255C4b

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JD
2nd reviewer: [illegible]

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

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for (1) Se were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

Recalculation: $\frac{(4.2882\ \mu g/L)(50\ ml)(1)}{(20\ ml)} \times \frac{1\ mg}{1000\ \mu g} = 0.0107\ mg/L$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Dil = 1
RD = 4.2882 µg/L
FV = 50 ml
In V = 20 ml

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Se 13:02	0.0107	0.0107	Y
	2	Se 15:39	0.465	0.465	
	3	Se 13:40	0.0363	0.0363	
	4	Se 13:46	0.000586	0.000586	
	5	Se 13:53	0.00311	0.00311	
	7	Se 13:05	0.0121	0.0121	
	8	Se (SM) 12:42	0.446	0.446	
	9	Cd 13:43	0.000947	0.000947	
	10	Se 13:49	0.00239	0.00239	
	11	Se 14:02	0.00303	0.00303	

Note:

Report# 34255C6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 20, 2015

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041354

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMST136-U**	04/14/15	L15041354-01
1504SWMST144-U**	04/14/15	L15041354-03
1504SWMDS025-U**	04/14/15	L15041354-05
1504SWMST275-U**	04/14/15	L15041354-07
1504SWMST133-U**	04/14/15	L15041354-09
1504SWMSG005-U	04/15/15	L15041354-11
1504SWMST136-F**	04/14/15	L15041354-02
1504SWMST144-F**	04/14/15	L15041354-04
1504SWMDS025-F**	04/14/15	L15041354-06
1504SWMST275-F**	04/14/15	L15041354-08
1504SWMST133-F**	04/14/15	L15041354-10
1504SWMSG005-F	04/15/15	L15041354-14
1504SWMSG005-U-MS	04/15/15	L15041354-12
1504SWMSG005-U-MSD	04/15/15	L15041354-13
1504SWMSG005-F-MS	04/15/15	L15041354-15
1504SWMSG005-F-MSD	04/15/15	L15041354-16
1504SWMST133-UDUP	04/14/15	L15041354-09DUP
1504SWMSG005-FDUP	04/15/15	L15041354-14DUP

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the method noted below:

- Standard Method 2340B for Hardness, EPA Method 300.0 for Sulfate, and Standard Method 2540-C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 7 days for method 2540C, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

Hardness results were outside the QC limits; results were not qualified since the original sample (1504SWMSG005-F) was greater than 4X the spike amount.

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

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

Wet Chemistry - Data Qualification Summary - SDG L15041354

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L15041354

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L15041354

No Sample Data Qualified in this SDG

LDC #: 34255C6 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/12/15

SDG #: L15041354 Stage 2B/4 Page: 1 of 1

Laboratory: Microbac Laboratories Reviewer: SD

2nd Reviewer: OK

METHOD: (Analyte) Hardness (SM2340B), Sulfate (EPA Method 300.0), TDS (~~EPA Method 160.~~1) SM 2540C

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/14-15/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	Neg Blank
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MS/D=(13,14) (15 16)
VII.	Duplicate sample analysis	A	DUP: 1504GWMBwell-UDUP (SDG: L15041295)
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	Not Reviewed
X.	Sample result verification	~~N~~ A	Not reviewed for Stage 2B validation.
XI.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID		Lab ID	Matrix	Date
1	1504SWMST136-U**	TDS	L15041354-01**	Water	04/14/15
2	1504SWMST144-U**		L15041354-03**	Water	04/14/15
3	1504SWMDS025-U**		L15041354-05**	Water	04/14/15
4	1504SWMST275-U**		L15041354-07**	Water	04/14/15
5	1504SWMST133-U**		L15041354-09**	Water	04/14/15
6	1504SWMSG005-U		L15041354-11	Water	04/15/15
7	1504SWMST136-F**	SO4	L15041354-02**	Water	04/14/15
8	1504SWMST144-F**		L15041354-04**	Water	04/14/15
9	1504SWMDS025-F**		L15041354-06**	Water	04/14/15
10	1504SWMST275-F**		L15041354-08**	Water	04/14/15
11	1504SWMST133-F**		L15041354-10**	Water	04/14/15
12	1504SWMSG005-F		L15041354-14	Water	04/15/15
13	1504SWMSG005-U-MS	TDS	L15041354-12	Water	04/15/15
14	1504SWMSG005-U-MSD		L15041354-13	Water	04/15/15
15	1504SWMSG005-F-MS	SO4	L15041354-15	Water	04/15/15
16	1504SWMSG005-F-MSD		L15041354-16	Water	04/15/15
17	1504SWMST133-UDUP	TDS	L15041354-09DUP	Water	04/14/15
18	#12 DUP	SO4			

LDC #: 34255C6

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: SD
2nd Reviewer: a

Method: Inorganics (EPA Method See Cover

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

LDC #: 34255C6

VALIDATION FINDINGS CHECKLIST

Reviewer: SD
2nd Reviewer: GW

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

LDC #: 34255C4

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JD
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1-6	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
7-12	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 Hardness
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC:13-14	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC:15-16	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC:17	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC:18	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 34255C6

VALIDATION FINDINGS WORKSHEET
Negative Blanks

Page: 1 of 1
Reviewer: JD
2nd Reviewer: 9

METHOD: Inorganics, Method See Cover
The absolute value of the negative blank conentrations listed below exceeded the RL

#	Blank ID	Analyte	Negative Blank Concentration	RL	Associated Samples	Qualifications
		TDS	-10.0 mg/L	10.0 mg/L	6	No Qual. (>10X RL) (11)

Comments:

LDC #: 34255C6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: SD
2nd Reviewer: [illegible]

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

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

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

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for samples?

LEVEL IV ONLY:

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	15/16	W	Ca	145			All	No Qual. (Ca > 4X) (~~Hardness qual'd by Ca findings~~)

Comments:

34255C4a.wpd

LDC #: 34255C6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: SD
2nd Reviewer: CL

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of SO_4 was recalculated. Calibration date: 4/21/15

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

%R = Found X 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	SO_4	s1	1.00	0.119	*0.996881*	0.996529	Y*
		s2	5	0.621			
		s3	20	2.628			
		s4	40	5.511			
		s5	60	8.804			
		s6	120	19.265			
ICV 16:16 Calibration verification	SO_4	Found 39.889 mg/L	True 40 mg/L		99.7%R	99.7%R	Y
CCV 15:30 Calibration verification	SO_4	39.17 mg/L	40 mg/L		97.9%R	97.9%R	Y
Calibration verification							

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

*Rounding

LDC #: 34255C4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: SD
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

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

$$\%R = \frac{Found}{True} \times 100$$

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	TDS	488 mg/L	500 mg/L	97.6%R	97.6%R	Y
MS 18-51	Matrix spike sample	SO_4	(SSR-SR) 42.9 mg/L	40 mg/L	107%R	108%R	Y*
DUP	Duplicate sample	TDS	152 mg/L	160 mg/L	5.13%RPD	Not Reported	Y

Comments: *Rounding

TOTCLC.6

LDC #: 34255C4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: SD
2nd reviewer: a

METHOD: Inorganics, Method See Cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for 11 Hardness reported with a positive detect were recalculated and verified using the following equation:

Concentration = $(2.497)(Ca) + (4.118)(Mg)$ Recalculation: $(2.497)(31.6) + (4.118)(4.8) = 98.7$ mg

Ca = 31.6
Mg = 4.8

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	TDS	174	174	Y
	2		476	476	
	3		1350	1350	
	4		110	110	
	5		160	160	Y
	7	SO4	28.5	28.5	Y
	8		239	239	Y
	9		791	791	Y*
	10		2.06	2.05	Y*
	11		12.5	12.5	Y
	11	Hardness	98.7	98.7	Y

Note:

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

MWH Americas, Inc.
2890 East Cottonwood Parkway Suite 300
Salt Lake City, UT 84121
ATTN: Ms. Betty VanPelt

May 27, 2015

SUBJECT: Monsanto, P4 Background, Data Validation

Dear Ms. VanPelt,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on May 12, 2015. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #34267:

SDG #	**Fraction**
L15041395, L15041474, L15041475	Metals, Wet Chemistry

The data verification was performed under Stage 2B guidelines. The analyses were validated using the following documents, as applicable to each method:

- QAPP Addendum, MWH 2009, to the project SAP, April, 2004
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

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

Sincerely,

Christina Rink
Project Manager/Chemist

HC

Attachment 1

2B/4

LDC #34267 (MWH Americas, Inc.-Salt Lake City, UT / Monsanto, P4 Background)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Se (6020A)		(3) Metals (6020A)		Diss. Se (6020A)		Diss. Cd,Se (6020A)		Diss. Ca,Mg (6010C)		Hard. (2340B)		SO_4 (300.0)		TDS (160.1)																			
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	L15041395	05/12/15	06/03/15	24	0	-	-	-	-	24	0	24	0	24	0	24	0	24	0																		
B	L15041474	05/12/15	06/03/15	-	-	7	0	7	0	-	-	-	-	-	-	7	0	7	0																		
C	L15041475	05/12/15	06/03/15	3	0	-	-	-	-	3	0	3	0	3	0	3	0	3	0																		
Total	T/CR			27	0	7	0	7	0	27	0	27	0	27	0	34	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	190

Shaded cells indicate Stage 4 review (all other cells are Stage 2B review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs L:\MWH\Monsanto P4\34267ST.wpd

Report# 34267A4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 25, 2015

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010C

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L15041395

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMDS026-F	04/16/15	L15041395-02
1504SWMST274-F	04/16/15	L15041395-04
1504SWMST143-F	04/16/15	L15041395-06
1504SWMST132-2-F	04/16/15	L15041395-08
1504SWMST132-1-F	04/16/15	L15041395-10
1504SWMST131-F	04/16/15	L15041395-12
1504SWMST128-F	04/16/15	L15041395-14
1504SWMST067-F	04/17/15	L15041395-16
1504SWMST095-F	04/17/15	L15041395-18
1504GWMSG006-F	04/17/15	L15041395-20
1504GWMSG007-F	04/17/15	L15041395-22
1504SWMST096-F	04/17/15	L15041395-24
1504SWMST092-1-F	04/18/15	L15041395-26
1504SWMST089-F	04/18/15	L15041395-28
1504SWMST090-F	04/18/15	L15041395-34
1504SWMST069-F	04/18/15	L15041395-36
1504SWMST226-F	04/18/15	L15041395-38
1504SWMDS034-F	04/19/15	L15041395-40
1504SWMDS044-F	04/19/15	L15041395-42
1504SWMST045-F	04/19/15	L15041395-44
1504SWMST063-F	04/19/15	L15041395-46
1504SWMST057-F	04/19/15	L15041395-52
1504SWMST050-F	04/19/15	L15041395-54
1504SWMST092-2-F	04/18/15	L15041395-56
1504SWMST089-F-MS	04/18/15	L15041395-30
1504SWMST089-F-MSD	04/18/15	L15041395-32

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMST063-F-MS	04/19/15	L15041395-48
1504SWMST063-F-MSD	04/19/15	L15041395-50

Introduction

This data review covers 28 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium and Magnesium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

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

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

For 1504SWMST089-F-MS/MSD, 1504SWMST063-F-MS/MSD, and 1504SWMSG005-FMS/MSD (from SDG L15041354) no data were qualified for Calcium percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041395

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15041395

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L15041395

No Sample Data Qualified in this SDG

LDC #: 34267A4a

SDG #: L15041395

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/18/15

Page: 1 of 2

Reviewer: JD

2nd Reviewer: CN

METHOD: Metals (EPA SW 846 Method 6010C)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/16-19/15
II.	Instrument Calibration	A	
III.	ICP Interference Check Sample (ICS) Analysis	A	
IV.	Laboratory Blanks	A	
V.	Field Blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MS/D=1504SWMSG005-F MS/D(SDG: L15041354)
VII.	Duplicate sample analysis	N	
VIII.	ICP Serial Dilution	A	SER=1504SWMST133-F (SDG: L15041354)
IX.	Laboratory control samples	A	LCS
X.	Field Duplicates	N	Not Reviewed
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504SWMDS026-F	L15041395-02	Water	04/16/15
2	1504SWMST274-F	L15041395-04	Water	04/16/15
3	1504SWMST143-F	L15041395-06	Water	04/16/15
4	1504SWMST132-2-F	L15041395-08	Water	04/16/15
5	1504SWMST132-1-F	L15041395-10	Water	04/16/15
6	1504SWMST131-F	L15041395-12	Water	04/16/15
7	1504SWMST128-F	L15041395-14	Water	04/16/15
8	1504SWMST067-F	L15041395-16	Water	04/17/15
9	1504SWMST095-F	L15041395-18	Water	04/17/15
10	1504GWMSG006-F	L15041395-20	Water	04/17/15
11	1504GWMSG007-F	L15041395-22	Water	04/17/15
12	1504SWMST096-F	L15041395-24	Water	04/17/15
13	1504SWMST092-1-F	L15041395-26	Water	04/18/15
14	1504SWMST089-F	L15041395-28	Water	04/18/15
15	1504SWMST090-F	L15041395-34	Water	04/18/15
16	1504SWMST069-F	L15041395-36	Water	04/18/15
17	1504SWMST226-F	L15041395-38	Water	04/18/15

LDC #: 34267A4a

SDG #: L1501395

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/18/15

Reviewer: JD

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010C)

	Client ID	Lab ID	Matrix	Date
18	1504SWMDS034-F	L15041395-40	Water	04/19/15
19	1504SWMDS044-F	L15041395-42	Water	04/19/15
20	1504SWMST045-F	L15041395-44	Water	04/19/15
21	1504SWMST063-F	L15041395-46	Water	04/19/15
22	1504SWMST057-F	L15041395-52	Water	04/19/15
23	1504SWMST050-F	L15041395-54	Water	04/19/15
24	1504SWMST092-2-F	L15041395-56	Water	04/18/15
25	1504SWMST089-F-MS	L15041395-30	Water	04/18/15
26	1504SWMST089-F-MSD	L15041395-32	Water	04/18/15
27	1504SWMST063-F-MS	L15041395-48	Water	04/19/15
28	1504SWMST063-F-MSD	L15041395-50	Water	04/19/15
29				
30				
31				
32				
33				

Notes:

LDC #: 34267A4c

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: JD
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-24	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC 25-28	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 34267A4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: SD
2nd Reviewer: [illegible]

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

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

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

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for samples?

LEVEL IV ONLY:

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	25/26	W	Ca	51	73.6		11-20, 22-24	No Qual. (Ca > 4X)
	27/28	W	Ca	150	44.7		21	No Qual. (Ca > 4X)
	1504SWMSG005-F MS/D (SDG: L15041354)	W	Ca	145			1-10	No Qual. (Ca > 4X)

Comments:

Report# 34267A4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 25, 2015

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041395

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMDS026-U	L15041395-01	04/16/15
1504SWMST274-U	L15041395-03	04/16/15
1504SWMST143-U	L15041395-05	04/16/15
1504SWMST132-2-U	L15041395-07	04/16/15
1504SWMST132-1-U	L15041395-09	04/16/15
1504SWMST131-U	L15041395-11	04/16/15
1504SWMST128-U	L15041395-13	04/16/15
1504SWMST067-U	L15041395-15	04/17/15
1504SWMST095-U	L15041395-17	04/17/15
1504GWMSG006-U	L15041395-19	04/17/15
1504GWMSG007-U	L15041395-21	04/17/15
1504SWMST096-U	L15041395-23	04/17/15
1504SWMST092-1-U	L15041395-25	04/18/15
1504SWMST089-U	L15041395-27	04/18/15
1504SWMST090-U	L15041395-33	04/18/15
1504SWMST069-U	L15041395-35	04/18/15
1504SWMST226-U	L15041395-37	04/18/15
1504SWMDS034-U	L15041395-39	04/19/15
1504SWMDS044-U	L15041395-41	04/19/15
1504SWMST045-U	L15041395-43	04/19/15
1504SWMST063-U	L15041395-45	04/19/15
1504SWMST057-U	L15041395-51	04/19/15
1504SWMST050-U	L15041395-53	04/19/15
1504SWMST092-2-U	L15041395-55	04/18/15
1504SWMDS026-F	L15041395-02	04/16/15

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMST274-F	L15041395-04	04/16/15
1504SWMST143-F	L15041395-06	04/16/15
1504SWMST132-2-F	L15041395-08	04/16/15
1504SWMST132-1-F	L15041395-10	04/16/15
1504SWMST131-F	L15041395-12	04/16/15
1504SWMST128-F	L15041395-14	04/16/15
1504SWMST067-F	L15041395-16	04/17/15
1504SWMST095-F	L15041395-18	04/17/15
1504GWMSG006-F	L15041395-20	04/17/15
1504GWMSG007-F	L15041395-22	04/17/15
1504SWMST096-F	L15041395-24	04/17/15
1504SWMST092-1-F	L15041395-26	04/18/15
1504SWMST089-F	L15041395-28	04/18/15
1504SWMST090-F	L15041395-34	04/18/15
1504SWMST069-F	L15041395-36	04/18/15
1504SWMST226-F	L15041395-38	04/18/15
1504SWMDS034-F	L15041395-40	04/19/15
1504SWMDS044-F	L15041395-42	04/19/15
1504SWMST045-F	L15041395-44	04/19/15
1504SWMST063-F	L15041395-46	04/19/15
1504SWMST057-F	L15041395-52	04/19/15
1504SWMST050-F	L15041395-54	04/19/15
1504SWMST092-2-F	L15041395-56	04/18/15
1504SWMST092-1-FMS	L15041395-26MS	04/18/15
1504SWMST092-1-FMSD	L15041395-26MSD	04/18/15
1504SWMST089-U-MS	L15041395-29	04/18/15
1504SWMST089-U-MSD	L15041395-31	04/18/15
1504SWMST063-U-MS	L15041395-47	04/19/15
1504SWMST063-U-MSD	L15041395-49	04/19/15
1504SWMST089-F-MS	L15041395-30	04/18/15
1504SWMST089-F-MSD	L15041395-32	04/18/15
1504SWMST063-F-MS	L15041395-48	04/19/15
1504SWMST063-F-MSD	L15041395-50	04/19/15

Introduction

This data review covers 58 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for manganese are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

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

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

Selenium results were outside the QC limits; results were not qualified since the original sample (1504SWMST132-2-F) was less than 50 times the lower limit of quantitation.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041395

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15041395

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L15041395

No Sample Data Qualified in this SDG

LDC #: 34267A4b
SDG #: L15041395
Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 5/18/15
Page: 1 of 3
Reviewer: SD
2nd Reviewer: a

METHOD: Metals (EPA SW 846 Method 6020A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/16-19/15
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MS/D = 1504GWMMW020-U MS/D 1504GWMMW020-F MS/D (SDG: L15041394)
VIII.	Duplicate sample analysis	N	
IX.	ICP Serial Dilution	SW	SER = 1504GWMMW006-U (SDG: L15041394)
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	Not Reviewed
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504SWMDS026-U Se	L15041395-01	Water	04/16/15
2	1504SWMST274-U	L15041395-03	Water	04/16/15
3	1504SWMST143-U	L15041395-05	Water	04/16/15
4	1504SWMST132-2-U	L15041395-07	Water	04/16/15
5	1504SWMST132-1-U	L15041395-09	Water	04/16/15
6	1504SWMST131-U	L15041395-11	Water	04/16/15
7	1504SWMST128-U	L15041395-13	Water	04/16/15
8	1504SWMST067-U	L15041395-15	Water	04/17/15
9	1504SWMST095-U	L15041395-17	Water	04/17/15
10	1504GWMSG006-U	L15041395-19	Water	04/17/15
11	1504GWMSG007-U	L15041395-21	Water	04/17/15
12	1504SWMST096-U	L15041395-23	Water	04/17/15
13	1504SWMST092-1-U	L15041395-25	Water	04/18/15
14	1504SWMST089-U	L15041395-27	Water	04/18/15
15	1504SWMST090-U	L15041395-33	Water	04/18/15

LDC #: 34267A4b

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: L15041395

Laboratory: Microbac Laboratories

Date: 5/18/15

Page: 2 of 3

Reviewer: SD

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
16	1504SWMST069-U	L15041395-35	Water	04/18/15
17	1504SWMST226-U	L15041395-37	Water	04/18/15
18	1504SWMDS034-U	L15041395-39	Water	04/19/15
19	1504SWMDS044-U	L15041395-41	Water	04/19/15
20	1504SWMST045-U	L15041395-43	Water	04/19/15
21	1504SWMST063-U	L15041395-45	Water	04/19/15
22	1504SWMST057-U	L15041395-51	Water	04/19/15
23	1504SWMST050-U	L15041395-53	Water	04/19/15
24	1504SWMST092-2-U	L15041395-55	Water	04/18/15
25	1504SWMDS026-F Cd, Se	L15041395-02	Water	04/16/15
26	1504SWMST274-F	L15041395-04	Water	04/16/15
27	1504SWMST143-F	L15041395-06	Water	04/16/15
28	1504SWMST132-2-F	L15041395-08	Water	04/16/15
29	1504SWMST132-1-F	L15041395-10	Water	04/16/15
030	1504SWMST131-F	L15041395-12	Water	04/16/15
31	1504SWMST128-F	L15041395-14	Water	04/16/15
32	1504SWMST067-F	L15041395-16	Water	04/17/15
33	1504SWMST095-F	L15041395-18	Water	04/17/15
34	1504GWMSG006-F	L15041395-20	Water	04/17/15
35	1504GWMSG007-F	L15041395-22	Water	04/17/15
36	1504SWMST096-F	L15041395-24	Water	04/17/15
37	1504SWMST092-1-F	L15041395-26	Water	04/18/15
38	1504SWMST089-F	L15041395-28	Water	04/18/15
39	1504SWMST090-F	L15041395-34	Water	04/18/15
40	1504SWMST069-F	L15041395-36	Water	04/18/15
41	1504SWMST226-F	L15041395-38	Water	04/18/15
42	1504SWMDS034-F	L15041395-40	Water	04/19/15
43	1504SWMDS044-F	L15041395-42	Water	04/19/15
44	1504SWMST045-F	L15041395-44	Water	04/19/15
45	1504SWMST063-F	L15041395-46	Water	04/19/15
46	1504SWMST057-F	L15041395-52	Water	04/19/15
47	1504SWMST050-F	L15041395-54	Water	04/19/15
48	1504SWMST092-2-F	L15041395-56	Water	04/18/15
49	1504SWMST092-1-FMS Cd, Se	L15041395-26MS	Water	04/18/15
50	1504SWMST092-1-FMSD "	L15041395-26MSD	Water	04/18/15

LDC #: 34267A4b

SDG #: L15041395

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/18/15

Page: 3 of 3

Reviewer: JD

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID		Lab ID	Matrix	Date
51	1504SWMST089-U-MS	Se	L15041395-29	Water	04/18/15
52	1504SWMST089-U-MSD	↓	L15041395-31	Water	04/18/15
53	1504SWMST063-U-MS	Se	L15041395-47	Water	04/19/15
54	1504SWMST063-U-MSD	↓	L15041395-49	Water	04/19/15
55	1504SWMST089-F-MS	Cd, Se	L15041395-30	Water	04/18/15
56	1504SWMST089-F-MSD	↓	L15041395-32	Water	04/18/15
57	1504SWMST063-F-MS	Cd, Se	L15041395-48	Water	04/19/15
58	1504SWMST063-F-MSD	↓	L15041395-50	Water	04/19/15
59					
60					
61					
62					
63					

Notes:

LDC #: 34267A4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: SD
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-24	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
25-48	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC: 49-50 55-58	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC: 51-54	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 34267A4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: SD
2nd Reviewer: OL

METHOD: Trace Metals (EPA SW 846 Method 6010C/6020A/7471B)

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

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >50X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
	28	W	Se	52.80	4-13, 28-37	No Qual. (<50X MDL)

Comments:

SerDil.wpd

Report# 34267A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 25, 2015

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041395

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMDS026-U	04/16/15	L15041395-01
1504SWMST274-U	04/16/15	L15041395-03
1504SWMST143-U	04/16/15	L15041395-05
1504SWMST132-2-U	04/16/15	L15041395-07
1504SWMST132-1-U	04/16/15	L15041395-09
1504SWMST131-U	04/16/15	L15041395-11
1504SWMST128-U	04/16/15	L15041395-13
1504SWMST067-U	04/17/15	L15041395-15
1504SWMST095-U	04/17/15	L15041395-17
1504GWMSG006-U	04/17/15	L15041395-19
1504GWMSG007-U	04/17/15	L15041395-21
1504SWMST096-U	04/17/15	L15041395-23
1504SWMST092-1-U	04/18/15	L15041395-25
1504SWMST089-U	04/18/15	L15041395-27
1504SWMST090-U	04/18/15	L15041395-33
1504SWMST069-U	04/18/15	L15041395-35
1504SWMST226-U	04/18/15	L15041395-37
1504SWMDS034-U	04/19/15	L15041395-39
1504SWMDS044-U	04/19/15	L15041395-41
1504SWMST045-U	04/19/15	L15041395-43
1504SWMST063-U	04/19/15	L15041395-45
1504SWMST057-U	04/19/15	L15041395-51
1504SWMST050-U	04/19/15	L15041395-53
1504SWMST092-2-U	04/18/15	L15041395-55
1504SWMDS026-F	04/16/15	L15041395-02

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMST274-F	04/16/15	L15041395-04
1504SWMST143-F	04/16/15	L15041395-06
1504SWMST132-2-F	04/16/15	L15041395-08
1504SWMST132-1-F	04/16/15	L15041395-10
1504SWMST131-F	04/16/15	L15041395-12
1504SWMST128-F	04/16/15	L15041395-14
1504SWMST067-F	04/17/15	L15041395-16
1504SWMST095-F	04/17/15	L15041395-18
1504GWMSG006-F	04/17/15	L15041395-20
1504GWMSG007-F	04/17/15	L15041395-22
1504SWMST096-F	04/17/15	L15041395-24
1504SWMST092-1-F	04/18/15	L15041395-26
1504SWMST089-F	04/18/15	L15041395-28
1504SWMST090-F	04/18/15	L15041395-34
1504SWMST069-F	04/18/15	L15041395-36
1504SWMST226-F	04/18/15	L15041395-38
1504SWMDS034-F	04/19/15	L15041395-40
1504SWMDS044-F	04/19/15	L15041395-42
1504SWMST045-F	04/19/15	L15041395-44
1504SWMST063-F	04/19/15	L15041395-46
1504SWMST057-F	04/19/15	L15041395-52
1504SWMST050-F	04/19/15	L15041395-54
1504SWMST092-2-F	04/18/15	L15041395-56
1504SWMST128-UDUP	04/16/15	L15041395-13DUP
1504SWMST089-U-MS	04/18/15	L15041395-29
1504SWMST089-U-MSD	04/18/15	L15041395-31
1504SWMST063-U-MS	04/19/15	L15041395-47
1504SWMST063-U-MSD	04/19/15	L15041395-49
1504SWMST089-F-MS	04/18/15	L15041395-30
1504SWMST089-F-MSD	04/18/15	L15041395-32
1504SWMST063-F-MS	04/19/15	L15041395-48
1504SWMST063-F-MSD	04/19/15	L15041395-50

Introduction

This data review covers 57 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- Standard Method 2340B for Hardness, EPA Method 300.0 for Sulfate, and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 7 days for method 2540C, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

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

Wet Chemistry - Data Qualification Summary - SDG L15041395

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L15041395

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L15041395

No Sample Data Qualified in this SDG

LDC #: 34267A6
SDG #: L15041395
Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 5/18/15
Page: 1 of 3
Reviewer: SD
2nd Reviewer: a

METHOD: (Analyte) Hardness (SM2340B), Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/16-18/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	Neg Blank
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/D=(50,51) (52,53) (54,55) (56,57)
VII.	Duplicate sample analysis	A	DUP= 1504GWMBW131-U DUP (SDG: L15041393) 1504GWMBW099-U DUP (SDG: L15041394)
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	Not Reviewed
X.	Sample result verification	N	
XI	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID		Lab ID	Matrix	Date
1	1504SWMDS026-U	TDS	L15041395-01	Water	04/16/15
2	1504SWMST274-U		L15041395-03	Water	04/16/15
3	1504SWMST143-U		L15041395-05	Water	04/16/15
4	1504SWMST132-2-U		L15041395-07	Water	04/16/15
5	1504SWMST132-1-U		L15041395-09	Water	04/16/15
6	1504SWMST131-U		L15041395-11	Water	04/16/15
7	1504SWMST128-U		L15041395-13	Water	04/16/15
8	1504SWMST067-U		L15041395-15	Water	04/17/15
9	1504SWMST095-U		L15041395-17	Water	04/17/15
10	1504GWMSG006-U		L15041395-19	Water	04/17/15
11	1504GWMSG007-U		L15041395-21	Water	04/17/15
12	1504SWMST096-U		L15041395-23	Water	04/17/15
13	1504SWMST092-1-U		L15041395-25	Water	04/18/15
14	1504SWMST089-U		L15041395-27	Water	04/18/15
15	1504SWMST090-U		L15041395-33	Water	04/18/15
16	1504SWMST069-U		L15041395-35	Water	04/18/15
17	1504SWMST226-U		L15041395-37	Water	04/18/15

LDC #: 34267A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/18/15
SDG #: L15041395 Stage 2B Page: 2 of 3
Laboratory: Microbac Laboratories Reviewer: SD
2nd Reviewer: [illegible]

METHOD: (Analyte) Hardness (SM2340B), Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID		Lab ID	Matrix	Date
18	1504SWMDS034-U	TDS	L15041395-39	Water	04/19/15
19	1504SWMDS044-U		L15041395-41	Water	04/19/15
20	1504SWMST045-U		L15041395-43	Water	04/19/15
21	1504SWMST063-U		L15041395-45	Water	04/19/15
22	1504SWMST057-U		L15041395-51	Water	04/19/15
23	1504SWMST050-U		L15041395-53	Water	04/19/15
24	1504SWMST092-2-U		L15041395-55	Water	04/18/15
25	1504SWMDS026-F	Hard, SO_4	L15041395-02	Water	04/16/15
26	1504SWMST274-F		L15041395-04	Water	04/16/15
27	1504SWMST143-F		L15041395-06	Water	04/16/15
28	1504SWMST132-2-F		L15041395-08	Water	04/16/15
29	1504SWMST132-1-F		L15041395-10	Water	04/16/15
30	1504SWMST131-F		L15041395-12	Water	04/16/15
31	1504SWMST128-F		L15041395-14	Water	04/16/15
32	1504SWMST067-F		L15041395-16	Water	04/17/15
33	1504SWMST095-F		L15041395-18	Water	04/17/15
34	1504GWMSG006-F		L15041395-20	Water	04/17/15
35	1504GWMSG007-F		L15041395-22	Water	04/17/15
36	1504SWMST096-F		L15041395-24	Water	04/17/15
37	1504SWMST092-1-F		L15041395-26	Water	04/18/15
38	1504SWMST089-F		L15041395-28	Water	04/18/15
39	1504SWMST090-F		L15041395-34	Water	04/18/15
40	1504SWMST069-F		L15041395-36	Water	04/18/15
41	1504SWMST226-F		L15041395-38	Water	04/18/15
42	1504SWMDS034-F		L15041395-40	Water	04/19/15
43	1504SWMDS044-F		L15041395-42	Water	04/19/15
44	1504SWMST045-F		L15041395-44	Water	04/19/15
45	1504SWMST063-F		L15041395-46	Water	04/19/15
46	1504SWMST057-F		L15041395-52	Water	04/19/15
47	1504SWMST050-F		L15041395-54	Water	04/19/15
48	1504SWMST092-2-F		L15041395-56	Water	04/18/15
49	1504SWMST128-UDUP	TDS	L15041395-13DUP	Water	04/16/15
50	1504SWMST089-U-MS	TDS	L15041395-29	Water	04/18/15
51	1504SWMST089-U-MSD		L15041395-31	Water	04/18/15

LDC #: 34267A6

SDG #: L15041395

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/18/15

Reviewer: SD

2nd Reviewer: CW

METHOD: (Analyte) Hardness (SM2340B), Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID		Lab ID	Matrix	Date
52	1504SWMST063-U-MS	TDS	L15041395-47	Water	04/19/15
53	1504SWMST063-U-MSD	↓	L15041395-49	Water	04/19/15
54	1504SWMST089-F-MS	SO_4	L15041395-30	Water	04/18/15
55	1504SWMST089-F-MSD	↓	L15041395-32	Water	04/18/15
56	1504SWMST063-F-MS	↓	L15041395-48	Water	04/19/15
57	1504SWMST063-F-MSD	↓	L15041395-50	Water	04/19/15
58					
59					
60					
61					
62					

Notes:

LDC #: 34267A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JD
2nd reviewer: a

All circled methods are applicable to each sample.

Sample ID	Parameter
1-24	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
25-48	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 Hardness
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC:49-53	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC:54-57	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 34267A6

VALIDATION FINDINGS WORKSHEET
Negative Blanks

Page: 1 of 1
Reviewer: JD
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover
The absolute value of the negative blank conentrations listed below exceeded the RL

#	Blank ID	Analyte	Negative Blank Concentration	RL	Associated Samples	Qualifications
		TDS	-10.0 mg/L	10.0 mg/L	17-24	No Qual. (>10X RL) (11)

Comments:

Report# 34267B4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 25, 2015

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041474

Sample Identification	Collection Date	Laboratory Sample Identification
1504GMMW023-U	04/19/15	L15041474-02
1504GMMW027-U	04/20/15	L15041474-03
1504GMMW035-U	04/20/15	L15041474-05
1504GMMW037-1-U	04/20/15	L15041474-07
1504GMMW037-2-U	04/20/15	L15041474-09
1504GMMW036-U	04/20/15	L15041474-11
1504GMMW025-U	04/20/15	L15041474-17
1504GMMW023-F	04/19/15	L15041474-01
1504GMMW027-F	04/20/15	L15041474-04
1504GMMW035-F	04/20/15	L15041474-06
1504GMMW037-1-F	04/20/15	L15041474-08
1504GMMW037-2-F	04/20/15	L15041474-10
1504GMMW036-F	04/20/15	L15041474-12
1504GMMW025-F	04/20/15	L15041474-18
1504GMMW036-U-MS	04/20/15	L15041474-13
1504GMMW036-U-MSD	04/20/15	L15041474-15
1504GMMW036-F-MS	04/20/15	L15041474-14
1504GMMW036-F-MSD	04/20/15	L15041474-16

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for manganese are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

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

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041474

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15041474

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L15041474

No Sample Data Qualified in this SDG

LDC #: 34267B4b

SDG #: L15041474

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/18/15

Page: 1 of 2

Reviewer: JD

2nd Reviewer: a

METHOD: Metals (EPA SW 846 Method 6020A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/19-20/15
II.	ICP/MS Tune	A	
III.	Instrument Calibration JD	~~SW~~ A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MS/D = 1504SWMST063-F MSD, 1504SWMST063-U MSD (SDG: L15041395)
VIII.	Duplicate sample analysis	N	
IX.	ICP Serial Dilution	A	SER = 1504SWMST092-2-F (SDG: L15041395) JD
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	Not Reviewed
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID		Lab ID	Matrix	Date
1	1504GMMW023-U	Cd, Se, Mn	L15041474-02	Water	04/19/15
2	1504GMMW027-U		L15041474-03	Water	04/20/15
3	1504GMMW035-U		L15041474-05	Water	04/20/15
4	1504GMMW037-1-U		L15041474-07	Water	04/20/15
5	1504GMMW037-2-U		L15041474-09	Water	04/20/15
6	1504GMMW036-U		L15041474-11	Water	04/20/15
7	1504GMMW025-U		L15041474-17	Water	04/20/15
8	1504GMMW023-F	Se	L15041474-01	Water	04/19/15
9	1504GMMW027-F		L15041474-04	Water	04/20/15
10	1504GMMW035-F		L15041474-06	Water	04/20/15
11	1504GMMW037-1-F		L15041474-08	Water	04/20/15
12	1504GMMW037-2-F		L15041474-10	Water	04/20/15
13	1504GMMW036-F		L15041474-12	Water	04/20/15
14	1504GMMW025-F		L15041474-18	Water	04/20/15
15	1504GMMW036-U-MS	Cd Mn, Se	L15041474-13	Water	04/20/15

LDC #: 34267B4b

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/18/15

SDG #: L15041474

Page: 2 of 2

Laboratory: Microbac Laboratories

Reviewer: JD

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID		Lab ID	Matrix	Date
16	1504GMMW036-U-MSD	Cd, Mn, Se	L15041474-15	Water	04/20/15
17	1504GMMW036-F-MS	Se	L15041474-14	Water	04/20/15
18	1504GMMW036-F-MSD	↓	L15041474-16	Water	04/20/15
19					
20					
21					
22					
23					

Notes:

LDC #: 34267B4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: JD
2nd reviewer: a

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
8-14	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC:15-16	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC:17-18	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

Report# 34267B6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 25, 2015

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041474

Sample Identification	Collection Date	Laboratory Sample Identification
1504GMMW023-U	04/19/15	L15041474-02
1504GMMW027-U	04/20/15	L15041474-03
1504GMMW035-U	04/20/15	L15041474-05
1504GMMW037-1-U	04/20/15	L15041474-07
1504GMMW037-2-U	04/20/15	L15041474-09
1504GMMW036-U	04/20/15	L15041474-11
1504GMMW025-U	04/20/15	L15041474-17
1504GMMW023-F	04/19/15	L15041474-01
1504GMMW027-F	04/20/15	L15041474-04
1504GMMW035-F	04/20/15	L15041474-06
1504GMMW037-1-F	04/20/15	L15041474-08
1504GMMW037-2-F	04/20/15	L15041474-10
1504GMMW036-F	04/20/15	L15041474-12
1504GMMW025-F	04/20/15	L15041474-18
1504GMMW023-UDUP	04/19/15	L15041474-02DUP
1504GMMW036-U-MS	04/20/15	L15041474-13
1504GMMW036-U-MSD	04/20/15	L15041474-15
1504GMMW036-F-MS	04/20/15	L15041474-14
1504GMMW036-F-MSD	04/20/15	L15041474-16

Introduction

This data review covers 19 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 160.1) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

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

Wet Chemistry - Data Qualification Summary - SDG L15041474

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L15041474

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L15041474

No Sample Data Qualified in this SDG

LDC #: 34267B6

SDG #: L15041474

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/18/15

Page: 1 of 2

Reviewer: JD

2nd Reviewer: OL

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/19-20/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	Neg Blank
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/D = (16,17) (18,19)
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	Not Reviewed
X.	Sample result verification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID		Lab ID	Matrix	Date
1	1504GMMW023-U	TDS	L15041474-02	Water	04/19/15
2	1504GMMW027-U		L15041474-03	Water	04/20/15
3	1504GMMW035-U		L15041474-05	Water	04/20/15
4	1504GMMW037-1-U		L15041474-07	Water	04/20/15
5	1504GMMW037-2-U		L15041474-09	Water	04/20/15
6	1504GMMW036-U		L15041474-11	Water	04/20/15
7	1504GMMW025-U		L15041474-17	Water	04/20/15
8	1504GMMW023-F	SO4	L15041474-01	Water	04/19/15
9	1504GMMW027-F		L15041474-04	Water	04/20/15
10	1504GMMW035-F		L15041474-06	Water	04/20/15
11	1504GMMW037-1-F		L15041474-08	Water	04/20/15
12	1504GMMW037-2-F		L15041474-10	Water	04/20/15
13	1504GMMW036-F		L15041474-12	Water	04/20/15
14	1504GMMW025-F		L15041474-18	Water	04/20/15
15	1504GMMW023-UDUP		L15041474-02DUP	Water	04/19/15
16	1504GMMW036-U-MS	~~TDS~~	L15041474-13	Water	04/20/15
17	1504GMMW036-U-MSD		L15041474-15	Water	04/20/15

LDC #: 34267B6

SDG #: L15041474

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/18/15

Reviewer: 3D

2nd Reviewer: ar

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID	Lab ID	Matrix	Date
18	1504GMMW036-F-MS SO4	L15041474-14	Water	04/20/15
19	1504GMMW036-F-MSD ↓	L15041474-16	Water	04/20/15
20				
21				
22				
23				
24				

Notes:

LDC #: 34261B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JD
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1-7	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
8-14	pH TDS Cl F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
AC15-17	pH (TDS) Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
AC.18-19	pH TDS Cl F NO_3 NO_2 (SO_4) O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 34267B6

VALIDATION FINDINGS WORKSHEET
Negative Blanks

Page: 1 of 1
Reviewer: SD
2nd Reviewer: a

METHOD: Inorganics, Method See Cover
The absolute value of the negative blank conentrations listed below exceeded the RL

#	Blank ID	Analyte	Negative Blank Concentration	RL	Associated Samples	Qualifications
		TDS	-10.0 mg/L	10.0 mg/L	1	No Qual. (>10X RL) (11)

Comments:

Report# 34267C4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 26, 2015

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010C

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L15041475

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMST019-F	04/20/15	L15041475-02
1504SWMST066-F	04/20/15	L15041475-04
1504SWMST020-F	04/20/15	L15041475-06

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium and Magnesium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

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

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

For 1504SWMST063-FMS/MSD (from SDG L15041395) no data were qualified for Calcium percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration.

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

Raw data were not reviewed for this SDG.

X(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041475

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15041475

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L15041475

No Sample Data Qualified in this SDG

LDC #: 34267C4a

SDG #: L15041475

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/8/15

Page: 1 of 1

Reviewer: SD

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010C)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/20/15
II.	Instrument Calibration	A	
III.	ICP Interference Check Sample (ICS) Analysis	A	
IV.	Laboratory Blanks	A	
V.	Field Blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MS/D = 1504SWMST063-F MS/D (SDG: L15041395)
VII.	Duplicate sample analysis	N	
VIII.	ICP Serial Dilution	A	SER = Non-Client
IX.	Laboratory control samples	A	LCS
X.	Field Duplicates	N	Not Reviewed
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504SWMST019-F	L15041475-02	Water	04/20/15
2	1504SWMST066-F	L15041475-04	Water	04/20/15
3	1504SWMST020-F	L15041475-06	Water	04/20/15
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

Notes:

LDC #: 34264a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: SD
2nd reviewer: OL

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 34267C4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JD
2nd Reviewer: 9

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

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

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

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for samples?

LEVEL IV ONLY:

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	1504SWMST063-F MS/D (SDG: L15041395)	W	Ca	150	44.7		21	No Qual. (Ca > 4X)

Comments:

Report# 34267C4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 26, 2015

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041475

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMST019-U	04/20/15	L15041475-01
1504SWMST066-U	04/20/15	L15041475-03
1504SWMST020-U	04/20/15	L15041475-05
1504SWMST019-F	04/20/15	L15041475-02
1504SWMST066-F	04/20/15	L15041475-04
1504SWMST020-F	04/20/15	L15041475-06

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for manganese are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

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

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15041475

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15041475

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L15041475

No Sample Data Qualified in this SDG

LDC #: 34267C4b

SDG #: L15041475

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 5/18/15

Page: 1 of 1

Reviewer: JD

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/20/15
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MS/D = 1504SWMST063-F 1504SWMST063-U MS/D (SDG: L1504 1395
VIII.	Duplicate sample analysis	N	
IX.	ICP Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	Not Reviewed
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID		Lab ID	Matrix	Date
1	1504SWMST019-U	Se	L15041475-01	Water	04/20/15
2	1504SWMST066-U	↓	L15041475-03	Water	04/20/15
3	1504SWMST020-U	↓	L15041475-05	Water	04/20/15
4	1504SWMST019-F	Se, Cd	L15041475-02	Water	04/20/15
5	1504SWMST066-F	↓	L15041475-04	Water	04/20/15
6	1504SWMST020-F	↓	L15041475-06	Water	04/20/15
7					
8					
9					
10					
11					
12					

Notes:

*MSD = 1504GMMW036-F MS/D
1504GMMW036-U MS/D (SDG: L15041474)

LDC #: 34267 K4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
4-6	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

Report# 34267C6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: May 25, 2015

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15041475

Sample Identification	Collection Date	Laboratory Sample Identification
1504SWMST019-U	04/20/15	L15041475-01
1504SWMST066-U	04/20/15	L15041475-03
1504SWMST020-U	04/20/15	L15041475-05
1504SWMST019-F	04/20/15	L15041475-02
1504SWMST066-F	04/20/15	L15041475-04
1504SWMST020-F	04/20/15	L15041475-06
1504SWMST020-UDUP	04/20/15	L15041475-05DUP

Introduction

This data review covers 57 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- Standard Method 2340B for Hardness, EPA Method 300.0 for Sulfate, and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 7 days for method 160.1, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

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

Wet Chemistry - Data Qualification Summary - SDG L15041475

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L15041475

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L15041475

No Sample Data Qualified in this SDG

LDC #: 34267C6 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/18/15
SDG #: L15041475 Stage 2B Page: 1 of 1
Laboratory: Microbac Laboratories Reviewer: SD
2nd Reviewer: G

METHOD: (Analyte) Hardness (SM2340B), Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	4/20/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates SD	~~A~~ NA ~~CS~~ SD	Non-Client Sample (Not Reviewed)
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	Not Reviewed
X.	Sample result verification	N	
XI	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	1504SWMST019-U	L15041475-01	Water	04/20/15
2	1504SWMST066-U	L15041475-03	Water	04/20/15
3	1504SWMST020-U	L15041475-05	Water	04/20/15
4	1504SWMST019-F Hard, SO4	L15041475-02	Water	04/20/15
5	1504SWMST066-F	L15041475-04	Water	04/20/15
6	1504SWMST020-F	L15041475-06	Water	04/20/15
7	1504SWMST020-UDUP	L15041475-05DUP	Water	04/20/15
8				
9				
10				
11				
12				
13				
14				

Notes:

LDC #: 34267C4

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JD
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1-3	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
4-6	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 Hardness
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC: 7	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

MWH Americas, Inc.
2890 East Cottonwood Parkway Suite 300
Salt Lake City, UT 84121
ATTN: Ms. Betty VanPelt

October 29, 2015

SUBJECT: Monsanto, P4 Background, Data Validation

Dear Ms. VanPelt,

Enclosed is the final validation report for the fractions listed below. This SDG was received on October 15, 2015. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #35204:

SDG #	Fraction
L15100152	Dissolved Metals, Metals, Wet Chemistry

The data verification was performed under Stage 2B & 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- QAPP Addendum, MWH 2009, to the project SAP, April, 2004
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

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

Sincerely,

Christina Rink
Project Manager/Chemist

HC EDD

Attachment 1

90/10 2B/4

LDC #35204 (MWH Americas, Inc.-Salt Lake City, UT / Monsanto, P4 Background)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Se (6020A)		Diss. V Cd,Se (6020A)		Diss. Ca,Mg (6010C)		Hard. (2340B)		SO_4 (300.0)		TDS (160.1)																							
Matrix: Water/Soil				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	L15100152	10/15/15	11/05/15	9	0	9	0	9	0	9	0	9	0	9	0																						
A	L15100152	10/15/15	11/05/15	1	0	1	0	1	0	1	0	1	0	1	0																						
Total	A/CR			10	0	10	0	10	0	10	0	10	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60

Shaded cells indicate Stage 4 review (all other cells are Stage 2B review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs L:\MWH\Monsanto P4\35204ST.wpd

Report# 35204A4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 28, 2015

Matrix: Water

Parameters: Dissolved Metals by SW 846 Method 6010C

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L15100152

Sample Identification	Collection Date	Laboratory Sample Identification
1509SWMST274-F**	09/30/15	L15100152-01**
1509SWMDS026-F	09/30/15	L15100152-03
1509SWMST044-F	09/30/15	L15100152-05
1509SWMST045-F	09/30/15	L15100152-07
1509SWMSG004-F	09/30/15	L15100152-09
1509SWMDS030-F	09/30/15	L15100152-11
1509SWMST069-F	09/30/15	L15100152-13
1509SWMST019-1-F	09/30/15	L15100152-15
1509SWMST019-2-F	09/30/15	L15100152-17
1509SWMST020-F	09/30/15	L15100152-19
1509SWMST020-F-MS	09/30/15	L15100152-21
1509SWMST020-F-MSD	09/30/15	L15100152-23

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6010C ICP: Calcium and Magnesium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for antimony, lead and thallium are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

III. Blanks

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

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

V. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

Calcium results were outside the QC limits; results were not qualified since the original sample (1509SWMST020-F) was greater than 4X the spike amount.

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

VIII. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the method detection limits [MDLs]) were met.

IX. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

X(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

X(b). Overall Assessment of Data

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

Dissolved Metals - Data Qualification Summary - SDG L15100152

No Sample Data Qualified in this SDG

Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG L15100152

No Sample Data Qualified in this SDG

Dissolved Metals - Field Blank Data Qualification Summary - SDG L15100152

No Sample Data Qualified in this SDG

LDC #: 35204A4a

SDG #: L15100152

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 10/28/15

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Dissolved Metals (EPA SW 846 Method 6010C)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	9/30/15
II.	Instrument Calibration	A	
III.	ICP Interference Check Sample (ICS) Analysis	A	
IV.	Laboratory Blanks	A	
V.	Field Blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	MSD=(11,12) = Ca>4x
VII.	Duplicate sample analysis	N	
VIII.	ICP Serial Dilution	A	
IX.	Laboratory control samples	A	LCS
X.	Field Duplicates	N	
XI.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XII.	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	1509SWMST274-F**	L15100152-01**	Water	09/30/15
2	1509SWMDS026-F	L15100152-03	Water	09/30/15
3	1509SWMST044-F	L15100152-05	Water	09/30/15
4	1509SWMST045-F	L15100152-07	Water	09/30/15
5	1509SWMSG004-F	L15100152-09	Water	09/30/15
6	1509SWMDS030-F	L15100152-11	Water	09/30/15
7	1509SWMST069-F	L15100152-13	Water	09/30/15
8	1509SWMST019-1-F	L15100152-15	Water	09/30/15
9	1509SWMST019-2-F	L15100152-17	Water	09/30/15
10	1509SWMST020-F	L15100152-19	Water	09/30/15
11	1509SWMST020-F-MS	L15100152-21	Water	09/30/15
12	1509SWMST020-F-MSD	L15100152-23	Water	09/30/15
13				
14				
15				
16				

Notes:

LDC #: 35204A49

VALIDATION FINDINGS CHECKLIST

Reviewer: JD
2nd Reviewer: [illegible]

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

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

LDC #: 35204A1c

VALIDATION FINDINGS CHECKLIST

Reviewer: SD
2nd Reviewer: a

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 35204A1a9

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: JD
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC-11-12	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 35204A4a

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: JD
2nd Reviewer: CL

METHOD: Trace Metals (See cover)

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

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV 10:22	ICP (Initial calibration)	Ca	10.7 mg/L	10 mg/L	107 %R	107 %R	Y
	ICP/MS (Initial calibration)						
	CVAA (Initial calibration)						
CCV 10:36	ICP (Continuing calibration)	Mg	10.1 mg/L	10 mg/L	101 %R	101 %R	Y
	ICP/MS (Continuing calibration)						
	CVAA (Contining calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments:

LDC #: 35204A4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: JD
2nd Reviewer: CL

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

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

$\%R = \frac{Found}{True} \times 100$

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

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

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

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

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

$\%D = \frac{|I-SDR|}{I} \times 100$

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

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICS AB 10:35	ICP interference check	Mg	251 mg/L	250 mg/L	100 %R	100 %R	Y
LCS 10:43	Laboratory control sample	Ca	6.71 mg/L	6.25 mg/L	107 %R	107 %R	↓
MS 11:19	Matrix spike	Mg	(SSR-SR) 6.75 mg/L	6.25 mg/L	108 %R	108 %R	↓
MSD 11:21	Duplicate	Ca	70.5 mg/L	69.25 mg/L	1.79 %RPD	1.85 %RPD	Y*
SER 11:02	ICP serial dilution	Ca	158.5 mg/L	151 mg/L	4.97 %D	5.09 %D	Y*

Comments: *Rounding

TOTCLC.4SW

LDC #: 35204A4a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JO
2nd reviewer: [illegible]

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

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for (1) Ca were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

Recalculation: $80.4 \text{ mg/L} \times \frac{50 \text{ ml}}{40 \text{ ml}} = 101 \text{ mg/L}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Dil = 1x
RD = 80.4 mg/L
FV = 50 ml
In. W/V = 40 ml

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Ca	101	101	Y

Note:

RECALC.4SW

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 28, 2015

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15100152

Sample Identification	Collection Date	Laboratory Sample Identification
1509SWMST274-U**	09/30/15	L15100152-02**
1509SWMDS026-U	09/30/15	L15100152-04
1509SWMST044-U	09/30/15	L15100152-06
1509SWMST045-U	09/30/15	L15100152-08
1509SWMSG004-U	09/30/15	L15100152-10
1509SWMDS030-U	09/30/15	L15100152-12
1509SWMST069-U	09/30/15	L15100152-14
1509SWMST019-1-U	09/30/15	L15100152-16
1509SWMST019-2-U	09/30/15	L15100152-18
1509SWMST020-U	09/30/15	L15100152-20
1509SWMST274-F**	09/30/15	L15100152-01**
1509SWMDS026-F	09/30/15	L15100152-03
1509SWMST044-F	09/30/15	L15100152-05
1509SWMST045-F	09/30/15	L15100152-07
1509SWMSG004-F	09/30/15	L15100152-09
1509SWMDS030-F	09/30/15	L15100152-11
1509SWMST069-F	09/30/15	L15100152-13
1509SWMST019-1-F	09/30/15	L15100152-15
1509SWMST019-2-F	09/30/15	L15100152-17
1509SWMST020-F	09/30/15	L15100152-19
1509SWMST020-U-MS	09/30/15	L15100152-22
1509SWMST020-U-MSD	09/30/15	L15100152-24
1509SWMST020-F-MS	09/30/15	L15100152-21
1509SWMST020-F-MSD	09/30/15	L15100152-23

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 24 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Selenium, and Vanadium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for cobalt, manganese and zinc are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Cadmium	0.123 ug/L	1509SWMST274-F** 1509SWMDS026-F

Sample concentrations were compared to concentrations detected in the ICB/CCB/PBs per the National Functional Guidelines. No samples were qualified.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

A post-digestion spike was analyzed for any spike recovery outlier when the spike x 4 is greater than the sample result. For spike % R < 30% and post digest spike > 75%, data are qualified 'J' or 'UJ'. For spike %R < 30% and post digest was < 75% or not reported, the 'R' matrix effect is verified for undetected data. The matrix spike qualifier 'J' is verified with consideration of significant low bias. No additional qualification is required for the post digest spike as data are already qualified for the matrix spike. If the post digest spike is not correlated (high or low) to the matrix spike, the difference is noted. If a post digest spike is not reported, the serial dilution may be used for further evaluation (see following section).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed.

The results for the dissolved metals sample analysis were greater than the total metals sample analysis as follows:

Analyte	Concentration (mg/L)	
	1509SWMDS026-U	1509SWMDS026-F
Selenium	0.0297	0.0421

Analyte	Concentration (mg/L)	
	1509SWMST019-1-U	1509SWMST019-1-F
Selenium	0.00246	0.00524

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

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

Metals - Data Qualification Summary - SDG L15100152

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L15100152

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L15100152

No Sample Data Qualified in this SDG

LDC #: 35204A4b

SDG #: L15100152

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 10/28/15

Page: 1 of 2

Reviewer: JSD

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	9/30/15
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MS/D = (21,22)(23,24)
VIII.	Duplicate sample analysis	N	
IX.	ICP Serial Dilution	N	Not Performed
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	SW	Not reviewed for Stage 2B validation.
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	1509SWMST274-U **	L15100152-02	Water	09/30/15
2	1509SWMDS026-U	L15100152-04	Water	09/30/15
3	1509SWMST044-U	L15100152-06	Water	09/30/15
4	1509SWMST045-U	L15100152-08	Water	09/30/15
5	1509SWMSG004-U	L15100152-10	Water	09/30/15
6	1509SWMDS030-U	L15100152-12	Water	09/30/15
7	1509SWMST069-U	L15100152-14	Water	09/30/15
8	1509SWMST019-1-U	L15100152-16	Water	09/30/15
9	1509SWMST019-2-U	L15100152-18	Water	09/30/15
10	1509SWMST020-U	L15100152-20	Water	09/30/15
11	1509SWMST274-F **	L15100152-01	Water	09/30/15
12	1509SWMDS026-F	L15100152-03	Water	09/30/15
13	1509SWMST044-F	L15100152-05	Water	09/30/15

LDC #: 35204A4b

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

SDG #: L15100152

Laboratory: Microbac Laboratories

Date: 10/28/15

Page: 2 of 2

Reviewer: JSD

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
14	1509SWMST045-F	L15100152-07	Water	09/30/15
15	1509SWMSG004-F	L15100152-09	Water	09/30/15
16	1509SWMDS030-F	L15100152-11	Water	09/30/15
17	1509SWMST069-F	L15100152-13	Water	09/30/15
18	1509SWMST019-1-F	L15100152-15	Water	09/30/15
19	1509SWMST019-2-F	L15100152-17	Water	09/30/15
20	1509SWMST020-F	L15100152-19	Water	09/30/15
21	1509SWMST020-U-MS	L15100152-22	Water	09/30/15
22	1509SWMST020-U-MSD	L15100152-24	Water	09/30/15
23	1509SWMST020-F-MS	L15100152-21	Water	09/30/15
24	1509SWMST020-F-MSD	L15100152-23	Water	09/30/15
25				
26				
27				
28				
29				
30				

Notes:

LDC #: 35204A46

VALIDATION FINDINGS CHECKLIST

Reviewer: SD
2nd Reviewer: [illegible]

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

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

LDC #: 35204A46

VALIDATION FINDINGS CHECKLIST

Reviewer: 3D
2nd Reviewer: a

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?			✓	
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 35204A4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: SD
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
11-20	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC:21-22	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
QC:23-24	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 35204A4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JD
2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 864 Method 6010/6020/7000) Soil preparation factor applied: ____
Sample Concentration units, unless otherwise noted: mg/L Associated Samples: 11-12

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	No Qual.									
Cd			0.123	0.000615										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 3520A4b

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: JD
2nd Reviewer: [illegible]

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

#	Sample ID	Analyte	Total (mg/l)	Dissolved (mg/l)	Finding	Qualifications
	2/12	Se	**0.0297**	0.0421	Total < Dissolved	Text
	8/18	Se	0.00246	0.00524	Total < Dissolved	Text

Comments:

SRV.SW4.wpd

LDC #: 35204A4b

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: SD
2nd Reviewer: [illegible]

METHOD: Trace Metals (See cover)

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

$\%R = \frac{Found}{True} \times 100$

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

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV 12:04	ICP/MS (Initial calibration)	Cd	50.27 ug/L	50 ug/L	101 %R	101 %R	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV 15:15	ICP/MS (Continuing calibration)	Se	50.29 ug/L	50 ug/L	101 %R	101 %R	Y
	CVAA (Contining calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments:

calclc.4sw.wpd

LDC #: 35204A4W

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: JD
2nd Reviewer: [illegible]

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

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

$\%R = \frac{Found}{True} \times 100$

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

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

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

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

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

$\%D = \frac{|I-SDR|}{I} \times 100$

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

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICS AB 12:17	ICP interference check	Cd	99.49 ug/L	100 ug/L	99.5 %R	99.5 %R	Y
LCS 14:08	Laboratory control sample	V	0.122 mg/L	0.125 mg/L	97.6 %R	97.6 %R	
MS 14:14	Matrix spike	Se	(SSR-SR) 0.1206 mg/L	0.125 mg/L	96.5 %R	96.5 %R	
MSD 14:17	Duplicate	V	120.70 ug/L	122.76 ug/L	1.69 % RPD	1.69 % RPD	
N	ICP serial dilution						

Comments: _____

TOTCLC.4SW

LDC #: 35204A4b

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JD
2nd reviewer: [illegible]

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

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for (11) V were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

Recalculation: $\frac{0.2310\ \mu g/L \times 50\ ml}{20\ ml} \times \frac{1\ mg}{1000\ ug} = 0.000578\ mg/L$

RD = Raw data concentration — RD = 0.2310 ug/L
FV = Final volume (ml) — FV = 50 ml
In. Vol. = Initial volume (ml) or weight (G) — In V = 20 ml
Dil = Dilution factor — Dil = 1x

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Se	0.00499	0.00499	
	11	V	0.000578	0.000578	

Note:

Report# 35204A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 27, 2015

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories

Sample Delivery Group (SDG): L15100152

Sample Identification	Collection Date	Laboratory Sample Identification
1509SWMST274-U**	09/30/15	L15100152-02**
1509SWMDS026-U	09/30/15	L15100152-04
1509SWMST044-U	09/30/15	L15100152-06
1509SWMST045-U	09/30/15	L15100152-08
1509SWMSG004-U	09/30/15	L15100152-10
1509SWMDS030-U	09/30/15	L15100152-12
1509SWMST069-U	09/30/15	L15100152-14
1509SWMST019-1-U	09/30/15	L15100152-16
1509SWMST019-2-U	09/30/15	L15100152-18
1509SWMST274-F**	09/30/15	L15100152-01**
1509SWMDS026-F	09/30/15	L15100152-03
1509SWMST044-F	09/30/15	L15100152-05
1509SWMST045-F	09/30/15	L15100152-07
1509SWMSG004-F	09/30/15	L15100152-09
1509SWMDS030-F	09/30/15	L15100152-11
1509SWMST069-F	09/30/15	L15100152-13
1509SWMST019-1-F	09/30/15	L15100152-15
1509SWMST019-2-F	09/30/15	L15100152-17
1509SWMST020-F	09/30/15	L15100152-19
1509SWMST020-U-MS	09/30/15	L15100152-22
1509SWMST020-U-MSD	09/30/15	L15100152-24
1509SWMST020-F-MS	09/30/15	L15100152-21
1509SWMST020-F-MSD	09/30/15	L15100152-23
1509SWMST020-U	09/30/15	L15100152-20

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 24 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the method noted below:

- Standard Method 2340B for Hardness, EPA Method 300.0 for Sulfate, and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

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

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

1 Holding Time
2 Sample Preservation (including receipt temperature)
3 Sample Custody
4 Missing Deliverable
5 ICPMS Tune
6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
9 Low-Level Calibration Check Sample
10 Calibration Blank
11 Laboratory or Preparation Blank
12 ICPMS or ICP Interference Check Standard
13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
14 Laboratory Control Sample Precision
15 Laboratory Duplicate Precision
16 Matrix Spike or Matrix Spike Duplicate Recovery
17 Matrix Spike/Matrix Spike Duplicate Precision
18 ICPMS or ICP Serial Dilution
19 ICPMS Internal Standard
20 Field Replicate Precision
21 Equipment Rinsate Blank
22 Linear Range Exceeded
23 Other reason
26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0, 7 days for method 160.1, and 6 months for method 2340B) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 3 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of ≤ 20% for water or ≤ 35% for soil. For low level results, <5 x RL, a difference of ± 1 x RL is allowed for water and ± 2 x RL for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

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

Wet Chemistry - Data Qualification Summary - SDG L15100152

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L15100152

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L15100152

No Sample Data Qualified in this SDG

LDC #: 35204A6
SDG #: L15100152
Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET
Stage 2B /4

Date: 10/22/15
Page: 1 of 2
Reviewer: SD
2nd Reviewer: —

METHOD: (Analyte) Hardness (SM2340B), Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	9/30/15
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/D=(20,21) (22,23)
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Sample result verification	*A	Only reviewed for Level 4
XI.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** = Level 4 validation

	Client ID	Lab ID	Matrix	Date
1	1509SWMST274-U ** TDS	L15100152-02	Water	09/30/15
2	1509SWMDS026-U	L15100152-04	Water	09/30/15
3	1509SWMST044-U	L15100152-06	Water	09/30/15
4	1509SWMST045-U	L15100152-08	Water	09/30/15
5	1509SWMSG004-U	L15100152-10	Water	09/30/15
6	1509SWMDS030-U	L15100152-12	Water	09/30/15
7	1509SWMST069-U	L15100152-14	Water	09/30/15
8	1509SWMST019-1-U	L15100152-16	Water	09/30/15
9	1509SWMST019-2-U	L15100152-18	Water	09/30/15
10	1509SWMST274-F ** Hardness Sulf	L15100152-01	Water	09/30/15
11	1509SWMDS026-F	L15100152-03	Water	09/30/15
12	1509SWMST044-F	L15100152-05	Water	09/30/15
13	1509SWMST045-F	L15100152-07	Water	09/30/15
14	1509SWMSG004-F	L15100152-09	Water	09/30/15
15	1509SWMDS030-F	L15100152-11	Water	09/30/15
16	1509SWMST069-F	L15100152-13	Water	09/30/15
17	1509SWMST019-1-F	L15100152-15	Water	09/30/15

LDC #: 35204A6

SDG #: L15100152

Laboratory: Microbac Laboratories

VALIDATION COMPLETENESS WORKSHEET

Stage 2B /4

Date: 10/22/15

Page: 2 of 2

Reviewer: SD

2nd Reviewer: ✓

METHOD: (Analyte) Hardness (SM2340B), Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID			Lab ID	Matrix	Date
18	1509SWMST019-2-F	Hardness	SO4	L15100152-17	Water	09/30/15
19	1509SWMST020-F	↓	↓	L15100152-19	Water	09/30/15
20	1509SWMST020-U-MS		TDS	L15100152-22	Water	09/30/15
21	1509SWMST020-U-MSD		↓	L15100152-24	Water	09/30/15
22	1509SWMST020-F-MS		SO4	L15100152-21	Water	09/30/15
23	1509SWMST020-F-MSD		↓	L15100152-23	Water	09/30/15
24	1509SWMST020-U		TDS	L15100152-20		
25						
26						
27						
28						
29						
30						

Notes:

LDC #: 35204A6

VALIDATION FINDINGS CHECKLIST

Reviewer: SD
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See Cover)

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

LDC #: 35204A10

VALIDATION FINDINGS CHECKLIST

Reviewer: SD
2nd Reviewer: [illegible]

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

LDC #: 35204A0

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: JD
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1-9, 24	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
10-19	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4 Hardness
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC: 20-21	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
QC: 22-23	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4
	pH TDS Cl F NO_3 NO_2 SO_4 O-PO_4 Alk CN NH_3 TKN TOC Cr6+ ClO_4

Comments:

LDC #: 35204A60

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: JD
2nd Reviewer: 9

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of SO_4 was recalculated. Calibration date: 4/21/15

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

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	SO_4	s1	1.0	0.119	*0.998904*	0.996529	y*
		s2	5	0.621			
		s3	20	2.628			
		s4	40	5.511			
		s5	60	8.804			
		s6	140	19.265			
ICV 16:16 Calibration verification	SO_4	Found 39.899 mg/L	True 40 mg/L		99.7%R	99.7%R	y
CCV 18:19 Calibration verification	SO_4	38.215 mg/L	40 mg/L		95.54%R	95.51%R	y*
Calibration verification							

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

*Rounding

LDC #: 35204A4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: JD
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

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

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	TDS	478 mg/L	500 mg/L	95.6 %R	95.6 %R	Y
MS 20:05	Matrix spike sample	SO4	(SSR-SR) 41.64 mg/L	40 mg/L	104 %R	104 %R	↓
MSD	Duplicate sample	TDS	688 mg/L	710 mg/L	3.15 %RPD	3.15 %RPD	↓

Comments:

LDC #: 35204A6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JD
2nd reviewer: [illegible]

METHOD: Inorganics, Method See Cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for (10) Hardness reported with a positive detect were recalculated and verified using the following equation:

Concentration = 2.497*Ca + 4.118*Mg Recalculation: 2.497 x 100.5 mg/L + 4.118 x 12.625 mg/L = 303 mg/L

Ca = 100.5 mg/L
Mg = 12.625 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	TDS	292	292	Y
	10	SO4	40.4	40.5	Y*
	10	Hardness	303	303	Y

Note: * Rounding

RECALC.6

LDC #: 35204

EDD POPULATION COMPLETENESS WORKSHEET

Date: 10/29/15
Page: 1 of 1
2nd Reviewer:

The LDC job number listed above was entered by JE.

	EDD Process		Comments/Action
I.	EDD Completeness	-	
Ia.	- All methods present?	Y	
Ib.	- All samples present/match report?	Y	
Ic.	- All reported analytes present?	Y	
Id.	-10% or 100% verification of EDD?	Y	
II.	EDD Preparation/Entry	-	
IIa.	- Carryover U/J?	Y	
IIb.	- Reason Codes used? If so, note which codes	Y	client
IIc.	-Additional Information (QC Level, Validator, Date, Validated Y/N, etc.)	Y	
III.	Reasonableness Checks	-	
IIIa.	- Do all qualified ND results have ND qualifier (i.e. UJ)?	Y	
IIIb.	- Do all qualified detect results have detect qualifier (i.e. J)?	Y	
IIIc.	- If reason codes used, do all qualified results have reason code field populated?	NA	
IIId.	-Does the detect flag require changing for blank qualifiers? If so, are all U results marked ND?	NA	
IIIe.	- Do blank concentrations in report match EDD, where data was qualified due to blank?	NA	
IIIf.	- Were any results rejected for overall assessment? If so, were results changed to nonreportable?	N/A	
IIIg.	- Is the readme complete? If applicable, were edits or discrepancies listed in the readme?	Y	

Notes: *see readme

10/29/15

The attached zipped file contains five files:

File	Format	Description	
1) Readme_Monsanto_102915.doc	MS Word 2003	A "Readme" file (this document).	
	MS Excel 2003	SDG	LDC#
2) 1410160.xls		L15100152	35204A

No discrepancies were observed between the hardcopy data packages and the electronic data deliverables during EDD population of validation qualifiers. A 100% verification of the EDD was not performed.

Please contact Christina Rink at (760) 827-1100 if you have any questions regarding this electronic data submittal.