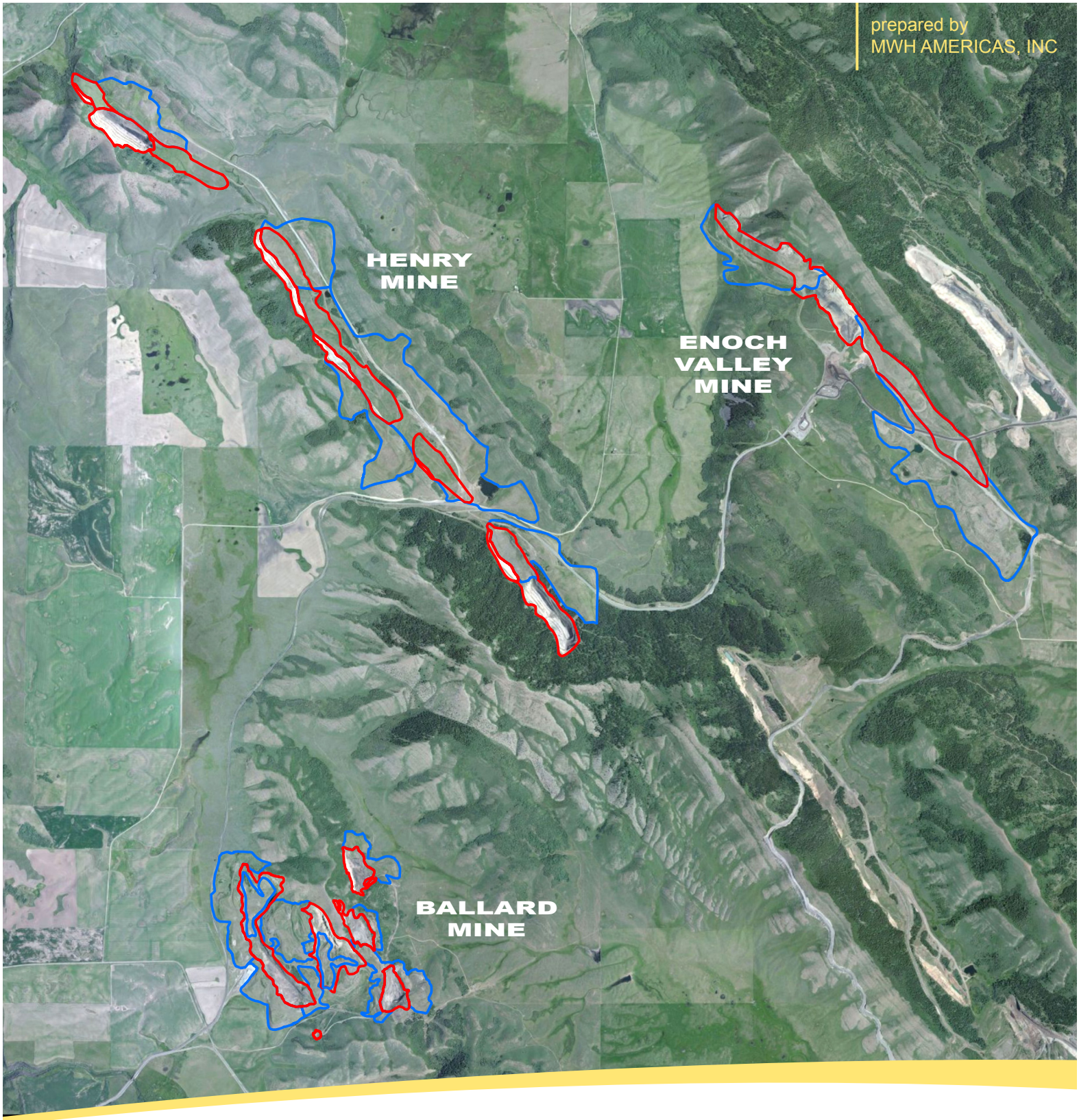

2014 DATA SUMMARY REPORT

Ballard, Enoch Valley, and Henry Mines Remedial Investigation Activities

FINAL
Revision 0
February 2015

prepared for
P4 PRODUCTION, LLC

MWH®
BUILDING A BETTER WORLD

2014 DATA SUMMARY REPORT

BALLARD, ENOCH VALLEY, AND HENRY MINES REMEDIAL INVESTIGATION ACTIVITIES

FINAL

Revision 0

FEBRUARY 2015

Prepared by:

MWH AMERICAS, INC.

Prepared for:

P4 PRODUCTION, LLC

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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
DQO	Data Quality Objectives
DSR	Data Summary Report
GPS	global positioning system
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.
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
SVOC	semi-volatile organic compounds
Tribes	The Shoshone-Bannock Tribes

ACRONYMS AND ABBREVIATIONS CONTINUED

USEPA	United States Environmental Protection Agency
USFS	United States Forest Service

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), the Shoshone-Bannock Tribes (Tribes). Collectively, the cooperating agencies are referred to as the Agencies and Tribes or 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, Henry and Enoch Valley Mines, collectively known as the "Sites".

This 2014 DSR documents the most recent sampling events conducted at P4 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 2014.

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 2014 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 set for each Site has been or will be evaluated in the individual Ballard, Henry, and Enoch Valley Mines RI and FS Reports. The purpose and objectives of the 2014 RI activities are further discussed below.

1.1.1 2014 Surface Water and Groundwater Sampling

The objectives, methods, and procedures for surface water and groundwater sampling conducted in 2014, and reported herein, are presented in the A/T-approved technical memorandum entitled *Proposed P4 Long-Term Surface Water and Groundwater Monitoring Plan - Final Rev 1* (*2014 Long-Term Surface Water and Groundwater Memo*; MWH, 2014a). In addition to fulfilling objectives established in the *2014 Long-Term Surface Water and Groundwater Memo,* the 2014 groundwater sampling event included collection of two additional groundwater samples from wells located near the Ballard Shop (MBW011 for bis(2-ethylhexyl)phthalate and SB-07 for PCE). These samples were collected to address recommendations made in the *Remedial Investigation (RI) Report for P4's Ballard Mine – Draft*

FinalRev 1 (MWH, 2014c). These additional samples are a one-time collection event, pending results, and currently are not part of the long-term monitoring (LTM) program for the Sites.

From 2004 through 2008, the objective of surface water monitoring conducted at the Sites was to support nature and extent characterizations of impacts to water quality associated with releases from potential sources. However, in 2009 the surface water monitoring program transitioned from a characterization program to an interim monitoring plan that provides an annual assessment of surface water conditions downstream of potential sources associated with each Site. The objective of the surface water sampling conducted since 2009 is to establish long-term data trends and assist with the development of site-specific remedies at individual mines. The details of the current monitoring plan, including data quality objectives (DQOs) and the field sampling plan (FSP), are included in the A/T-approved *2009 and 2010 Surface Water Monitoring Sampling and Analysis Plan - Final Revision 2* (*2009/2010 Surface Water SAP*; MWH, 2009a).

Characterization of groundwater at the Sites has been conducted in a phased approach since 2004 and the spatial/categorical relevance of individual groundwater monitoring locations and the analyte lists were evaluated as part of several Sampling and Analysis Plans (SAPs) and Memorandums between 2009 and 2012 (MWH, 2009b; MWH, 2010; and MWH, 2012).

Starting in 2013, monitoring of constituents of potential concern (COPC) and constituents of potential ecological concern (COPEC) concentrations and piezometric conditions in monitoring wells began to support the evaluation of remedies in the FS and implementation of the sites-selected remedies (*Proposed P4 Long-Term Surface Water and Groundwater Monitoring Plan – Final Rev 1*, MWH, 2013). Sampling of the long-term groundwater monitoring locations also allows for an understanding of potential long-term trends, especially following the implementation of the selected remedy at each of the Sites.

1.2 Report Organization

The content of this DSR is as follows:

- Section 1.0 – Introduction
- Section 2.0 – Summary of 2014 Field Activities
- Section 3.0 – Summary of 2014 Analytical Results by Mine Site
- Section 4.0 – References

2.0 SUMMARY 2014 FIELD ACTIVITIES

This section discusses the surface water and groundwater sampling programs and data collection activities during the 2014 field program at the P4 Sites. Further evaluation of the data is reserved for the individual Site RI 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 through 2012. Therefore, future data collected at Ballard Mine, including the 2014 presented herein, will be used as baseline data until the selected remedy for the Ballard Mine is in place.

The 2014 and future data collected for Henry and Enoch Valley Mines will be included in their respective RI reports. A summary of analyte exceedances in each program, organized by individual Site, 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 2014 Surface Water and Groundwater Sampling Activities

Surface water and groundwater sampling was conducted during the spring and fall of 2014 as described in the *2014 Long-Term Surface Water and Groundwater Memo*. The surface water and groundwater sample locations for each of the mine sites 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 mine site between May 5 and 13, 2014, including the following numbers for each mine site:

- Ballard Mine: 17 surface water and 23 groundwater samples
- Enoch Valley Mine: 10 surface water and 14 groundwater samples (one surface water [MST269] and three groundwater locations were dry [MBW107, MBW112, and MMW012])
- Henry Mine: seven surface water and six groundwater samples (one surface water location was dry [MST051])

Fall Sampling. In accordance with rationale set forth in the *2014 Long-Term Surface Water and Groundwater Memo,* surface water samples were collected in the following numbers at each mine site:

- Ballard Mine: five surface water samples
- Enoch Valley Mine: two surface water samples (the other two surface water locations [MDS025 and MST144] scheduled for sampling were dry)
- Henry Mine: three surface water samples (one surface water location [MST275] scheduled for sampling was dry)

Fall 2014 groundwater samples were not collected, as prescribed by the *2014 Long-Term Surface Water and Groundwater Memo*.

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 *2009/2010 Surface Water SAP* and also are attached to the *2014 Long-Term Surface Water and Groundwater Memo*.

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 *2009 Groundwater SAP* and also are attached to the *2014 Long-Term Surface Water and Groundwater Memo*.

Summaries of surface water and groundwater COPC/COPEC exceedances based on the appropriate regulatory standards for the 2014 program are provided in Sections 3.1 and 3.2.

As requested by the A/Ts, and included in the *2014 Long-Term Surface Water and Groundwater Memo*, global positioning system (GPS) latitude/longitude coordinates were collected for all 2014 surface water and groundwater stations. Tables 2-1 and 2-2 present a comparison of the GPS coordinates that were on file and the 2014 collected coordinates. It should be noted that the 2014 coordinates were collected using a Trimble® Geoexplorer 6000 series which has greater accuracy than the hand held GPS units that were used in the past (2006 to 2010) to collect the site coordinates. This enhanced accuracy, along with the new 2014 GPS coordinates being collected in the most recent datum (WGS84 vs NAD27), explains the differences noted between the coordinates presented in Table 2-1 and Table 2-2. NAD27 was created on an ellipsoid model based on less precise surveys. As surveys became increasingly more accurate, a better mathematical model was created of the earth's surface resulting in the WGS84 datum. The coordinates collected in 2014 will be utilized during future sampling at the Sites. A photographic log of each station along with collected GPS coordinates are presented in Appendix B.

2.2 2014 Surface Water and Groundwater Program Changes from 2013

Two additional groundwater samples were collected during the 2014 spring sampling round from two wells located near the Ballard Shop (MBW011 for bis(2-ethylhexyl)phthalate and SB-07 for PCE) to address recommendations made in the *RI Report for P4's Ballard Mine – Draft Final Rev 1* (MWH, 2014c). Collection of these groundwater samples was a one-time collection event, and pending the 2014 results are not currently part of the LTM program. In an effort to maximize sampling efficiency, these groundwater samples were collected during the spring 2014 LTM sampling event. The *Ballard Shop Monitoring Well Sample Collection during P4's LTM Sampling – Final. Revision 1* (MWH, 2014d) provides details regarding the collection of these additional samples.

2.3 Work Plan Deviations

There was one deviation from the *2014 Long-Term Surface Water and Groundwater Memo* for the spring 2014 sampling round. The additional groundwater sample collected at SB-07 was inadvertently lost by the laboratory upon receipt. This sample was never analyzed; therefore it will be collected again during the spring 2015 sampling round.

There were no work plan deviations for the fall 2014 sampling round.

3.0 SUMMARY OF 2014 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 2014 field activities. A comprehensive discussion of the development of screening levels for the Site is found in Section 3.2 and Table 3-1 of the *Remedial Investigation/Feasibility Study Work Plan for P4's Ballard, Henry and Enoch Valley Mines Final - Revision 2 (RI/FS Work Plan*; MWH 2011).

Screening levels are used to evaluate the concentration of each constituent in each medium to show those constituents that are elevated and those that are not. The elevated constituents will be evaluated in greater detail in the exposure scenarios presented in the Baseline Risk Assessments (BRAs) prepared for each mine. These BRAs will evaluate and determine the risks posed by individual constituents and combined constituent exposures. The comprehensive results for all 2014 analytical data presented herein, as well as a copy of Table 4-1 (Screening Level Summary by Media) from the *Final Ballard RI Report,* are provided in Appendix C.

3.1 Surface Water Sampling – 2014 Analytical Results

Tables 3-1 (Ballard), 3-2 (Enoch Valley) and 3-3 (Henry) present the exceedances of screening levels, by Mine Site, in surface water for the 2014 spring and fall events. The comprehensive results for all 2014 surface water constituents are provided in Appendix C.

3.2 Groundwater Sampling – 2014 Analytical Results

Tables 3-4a and 3-4b (Ballard), 3-5 (Enoch Valley) and 3-6 (Henry) present the exceedances of screening levels by Mine Site in groundwater for the 2014 spring event. The comprehensive results for all 2014 groundwater constituents are provided in Appendix C.

3.3 Third Party Data Validation

Third party data validation was performed on all laboratory analyses from the 2014 field program. Data validation is the process of evaluating the quality control (QC) parameters against the criteria established in the Quality Assurance Project Plan (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 D.

3.4 Conclusions

This DSR presents data collected in 2014 to address long term monitoring (LTM) of surface water and groundwater at the Sites. No additional potential data gaps were discovered based on the 2014 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 Reports for Henry and Enoch Valley Mines and during preparation of the feasibility studies for the three Sites.

Please note, semi-volatile organic compounds (SVOCs) were collected at MBW011 due to a prior detection of bis(2-ethylhexyl) phthalate. Exceedance data for the SVOC analytes are presented in Table 3-4b. There was no detection of bis(2-ethylhexyl) phthalate in the groundwater collected from MBW011. The polycyclic aromatic hydrocarbons (PAHs) have method detection limits above their screening limits; however, these constituents are not the concern at this location. Therefore, no further sampling is required for SVOCs at this location. Also due to the lab misplacing SB-07 volatile organic compound bottles, this sample should to be recollected in 2015.

Also, sample MST044, and its duplicate collected on May 9, 2014, have an order of magnitude difference in selenium results with the dissolved result higher than the total result. There were no notes made in the field book and the field team had no recollection of anything out of the ordinary. The laboratory was contacted and they noted that bromide was an order of magnitude higher in the dissolved sample and was interfering with selenium. The dissolved result for MST044 collected May 9, 2014 is "J+" qualified to indicate potential high bias. The laboratory stated this could be due to cross-contamination on that sample only. There was no evidence of cross-contamination in any of the batch QC samples.

Additionally, based on the A/Ts' request made during the review of the *2014 Long-Term Surface Water and Groundwater Memo*, a comprehensive LTM SAP will be prepared in 2015 for Site surface and groundwater sampling activities. It will no longer be tied to the approved 2009/2010 SAP and QAPP, but instead will be a stand-alone SAP/QAPP for the Surface Water and Groundwater LTM Sampling Program for the Sites. By using this approach, the yearly update plans likely can be avoided in 2015 and beyond because a single stand-alone SAP/QAPP will guide P4's LTM program.

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, 2013. *Proposed P4 Long-Term Surface Water and Groundwater Monitoring Plan – Final Rev 1*, prepared for P4 Production L.L.C., April 2013.

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

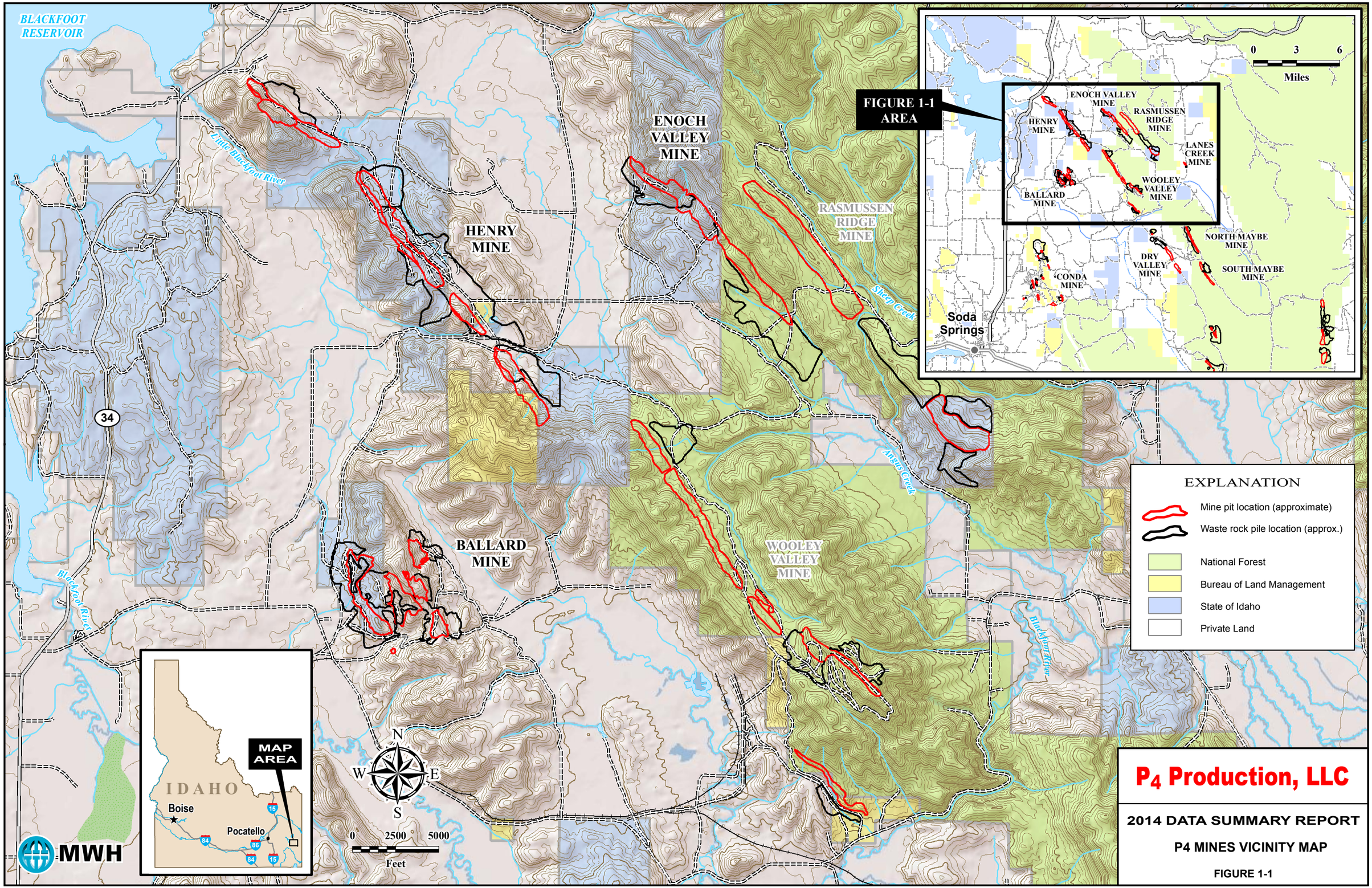
MWH, 2014b. *Remedial Investigation Report for P4's Ballard Mine – Final Revision 2,* prepared for P4 Production L.L.C., November 2014.

MWH, 2014c. *Remedial Investigation Report for P4's Ballard Mine – Draft Final Revision 1,* prepared for P4 Production L.L.C., 2014.

MWH, 2014d. *Ballard Shop Monitoring Well Sample Collection during P4's LTM Sampling – Final Revision 1*, prepared for P4 Production L.L.C., April 2014.

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
RASMUSSEN RIDGE MINE
HENRY 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
2014 DATA SUMMARY REPORT
P4 MINES VICINITY MAP
FIGURE 1-1
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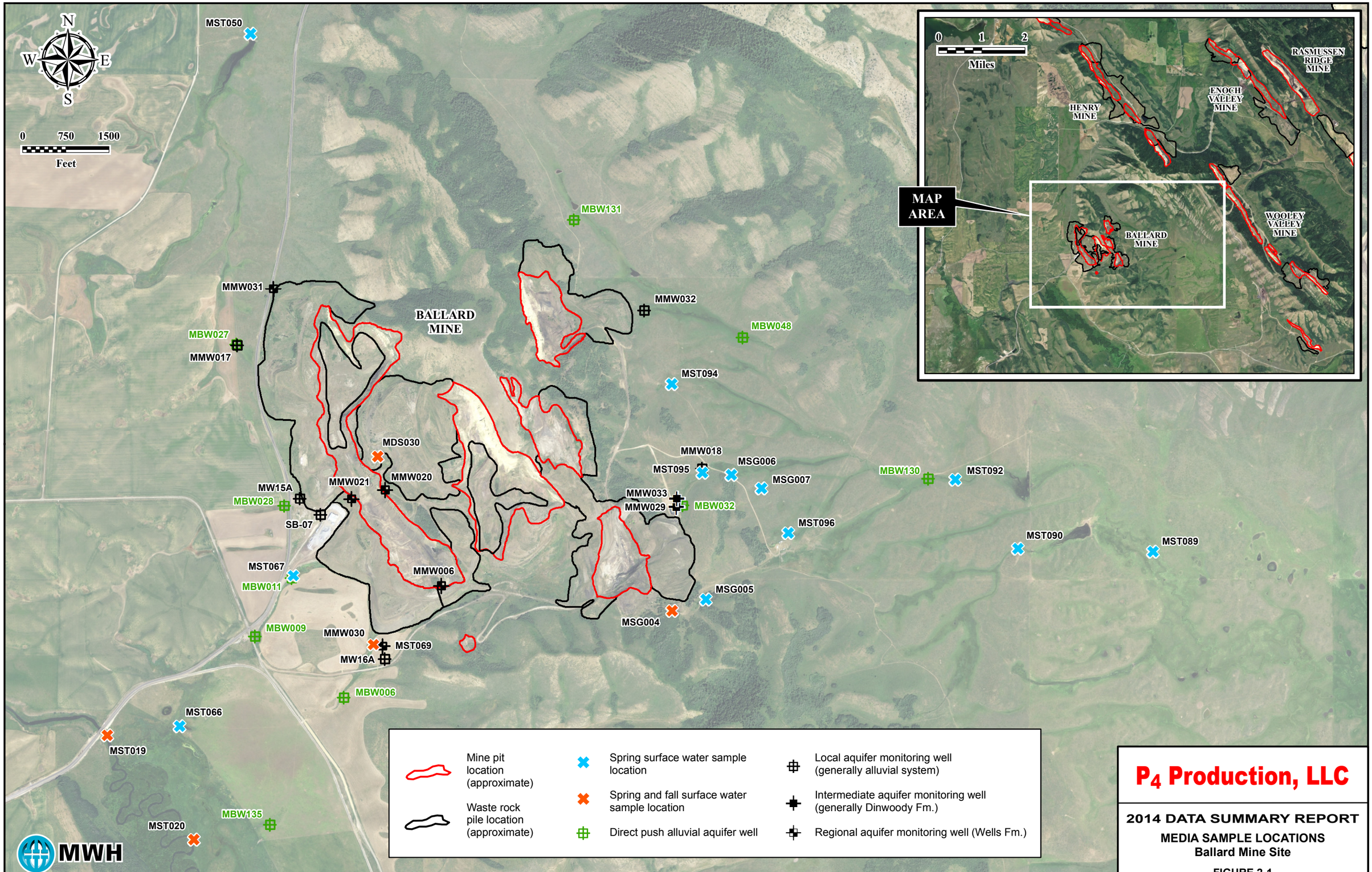
19 Nov 2014
J:\Industrial Projects\P4 Monsanto\2014 DSR\Draft\FIGURES\Fig 1-1_MONSANTO_Vicinity Map_Dec2014.mxd



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19 Nov 2014

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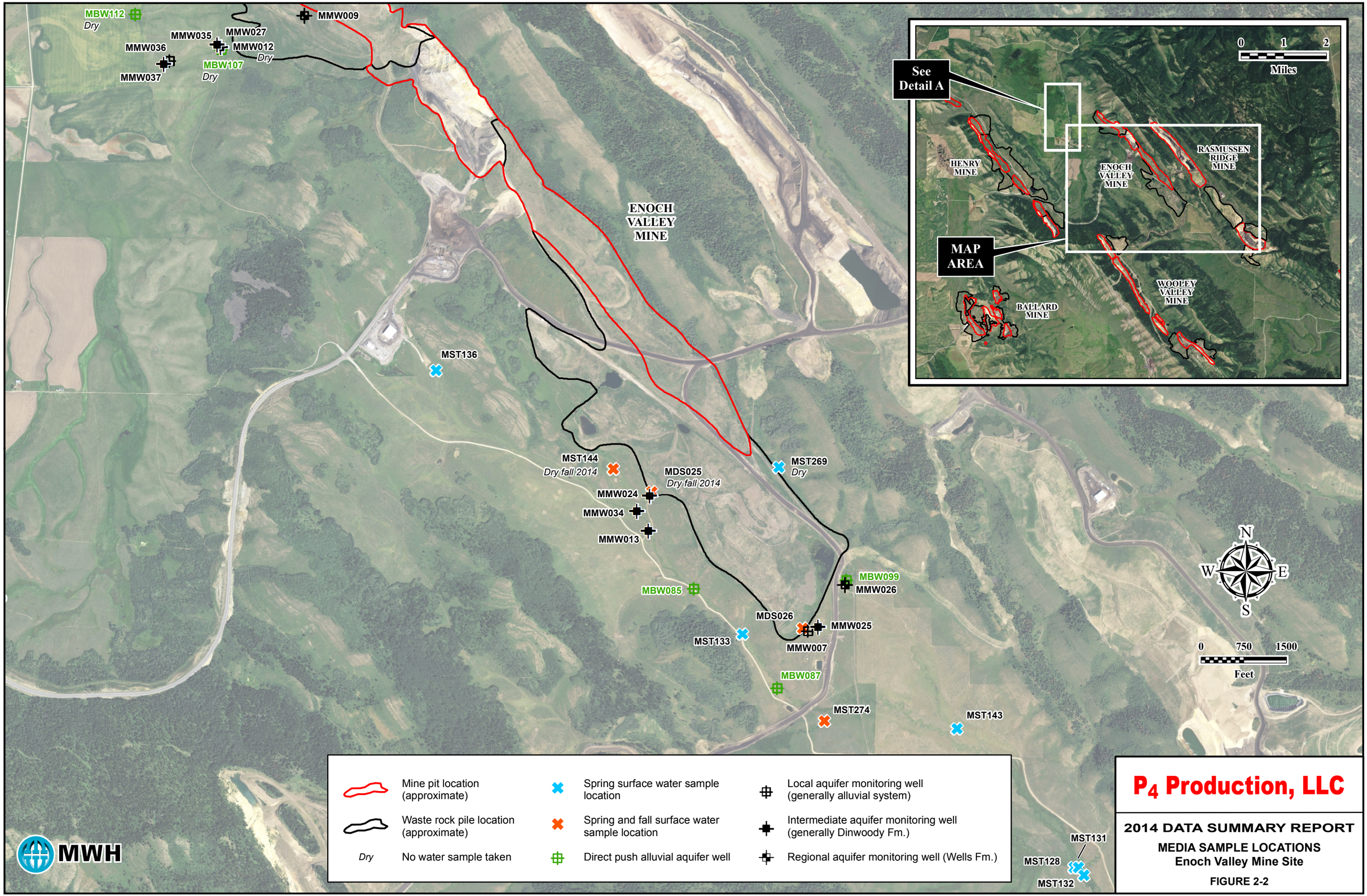
MEDIA SAMPLE LOCATIONS
Ballard Mine Site

FIGURE 2-1



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2014 DATA SUMMARY REPORT

MEDIA SAMPLE LOCATIONS
Enoch Valley Mine Site

FIGURE 2-2

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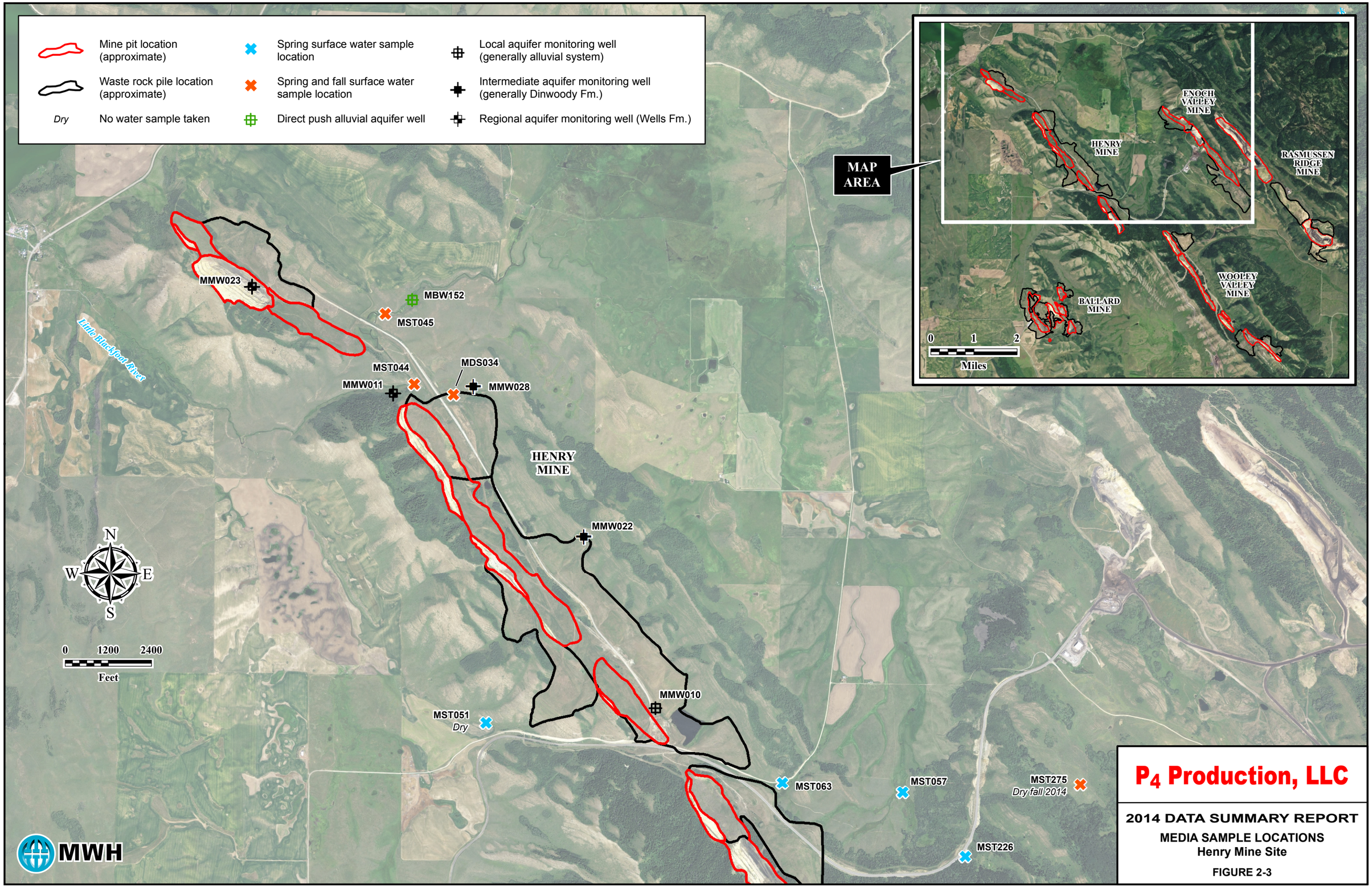

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2014 DATA SUMMARY REPORT

MEDIA SAMPLE LOCATIONS
Henry Mine Site

FIGURE 2-3

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TABLES

TABLE 2-1 GPS COORDINATES FOR LTM SURFACE WATER MONITORING LOCATIONS						
Mine	Station ID[a]	Feature Name[b]	On File[c]		2014 Measurement[d]	
			Latitude	Longitude	Latitude	Longitude
Ballard Mine	MST019	Blackfoot River below Ballard Creek	42 48 49.28	111 30 21.52	42 48 54.92	111 30 23.93
	MST020	Blackfoot River below State Land Creek	42 48 31.97	111 30 06.28	42 48 36.53	111 30 03.88
	MST050	*Long Valley Creek* below Ballard Mine	42 50 54.00	111 29 49.00	42 50 55.01	111 29 51.92
	MST066	*Ballard Creek* above Blackfoot River	42 48 56.30	111 30 07.32	42 48 57.02	111 30 07.53
	MST067	*Ballard Creek* headwaters	42 49 23.79	111 29 36.31	42 49 22.40	111 29 41.08
	MST069	*Short Creek* below Ballard Mine	42 49 11.23	111 29 19.75	42 49 11.64	111 29 22.32
	MST089	*Wooley Valley Creek*, below *North Fork Wooley Valley Creek*	42 49 28.70	111 26 19.40	42 49 27.44	111 26 20.54
	MST090	*Wooley Valley Creek*, above *North Fork Wooley Valley Creek*	42 49 28.00	111 26 49.00	42 49 27.63	111 26 52.24
	MST092	*North Fork Wooley Valley Creek* above *Wooley Valley Creek*	42 49 40.00	111 27 04.30	42 49 39.62	111 27 06.65
	MST094	*Spring-fed trib. #1 of N. Fork Wooley Valley Cr.*, below Ballard Mine	42 49 56.00	111 28 10.00	42 49 55.71	111 28 13.43
	MST095	*Spring-fed trib. #2 of N. Fork Wooley Valley Cr.*, below Ballard Mine	42 49 39.00	111 28 05.00	42 49 40.56	111 28 05.55
	MST096	Tributary of North Fork Wooley Valley Creek, below Ballard Mine	42 49 30.00	111 27 45.00	42 49 30.15	111 27 45.32
	MDS030	*Pit #2 Upper Dump Seep*	42 49 44.25	111 29 20.95	42 49 42.99	111 29 21.62
	MSG004	*Holmgren Spring*	42 49 16.75	111 28 16.04	42 49 16.94	111 28 12.47
	MSG005[f]	*Cattle Spring*	42 49 19.07	111 28 01.90	42 49 19.61	111 28 05.17
	MSG006	*Southeast Spring*	42 49 41.43	111 27 51.34	42 49 40.40	111 27 58.82
	MSG007	*South of Southeast Spring*	42 49 38.19	111 27 42.68	42 49 37.83	111 27 51.50

TABLE 2-1
GPS COORDINATES FOR LTM SURFACE WATER MONITORING LOCATIONS

Mine	Station ID[a]	Feature Name[b]	On File[c]		2014 Measurement[d]	
			Latitude	Longitude	Latitude	Longitude
Henry Mine	MST044	Immediately below Henry Mine (1997 #24)	42 53 50.60	111 29 24.80	42 53 50.66	111 29 25.34
	MST045	Little Blackfoot River above Henry Creek	42 54 10.70	111 29 30.10	42 54 09.91	111 29 36.21
	MST051	East Fork Long Valley Creek below Henry Mine	42 52 18.23	111 28 58.49	42 52 17.71	111 28 57.63
	MST057	West Fork Lone Pine Creek above Lone Pine Creek	42 51 59.49	111 26 21.78	42 51 59.27	111 26 21.74
	MST063	Strip Mine Creek below Henry Mine	42 52 01.70	111 27 03.40	42 52 01.70	111 27 06.81
	MST226	Tributary to Lone Pine Creek	42 51 42.27	111 25 55.16	42 51 41.90	111 25 58.28
	MST275	Tributary to Lone Pine Creek	42 51 56.33	111 25 04.24	42 52 01.64	111 25 15.37
	MDS034	Henry Mine, Dump Seep #3	111 29 23.87	42 53 46.90	42 53 48.13	111 29 10.81
Enoch Valley Mine	MST128	*Angus Creek* above Rasmussen Creek	42 51 08.00	111 22 32.00	42 51 07.51	111 22 34.17
	MST131	*Rasmussen Creek* above Angus Creek	42 51 08.00	111 22 31.00	42 51 07.64	111 22 33.62
	MST132	Angus Creek Above *No Name Creek* and below *Rasmussen Creek*	42 51 07.00	111 22 29.00	42 51 06.25	111 22 32.01
	MST133	*Rasmussen Creek* below Enoch Valley Mine	42 51 48.00	111 23 50.00	42 51 47.65	111 23 52.77
	MST136	*Rasmussen Creek* headwaters near *Enoch Valley Mine Shop Pond*	42 52 34.00	111 25 03.00	42 52 33.08	111 25 05.30
	MST143	*East Fork Rasmussen Creek* above *Rasmussen Creek*	42 51 31.70	111 23 01.40	42 51 31.50	111 23 02.16
	MST144	*West Pond Creek headwaters*, below West Pond	42 52 16.07	111 24 18.66	42 52 16.07	111 24 23.32
	MST269	*East Fork Rasmussen Creek* headwaters	42 52 16.57	111 23 41.69	42 52 16.58	111 23 44.36
	MST274	West Fork of Rasmussen Creek	42 51 31.00	111 23 34.00	42 51 32.70	111 23 33.34
	MDS025	West Dump Seep	42 52 13.00	111 24 11.00	42 52 12.27	111 24 14.27
	MDS026	South Dump Seep	42 51 54.20	111 23 36.27	42 51 48.81	111 23 38.85

TABLE 2-1
GPS COORDINATES FOR LTM SURFACE WATER MONITORING LOCATIONS

Mine	Station ID[a]	Feature Name[b]	On File[c]		2014 Measurement[d]	
			Latitude	Longitude	Latitude	Longitude

Notes:

MDS - Dump Seep
MSG - Spring
MST – Stream

[a]Table does not include all available surface water monitoring locations at the P4 Sites, only those locations identified for continued monitoring
[b] Stream names in *italics* were assigned by either IMA or P4 Production as these streams are unnamed on USGS maps or, as far as is known, are unnamed by common usage of local inhabitants. The reason for this is that most such streams are small with intermittent or ephemeral flows.
[c]Location (GPS) coordinates use the NAD27 datum and are presented in ddd mm ss.ss format (degrees minutes seconds).
[d]Location (GPS) coordinates use the WGS84 datum and are presented in ddd mm ss.ss format (degrees minutes seconds).

TABLE 2-2 GPS COORDINATES FOR LTM GROUNDWATER MONITORING WELL AND BOREHOLE WELL LOCATIONS								
Mine	Station ID	Station Description	On File[a]		2014 Measurement[b]		Well Install Year	Groundwater System Monitored Screened Interval (ft bgs)
			Latitude	Longitude	Latitude	Longitude		
Ballard Mine	MBW006	Short Creek	42 49 04.15	111 29 25.80	c	c	2008	Alluvial 14-9
	MBW009	Blackfoot River Road @ Monsanto Haul Road	42 49 12.96	111 29 48.71	42 49 04.15	111 29 25.80	2008	Alluvial 11-6
	MBW011	Ballard Creek	42 49 23.46	111 29 38.93	42 49 21.98	111 29 41.25	2008	Alluvial 15-10
	MBW027	Ballard, Western Deeper	42 50 02.23	111 29 54.34	42 50 02.08	111 29 54.31	2008	Alluvial 16-11
	MBW028	Torgesen	42 49 34.44	111 29 42.93	42 49 34.36	111 29 43.05	2008	Alluvial 21-16
	MBW032	Holmgren	42 49 33.92	111 28 11.14	42 49 34.40	111 28 11.20	2008	Alluvial 15-10
	MBW048	Wooley Valley Creek	42 50 03.76	111 27 56.21	42 50 03.70	111 27 56.20	2008	Alluvial 9-4
	MBW130	East of Ballard Mine, along Wooley Valley Creek	42 49 40.00	111 27 10.00	42 49 39.84	111 27 12.98	2009	Alluvial 25-20
	MBW131	Northeast of Ballard Mine, near MST093	42 50 24.00	111 28 33.00	42 50 24.03	111 28 35.64	2009	Alluvial 8-3
	MBW135	Southeast of Ballard Mine, across Blackfoot River Road	42 48 40.00	111 29 43.00	42 48 40.05	111 29 45.57	2009	Alluvial 20-15
	MMW006	South of West Ballard Pit; south of waste rock dumps	42 49 20.00	111 29 03.00	42 49 20.70	111 29 06.00	2007	Wells Formation 330-310
	MMW017	Northwest of Ballard Mine into Long Valley Creek alluvial flow field	42 49 59.60	111 29 47.40	42 50 01.90	111 29 54.20	2007	Alluvial 56-36
	MMW018	East of Ballard Mine in Wooley Valley alluvial flow field	42 49 39.40	111 28 04.50	42 40 41.20	111 28 05.20	2007	Alluvial/ Dinwoody Formation 33-18
	MMW020	East side of West Ballard Pit (MMP035); replacement of MMW001	42 49 36.40	111 29 03.30	42 49 36.70	111 29 19.60	2007	Wells Formation 408-388
	MMW021	West side of West Ballard Pit (MMP035); replacement of MMW002	42 49 35.60	111 29 23.90	42 49 35.70	111 29 27.30	2007	Wells Formation 250-230
	MMW029	East Ballard mine area in the vicinity of MMW018	42 49 37.78	111 28 08.74	42 49 34.60	111 28 11.70	2008	Dinwoody Formation 60-45

TABLE 2-2 GPS COORDINATES FOR LTM GROUNDWATER MONITORING WELL AND BOREHOLE WELL LOCATIONS								
Mine	Station ID	Station Description	On File[a]		2014 Measurement[b]		Well Install Year	Groundwater System Monitored Screened Interval (ft bgs)
			Latitude	Longitude	Latitude	Longitude		
Ballard Mine	MMW030	Along the southwestern portion of Ballard Mine in the vicinity of MMW016A	42 49 10.72	111 29 17.03	42 49 10.50	111 29 20.00	2008	Wells Formation 155-135
	MMW031	Along the western perimeter of Ballard Mine in the vicinity and north of MMW017	42 50 11.87	111 29 43.05	c	c	2008	Wells Formation 200-180
	MMW032	Adjacent to MWD084	42 50 09.30	111 28 21.80	42 50 09.10	111 28 21.70	2009	Dinwoody Formation 65-55
	MMW033	Deeper well nested with MMW029	42 49 35.30	111 2811.90	42 49 35.30	111 28 12.30	2009	Dinwoody Formation 150-130
	MW-15A	West Ballard Mine near MST068	42 49 35.99	111 29 36.55	42 49 36.10	111 29 40.22	2006	Alluvial 40-30
	MW-16A	Southwest Ballard Mine near MST069	42 49 08.83	111 29 16.53	42 49 07.54	111 29 23.64	2006	Alluvial 30-20
Henry Mine	MBW152	North Henry Mine, along Little Blackfoot River	42 54 14.00	111 29 23.00	42 54 13.15	111 29 26.21	2009	Alluvial 15-10
	MMW010	Southeast of Center Henry Pit; near MPW023	42 52 22.30	111 27 51.30	42 52 22.00	111 27 54.20	2007	Alluvial 32-12
	MMW011	Northwest of Center Henry Pit; south of Little Blackfoot River	42 53 48.30	111 29 30.00	42 53 48.00	111 29 32.90	2007	Wells Formation 115-95
	MMW022	Northeast lobe of Henry Mine waste rock dump MWD086	42 53 09.20	111 28 18.30	42 53 08.70	111 28 21.70	2007	Dinwoody Formation 326-306
	MMW023	Henry Mine North Pit	42 54 20.50	111 30 27.50	42 54 19.30	111 30 29.30	2007	Wells Formation 357-352
	MMW028	Near the Little Blackfoot River northwest of MMW019	42 53 50.24	111 28 60.00	42 53 50.40	111 29 82.60	2008	Dinwoody Formation 96-76
Enoch Valley Mine	MBW085	Rasmussen Creek	42 51 55.52	111 24 04.12	42 51 56.02	111 23 42.64	2008	Alluvial 12.25-7.25
	MBW087	Rasmussen Road and Agrium Haul Road intersection	42 51 38.34	111 23 44.32	42 51 37.90	111 26 13.53	2008	Alluvial 12-7
	MBW099	Agrium Haul Road North	42 51 57.08	111 23 28.14	42 51 53.40	111 23 28.70	2008	Alluvial 29-24
	MBW107	Western Enoch Valley, East of fence	42 53 28.32	111 25 55.86	42 53 28.30	111 25 56.00	2008	Alluvial 40-35
	MBW112	Western Enoch Valley, west of fence	42 53 34.67	111 26 13.72	42 53 34.50	111 26 13.53	2008	Alluvial 18-13

TABLE 2-2

GPS COORDINATES FOR LTM GROUNDWATER MONITORING WELL AND BOREHOLE WELL LOCATIONS

Mine	Station ID	Station Description	On File[a]		2014 Measurement[b]		Well Install Year	Groundwater System Monitored Screened Interval (ft bgs)
			Latitude	Longitude	Latitude	Longitude		
Enoch Valley Mine	MMW007	South of EVM South Dump; near edge of dump footprint	42 51 48.50	111 23 34.40	42 51 48.40	111 23 37.20	2007	Alluvial/ Dinwoody Formation 90-70
	MMW009	Central North Dump (MWD091)	42 53 34.60	111 25 33.80	42 53 37.50	111 25 48.50	2007	Wells Formation 554-549
	MMW012	Northwest of EVM North Dump in Lone Pine Creek alluvial flow field	42 53 28.75	111 25 53.34	42 52 08.80	111 24 16.80	2007	Alluvial/ Dinwoody Formation 52-28
	MMW013	Southwest of EVM in Rasmussen Creek alluvial flow field	42 52 05.70	111 24 12.00	42 52 08.80	111 24 16.80	2007	Dinwoody Formation 35-25
	MMW024	Along the south end of Enoch Valley Mine, near MMW013	42 52 11.73	111 24 11.86	c	c	2008	Dinwoody Formation 200-180
	MMW025	Along the south end of Enoch Valley Mine, near MMW007	42 51 49.16	111 23 31.95	42 51 48.90	111 23 34.70	2008	Dinwoody Formation 200-180
	MMW026	Northeast of MPW006/MMW008	42 51 56.48	111 23 25.75	42 51 56.30	111 23 28.80	2008	Wells Formation 355-335
	MMW027	Near MMW012	42 53 28.97	111 25 53.50	42 53 28.70	111 25 56.40	2008	Dinwoody Formation 120-100
	MMW034	Deeper well nested with MMW013	42 52 09.10	111 24 14.80	42 52 08.50	111 24 16.80	2009	Dinwoody Formation 156-136
	MMW035	Deeper well nested with MMW027	42 53 29.50	111 25 54.30	42 53 29.10	111 25 56.40	2009	Dinwoody Formation 199 – 179
	MMW036	Well west of MMW027	42 53 26.70	111 26 05.60	42 53 26.10	111 26 07.60	2009	Basalt 135 – 115
	MMW037	Nested with MMW036	42 53 26.14	111 26 06.82	42 53 26.10	111 26 06.90	2010	Dinwoody 302 – 292

Notes:

MBW - Borehole Monitoring Well (direct-push pre-packed screen monitoring well)
MMW - Monitoring Well

[a]Location (GPS) coordinates use the NAD27 datum and are presented in ddd mm ss.ss format (degrees minutes seconds).
[b]Location (GPS) coordinates use the WGS84 datum and are presented in ddd mm ss.ss format (degrees minutes seconds).
[c]GPS coordinate inadvertently not collected, will be collected in 2015.

TABLE 3-1

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS
(Page 1 of 8)

Location Identification		**MDS030**		**MDS030**		**MSG004**	
Location Type		**Dump Seep**		**Dump Seep**		**Spring**	
Date Collected		**5/9/2014**		**9/12/2014**		**5/8/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Selenium	0.005 mg/l	**0.908 D**	**0.684 D**	**0.846 D**	**0.981 D**	**0.0135**	**0.0206**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
	Highlight indicates result exceeded screening limits.
--	Not scheduled.
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.
J-	Data are estimated due to associated quality control data. Potential low bias.

TABLE 3-1

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		**MSG004**		**MSG005**		**MSG006**	
Location Type		**Spring**		**Spring**		**Spring**	
Date Collected		**9/12/2014**		**5/8/2014**		**5/8/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Selenium	0.005 mg/l	**0.00222**	**0.0146**	**0.0109**	**0.0111**	**0.248**	**0.243**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
	Highlight indicates result exceeded screening limits.
--	Not scheduled.
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.
J-	Data are estimated due to associated quality control data. Potential low bias.

TABLE 3-1

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS
(Page 3 of 8)

Location Identification		**MSG007**		**MST050**		**MST019**	
Location Type		**Spring**		**Stream**		**Stream**	
Date Collected		**5/8/2014**		**5/7/2014**		**5/11/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Selenium	0.005 mg/l	**0.0463**	**0.0494**	**0.000551 F**	**0.000601 F**	**0.00544**	**0.00569**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
	Highlight indicates result exceeded screening limits.
--	Not scheduled.
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.
J-	Data are estimated due to associated quality control data. Potential low bias.

TABLE 3-1

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		**MST019**		**MST020**		**MST020**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**9/12/2014**		**5/11/2014**		**9/12/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Selenium	0.005 mg/l	**0.00274**	**0.0018**	**0.00552**	**0.00475**	**0.00145**	**0.00168**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
Highlight indicates result exceeded screening limits.
-- Not scheduled.
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.
J- Data are estimated due to associated quality control data. Potential low bias.

TABLE 3-1

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		**MST066**		**MST067**		**MST069**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/11/2014**		**5/9/2014**		**5/5/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	**0.00181**	--	<0.0006	--
Selenium	0.005 mg/l	**0.0237**	**0.0245**	**0.336 D**	**0.299 D**	**1.71 D**	**1.85 D**
Vanadium	0.02 mg/l	<0.01	--	**0.0202**	--	<0.01	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
	Highlight indicates result exceeded screening limits.
--	Not scheduled.
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.
J-	Data are estimated due to associated quality control data. Potential low bias.

TABLE 3-1

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		**MST069**		**MST069 Dup**		**MST089**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**9/12/2014**		**9/12/2014**		**5/8/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Selenium	0.005 mg/l	**1.17 D**	**1.27 D**	**1.26 D**	**1.33 D**	**0.00185**	**0.00205**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
	Highlight indicates result exceeded screening limits.
--	Not scheduled.
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.
J-	Data are estimated due to associated quality control data. Potential low bias.

TABLE 3-1

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		**MST090**		**MST092**		**MST094**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/8/2014**		**5/8/2014**		**5/8/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Selenium	0.005 mg/l	<0.001	<0.001	**0.00145**	**0.00164**	**0.00088 F**	**0.00089 F**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
	Highlight indicates result exceeded screening limits.
--	Not scheduled.
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.
J-	Data are estimated due to associated quality control data. Potential low bias.

TABLE 3-1

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		**MST095**		**MST096**	
Location Type		**Stream**		**Stream**	
Date Collected		**5/8/2014**		**5/8/2014**	
Analyte/Methods (Units)	**Screening Limits**				
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--
Selenium	0.005 mg/l	**0.103**	**0.1**	**0.0329**	**0.0314**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
	Highlight indicates result exceeded screening limits.
--	Not scheduled.
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.
J-	Data are estimated due to associated quality control data. Potential low bias.

TABLE 3-2

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
ENOCH VALLEY MINE, P4 RI/FS
(Page 1 of 4)

	Location Identification	**MDS025**		**MDS026**		**MDS026**	
	Location Type	**Deep Sump**		**Deep Sump**		**Deep Sump**	
	Date Collected	**5/7/2014**		**5/6/2014**		**9/12/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	**0.00167**	--	**0.0051**	--	**0.001**	--
Selenium	0.005 mg/l	**0.0427**	**0.0371**	**0.56 D**	**0.516 D**	**0.0118**	**0.0335**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Highlight indicates result exceeded screening limit.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-2

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
ENOCH VALLEY MINE, P4 RI/FS
(Page 2 of 4)

Location Identification		**MST128**		**MST131**		**MST132**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/6/2014**		**5/6/2014**		**5/6/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Selenium	0.005 mg/l	**0.00293**	**0.00299**	**0.00338**	**0.00348**	**0.00329**	**0.003**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Highlight indicates result exceeded screening limit.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-2

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
ENOCH VALLEY MINE, P4 RI/FS
(Page 3 of 4)

	Location Identification	**MST133**		**MST136**		**MST143**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**5/6/2014**		**5/7/2014**		**5/6/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Selenium	0.005 mg/l	**0.00212**	**0.0023**	**0.00636**	**0.00681**	<0.001	**0.000515 F**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Highlight indicates result exceeded screening limit.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-2

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
ENOCH VALLEY MINE, P4 RI/FS
(Page 4 of 4)

	Location Identification	**MST144**		**MST274**		**MST274**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**5/7/2014**		**5/6/2014**		**9/12/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Selenium	0.005 mg/l	**0.38 D**	**0.37 D**	**0.00593**	**0.00539**	**0.00427**	**0.00385**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
Highlight indicates result exceeded screening limit.
D Sample dilution required for analysis; reported values reflect the dilution.

TABLE 3-3

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
HENRY MINE, P4 RI/FS
(Page 1 of 4)

	Location Identifica	MDS034		MST044		MST044	
	Location Type	Deep Sump		Stream		Stream	
	Date Collected	5/9/2014		5/9/2014		9/12/2014	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Selenium	0.005 mg/l	**0.0226**	**0.0164**	**0.00579 J+**	**0.000675 F**	**0.000894 F**	**0.00186**

mg/l	milligrams per liter.
	Highlight indicates result above screening limit.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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+	Datum is estimated; potential high bias.

TABLE 3-3

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
HENRY MINE, P4 RI/FS
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	Location Identifica	**MST045**		**MST045 Dup**		**MST045 Average**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**5/9/2014**		**5/9/2014**		**5/9/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Selenium	0.005 mg/l	**0.00107**	**0.00103**	**0.000664 F**	**0.000617 F**	**0.000867**	**0.000824**

mg/l	milligrams per liter.
	Highlight indicates result above screening limit.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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+	Datum is estimated; potential high bias.

TABLE 3-3

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
HENRY MINE, P4 RI/FS
(Page 3 of 4)

	Location Identifica	**MST045**		**MST057**		**MST063**	
	Location Type	**Stream**		**Stream**		**Stream**	
	Date Collected	**9/12/2014**		**5/7/2014**		**5/7/2014**	
Analyte/Methods (Units)	**Screening Limits**						
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Selenium	0.005 mg/l	**0.000876 F**	**0.000988 F**	<0.001	**0.000585 F**	**0.0123**	**0.0112**

mg/l	milligrams per liter.
	Highlight indicates result above screening limit.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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+	Datum is estimated; potential high bias.

TABLE 3-3

EXCEEDANCE SUMMARY OF 2014 SURFACE WATER RESULTS
HENRY MINE, P4 RI/FS
(Page 4 of 4)

	Location Identifica	**MST226**		**MST275**	
	Location Type	**Stream**		**Stream**	
	Date Collected	**5/7/2014**		**5/7/2014**	
Analyte/Methods (Units)	**Screening Limits**				
Metals (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**
Selenium	0.005 mg/l	**0.00204**	**0.00218**	<0.001	<0.001

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
	Highlight indicates result above screening limit.
--	Not scheduled.
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+	Datum is estimated; potential high bias.

TABLE 3-4a

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS
(Page 1 of 8)

Location Identification		MBW006		MBW009		MBW011	
Location Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		5/6/2014		5/7/2014		5/12/2014	
Analyte/Methods (Units)	**Screening Limits**						
Anions (mg/l)	**Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**379 D**	--	**403 D**	--	**179 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**700**	--	**748**	--	**694**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.00811**	--	**0.344 D**	--	**0.108**
Selenium	0.05 mg/l	**0.443 D**	**0.43 D**	**0.00217**	**0.00206**	**0.579 D**	**0.744 D**

mg/l	milligrams per liter.
	Highlight indicates result above screening limit.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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.
UJ	Potential low bias, possible false negative.

TABLE 3-4a

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		MBW027		MBW028		MBW032	
Sample Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		5/11/2014		5/10/2014		5/8/2014	
Analyte/Methods (Units)	**Screening Limits**						
Anions (mg/l)	**Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**349 D**	--	**585 D**	--	**748 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**676**	--	**1020**	--	**1120**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	**0.000323 F**	--	**0.000374 F**	--	**0.000602**
Manganese	0.05 mg/l	--	**0.0016 F**	--	**0.0764**	--	**0.00381**
Selenium	0.05 mg/l	**0.708 D**	**0.696 D**	**1.36 D**	**1.25 D**	**1.43 D,J**	**1.26 D,J**

mg/l	milligrams per liter.
	Highlight indicates result above screening limit.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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.
UJ	Potential low bias, possible false negative.

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EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS
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Location Identification		MBW048		MBW130		MBW131	
Sample Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		5/8/2014		5/9/2014		5/10/2014	
Analyte/Methods (Units)	**Screening Limits**						
Anions (mg/l)	**Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**5.44**	--	**8.45**	--	**3.57**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**128**	--	**156**	--	**118**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	**0.000332 F**	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.315 D**	--	**0.116**	--	**0.00188 F**
Selenium	0.05 mg/l	<0.001 UJ	<0.001	**0.000539 F**	**0.000545 F**	**0.0028**	**0.00219**

mg/l	milligrams per liter.
	Highlight indicates result above screening limit.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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.
UJ	Potential low bias, possible false negative.

TABLE 3-4a

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS
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Location Identification		MBW135		MMW006		MMW017	
Sample Type		Bore Hole Well		Monitoring Well		Monitoring Well	
Date Collected		5/10/2014		5/7/2014		5/11/2014	
Analyte/Methods (Units)	**Screening Limits**						
Anions (mg/l)	**Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**48.6**	--	**85.4**	--	**494 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**222**	--	**308**	--	**1020**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	**0.000447 F**
Manganese	0.05 mg/l	--	**0.0583**	--	<0.002	--	**0.00347**
Selenium	0.05 mg/l	<0.001	<0.001	**0.105**	**0.104**	**0.131 J**	**0.133 J**

mg/l	milligrams per liter.
	Highlight indicates result above screening limit.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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.
UJ	Potential low bias, possible false negative.

TABLE 3-4a

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS
(Page 5 of 8)

Location Identification		MMW018		MMW020		MMW021	
Sample Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/8/2014		5/7/2014		5/7/2014	
Analyte/Methods (Units)	**Screening Limits**						
Anions (mg/l)	**Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**46.1**	--	**198 D**	--	**48.8**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**262**	--	**500**	--	**368**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	**0.0126**	--	<0.0006
Manganese	0.05 mg/l	--	**0.0408**	--	**0.00292**	--	<0.002
Selenium	0.05 mg/l	**0.0309 J**	**0.0302 J**	**0.349 D**	**0.333 D**	**0.0617**	**0.0593**

mg/l	milligrams per liter.
	Highlight indicates result above screening limit.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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.
UJ	Potential low bias, possible false negative.

TABLE 3-4a

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS
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Location Identification		MMW029		MMW030		MMW031	
Sample Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/8/2014		5/9/2014		5/6/2014	
Analyte/Methods (Units)	**Screening Limits**						
Anions (mg/l)	**Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**809 D**	--	**14.9**	--	**3.19**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**1250**	--	**190**	--	**158**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.00103 F**	--	**0.0377**	--	<0.002
Selenium	0.05 mg/l	**0.694 D**	**0.61 D**	**0.000554 F,J**	<0.001 J	**0.00109**	**0.00133**

mg/l	milligrams per liter.
	Highlight indicates result above screening limit.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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.
UJ	Potential low bias, possible false negative.

TABLE 3-4a

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		MMW032		MMW033		MW15A	
Sample Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/11/2014		5/8/2014		5/10/2014	
Analyte/Methods (Units)	**Screening Limits**						
Anions (mg/l)	**Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**5.55**	--	**27.2**	--	**722 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**204**	--	**276**	--	**1280**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.00319**	--	**0.0334**	--	**0.00188 F**
Selenium	0.05 mg/l	**0.00198**	**0.00183 J**	<0.001	**0.000723 F**	**2.01 D**	**2.04 D**

mg/l	milligrams per liter.
	Highlight indicates result above screening limit.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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.
UJ	Potential low bias, possible false negative.

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EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS

Location Identification		**MW16A**	
Sample Type		**Monitoring Well**	
Date Collected		**5/5/2014**	
Analyte/Methods (Units)	**Screening Limits**		
Anions (mg/l)	**Limits**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**672 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**1280**
Metals (mg/l)			
Cadmium	0.005 mg/l	--	<0.0006
Manganese	0.05 mg/l	--	**1.77 D**
Selenium	0.05 mg/l	**0.00125**	**0.00426**

mg/l	milligrams per liter.
	Highlight indicates result above screening limit.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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.
UJ	Potential low bias, possible false negative.

TABLE 3-4b

EXCEEDANCE SUMMARY OF 2014 SEMI-VOALTILE GROUNDWATER RESULTS
BALLARD MINE, P4 RI/FS
(Page 1 of 1)

	Location Identification	**MBW011**
	Field Sample Identification	**1405GWMBW011-BN**
	Date Collected	**5/12/2014**
Analyte/Methods (Units)		
Semi-Volatile Organic Compounds (µg/l)	**Screening Limits**	
2,6-Dinitrotoluene	0.22	*<2.63*
3,3'-Dichlorobenzidine	0.15	*<2.63*
Benzo(a)anthracene	0.1	*<2.63*
Benzo(a)pyrene	0.2	*<2.63*
Benzo(b)fluoranthene	0.1	*<2.63*
Benzo(k)fluoranthene	0.8	*<2.63*
Chrysene	4.8	*<2.63*
Hexachlorobutadiene	0.042	*<2.63*
Hexachloroethane	0.87	*<2.63*
Pentachlorophenol	0.12	*<13.2*
Phenanthrene	0.17	*<2.63*

µg/l	micrograms per liter.
NE	Not established.
Italic	Italicized result indicates analyte reported to the method detection limit.
Shaded	Shaded result indicates result or method detection limit greater than or equal to the action level.

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EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
ENOCH VALLEY MINE, P4 RI/FS
(Page 1 of 6)

Location Identification		MBW085		MBW087		MBW099	
Location Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		5/10/2014		5/10/2014		5/9/2014	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**20.8**	--	**24.9**	--	**24.7**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**188**	--	**310**	--	**192 J-**
Metals (mg/l)							
Manganese	0.05 mg/l	--	**0.0133**	--	**0.0318**	--	**0.0906**
Selenium	0.05 mg/l	**0.00193**	**0.00205**	**0.000735 F**	**0.000928 F**	**0.00401**	**0.00182 J+**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
	Highlight indicates result above screening limit.
--	Not scheduled.
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 low bias.
J+	Data are estimated due to associated quality control data. Potential high bias.

TABLE 3-5

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
ENOCH VALLEY MINE, P4 RI/FS
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Location Identification		MMW007		MMW009		MMW013	
Sample Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/9/2014		5/12/2014		5/11/2014	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**14.7**	--	**63.2**	--	**196 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**170 J-**	--	**374**	--	**456**
Metals (mg/l)							
Manganese	0.05 mg/l	--	**0.0456**	--	**0.0809**	--	**0.0276**
Selenium	0.05 mg/l	**0.00266 J+**	**0.00209 J+**	**0.000941 F**	<0.001	**0.155 J**	**0.149 J**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
	Highlight indicates result above screening limit.
--	Not scheduled.
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 low bias.
J+	Data are estimated due to associated quality control data. Potential high bias.

TABLE 3-5

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
ENOCH VALLEY MINE, P4 RI/FS
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Location Identification		MMW024		MMW025		MMW026	
Sample Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/11/2014		5/6/2014		5/9/2014	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**258 D**	--	**13.3**	--	**24.2**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**542**	--	**402**	--	**230**
Metals (mg/l)							
Manganese	0.05 mg/l	--	<0.002	--	**0.00177 F**	--	**0.00208**
Selenium	0.05 mg/l	**0.0898 J**	**0.0895 J**	**0.000752 F**	**0.000551 F**	**0.00187 J**	**0.00165 J**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
Highlight indicates result above screening limit.
-- Not scheduled.
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 low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.

TABLE 3-5

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
ENOCH VALLEY MINE, P4 RI/FS
(Page 4 of 6)

Location Identification		MMW027		MMW034		MMW034 Dup	
Sample Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/12/2014		5/11/2014		5/11/2014	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**334 D**	--	**162 D**	--	**128 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**776**	--	**314**	--	**544**
Metals (mg/l)							
Manganese	0.05 mg/l	--	**0.00319**	--	<0.002	--	**0.0191**
Selenium	0.05 mg/l	**0.861 D**	**0.785 D**	**0.107 J**	**0.105 J**	**0.899 D,J**	**0.937 D,J**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
	Highlight indicates result above screening limit.
--	Not scheduled.
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 low bias.
J+	Data are estimated due to associated quality control data. Potential high bias.

TABLE 3-5

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
ENOCH VALLEY MINE, P4 RI/FS
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Location Identification		MMW034 Average		MMW035		MMW036	
Sample Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/11/2014		5/12/2014		5/12/2014	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**145 D**	--	**512 D**	--	**23.1**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**429**	--	**1060**	--	**218**
Metals (mg/l)							
Manganese	0.05 mg/l	--	**0.0191**	--	**0.00132 F**	--	**0.0294**
Selenium	0.05 mg/l	**0.503 D**	**0.521 D**	**1.36 D**	**1.36 D**	**0.0187**	**0.0183**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
Highlight indicates result above screening limit.
-- Not scheduled.
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 low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.

TABLE 3-5

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
ENOCH VALLEY MINE, P4 RI/FS
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Location Identification Sample Type Date Collected Analyte/Methods (Units)	Screening Limits	MMW037 Monitoring Well 5/12/2014		MMW037 Dup Monitoring Well 5/12/2014		MMW037 Average Monitoring Well 5/12/2014	
Chemistry Parameters (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**28.4**	--	**28.9**	--	**28.65**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**224**	--	**246**	--	**235**
Metals (mg/l)							
Manganese	0.05 mg/l	--	**0.0263**	--	**0.0455**	--	**0.0359**
Selenium	0.05 mg/l	**0.0263**	**0.0264**	**0.0252**	**0.0259**	**0.02575**	**0.02615**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
	Highlight indicates result above screening limit.
--	Not scheduled.
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 low bias.
J+	Data are estimated due to associated quality control data. Potential high bias.

TABLE 3-6

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
HENRY MINE, P4 RI/FS
(Page 1 of 3)

Location Identification		**MBW152**		**MMW010**		**MMW011**	
Location Type		**Bore Hole Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/11/2014**		**5/10/2014**		**5/10/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	--	**113 D**	**695 D**	--	**119 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	**350**	--	--	**1320**	--	**458**
Metals (mg/l)							
Cadmium	0.005 mg/l	<0.0006	--	--	**0.00527**	--	**0.000694**
Manganese	0.05 mg/l	**0.11**	--	--	**0.0256**	--	**0.00146 F**
Selenium	0.05 mg/l	**0.00188**	**0.00225**	**0.171 J**	**0.166 J**	0.00072 F,UJ	0.00067 F,UJ

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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.
UJ Potential low bias, possible false negative.

TABLE 3-6

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
HENRY MINE, P4 RI/FS
(Page 2 of 3)

Location Identification		**MMW022**		**MMW023**		**MMW028**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/10/2014**		**5/10/2014**		**5/10/2014**	
Analyte/Methods (Units)	**Screening**						
Chemistry Parameters (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**291 D**	--	**201 D**	--	**70.4**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**640**	--	**610**	--	**310**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.0116**	--	**0.371 D**	--	<0.002
Selenium	0.05 mg/l	**0.042 J**	**0.0438 J**	<0.001 UJ	<0.001	**0.00298 J**	**0.00321 J**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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.
UJ Potential low bias, possible false negative.

TABLE 3-6

EXCEEDANCE SUMMARY OF 2014 GROUNDWATER RESULTS
HENRY MINE, P4 RI/FS
(Page 3 of 3)

Location Identification		MMW028 Dup		MMW028 Average	
Location Type		Monitoring Well		Monitoring Well	
Date Collected		5/10/2014		5/10/2014	
Analyte/Methods (Units)	**Screening**				
Chemistry Parameters (mg/l)		**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**69.5**	--	**69.95**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**328**	--	**319**
Metals (mg/l)					
Cadmium	0.005 mg/l	--	<0.0006	--	<0.006
Manganese	0.05 mg/l	--	**0.00143 F**	--	**0.00143 F**
Selenium	0.05 mg/l	**0.00313 J**	**0.00337 J**	**0.003055**	**0.00329**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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.
UJ Potential low bias, possible false negative.

APPENDICES

APPENDIX A – FIELD NOTES AND FIELD FORMS

A-1 2014 Spring Groundwater and Surface Water Sampling

A-2 2014 Fall Surface Water Sampling

A-1 2014 Spring Groundwater and Surface Water Sampling

TABLE A-1
2014 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	6.8	1712	1117	26.2	26.4	6.4	12.1	0.77	4	0.0034		5/7/2014	930
SW	MDS026	7.3	1588	1052	23.9	2.89	6.69	108.9	1.25	11	N/A	Flow can not be measured, seep is appx 25-30' across and minimal flow is coming out of entire length. Ponding in flat area on hill in tress is where the sample was collected.	5/6/2014	1510
SW	MDS030	7.6	853		71.1	8.6	7.21	136	1.91	11	0.0187		5/9/2014	1410
SW	MDS034	7.7	752	504	29.6	3.45	7.51	126.4	2.72	5	0.0033		5/9/2014	1300
SW	MSG004	4.4	497.6	302.1	71.1	9.19	7.65	33.2	2.3	1	N/A	Flow exiting hill side in multiple locations across 15-20' width, can not be measured.	5/8/2014	845
SW	MSG005	5.2	550.9	341.6	79	9.66	7.4	52.8	0.22	2	0.0166		5/8/2014	930
SW	MSG006	5.6	1279	806	72.1	9.01	7.3	59.6	38.6	0	N/A	Flow can not be measured, spring daylights in several locations along hillside, appx 150-200' wide where flows exit hill.	5/8/2014	1420
SW	MSG007	6.7	459.2	297.1	36.6	4.5	7.7	84.3	12.6	0		Flow coming out of several locations along hillside, daylight width appx 20-30' wide, can not be measured.	5/8/2014	1500
SW	MST019	6.3	318	204.7	19.4	9.74	8.15	110.6	16	3	333	Flow measurement from USGS stream flow gauge station, river running too high and fast to safely enter and measure flow.	5/11/2014	845
SW	MST020	6.3	317.7	204.5	82.8	10.19	8.24	61.6	14.3	3	337	Flow measurement from USGS stream flow gauge station, river running too high and fast to safely enter and measure flow.	5/11/2014	1100
SW	MST044	7.9	503.6	339.1	87.1	10.3	8.19	109.5	3.98	5	8.72		5/9/2014	1145
SW	MST045	7.5	5.5	336.4	79.7	9.5	7.99	115.7	7.33	4	9.72		5/9/2014	930
SW	MST050	9.2	317.9	220.9	86.7	10	8.64	106.4	2.29	6	0.0024		5/7/2014	1630
SW	MST051	DRY											5/7/2014	1247
SW	MST057	7.1	384.8	253.8	76.6	9.25	8.03	38	1.19	2	0.214		5/7/2014	1400
SW	MST063	4.4	546.8	332	40.2	6.17	7.22	41.9	7.57	3	0.0167		5/7/2014	1330
SW	MST066	5	450.9	279	99.6	12.66	7.75	36.6	2.77	3	0.04		5/11/2014	930
SW	MST067	8.1	1739	1177	44.6	5.24	7.56	141.5	1.44	11	0.095		5/9/2014	1450
SW	MST069	11.9	2345	1756	87	9.37	7.99	71.6	5.1	13	0.0152		5/5/2014	1700
SW	MST089	12.3	321.4	243.6	105.5	11.41	7.99	74.4	1.53	0	0.17		5/8/2014	1135
SW	MST090	12.6	379.9	289.9	98.1	10.43	8.26	71.6	0.56	0	0.21		5/8/2014	1255
SW	MST092	11.3	372.9	275.5	105.6	11.57	8.1	59.6	4.9	2	0.03		5/8/2014	1040
SW	MST094	10.8	309.3	225.3	82.2	9.1	7.99	120.8	0.93	9	0.0154		5/8/2014	1600

TABLE A-1
2014 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	MST095	12.9	713	548	86.3	9.1	8.01	95.4	0.58	0	0.085		5/8/2014	1505
SW	MST096	13.4	565.2	439.3	87.9	9.18	7.91	21.9	1.14	0	0.016		5/8/2014	1330
SW	MST128	9.2	357.3	249.5	94.6	10.73	8.02	160	3.8	10	7.98		5/6/2014	1055
SW	MST131	7.8	282.3	189.4	99.3	11.61	7.91	51.1	7.04	10	2.15		5/6/2014	1010
SW	MST132	9.9	339.7	241.8	89.2	10.04	8.05	145.4	5.77	10	10.81		5/6/2014	1140
SW	MST133	12.7	174.7	133.7	93.9	9.92	8.08	118.5	30.9	11	0.69		5/6/2014	1615
SW	MST136	7.5	395.6	260.3	40	4.78	7.12	101.4	1.43	4	0.403		5/7/2014	1150
SW	MST143	12.6	123.4	94.1	58	6.16	6.463	103.8	3.48	13	0.001		5/6/2014	1325
SW	MST144	5.8	570.6	361.6	53.6	6.67	6.99	83.7	24.3	4	0.016		5/7/2014	945
SW	MST226	3.7	232.8	138	74	9.76	7.22	76.1	2.58	6	0.058		5/7/2014	1524
SW	MST269	DRY											5/6/2014	1550
SW	MST274	8.9	450.5	312	99	11.48	8.23	84	1.32	14	0.21		5/6/2014	1411
SW	MST275	9.2	64.5	47.1	89.7	10.33	7.73	82.9	8.89	6	0.087		5/7/2014	1100

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
2014 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	36.59	6352.51	N/A	N/A	9.6	7.37	160.3	2.82	1614	632	Bailer	Sampled with disposable bailer and 3-volume purge sampling.	5/11/2014	1515
GW	MBW006	6319.31	2.91	6316.4	0.28	5.60	5.09	7.24	165.3	7.17	976.7	2.08	Peristaltic	low flow sample	5/6/2014	1605
GW	MBW009	6310.69	1.7	6308.99	0.20	10.00	5.1	6.74	59.2	3.29	1027.8	3.4	Peristaltic	low flow sample	5/7/2014	1745
GW	MBW011	6339.8	0.73	6339.07	purged dry	6.00	4.5	6.53	153.9	1.55	768.2	30.8	Peristaltic	purge dry and sample	5/12/2014	1215
GW	MBW027	6313.33	9.15	6304.18	0.08	1.85	5.3	7.3	122.7	8.68	1055	2.28	Peristaltic	low flow sample	5/11/2014	1350
GW	MBW028	6339.99	4.88	6335.11	1.00	20.80	6.4	6.65	181.5	0.55	1303	18.9	Peristaltic	purge dry and sample	5/10/2014	1640
GW	MBW032	6499.13	8.08	6491.05	0.43	6.40	3.19	7.3	187.3	8.46	1412.4	3.87	Peristaltic	low flow sample	5/8/2014	1435
GW	MBW048	6421.72	0.6	6421.12	0.40	10.00	3.58	6.72	64.2	0.05	199.4	3.59	Peristaltic	low flow sample once at sustainable depth	5/8/2014	1650
GW	MBW085	6639.57	1.42	6638.15	purged dry	16.40	3.1	6.99	146.1	8.48	352.9	4.99	Peristaltic	purge dry and sample	5/10/2014	1218
GW	MBW087	6587.3	0.76	6586.54	0.12	3.63	4.1	6.69	127.5	0.51	545.1	4.17	Peristaltic	low flow sample	5/10/2014	1047
GW	MBW099	6599.25	0.9	6598.35	purged dry	5.00	6.53	6.99	193	7.01	267.4	4.55	Peristaltic	purge dry and sample	5/9/2014	1445
GW	MBW107	6486.78	DRY												5/12/2014	1700
GW	MBW112	6404	DRY												5/12/2014	1636
GW	MBW130	6416.29	0.8	6415.49	purged dry	11.40	5.8	7.59	128.5	3.63	161.8	74.8	Peristaltic	purge dry and sample	5/9/2014	1530
GW	MBW131	6468.52	1.6	6466.92	0.11	5.94	4.6	6.52	158.3	5.19	189.1	3.42	Peristaltic	low flow sample	5/10/2014	1507
GW	MBW135	6290.56	1.81	6288.75	purged dry	purged dry	5.8	7.78	88.2	1.5	413.2	7.92	Peristaltic	purge dry and sample	5/10/2014	915
GW	MBW152	6280	9.32	6270.68	purged dry	2.45	6.3	7.45	102.2	8.67	699.9	98.4	Peristaltic	purge dry and sample	5/11/2014	1220
GW	MW15A	6364.37	19.64	6344.73	0.08	3.95	8	6.73	178.8	4.24	1658	0.27	Peristaltic	low flow sample	5/10/2014	1746
GW	MW16A	6346.71	4.94	6341.77	0.07	1.81	5.5	7.6	-69.2	0.51	1461	1.74	Peristaltic	low flow sample	5/5/2014	1830
GW	MMW006	6485.46	266.35	6219.11	0.28	21.60	8.99	7.71	189.5	5.1	502.7	5	Bladder Pump/Nitrogen	low flow sample	5/7/2014	1445
GW	MMW007	6619.89	34.15	6585.74	variable	low flow final sample	6.6	7.18	143.6	1.64	245.3	4.45	Bladder Pump	low flow sample	5/9/2014	1205
GW	MMW009	6789.2	213.71	6575.49	0.40	36.00	8.3	7.21	-0.4	0	631	1.68	Bladder Pump/Nitrogen	low flow sample	5/12/2014	1100
GW	MMW010	6462.62	0.9	6461.72	0.30	7.80	6.59	6.57	180.8	2.79	1677.3	4.21	Bladder Pump	low flow sample	5/10/2014	1415
GW	MMW011	6268.31	74.81	6193.5	0.20	8.00	7.45	7.34	106.1	5.63	781.2	4.43	Bladder Pump	low flow sample	5/10/2014	1110
GW	MMW012	6488.72	DRY												5/12/2014	1315
GW	MMW013	6634.46	2.72	6631.74	0.50	12.50	6.17	7.05	204.6	8.73	686.2	3.99	Bladder Pump/Nitrogen	low flow sample	5/11/2014	1105
GW	MMW017	6313.86	35.49	6278.37	0.08	4.60	10.47	6.87	217.4	6.14	1345.4	1.1	Bladder Pump	low flow sample	5/11/2014	1425
GW	MMW018	6459.52	9.02	6450.5	0.15	10.00	7.89	7.36	200.3	6.71	416.7	4.54	Bladder Pump	low flow sample	5/8/2014	1540
GW	MMW020	6525.71	283.85	6241.86	not calculated due to bladder pump malfunction	27.00	8.72	7.18	184.7	5.07	744.6	3.9	Bladder Pump/Nitrogen	low flow sample	5/7/2014	1620
GW	MMW021	6436.3	211	6225.3	0.40	24.00	8.86	7.38	200.3	5.16	629.7	2.61	Bladder Pump	low flow sample	5/7/2014	1150
GW	MMW022	6635.85	207.85	6428	0.15	20.40	7.42	7.15	154.5	4.19	924.9	2.14	Bladder Pump	low flow sample	5/10/2014	1515
GW	MMW023	6230.92	107.3	6123.62	1.00	29.00	8.9	7.06	-100.3	0.02	971.2	3.21	Bladder Pump	low flow sample	5/10/2014	945
GW	MMW024	6704.05	58.83	6645.22	1.00	30.00	7.36	7.23	181.6	3.24	810.9	2.88	Bladder Pump/Nitrogen	low flow sample	5/11/2014	1250
GW	MMW025	6612.87	27.68	6585.19	1.00	248.00	7.68	8	152.4	1.33	303.9	1.41	Bladder Pump	low flow sample	5/6/2014	1405
GW	MMW026	6599.21	285.1	6314.11	0.60	29.00	9.97	7.74	162.3	0.8	425.9	3.16	Bladder Pump/Nitrogen	low flow sample	5/9/2014	1400
GW	MMW027	6491.07	109.16	6381.91	0.50	11.50	7.11	7.16	152.3	3.85	1082.4	1.8	Bladder Pump	low flow sample	5/12/2014	1300
GW	MMW028	6316.91	70.62	6246.29	0.90	38.00	7.56	7.62	131.2	6.73	548.6	4.25	Bladder Pump	low flow sample	5/10/2014	1240
GW	MMW029	6498.67	15.9	6482.77	0.40	11.50	7.46	7.19	240.5	6.18	1558.7	1.18	Bladder Pump	low flow sample	5/8/2014	1205
GW	MMW030	6355.25	23.52	6331.73	purged dry	purged dry	8.8	7.86	198.1	3.39	402.1	2.15	Bladder Pump	purge dry and sample	5/9/2014	1610
GW	MMW031	6346.42	95.95	6250.47	0.40	14.00	8.78	7.9	162.6	8.33	263.1	2.93	Bladder Pump	low flow sample	5/6/2014	1715
GW	MMW032	6446.39	17.45	6428.94	0.60	19.00	6.14	7.48	177.1	6.51	385.4	2.54	Bladder Pump	purge dry and sample	5/11/2014	930
GW	MMW033	6489.84	8.3	6481.54	0.50	42.50	6.43	7.81	82.1	0	467.5	1.75	Bladder Pump	low flow sample	5/8/2014	1355
GW	MMW034	6640.31	10.33	6629.98	0.40	10.00	6.62	7.4	203.6	8.47	622.2	1.11	Bladder Pump/Nitrogen	low flow sample	5/11/2014	1145
GW	MMW035	6500.34	110.6	6389.74	0.50	14.50	7.24	7.03	122.5	2.21	1429.5	2.5	Bladder Pump/Nitrogen	low flow sample	5/12/2014	1215
GW	MMW036	6425.18	113.14	6312.04	0.40	13.00	7.65	7.62	116.7	7.79	429.8	9.09	Bladder Pump	low flow sample	5/12/2014	1525
GW	MMW037	6419.39	119.9	6299.49	0.70	19.50	7.88	7.61	145.5	8.14	430.7	2.94	Bladder Pump/Nitrogen	low flow sample	5/12/2014	1420

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

2014 Spring Surface Water Sampling Forms

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05 / 07 / 14 **Arrival Time** 0915

Field Personnel

E. Yeager
J. Pierson

Signatures

SITE DESCRIPTION

Station Name West Dump Seep **Station Number** MDS025

~~**Latitude**~~ N 4746465.09 mN ~~**Longitude**~~ W 467004.85 mE.

Elevation 6693.67 ft **Datum** NAD 27/83 **Photo Number** ~~6693~~ on GPS file

Site & Stream Description Seep ~~[illegible]~~ daylights out of hillside in one ponded location, flows in one channel then spreads

Surface Water Characteristics (color, odor, appearance): orange iron staining on ground where water flows, distinct odor, water very clear

SAMPLE COLLECTION

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

Sample ID: 1405SWMDS025; U,F **Sample Time:** 0930

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					0930		
Water Temperature (°C)					6.8		
Specific Conductivity (µS/cm) @ 25° C					1712		
Conductivity (µS/cm)					1117		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					26.2		
Dissolved Oxygen (mg/L)					26.4		
pH					6.40		
ORP (mV)					12.1		
Turbidity (FTU)					0.77		
Air Temperature (°C)					4		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05 / 07 / 14 **Time** 0930 **Station Number** MDS025

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	15.10	1.5
2	15.88	1.5
3	18.19	1.7

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 2014 SW Sampling

Date 05/06/14 **Arrival Time** 1504

Field Personnel

E. Yeager

J. Pierson

Signatures

SITE DESCRIPTION

Station Name South dump seep **Station Number** MDS026

~~**Latitude**~~ N 4745736.72 m W " ~~**Longitude**~~ W 467811.84 m E "

Elevation ft **Datum** NAD ~~27~~83 **Photo Number** on GPS file

Site & Stream Description Seep appx 25-30' across. Ponded, flat area on hill in trees where seep ~~highlights~~ daylights.

Surface Water Characteristics (color, odor, appearance): oily appearance to water, slight odor, oily-sheen film

SAMPLE COLLECTION

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

Sample ID: ~~1405SW~~ 1405SWMDS026-U,F **Sample Time:** 1510

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1510		
Water Temperature (°C)					7.3		
Specific Conductivity (µS/cm) @ 25° C					1588		
Conductivity (µS/cm)					1052		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					23.9		
Dissolved Oxygen (mg/L)					2.89		
pH					6.69		
ORP (mV)					108.9		
Turbidity (FTU)					1.25		
Air Temperature (°C)					11		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/06/14 **Time** 1510 **Station Number** MDS026

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
Flow can not be measured, seep is appx 25-30' across and minimal flow is coming out of entire length. Ponding in flat area on hill in trees is where sample is collected.		

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 2014 SW Sampling

Date 05/09/14 **Arrival Time** 1400

Field Personnel

E. Yeager **Signatures**

J. Pierson

SITE DESCRIPTION

Station Name Pit #2 upper dump seep **Station Number** MDS030

~~**Latitude** N~~ 474899.09 mno; ~~**Longitude** W~~ 460005.31 m.E.

Elevation 6494.33 ft **Datum** NAD 27 83 **Photo Number** on GPS file

Site & Stream Description seep daylights at base of dump in small flowing channel into pool.

Surface Water Characteristics (color, odor, appearance): no, odor, algae/moss growth in pool, clear

SAMPLE COLLECTION

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

Sample ID: 1405SWMDS030-4,F **Sample Time:** 1410, 1415

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1410	1415	
Water Temperature (°C)					7.6	7.5	
Specific Conductivity (µS/cm) @ 25° C					853	852	
Conductivity (µS/cm)					569	567	
TDS (g/L)					—	—	
Dissolved Oxygen (% sat.)					71.1	69.6	
Dissolved Oxygen (mg/L)					8.60	8.32	
pH					7.21	7.16	
ORP (mV)					136	136	
Turbidity (FTU)					1.91	0.58	
Air Temperature (°C)					11	11	

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/09/14 **Time** 1400 **Station Number** MD5030

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	2.35	1.1
2	2.15	1.25
3	2.41	1.30
4	1.02	1.0

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 2014 SW Sampling

Date 05/09/14 **Arrival Time** 1245

Field Personnel

E. Yeager
J. Pierson

Signatures

SITE DESCRIPTION

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

~~**Latitude N**~~ 474941.84 M. No. ~~**Longitude W**~~ 460292.94 M. E.

Elevation 6296.44 ft **Datum** NAD 27 83 **Photo Number** on GPS file

Site & Stream Description seep that daylights at base of dump hill, runs through grassy field, flows over slide area in one loc.

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: 1405SWMDS034-U.F **Sample Time:** 1300

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1300		
Water Temperature (°C)					7.1		
Specific Conductivity (µS/cm) @ 25° C					752		
Conductivity (µS/cm)					504		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					29.6		
Dissolved Oxygen (mg/L)					3.45		
pH					7.51		
ORP (mV)					126.4		
Turbidity (FTU)					2.72		
Air Temperature (°C)					~~8.72~~ 5		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/09/14 **Time** _____ **Station Number** MDS034

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	10.57	0.95
2	10.09	1.0
3	10.91	1.0
4	10.57	1.1

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						
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	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/08/14 **Arrival Time** 0845

Field Personnel

E. Yeager

J. Pierson

Signatures [signature]

[signature]

SITE DESCRIPTION

Station Name Holmgren Spring **Station Number** MSG004

~~**Latitude** N~~ 4741085.96 M ho: ~~**Longitude** W~~ 461568.67 M.E "

Elevation 6619.23 ft **Datum** NAD ~~27~~83 **Photo Number** — on GPS file

Site & Stream Description flowing from hill side, flow horizontal distance 15-20' wide, exiting hill in multipe locations

Surface Water Characteristics (color, odor, appearance): oily sheen on water surface, no odor

SAMPLE COLLECTION

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

Sample ID: 1405SWMSG004-U,F **Sample Time:** 0900

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					0900		
Water Temperature (°C)					4.4		
Specific Conductivity (µS/cm) @ 25° C					497.6		
Conductivity (µS/cm)					302.1		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					71.1		
Dissolved Oxygen (mg/L)					9.19		
pH					7.65		
ORP (mV)					33.2		
Turbidity (FTU)					2.30		
Air Temperature (°C)					1.0		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/08/14 **Time** 0900 **Station Number** MSG004

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

Flow exiting hillside in multiple locations across 15-20' width. can't be measured.

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						
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	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/08/14 **Arrival Time** 0925

Field Personnel

E. Yeager

J. Pierson

Signatures [signature]

[signature]

SITE DESCRIPTION

Station Name Cattle Spring **Station Number** MSG005

~~**Latitude**~~ N 4741168.58 mho: ~~**Longitude**~~ W 461735.48 ME

Elevation 6547.84 ft **Datum** NAD ~~27~~83 **Photo Number** on GPS file

Site & Stream Description Piped spring

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

SAMPLE COLLECTION

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

Sample ID: 1405SWMSG005-U,F +MS/MSD **Sample Time:** 0930, 0935, 0940

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					0930	0935	0940
Water Temperature (°C)					5.2	→	→
Specific Conductivity (µS/cm) @ 25° C					550.9	→	→
Conductivity (µS/cm)					341.6	→	→
TDS (g/L)					–		
Dissolved Oxygen (% sat.)					79.0	→	→
Dissolved Oxygen (mg/L)					9.66	→	→
pH					7.40	→	→
ORP (mV)					52.8	→	→
Turbidity (FTU)					0.22	→	→
Air Temperature (°C)					2	→	→

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/08/14 **Time** 0930 **Station Number** MSG005

Completed by: Eyecger J. Pierson **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	10.72	5L
2	10.59	5L
3	10.57	5L

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 2014 SW Sampling

Date 05/08/14 **Arrival Time** 1400

Field Personnel

E. Yeager

J. Pierson

Signatures [signature]

SITE DESCRIPTION

Station Name Southeast Spring **Station Number** MSG006

~~**Latitude N**~~ 4741807.36mNo ~~**Longitude W**~~ 461884.07mE

Elevation 6465.68 ft **Datum** NAD ~~27~~83 **Photo Number** on gps file

Site & Stream Description Spring ~~dry~~ daylights on hill side, appx ~~40-50'~~ 150-200' wide flow exits from several locations

Surface Water Characteristics (color, odor, appearance): clear with slight yellow tint, cold

SAMPLE COLLECTION

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

Sample ID: 1405SWMSG006-U,F **Sample Time:** 1420

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1420		
Water Temperature (°C)					5.6		
Specific Conductivity (µS/cm) @ 25° C					1279		
Conductivity (µS/cm)					806		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)		[illegible]			72.1		
Dissolved Oxygen (mg/L)					9.01		
pH					7.30		
ORP (mV)					59.6		
Turbidity (FTU)					38.6		
Air Temperature (°C)					0		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/08/14 **Time** 1405 **Station Number** MSG006

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

Spring daylights in several spots along hillside, appx ~~40 yds~~ 150-200' wide where flows exit hill.

Flow by Capture Method

can not be measured

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 2014 SW Sampling

Date 05/08/14 **Arrival Time** 1455

Field Personnel

E. Yeager
J. Pierson

Signatures

SITE DESCRIPTION

Station Name South of Southeast Spring **Station Number** MSG007

~~Latitude~~ N 474728.09m No. " **~~Longitude~~ W** 462049.13m E "

Elevation 6443.68 ft **Datum** NAD ~~27~~83 **Photo Number** on gps file

Site & Stream Description spring daylights in several locations along hill, appx 20-30' wide, drains into grassy field

Surface Water Characteristics (color, odor, appearance): oily sheen on standing water, no smell, clear, free flowing from several spots along hill

SAMPLE COLLECTION

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

Sample ID: 1405SWMSG007-U,F **Sample Time:** 1500

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1500		
Water Temperature (°C)					6.7		
Specific Conductivity (µS/cm) @ 25° C					459.2		
Conductivity (µS/cm)					297.1		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					36.6		
Dissolved Oxygen (mg/L)					4.50		
pH					7.7		
ORP (mV)					84.3		
Turbidity (FTU)					12.6		
Air Temperature (°C)					0		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/08/14 **Time** 1455 **Station Number** MSG007

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

Flow coming out of several locations along hillside, daylight width app 20-30'. can not be measured

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 2014 SW Sampling

Date 5/11/14 **Arrival Time** 0830

Field Personnel

E. Yeager
J. Pierson

Signatures E Yeager

SITE DESCRIPTION

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

~~**Latitude**~~ N 4740424.74 ' " ~~**Longitude**~~ WE 458578.10 ' "

Elevation 6284.40 ft **Datum** NAD ~~27~~ 83 **Photo Number** on GPS file

Site & Stream Description Approximately 30-40 feet across. Turbid. High water levels near top of bank but below max flood banks.

Surface Water Characteristics (color, odor, appearance): Turbid brown

SAMPLE COLLECTION

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

Sample ID: 14055WMST019-U,F **Sample Time:** 0845

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					0845		
Water Temperature (°C)					6.3		
Specific Conductivity (µS/cm) @ 25° C					318.0		
Conductivity (µS/cm)					204.7		
TDS (g/L)		JP			~~79.8~~ JP		
Dissolved Oxygen (% sat.)					79.4		
Dissolved Oxygen (mg/L)					9.74		
pH					8.15		
ORP (mV)					110.6		
Turbidity (FTU)					16.0		
Air Temperature (°C)					3		

* river too high and fast to enter safely. Sampled by extending tubing into channel appx. 8' across flow and sinking it deep into river. Then [illegible] DUMP into bottles

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/11/14 **Time** 0830 **Station Number** MS1019

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						

Flow from USGS station #Blackfoot Rvr by stream gauge missing from station Henry

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/ 11 / 14 **Arrival Time** 1045

Field Personnel

E. Yeager

J. Pierson

Signatures [signature]

[signature]

SITE DESCRIPTION

Station Name Blackfoot Rvr. Below State Land Cr. **Station Number** MST020

~~**Latitude**~~ N 4739855.25 M.No. ~~**Longitude**~~ W 459032.67 M E. "

Elevation 6289.05 ft **Datum** NAD ~~27~~83 **Photo Number** on GPS file

Site & Stream Description 20-30 ft wide, Near top of band but below flood plain, Sampled on outside of meander from cut bank.

Surface Water Characteristics (color, odor, appearance): Turbid, brown.

SAMPLE COLLECTION

see notes below

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

Sample ID: 1405SWMST020-U,F **Sample Time:** 1100

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1100		
Water Temperature (°C)					6.3		
Specific Conductivity (µS/cm) @ 25° C					317.7		
Conductivity (µS/cm)					204.5		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					82.8		
Dissolved Oxygen (mg/L)					10.19		
pH					8.24		
ORP (mV)					61.6		
Turbidity (FTU)					14.3		
Air Temperature (°C)					3		

* Rvr. too deep/fast to enter and collect sample w/ kemmerer. sample collected by extending tubing ~8' into river channel at ~6" deep and pumping with peristaltic pump.

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05 / 11 / 14 **Time** _____ **Station Number** MST020

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						

River flow too high and swift to enter safely and collect flow.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 5 / 11 / 14 **Arrival Time** 09:20

Field Personnel

E Yeager **Signatures**

J. Pierson

SITE DESCRIPTION

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

~~**Latitude** N~~ 4740485.76 mN: ~~**Longitude** W~~ 458952.90 mE:

Elevation 6291.40 ft **Datum** NAD ~~27~~ 83 conus **Photo Number** on GPS file

Site & Stream Description meandering stream through grassy hummocks. free flowing.

Surface Water Characteristics (color, odor, appearance): oily sheen on standing water, no odor, slight yellow tint to water.

SAMPLE COLLECTION

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

Sample ID: 1405SWMST066-U,L **Sample Time:** 0930

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					0930		
Water Temperature (°C)					5.0		
Specific Conductivity (µS/cm) @ 25° C					450.9		
Conductivity (µS/cm)					279.0		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					99.6		
Dissolved Oxygen (mg/L)					12.66		
pH					7.75		
ORP (mV)					36.6		
Turbidity (FTU)					2.77		
Air Temperature (°C)					3		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05 / 11 / 14 **Time** 0920 **Station Number** MST066

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 3.3 ft L.E.W. 12.6 ft Total Width 16.3 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)
3.3	1	—	—	10.8	16	0.20	0.02
3.8	2	—	—	11.3	17	0.15	0.00
4.3	3	—	—	11.8	18	0.20	-0.01
4.8	4	0.15	-0.03	12.3	19	0.15	-0.02
5.3	5	0.175	-0.04				
5.8	6	0.25	-0.01				
6.3	7	0.275	-0.01				
6.8	8	0.30	0.00				
7.3	9	0.275	-0.01				
7.8	10	0.25	-0.01				
8.3	11	0.20	-0.02				
8.8	12	0.225	-0.02				
9.3	13	0.25	0.02				
9.8	14	0.30	~~0.08~~ → 0.12				
10.3	15	0.20	0.07				

* m/s

to shallow to measure

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/09/14 **Arrival Time** 1125

Field Personnel

E. Yeager **Signatures**

J. Pierson

SITE DESCRIPTION

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

~~**Latitude** N~~ 4749538.51 m. No ~~**Longitude** W~~ 459963.85 m E

Elevation 6273.86 ft **Datum** NAD ~~27~~ 83 **Photo Number** on GPS File

Site & Stream Description Clear, free flowing in distinct channel, rocky bottom minimal sediment

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

SAMPLE COLLECTION

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

Sample ID: 1405SWMST044-U,F **Sample Time:** 1145

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1145		
Water Temperature (°C)					7.9		
Specific Conductivity (µS/cm) @ 25° C					503.6		
Conductivity (µS/cm)					339.1		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					87.1		
Dissolved Oxygen (mg/L)					10.30		
pH					8.19		
ORP (mV)					109.5		
Turbidity (FTU)					3.98		
Air Temperature (°C)					5		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05 / 09 / 14 **Time** 1145 **Station Number** MST0414

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

8.2 ft **R.E.W.** 12.8 **ft** **L.E.W.** 21.0 **ft** **Total Width** ~~8.6~~ 21.4 **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 0.6
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)
12.8	0	1	0.25	0.00			
13.4 ~~13.2~~	1.6 ~~1.4~~	2	0.65 ~~0.6~~	0.03 ~~0.07~~			
14.0 ~~13.6~~	1.2 ~~.8~~	3	0.75	0.01			
14.6 ~~14.0~~	1.8 ~~1.2~~	4	0.7	0.36			
15.2 ~~14.4~~	2.4 ~~1.6~~	5	0.85	0.44			
15.8 ~~14.8~~	3.0 ~~2.0~~	6	0.95	0.53			
16.4 ~~15.2~~	3.6	7	0.8	0.60			
17.0	4.2	8	0.75	0.64			
17.6	4.8	9	1.1	0.63			
18.2	5.4	10	1.1	0.19			
18.8	6.0	11	1.1	0.16			
19.4	6.6	12	1.1	0.67			
20.0	7.2	13	1.0	0.51			
20.6	7.8	14	0.45	-0.05			
–	–	15	–	–			

~~cm/s~~ → m/s

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/09/14 **Arrival Time** 0905

Field Personnel

E. Yeager
J. Pierson

Signatures

SITE DESCRIPTION

Station Name little blackfoot River above Henry Cr. **Station Number** MSTO45

~~**Latitude N**~~ 4750133.10 m No ~~**Longitude W**~~ 459721.25 m E

Elevation 6288.51 ft **Datum** NAD ~~27~~83 **Photo Number** on GPS File

Site & Stream Description free flowing, distinct channel, silty/rocky bottom

Surface Water Characteristics (color, odor, appearance): no odor, slight yellow tint

SAMPLE COLLECTION

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

Sample ID: 1405SWMSTO45; U, F + DUP **Sample Time:** 0930, 0935

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					0930	0935	
Water Temperature (°C)					7.5	7.5	
Specific Conductivity (µS/cm) @ 25° C					505.0	505.0	
Conductivity (µS/cm)					336.4	336.4	
TDS (g/L)					—	—	
Dissolved Oxygen (% sat.)					79.7	79.7	
Dissolved Oxygen (mg/L)					9.50	9.50	
pH					7.99	7.99	
ORP (mV)					115.7	115.7	
Turbidity (FTU)					7.33	7.33	
Air Temperature (°C)					4	4	

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/09/14 **Time** 0905 **Station Number** MST045

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

n/a

Flow by Meter

R.E.W. 20.9 ft **L.E.W.** 30.9 ft **Total Width** 31.8 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) m/s		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
20.9	0	1	0.9	0.07				
21.6	0.7	2	1.1	0.11				
22.3	1.4	3	1.05	0.28				
~~23.0~~	2.1	4	1.1	~~0.90~~ 0.29				
23.7 ~~30.7~~	2.8	5	1.3	0.28				
24.~~4~~ ~~31.4~~	3.5	6	1.35	0.38				
25.1 ~~32.~~	4.2	7	1.1	0.44				
25.8	4.9	8	1.2	0.34				
26.5	5.6	9	1.3	0.39				
27.2	6.3	10	1.1	0.35				
27.9	7.0	11	1.0	0.35				
28.6	7.7	12	0.9	0.29				
29.3	8.4	13	0.8	0.05				
30.0	9.1	14	0.75	0.21				
30.7	9.8	15	0.55	0.07				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/07/14 **Arrival Time** 1615

Field Personnel

E. Yeager
J. Pierson

Signatures

SITE DESCRIPTION

Station Name Long valley creek below Ballard mine **Station Number** MST050

~~Latitude~~ N 4744123.82 M No: ~~Longitude~~ W 459330.93 M.E.

Elevation 6275.82 ft **Datum** NAD ~~27~~83 **Photo Number** on GPS file

Site & Stream Description very minimal flow coming from under rock overflow for pond. Flows into grassy field.

Surface Water Characteristics (color, odor, appearance): Slight yellow color, no odor

SAMPLE COLLECTION

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

Sample ID: 1405SWMST050-U,F **Sample Time:** 1630

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1630		
Water Temperature (°C)					9.2		
Specific Conductivity (µS/cm) @ 25° C					317.9		
Conductivity (µS/cm)					220.9		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					86.7 ~~100.8~~		
Dissolved Oxygen (mg/L)					10.00		
pH					8.64		
ORP (mV)					106.4		
Turbidity (FTU)					2.29		
Air Temperature (°C)					6		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 5 / 7 / 14 **Time** 1630 **Station Number** MST050

Completed by: J Pierson E Kenger **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	7.09	0.5
2	7.72	0.5
3	7.00	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 2014 SW Sampling

Date 5 / 7 / 14 **Arrival Time** 1247

Field Personnel

E. Yeager

J. Pierson

Signatures [signature]

[signature]

SITE DESCRIPTION

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

~~**Latitude**~~ N 4746668.01 mho. ~~**Longitude**~~ W 460576.38 mE.

Elevation 6347.08 ft **Datum** NAD ~~27~~83 **Photo Number** ~~[illegible]~~ on GPS file

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: ~~1405 SW MST051~~ **Sample Time:** _____

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	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 2014 SW Sampling

Date 05/07/14 **Time** 1247 **Station Number** MST051

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						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 5 / 7 / 14 **Arrival Time** 1400

Field Personnel

E Yeager **Signatures** [signature]

J Pierson [signature]

SITE DESCRIPTION

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

~~**Latitude**~~ N 4746079.09 M.No. ~~**Longitude**~~ W 464111.21 mE

Elevation 6395.36 ft **Datum** NAD ~~27~~83 **Photo Number** ~~163~~ on GPS file

Site & Stream Description clear, flowing through grassy field with some channeling formed

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: 1405SWMST057-U,F **Sample Time:** 14:30

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1430		
Water Temperature (°C)					7.1		
Specific Conductivity (µS/cm) @ 25° C					384.8		
Conductivity (µS/cm)					253.8		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					76.6		
Dissolved Oxygen (mg/L)					9.25		
pH					8.03		
ORP (mV)					38.0		
Turbidity (FTU)					1.19		
Air Temperature (°C)					2		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 5 / 7 / 14 **Time** 1430 **Station Number** MST057

Completed by: E Kenyer J Pierson **Checked by:** _____

Flow by Capture Method

* use marsh McBirney flow meter on wet years possible

Measurement Number	Time (sec)	Volume (L)
1	1.28	6.75
2	1.15	7.5
3	1.10	7.0
4	1.25	7.25

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						

end

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 5 / 7 / 14 **Arrival Time** 1312

Field Personnel

E. Yeager

J. Pierson

Signatures [signature]

SITE DESCRIPTION

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

Latitude N 4746160.10 mno: **Longitude** W 463087.87 M.E.

Elevation 6445.38 ft **Datum** NAD ~~27~~ 83 Lamas **Photo Number** ~~[illegible]~~ on GPS file

Site & Stream Description running through willows, grass, marshy areas around stream.

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: 1405SWMST063-U,F+MS/MSD **Sample Time:** 1330, 1335, 1340

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1330	MS 1335	MSD 1340
Water Temperature (°C)					4.4	4.4	4.4
Specific Conductivity (µS/cm) @ 25° C					546.8 ~~544.0~~	546.9 ~~544.1~~	547.0 ~~544.1~~
Conductivity (µS/cm)					332.0 ~~[illegible]~~	332.0	332.0
TDS (g/L)					—	—	—
Dissolved Oxygen (% sat.)					40.2	40.2	40.2
Dissolved Oxygen (mg/L)					6.17	6.17	6.17
pH					7.22	7.22	7.22
ORP (mV)					41.9	41.9	41.9
Turbidity (FTU)					7.57	1.62	0.45
Air Temperature (°C)					3	3	3

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 5 / 7 / 14 **Time** 1312 **Station Number** MST063

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	2.13	1.0
2	2.06	1.0
3	2.15	1.0

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 2014 SW Sampling

Date 05/09/14 **Arrival Time** 1450

Field Personnel

E. Yeager **Signatures**

J. Pierson

SITE DESCRIPTION

Station Name Ballard Creek Headwaters **Station Number** MST067

~~**Latitude** N~~ 4741265.21 m N10. ~~**Longitude** W~~ 459557.74 m E

Elevation 6353.37 ft **Datum** NAD ~~27~~83 **Photo Number** on GPS file

Site & Stream Description daylights in grassy field, semi defined channel full of tall grass and algae

Surface Water Characteristics (color, odor, appearance): clear, flowing slowly through tall grass with a lot of algae growth

SAMPLE COLLECTION

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

Sample ID: 1405SWMST067-U,F **Sample Time:** 1510

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1510		
Water Temperature (°C)					8.1		
Specific Conductivity (µS/cm) @ 25° C					1739		
Conductivity (µS/cm)					1177		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					44.6		
Dissolved Oxygen (mg/L)					5.24		
pH					7.56		
ORP (mV)					141.5		
Turbidity (FTU)					1.44		
Air Temperature (°C)					11		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/09/14 **Time** 1510 **Station Number** MST067

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	~~10.72~~ 5.07	~~1.1~~ 0.49
2	4.97	0.45
3	5.03	0.49

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 2014 SW Sampling

Date 05 /05 /2014 **Arrival Time** 1635

Field Personnel

E. Yeager

J. Pierson

Signatures

SITE DESCRIPTION

Station Name Short Creek Below Ballard mine **Station Number** MST0169

Latitude N ~~454982.14~~ 4740931.37 **Longitude** W 459982.19 ' "

Elevation 6,358.47 ft **Datum** ~~NAD 27~~ 83 Conus **Photo Number** on GPS file

Site & Stream Description ~~low flow, slight odor, clear~~ ; small channel 1-3 ft wide

Surface Water Characteristics (color, odor, appearance): slight odor (sulfides?), clear water

SAMPLE COLLECTION

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

Sample ID: 1405SWMST0169-U,F **Sample Time:** 1700

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1700		
Water Temperature (°C)					11.9		
Specific Conductivity (µS/cm) @ 25° C					2345		
Conductivity (µS/cm)					1756		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					87.0		
Dissolved Oxygen (mg/L)					9.37		
pH					7.99		
ORP (mV)					71.6		
Turbidity (FTU)					5.10		
Air Temperature (°C)					13		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/05/14 **Time** 1650 **Station Number** MST069

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	3.74	1.5
2	3.78	1.75
3	4.03	1.75

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 2014 SW Sampling

Date 05/08/14 **Arrival Time** 1135

Field Personnel

E. Yeager

J. Pierson

Signatures [signature]

SITE DESCRIPTION

Station Name Wooley Valley Cr. below No. Fork Wolley Valley Cr. **Station Number** MST089

~~**Latitude** N~~ 4741396.58 M No. ~~**Longitude** W~~ ~~4644~~ 464112.22 ME.

Elevation 6392.09 ft **Datum** NAD ~~27~~ 83 **Photo Number** On GPS file

Site & Stream Description Free flowing through grassy field, 5-7' wide

Surface Water Characteristics (color, odor, appearance): clear, warm, slight yellow tint to water, no odor

SAMPLE COLLECTION

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

Sample ID: 1405SWMST089-U,F +MS/MSD **Sample Time:** 1200, 1205, 1210

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1200	1205	1210
Water Temperature (°C)					12.3	12.3	12.3
Specific Conductivity (µS/cm) @ 25° C					321.4	321.2	321.1
Conductivity (µS/cm)					243.6	243.2	243.0
TDS (g/L)					—	—	—
Dissolved Oxygen (% sat.)					105.5	103.7	103.2
Dissolved Oxygen (mg/L)					11.41	11.12	11.04
pH					7.99	7.95	7.94
ORP (mV)					74.4	74.4	74.9
Turbidity (FTU)					1.53	1.22	1.38
Air Temperature (°C)					0	0	0

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/07/14 **Time** 1135 **Station Number** MST089

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 2.9 **ft** **L.E.W.** 6.6 **ft** **Total Width** 7.3 **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) m/s		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
2.9	1	—	— not deep enough to measure				
3.3	2	0.23	-0.01				
3.7	3	0.33	0.02				
4.1	4	0.45	0.12				
4.5	5	0.48	0.10				
4.9	6	0.50	0.04				
5.3 ~~5.3~~	7	0.33	0.02				
5.7 ~~5.7~~	8	0.22	-0.01				
6.1 ~~6.1~~	9	—	—				
6.5 ~~6.5~~	10	—	—				
~~6.5~~	11	—	—				
~~6.9~~	12	—	—				
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/08/14 **Arrival Time** 1255

Field Personnel

E. Yeager **Signatures** [signature]

J. Pierson [signature]

SITE DESCRIPTION

Station Name Wooley Valley Cr., above no. Fork Wooley Valley Cr. **Station Number** MST090

~~**Latitude N**~~ 4741405.85m No. ~~**Longitude W**~~ 463393.57

Elevation 6409.09 ft **Datum** NAD ~~27~~ 83 **Photo Number** ongps file

Site & Stream Description clear, free flowing through grassy field, appx 2-3' wide

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

SAMPLE COLLECTION

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

Sample ID: 1405SWMST090-U,F **Sample Time:** 1300

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1300		
Water Temperature (°C)					12.6		
Specific Conductivity (µS/cm) @ 25° C					379.9		
Conductivity (µS/cm)					289.9		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					98.1		
Dissolved Oxygen (mg/L)					10.43		
pH					8.26		
ORP (mV)					~~0.5~~ 71.6		
Turbidity (FTU)					0.56		
Air Temperature (°C)					0		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05 / 08 / 14 **Time** ~~AM~~ 1255 **Station Number** MST090

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.69	7.1
2	1.34	8.25
3	1.40	8.0
4	1.25	8.0
5	1.56	8.3

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 2014 SW Sampling

Date 5 / 8 / 14 **Arrival Time** 1040

Field Personnel

E Yeager **Signatures** [signature]

J Pierson [signature]

SITE DESCRIPTION

Station Name North Fork Wooley Valley Creek above Wooley Valley Creek ~~MST092~~ **Station Number** MST092

~~Latitude~~ N 4741778.08 mho. " **~~Longitude~~ W** 4630666.77 mE. "

Elevation 6405.76 ft **Datum** NAD ~~27~~ 83 **Photo Number** on GPS File

Site & Stream Description free flowing, shallow, flow through grassy field

Surface Water Characteristics (color, odor, appearance): slight yellow tint to water, warm, no odor

SAMPLE COLLECTION

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

Sample ID: 1405SWMST092-U,F **Sample Time:** 1050

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1050		
Water Temperature (°C)					11.3		
Specific Conductivity (µS/cm) @ 25° C					372.9		
Conductivity (µS/cm)					275.5		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					105.6		
Dissolved Oxygen (mg/L)					11.57		
pH					8.10		
ORP (mV)					59.6		
Turbidity (FTU)					4.9		
Air Temperature (°C)					2		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/08/14 **Time** 1050 **Station Number** MST092

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. ~~10.7~~ 0.8 **ft** **L.E.W.** 10.6 **ft** **Total Width** ~~10.8~~ 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	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)
10.6	1	—	—				
10.1	2	—	—	Too shallow to measure			
5.6	3	—	—				
5.1	4	0.15	-0.02				
4.6	5	0.25	0.02				
4.1	6	0.30	0.02				
3.6	7	0.30	0.02				
3.1	8	0.27	0.02				
2.6	9	0.18	-0.02				
2.1	10	—	—				
1.6	11	—	—				
1.1	12	—	—				
0.6	13	—	—				
	14						
	15						

*m/s →

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/08/14 **Arrival Time** 1600

Field Personnel

E. Yeager **Signatures**

J. Pierson

SITE DESCRIPTION

Station Name Spring fed trib. #1 of N. Fork Wooley Valley Cr., below Ballard mine. **Station Number** MST094

~~Latitude N~~ 4742380.52 m No. " ~~Longitude W~~ 461554.17 m E "

Elevation 6470.100 ft **Datum** NAD 27/83 **Photo Number** on GPS file

Site & Stream Description free flowing through grassy field from spring fed from above.

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: 1405SWMST094-U,F **Sample Time:** 1610

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1610		
Water Temperature (°C)					10.8		
Specific Conductivity (µS/cm) @ 25° C					309.3		
Conductivity (µS/cm)					225.3		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					82.2		
Dissolved Oxygen (mg/L)					9.10		
pH					7.99		
ORP (mV)					120.8		
Turbidity (FTU)					0.93		
Air Temperature (°C)					9		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/08/14 **Time** 1600 **Station Number** MST094

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.47	0.65
2	1.50	0.70
3	1.19	0.50
4	1.47	0.60

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 2014 SW Sampling

Date 05/08/14 **Arrival Time** 1505

Field Personnel

E. Yeager
J. Pierson

Signatures

SITE DESCRIPTION

Station Name spring fed trib #2 of No. Fork Wooley Valley Cr., below Ballard Mine **Station Number** MST095

~~Latitude N~~ 4741812.14 m No. ~~Longitude W~~ 461728.31 m E.

Elevation 6472.90 ft **Datum** NAD ~~27~~83 **Photo Number** on GPS file

Site & Stream Description free flowing through grassy hillside

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

SAMPLE COLLECTION

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

Sample ID: 1405SWMST095-U,F **Sample Time:** 1515

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1515		
Water Temperature (°C)					12.9		
Specific Conductivity (µS/cm) @ 25° C					713		
Conductivity (µS/cm)					548		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					86.3		
Dissolved Oxygen (mg/L)					9.10		
pH					8.01		
ORP (mV)					95.4		
Turbidity (FTU)					0.58		
Air Temperature (°C)					0		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/08 / 14 **Time** 1515 **Station Number** MST095

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.16	2.80
2	~~1.19~~ 1.25	2.75
3	1.32	3.5
4	1.34	2.90

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 2014 SW Sampling

Date 05/08/14 **Arrival Time** 1330

Field Personnel

E. Yeager
J. Pierson

Signatures

SITE DESCRIPTION

Station Name Trib. of No. Fork Wooley Valley Cr., below Ballard mine **Station Number** MST0916

~~**Latitude** N~~ 4741490.20 m No. ~~**Longitude** W~~ 402187.60 m E

Elevation 6455.81 ft **Datum** NAD ~~27~~83 **Photo Number** on gps file

Site & Stream Description oily sheen on stagnant water, free flowing water clear. Flow appx 3-5' wide, shallow

Surface Water Characteristics (color, odor, appearance): yellowish tint, oily sheen on stagnant water, warm

SAMPLE COLLECTION

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

Sample ID: 140508WMST0916-U,F **Sample Time:** 1340

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1340		
Water Temperature (°C)					13.4		
Specific Conductivity (µS/cm) @ 25° C					565.2		
Conductivity (µS/cm)					439.3		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					87.9		
Dissolved Oxygen (mg/L)					9.18		
pH					7.91		
ORP (mV)					21.9		
Turbidity (FTU)					1.14		
Air Temperature (°C)					0		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/08/14 **Time** 1330 **Station Number** MST096

Completed by: Eyeager J. Pierson **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	5.44	2.25
2	4.40	2.20
3	4.56	2.0
4	3.94	1.90

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 2014 SW Sampling

Date 05/06/14 **Arrival Time** 1055

Field Personnel

E. Yeager

J. Pierson

Signatures

SITE DESCRIPTION

Station Name Angus Cr. above Rasmussen Cr. **Station Number** MST128

Latitude N 4744458.18" **Longitude** W 469266.02"

Elevation 6,538.62 ft **Datum** NAD ~~27~~83 Conus **Photo Number** on GPS file

Site & Stream Description Free flowing, below max flow, gravel/cobbles on stream bed, secondary/smaller channel bypasses sampling/flow measurement site

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

SAMPLE COLLECTION

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

Sample ID: 140506WMST128-U,F **Sample Time:** 1100

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1100		
Water Temperature (°C)					9.2		
Specific Conductivity (µS/cm) @ 25° C					357.3		
Conductivity (µS/cm)					249.5		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					94.6		
Dissolved Oxygen (mg/L)					10.73		
pH					8.02		
ORP (mV)					100.0		
Turbidity ~~(FTU)~~ NTU					3.8		
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/06/14 **Time** 1100 **Station Number** MST 128

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

ey

Flow by Meter

7.9 **R.E.W.** 2.5 **ft** **L.E.W.** 10.4 **ft** **Total Width** 12.0 **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)		m/s	Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			m/s
		Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)	
R.E.W. = 2.5									
2.5	0	1	–	–	10	7.5	1.2	0.12	
3.0	.5	2	0.3	-0.02	10.5	8.0	–	–	
3.5	1.0	3	0.35	-0.04					
4.0	1.5	4	0.35	-0.06					
4.5	2.0	5	0.4	-0.04					
5.0	2.5	6	0.5	-0.03					
5.5	3.0	7	0.7	0.09					
6.0	3.5	8	0.85	0.33					
6.5	4.0	9	0.9	0.69					
7	4.5	10	1.0	0.75					
7.5	5.0	11	1.0	0.74					
8	5.5	12	1.0	0.76					
8.5	6.0	13	1.0	0.82					
9	6.5	14	1.1	0.56					
9.5	7.0	15	1.2	0.12					

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/06/14 **Arrival Time** 1010

Field Personnel

E. Yeager

J. Pierson

Signatures

SITE DESCRIPTION

Station Name Rasmussen creek above Angus Cr. **Station Number** MST131

Latitude N 4749461.37 " **Longitude** W 469280.89 " "

Elevation _____ ft **Datum** NAD ~~27~~ 83 **Photo Number** ~~26~~ on GPS file

Site & Stream Description Meandering stream ~4-5 ft wide, free flowing, generally below maximum flows

Surface Water Characteristics (color, odor, appearance): No odor, low turbidity

SAMPLE COLLECTION

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

Sample ID: 1405SWMST131-U,F **Sample Time:** 1025

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1025		
Water Temperature (°C)					7.8		
Specific Conductivity (µS/cm) @ 25° C					282.3		
Conductivity (µS/cm)					189.4		
TDS (g/L)					–		
Dissolved Oxygen (% sat.)					99.3		
Dissolved Oxygen (mg/L)					11.61		
pH					7.91		
ORP (mV)					57.1		
Turbidity ~~(FTU)~~ NTU					7.04		
Air Temperature (°C)					10		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05 / 06 / 14 **Time** 1010 **Station Number** MST131

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 7.5 **ft** **L.E.W.** 4.2 **ft** **Total Width** 10.2 **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) m/s			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) m/s
L.E.W. 4.2 ft	0	1	1.4	0.01				
4.6	0.4	2	1.4	0.42				
5.0	0.8	3	1.45	0.43				
5.4	1.2	4	1.2	0.25				
5.8	1.6	5	1.2	0.08				
6.2	2.0	6	0.6	0.07				
6.6	2.4	7	0.6	0.02				
7.0	2.8	8	0.2	0.01				
7.4	3.2	9	–	–				
7.8	3.6	10	–	–				
		11						
		12						
		13						
		14						
		15						

8 < 1in

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 5 / 6 / 14 **Arrival Time** 11:40

Field Personnel

E. Yenger **Signatures**

J. Pierson

SITE DESCRIPTION

Station Name Angus Cr. Above No Name Cr. below Rasmussen Cr. **Station Number** MST132

Latitude N 4744418.77' " **Longitude** ~~W~~ E 469314.38' "

Elevation 6,530.09 ft **Datum** NAD ~~27~~ 83 Conus **Photo Number** on GPS file

Site & Stream Description Rocky/sandy bottom, free flow, below mine flow

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

SAMPLE COLLECTION

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

Sample ID: 1405SW MST132-U,F + Dup **Sample Time:** 11:50 / 11:55

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					~~11:45~~ 11:50	11:55 ~~11:50~~	
Water Temperature (°C)					9.9	10.1	
Specific Conductivity (µS/cm) @ 25° C					339.7	334.3	
Conductivity (µS/cm)					241.8	242.7	
TDS (g/L)					–		
Dissolved Oxygen (% sat.)					89.2	87.5	
Dissolved Oxygen (mg/L)					10.04	9.81	
pH					8.05	8.05	
ORP (mV)					145.4	140.3	
Turbidity (FTU)					5.77	5.57	
Air Temperature (°C)							

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/06/14 **Time** 12:00 **Station Number** MST132

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 6.1 **ft** **L.E.W.** 13.0 **ft** **Total Width** 14.7 **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) m/s		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
6.1	0	1	-	-				
6.6	0.5	2	-	-				
7.1	1.0	3	1.8	0.18				
7.6	1.5	4	1.9	0.15				
8.1	2	5	1.9	0.42				
8.6	2.5	6	1.8	0.60				
9.1	3	7	1.8	0.60				
9.6	3.5	8	1.8	0.59				
10.1	4	9	1.8	0.53				
10.6	4.5	10	1.7	0.44				
11.1	5	11	0.6	0.41				
11.6	5.5	12	0.7	0.02				
12.1	6	13	-	-				
		14						
		15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/06/14 **Arrival Time** 1615

Field Personnel

E. Yeager

J. Pierson

Signatures E Yeager

SITE DESCRIPTION

Station Name Rasmussen Cr. below Enoch Valley Mine **Station Number** MST 133

~~**Latitude**~~ N 4745703.25m " ~~**Longitude**~~ W 467488.67 ME "

Elevation 6604.76 ft **Datum** NAD ~~27~~ 83 **Photo Number** on GPS file

Site & Stream Description free flowing in channel, appx 2-4' wide

Surface Water Characteristics (color, odor, appearance): water feels warm, turbid, no odor

SAMPLE COLLECTION

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

Sample ID: 1405SWMST133-U,F **Sample Time:** 1620

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1620		
Water Temperature (°C)					12.7		
Specific Conductivity (µS/cm) @ 25° C					174.7		
Conductivity (µS/cm)					133.7		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					93.9		
Dissolved Oxygen (mg/L)					9.92		
pH					8.08		
ORP (mV)					118.5		
Turbidity (FTU)					30.9		
Air Temperature (°C)					11		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/06/14 **Time** 1640 **Station Number** MST133

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 1.4 ft **L.E.W.** 3.1 ft **Total Width** 4.8 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

1.7

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) m/s		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
1.4	0	1	—	—				
1.6	0.2	2	0.65	0.33				
1.8	0.4	3	0.65	0.37				
2.0	0.6	4	0.7	0.40				
2.2	0.8	5	0.7	0.45				
2.4	1	6	0.65	0.30				
2.6	1.2	7	0.45	0.07				
2.8	1.4	8	0.35	-0.03				
3.0	1.6	9	—	—				
		10						
		11						
		12						
		13						
		14						
		15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/07/14 **Arrival Time** 1150

Field Personnel

E. Yeager

J. Pierson

Signatures

SITE DESCRIPTION

Station Name Raemussen Cr. headwaters near E.V. mine shop pond **Station Number** MST136

~~**Latitude** N~~ 4747111.04 m No. ~~**Longitude** W~~ 465846.64 m. E

Elevation 6727.59 ft **Datum** NAD 27 **Photo Number** ~~0003~~ on GPS file

Site & Stream Description clear, free flowing from pond, 1-3' wide

Surface Water Characteristics (color, odor, appearance):

clear, no odor, slight yellow tint

SAMPLE COLLECTION

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

Sample ID: 1405SWMST136-U,P **Sample Time:** 1200

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1200		
Water Temperature (°C)					7.5		
Specific Conductivity (µS/cm) @ 25° C					395.6		
Conductivity (µS/cm)					260.3		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					40.0		
Dissolved Oxygen (mg/L)					4.78		
pH					7.12		
ORP (mV)					101.4		
Turbidity (FTU)					1.43		
Air Temperature (°C)					4		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05 / 07 / 14 **Time** 1150 **Station Number** MST 136

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	2.41	1.0
2	2.57	1.0
3	2.47	1.0

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 2014 SW Sampling

Date 5 / 6 / 14 **Arrival Time** 1325

Field Personnel

E Yeager **Signatures** [signature]

J Pierson [signature]

SITE DESCRIPTION

Station Name East Fork Rasmussen Cr. above Rasmussen Cr. **Station Number** MST 143

Latitude N 474°5200.32' " **Longitude** ~~W~~ E 468634.21' "

Elevation 6,554.56 ft **Datum** NAD ~~27~~ 83 **Photo Number** eg on GPS file

Site & Stream Description Ponded, non-continuous (Louvs), some flow near confluence but is spread over grass 3-4 ft width and impossible/difficult to measure accurately; flow is underestimated

Surface Water Characteristics (color, odor, appearance): ~~no odor~~ no odor, clear with areas of film (oily sheen)

SAMPLE COLLECTION

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

Sample ID: 1405SWMST143-U,F **Sample Time:** 1330

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1330		
Water Temperature (°C)					12.6		
Specific Conductivity (µS/cm) @ 25° C					123.4		
Conductivity (µS/cm)					94.1		
TDS (g/L)					-		
Dissolved Oxygen (% sat.)					58.0		
Dissolved Oxygen (mg/L)					6.16		
pH					6.43		
ORP (mV)					103.8		
Turbidity (FTU)					3.48		
Air Temperature (°C)					13[illegible]		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling ≈ 300 ft S of

Date 05/06/14 **Time** 1350 **Station Number** MST143

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	9.49	0.27
2	7.52	0.3
3	15.51	0.3
4	12.87	0.29

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 2014 SW Sampling

Date 05/07/14 **Arrival Time** 0945

Field Personnel

E. Yeager
J. Pierson

Signatures

SITE DESCRIPTION

Station Name West Pond Cr. Headwaters below West Pond **Station Number** MST144

~~**Latitude** N~~ 4746585.94 m No. ~~**Longitude** W~~ 468800.40 m E.

Elevation 6664.99 ft **Datum** NAD ~~27~~83 **Photo Number** ~~0063~~ on GPS file

Site & Stream Description Water daylights below West Pond into small channel and stream.

Surface Water Characteristics (color, odor, appearance): clear, free flowing

SAMPLE COLLECTION

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

Sample ID: 1405SWMST144-U,F **Sample Time:** 1015

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1015		
Water Temperature (°C)					5.8		
Specific Conductivity (µS/cm) @ 25° C					570.6		
Conductivity (µS/cm)					361.6		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					53.6		
Dissolved Oxygen (mg/L)					6.67		
pH					6.99		
ORP (mV)					83.7		
Turbidity (FTU)					24.3		
Air Temperature (°C)					4		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05 / 07 / 14 **Time** 0945 **Station Number** MST144

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	2.25	1.0
2	2.06	1.0
3	2.31	1.0

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 2014 SW Sampling

Date 5 / 7 / 14 **Arrival Time** 1524

Field Personnel

E. Yeager **Signatures**

J. Pierson

SITE DESCRIPTION

Station Name Tributary to Lone Pine Creek **Station Number** MST226

~~Latitude~~ N 4745539.77 mNa ~~Longitude~~ W 464638.37 m.E

Elevation 6518.30 ft **Datum** NAD ~~27~~ 83 Conus **Photo Number** on GPS file

Site & Stream Description a lot of snow still in area, flow collected from channeled area below ponded water before entering culvert

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

SAMPLE COLLECTION

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

Sample ID: 1405SW MST226-U,F **Sample Time:** 1545

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1545		
Water Temperature (°C)					3.7		
Specific Conductivity (µS/cm) @ 25° C					232.8		
Conductivity (µS/cm)					138.0		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					74.0		
Dissolved Oxygen (mg/L)					9.76		
pH					7.22		
ORP (mV)					74.1		
Turbidity (FTU)					2.58		
Air Temperature (°C)					6		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 5 / 7 / 14 **Time** 1545 **Station Number** MST 226

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.63	2.3
2	1.47	2.6
3	1.50	2.75
4	1.60	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 2014 SW Sampling

Date 05/06/14 **Arrival Time** 1550

Field Personnel

E. Yeager **Signatures**

J. Pierson

SITE DESCRIPTION

Station Name East Fork Rasmussen Cr. headwaters **Station Number** MST269

~~**Latitude**~~ N 4746598.01 m " ~~**Longitude**~~ W 467683.65 m E "

Elevation _____ ft **Datum** NAD ~~27~~ 83 **Photo Number** on GPS file

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	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	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 – Spring 2014 SW Sampling

Date 05/06/14 **Time** 1550 **Station Number** MST2609

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

DRY

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 – Spring 2014 SW Sampling

Date 05/06/14 **Arrival Time** 1411

Field Personnel

E. Yeager

J. Pierson

Signatures

SITE DESCRIPTION

Station Name West Fork of Rasmussen Cr. **Station Number** MST274

Latitude N 4745243.47 " **Longitude** ~~W~~ E 4679929.07 "

Elevation 6,576.90 ft **Datum** NAD 27 83 **Photo Number** ~~60~~ on GPS file.

Site & Stream Description Grassy stream bed, ~~[illegible]~~ saturated mud/grass near stream

Surface Water Characteristics (color, odor, appearance): No odor, clear, free-flowing

SAMPLE COLLECTION

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

Sample ID: 1405SWMST274-U,F **Sample Time:** 1415

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1415		
Water Temperature (°C)					8.9		
Specific Conductivity (µS/cm) @ 25° C					450.5		
Conductivity (µS/cm)					312.0		
TDS (g/L)					–		
Dissolved Oxygen (% sat.)					99.0		
Dissolved Oxygen (mg/L)					11.48		
pH					8.23		
ORP (mV)					84.0		
Turbidity ~~(FTU)~~ NTU					1.32		
Air Temperature (°C)					14		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05 06 14 **Time** 1411 **Station Number** MST274

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
	NP	

Flow by Meter

R.E.W. 1.8 ft **L.E.W.** 5.2 ft **Total Width** 7.0 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) m/s		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
1.8	0	1	—	—				
2.1	0.3	2	0.2	-0.01				
2.4	0.6	3	0.25	-0.01				
2.7	0.9	4	0.25	0.01				
3.	1.2	5	0.25	0.01				
3.3	1.5	6	0.45	0.04				
3.6	1.8	7	0.4	0.07				
3.9	2.1	8	0.4	0.14				
4.2	2.4	9	0.4	0.20				
4.5	2.7	10	0.4	0.03				
4.8	3.0	11	0.35	0.06				
5.1	3.3	12	0.1	0.02				
5.4	3.6	13	—	—				
5.7		14						
		15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/07/14 **Arrival Time** 1100

Field Personnel

E. Yeager
J. Pierson

Signatures

SITE DESCRIPTION

Station Name Tributary to Lone Pine Cr. **Station Number** MST275

~~**Latitude** N~~ 4748146.72 m No. ~~**Longitude** W~~ 465617.83 m E.

Elevation 6764.76 ft **Datum** NAD ~~27~~83 **Photo Number** ~~0063~~ on GPS file

Site & Stream Description headwaters of Lone Pine Cr., daylights into pond area, flows out through field

Surface Water Characteristics (color, odor, appearance): clear, no odor, free flowing from pond headwaters to Lone Pine Cr.

SAMPLE COLLECTION

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

Sample ID: 1405SWMST275-U,F **Sample Time:** 1105

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1105		
Water Temperature (°C)					9.2		
Specific Conductivity (µS/cm) @ 25° C					64.5		
Conductivity (µS/cm)					47.1		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					89.7		
Dissolved Oxygen (mg/L)					10.33		
pH					7.73		
ORP (mV)					82.9		
Turbidity (FTU)					8.89		
Air Temperature (°C)					6		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2014 SW Sampling

Date 05/07/14 **Time** 1100 **Station Number** MST275

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

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.44	3.0
2	1.47	4.0
3	1.50	4.0
4	1.65	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						

2014 Spring Groundwater Sampling Forms

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 05/11/14 Well ID: SB07

Task: Spring 2014 Field Crew: E. Yeager J. Pierson

Measuring Point (MP): TOC Water Level (WL): 36.59 ft below MP

Sampling Method (see applicable calculations below): 3-vol w/ bailer Device: disp. 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

Total Depth (TD): 43.5 ft below MP Water Height (H): ~~36.59~~ 6.91 ft below MP Casing Radius (r): ~~0.0417~~ 0.08' ft (2.0")

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: ~~5.5~~ 1.03 3.11 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
1500	—	—	2.0	10.4	7.3	160.9	3.03	1625	594
1511	—	—	3.0	9.6	7.37	160.3	2.82	1614	632

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)
1515	—	—	3.11	9.6	7.37	160.3	2.82	1614	632

SAMPLE ID: 1405GWSB07-PCE **TIME:** 1515

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

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/6/14 Well ID: MBW006

Task: GW Sampling Field Crew: A. Pettley / B. Dicou

Measuring Point (MP): TOCN Water Level (WL): 2.91 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): 0.45L 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
1545	2.91	.28	0	5.29	7.29	160.9	7.40	982.1	19.30
1550	3.00	.28	1.4	5.20	7.26	161.6	7.18	978.0	8.19
1555	3.00	.28	2.8	5.11	7.24	162.5	7.21	977.2	2.79
1600	3.00	.28	4.2	5.11	7.25	163.7	7.19	976.8	1.99
1605	2.98	.28	5.6	5.09	7.24	165.3	7.17	976.7	2.08

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)
1605	2.98	.28	5.6	5.09	7.24	165.3	7.17	976.7	2.08

SAMPLE ID: 1405MBW006 **TIME:** 1605

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

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/7/14 Well ID: MBW009

Task: GW Sampling Field Crew: A. Pettley / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): 1.70 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): _____ Starting PSI = (½ WL + 20): _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 10.10 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
1705	3.17	.40	0	5.49	7.09	124.3	2.24	852.6	3.59
1715	5.45	.40	4.0	5.18	6.77	69.4	1.79	661.1	5.80
1725	8.80	.20	6.0	5.32	6.77	52.5	3.21	976.7	3.15
1730	8.81	.20	7.0	5.22	6.76	80.5	3.31	1010.2	4.44
1735	8.81	.20	8.0	5.21	6.76	56.6	3.32	1021.6	2.02
1740	8.82	.20	9.0	5.14	6.75	57.1	3.30	1026.0	2.38
1745	8.81	.20	10.0	5.10	6.74	59.2	3.29	1027.8	3.40

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)
1745	8.81	.20	10.0	5.10	6.74	59.2	3.29	1027.8	3.40

SAMPLE ID: 1405GWMBW009-F, U **TIME:** 1745

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

GPS WGS 84 N 42° 49' 12.1" W 111° 29' 49.8"

WELL SAMPLING FORM

Page: 1 of ____

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 05/12/14 Well ID: MBW011

Task: spring 2014 Field Crew: E. Yeager 90% = 12.42'

Measuring Point (MP): TOC Water Level (WL): 0.73 ft below MP

Sampling Method (see applicable calculations below): ~~3 vol purge~~ Device: peristaltic Tubing

↳ purge dry / sample ~~sample~~

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]

= 2.11' bTOC

3-Volume Purge Sampling

Total Depth (TD): 14.53 ft below MP Water Height (H): 0.73 ft below MP Casing Radius (r): 0.0625 ft

Three Purge Volumes = 3*[Pi * r^2 * H * 7.48]: 1.26 X 3 = 3.8 gal (H = 13.8) 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
1122 start pump									
1127	—		~4.0L	4.5	6.53	153.9	1.55	768.2	30.8
1128	Dry		~~6.0L~~						
1135 -	1136.5 recovery		rate	1.0ft	1.5min				

Continue stabilization readings on additional pages if necessary

NAD83 4741254.22m No 459554.39mE elev 6343.02'

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	2.11	—	6.0	4.5	6.53	153.9	1.55	768.2	30.8

SAMPLE ID: 1405GWMBW011-(U,F) **TIME:** 1215

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

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 05/11/14 Well ID: ~~MBW028~~ MBW027

Task: Spring 2014 Field Crew: E. Yeager J. Pierson

Measuring Point (MP): TOC Water Level (WL): 9.15 ft below MP

Sampling Method (see applicable calculations below): _____ Device: peristaltic/dedicated tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 0.9L 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

Bubbles in tubing influence DO

Low Flow Max DTW: 9.35 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
Pump start 1327			0						
1330	9.30	0.1	0.3	5.5	7.38	121.2	9.31	1095	7.66
1333	9.32	0.05	0.45	5.6	7.32	121.6	9.06	1097	–
1335	9.28	0.1	0.65	5.7	7.31	121.7	9.00	1100	4.41
~~1340~~ 1338	9.32	0.08	0.89	5.5	7.31	122.2	8.32	1098	–
1341	9.34	0.08	1.13	5.4	7.29	122.5	8.39	1095	2.23
1344	9.34	0.08	1.37	5.3	7.30	122.6	8.60	1089	2.69
1347	9.35	0.08	1.61	5.2	7.30	122.6	8.57	1072	2.37
1350	9.35	0.08	1.85	5.3	7.30	122.7	8.68	1055	2.28

Continue stabilization readings on additional pages if necessary

N 4742492.27 m E 459264.42 m Elev ~~45~~ 90 6328.65 ft

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	9.35	0.08	1.85	5.3	7.30	122.7	8.68	1055	2.28

SAMPLE ID: 1405GWMBW0~~28~~27-U,F **TIME:** 1350

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

WELL SAMPLING FORM

Page: 1 of ____

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/10/14 Well ID: MBW028

Task: Spring 2014 Field Crew: E Yeager J. Pierson

Measuring Point (MP): TOC Water Level (WL): 4.88 ft below MP 90% of bore hole volume = 6.3 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): 20.0 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
Start pump ~~1610~~ 1604	4.88	0.65	0.65	~~6.1~~	~~6.56~~	~~179.0~~	~~0.76~~	~~1362~~	JP
1606	8.75	0.65	1.95	6.1	6.56	179.0	0.76	1362	1.01
1609	10.19	0.65	3.90	5.9	6.64	177.6	0.69	1334	1.25
1612	12.32	0.65	5.85	6.1	6.56	177.0	0.95	1312	1.11
1615	13.70	0.65	7.80	6.1	6.60	175.9	1.85	1302	1.96
1618	15.61	1.0	10.80	6.0	6.63	175.4	2.18	1287	3.69
1623	Dry	1.0	15.80						
1640	Sample	~~1.0~~ 0	15.80						
~~1640~~ JP 1645	6.3	1.0	20.80	6.4	6.65	181.5	0.55	1303	18.9

Continue stabilization readings on additional pages if necessary

N 4741634.47m E 459515.44m Elev. 6357.11 ft

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)
1640	~	1.0	20.80	6.4	6.65	181.5	0.55	1303	18.9

SAMPLE ID: _____ **TIME:** _____

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

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/8/14 Well ID: MBW032

Task: GW Sampling Field Crew: A. Pettley / B. Dicou

Measuring Point (MP): TOCN Water Level (WL): 8.08 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): .80 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	8.08	Measured by Purge Volume	.40	3.40	7.58	173.8	8.62	1435.2	3.19
1425	8.15		2.40	3.09	7.38	178.4	8.55	1414.1	2.34
1430	8.15		4.40	3.04	7.31	183.6	8.53	1412.5	2.20
1435	8.18		6.40	3.19	7.30	187.3	8.46	1412.4	3.87

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 ~~1440~~	8.18	—	6.40	3.19	7.30	187.3	8.46	1412.4	3.87

SAMPLE ID: 14056GW/MBW032 **TIME:** 1440

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

GPS WGS 84 N 42° 49' 34.4" W 111° 28' 11.2"

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: _____ Well ID: MBW048

Task: GW Sampling Field Crew: A. Pettley / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): .60 ft below MP

Sampling Method (see applicable calculations below): Low Flow at Depth 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
1625	.60	.09	.09	4.20	6.86	135	0.48	184.3	23.26
1630	1.94	ramping to a sustainable depth	2.0	3.76	6.81	115.5	0.14	177.3	6.31
1635	2.00	.40	4.0	3.77	6.77	83.6	0.07	187.8	4.79
1640	2.00	.40	6.0	3.62	6.75	63.9	0.01	198.8	3.05
1645	2.00	.40	8.0	3.57	6.76	62.2	0.03	198.1	2.81
1650	1.98	.40	10.0	3.58	6.72	64.2	0.05	199.4	3.59

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)
1650	1.98	.40	10.0	3.58	6.72	64.2	0.05	199.4	3.59

SAMPLE ID: 1405GWMBW048 **TIME:** 1650

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

GPS
WGS 84 N 42° 50' 03.7"
W 111° 27' 56.2"

WELL SAMPLING FORM

Page: 1 of ____

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/10/14 Well ID: MBW085

Task: Spring 2014 Field Crew: E. Yeager J. Pierson

Measuring Point (MP): TOC Water Level (WL): 1.42 ft below MP 90% = 3.0 ft

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): _____ 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
1136	1.42		0.2						
1137	1.75	0.6	0.8						
1140	4.15	0.6	2.6	2.9	7.13	132.4	8.0	323.7	2.07
1143	6.60	0.6	4.4	3.1	7.08	134.3	7.08	327.8	~~5.0~~ 59.9
1146	7.91	0.6	6.2	3.2	7.00	136.2	7.32	348.0	171
1149	9.10	0.6	8.0	3.2	6.95	136.8	7.47	353.6	94.7
1152	9.88	0.6	9.8	3.3	6.93	137.4	7.35	352.5	27.5
1155	10.90	0.6	Dry/11.6	~~3.3~~			~~7.47~~		
~~1156~~	Recover	to 90%	of borehole	volume					
1210	3.0	0.6	11.6						
1218		~~0~~ 0.6	16.4	3.1	6.99	146.1	8.48	352.9	4.99

Continue stabilization readings on additional pages if necessary

new DTW 1.72

4.

N 4745964.37m E 467221.25m Elev 6,620.49 ft

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)
1218	~~0.6~~ gf	~~10.4~~ 0.6	16.4	3.1	6.99	146.1	8.48	352.9	4.99

SAMPLE ID: 140526WMBW085-U,F **TIME:** 1210

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

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 05/10/14 Well ID: MBW087

Task: Spring 2014 Field Crew: E. Yeager J. Pierson

Measuring Point (MP): TOC Water Level (WL): 0.756 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): 0.53L 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
1017	0.98	0.17	0						
1021	1.02	0.17	0.51	~~5~~ 4.3	6.70	126.0	0.57	547.3	3.50
1024	0.99	0.12	0.87	4.4	6.62	131.5	0.63	548.0	6.51
1027	0.99	0.12	1.23	4.4	6.62	132.6	0.56	546.6	4.07
1032	0.99	0.12	1.83	4.5	6.61	132.1	0.48	546.4	~~10.0~~ 10.20
1037	1.00	0.12	2.43	4.3	6.64	129.9	0.46	544.4	4.93
1042	1.00	0.12	3.03	4.2	6.68	128.1	0.56	545.0	4.25
1047	1.00	0.12	3.63	4.1	6.69	127.5	0.51	545.1	4.17

TW = 0.05 max

Moved pump/tubing

Continue stabilization readings on additional pages if necessary

N 4745402.42 m E 467716.87 m Elev 6,586.63 ft

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~~ 1047 DP	1.00	0.12	3.63	4.1	6.69	127.5	0.51	545.1	4.17

SAMPLE ID: 1405GWMBW087-U,F **TIME:** 1050

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

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/6/14 Well ID: MBW 099

Task: GW Sampling / Spring 2014 Field Crew: A. Petthy / B. Dicon

Measuring Point (MP): TOCN Water Level (WL): 0.90 ft below MP

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): 17.56 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
5/6/14	1325	3.25	1 L/min		8.92	7.73	177.2	4.55	283.6	0.18
	1335	Purged dry after ~ 5 L.								
5/7/14 →	1425	3.05			7.44	7.42	193.0	6.40	319.8	7.45
	1430				6.35	7.04	195.0	6.91	292.5	5.95
	1435	7.45			6.50	7.02	193.4	~~6.88~~ 7.00	284.2	5.00
	1440				6.52	6.99	192.9	7.02	266.7	4.99
	1445	11.10			6.53	6.99	193.0	7.01	267.4	4.55

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)
1445	11.10	1.0		6.53	6.99	193.0	7.01	267.4	4.55

SAMPLE ID: 1405GWMBW099-F,U **TIME:** 1445 (05/09/14)

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

GPS WGS 84 N 42° 51' 53.4"
W 111° 23' 28.7"

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 05/12/14 Well ID: MBW107

Task: Spring 2014 Field Crew: A. Pettley B. Dicou

Measuring Point (MP): _____ Water Level (WL): _____ 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

Continue stabilization readings on additional pages if necessary

Dry Well

WGS 84 N 42° 53' 28.3" W 111° 25' 56.0"

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.: 10503773.160101 Client: P4 Spring 2014 Date: 05/12/14 Well ID: MBW112

Task: Spring 2014 Field Crew: E. Yeager

Measuring Point (MP): _____ Water Level (WL): _____ 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

Continue stabilization readings on additional pages if necessary

NAD 83 474901.6.5m N. 464311.12 mE. Elev. 6415.62

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

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/8/14 Well ID: MBW130

Task: _____ Field Crew: E. Yeager J. Pierson

Measuring Point (MP): TOC Water Level (WL): 0.80 ft below MP

Sampling Method (see applicable calculations below): purge dry / sample Device: ~~peristaltic~~ 90% = 3.21' ~~80% 4.5'~~

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): 24.9 ft below MP Water Height (H): 0.80 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

elv 6410.99'

nad83 northing 4741786.89m easting 4602924.45m

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
5/8/14	1023	0.80	1.0L / 54s	1.4 L	5.8	7.06	33.9	2.0	143	25.5
	1028	12.1	1.0	6.4 L	5.2	6.82	45.5	2.3	133.9	24.4
	1033	22.9	1.0	11.4 L	5.6	6.67	53.9	2.65	149	55.2
	1034	Pumped	Dry							
	1240	15.46								
5/9/14	1506	2.50	—	—	5.8	7.59	128.5	3.63	161.8	74.8

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)
5/9/14	1530	2.50	—	—	5.8	7.59	128.5	3.63	161.8	74.8

SAMPLE ID: 1405GWMBW130-U,F **TIME:** 1530 5/9/14

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

WELL SAMPLING FORM

Page: 1 of ____

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/10/14 Well ID: MBW131

Task: Spring 2014 Field Crew: E. Younger J. Pierson

Measuring Point (MP): TOC Water Level (WL): ~~1.70~~ 1.60 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): 7.0 0.03 0.42L Starting PSI = (½ WL + 20): ____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 7.86 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

Max DTW: ~~2.1~~ 1.9

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
~~2.1~~ 1418	~~1.90~~ 1.60		0.11						
1421	1.75	0.11	0.44	5.3	6.93	137.3	5.83	260.8	20.8
1426	1.78	0.11	~~0.77~~ 0.99	4.8	6.65	142.9	5.54	191.1	31.4
1431	1.79	0.11	~~1.10~~ 1.54	4.5	6.58	146.6	5.60	190.9	20.3
1436	1.79	0.11	2.09	4.5	6.56	149.5	5.45	190.7	15.4
1441	1.76	0.11	2.64	4.5	6.55	151.5	5.42	190.9	10.6
1446	1.75	0.11	3.19	4.5	6.55	153.4	5.39	190.2	7.79
1451	1.72	0.11	3.74	4.5	6.54	154.7	5.35	189.9	7.08
1456	1.71	0.11	4.29	4.6	6.53	155.9	5.33	189.5	5.86
1501	1.70	0.11	4.84	4.7	6.52	157.2	5.27	189.4	4.32
1504	1.70	0.11	5.39	4.6	6.52	158.0	5.20	189.7	3.67
1507	1.70	0.11	5.94	4.6	6.52	158.3	5.19	189.1	3.42

Continue stabilization readings on additional pages if necessary

N 474315 7.62m E. 461054.75 m Elev. 6483.77 ft

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)
1507	1.70	0.11	5.94	4.6	6.52	158.3	5.19	189.1	3.42

SAMPLE ID: ~~1404~~ 1405GWMBW131-U,F **TIME:** 1510

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

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 05/10/14 Well ID: MBW135

Task: Spring 2014 Field Crew: E.Yeager J.Pierson

Measuring Point (MP): TOC Water Level (WL): 1.81 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): _____ 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

Purged dry on 05/07/14

Continue stabilization readings on additional pages if necessary

ncd 83 GPS: 4739958.37 m No. 459447.20 m E elev 6295.98'

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)
0915	1.81	—	—	5.8	7.78	88.2	1.50	413.2	7.92

SAMPLE ID: 1405GWMBW135-4,F **TIME:** 0915 on 5/10/14

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

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 05/09/14 Well ID: MBW152

Task: Spring 2014 Field Crew: Eyeager J Pierson

Measuring Point (MP): TOC Water Level (WL): ~~14.46~~ ~~9.69~~ 9.32 ft below MP

Sampling Method (see applicable calculations below): purge/sample Device: peristaltic/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): 14.46 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
05/09/14	0959	9.32	~~0.25~~	0						
	1000		0.25	0.25	6.2	7.30	124.8	8.24	701.1	7.61
	9P ~~0.7~~ 1002		~~0.6~~ 9P	0.50	6.0	7.14	128.4	7.56	690.8	
	1005	13.52	0.6	~~1.25~~ 1.25	5.9	7.06	132.0	7.47	699.3	43.7
	1007	Pumped Dry		~~2.45~~ 2.45						
5/11/14	1212	9.69								
	1215	Samples collected								

Continue stabilization readings on additional pages if necessary

N 4750235.41 m E 459948.11 m Elev 6289.94

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)
5/11/14	1220	Pumped Dry	–	–	6.3	~~7.6~~ 7.45	102.2	8.67	699.9	98.4

5/11/14 **SAMPLE ID:** 1405GWMBW152-U,F **TIME:** 1215

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

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/10/14 Well ID: MW15A

Task: Spring 2014 Field Crew: E. Yeager J. Pierson

Measuring Point (MP): TOC Water Level (WL): 19.64 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): _____ 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

MxDTW = 19.94

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
Start pump 1710	19.64	0	Air bubbles intermittently rise (3-5/min);						
1715	19.94	0.11	0.55	8.0	6.86	182.2	4.04	1638	1.91
1720	20.03	0.08	0.95	8.0	6.83	183.3	4.00	1656	0.38
1725	20.07	0.08	1.35	7.7	6.83	182.3	3.92	1652	0.69
1730	20.12	0.08	1.75	7.6	6.82	181.8	3.67	1651	0.72
1735	20.12	0.08	2.15	7.9	6.82	181.0	3.82	1645	1.26
1740	20.12	0.08	2.55	8.1	6.75	179.7	4.24	1655	0.52
1743	20.13	0.08	2.95	8.0	6.74	179.5	4.13	1658	0.33
1746	20.14	0.08	3.95	8.0	6.73	178.8	4.24	1658	0.27
1800	Lost suction and water fell back into well; Water level rose 0.2-0.3 ft								
1805	Increased flow rate to draw water back into tubing; check length of tubing to find 30 ft								
1813	20.25	0.065							

Continue stabilization readings on additional pages if necessary

N 4741688.02m E 459580.10m Elev 6375.83 ft

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)
1746	20.14	0.08	3.95	8.0	6.73	178.8	4.24	1658	0.27

SAMPLE ID: 140506WMW15A-U,F **TIME:** _____

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

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 05/05/14 Well ID: MW16A

Task: GW sampling Field Crew: E. Yeager J. Pierson

Measuring Point (MP): TOC Water Level (WL): 4.94 ft below MP

Sampling Method (see applicable calculations below): low Flow Device: peristaltic

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 1.8L 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

N4740805.14 E459951.14 NAD83 ELV 6340.13' TOC

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
1807	5.27	0.08	0.08	6.0	7.63	-48.1	0.98	1539	2.59
1812	5.28	0.08	0.48	5.7	7.60	-56.5	0.75	1506	2.01
1817	5.31	0.08	0.88	5.7	7.60	-62.1	0.64	1479	3.06
1822	5.37	0.07	1.23	5.5	7.60	-64.9	0.66	1466	3.97
1827	5.39	0.07	1.58	5.5	7.60	-69.2	0.51	1461	1.74

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)
1830	5.39	0.07	1.81	5.5	7.60	-69.2	0.51	1461	1.74

SAMPLE ID: 1405GWMW16A-U,F **TIME:** 1830

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

(1)

WELL SAMPLING FORM

Page: 1 of ____

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/7/14 Well ID: MMW006

Task: GW Sampling Field Crew: A. Pettley / B. Dicou

Measuring Point (MP): TOCN Water Level (WL): 266.35 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): 20.62 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
1300	266.35	Adjusting for LW		7.87	7.85	197.0	8.47	500.6	11.23
1310	266.45	.28	1.50	7.96	7.56	195.9	7.44	502.0	11.67
1320	266.45	.28	4.30	8.73	7.71	191.8	5.44	500.9	94.73
1330	266.50	.28	6.30	8.78	7.71	191.7	5.19	499.3	242.0
1340	266.50	.28	8.30	8.70	7.71	198.4	5.20	500.0	119.0
1350	266.47	.28	10.30	8.65	7.73	196.7	5.18	498.2	67.10
1400	266.45	.28	11.80	7.42	7.72	196.5	5.23	496.2	40.98
1410	266.48	.28	14.60	8.71	7.71	193.9	5.45	501.4	14.96
1420	266.48	.28	16.60	8.74	7.71	193.2	5.10	501.1	12.18
1430	266.45	.28	18.60	8.84	7.72	191.4	5.15	502.1	4.77
1440	266.48	.28	20.60	8.99	7.71	189.5	5.10	502.7	5.00
1445	266.49	.28	21.60	8.99	7.71	189.5	5.10	502.7	5.00

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)
1445	266.49	.28	21.60	8.99	7.71	189.5	5.10	502.7	5.00

SAMPLE ID: 1405GWMMW006-F,U **TIME:** 1445

Final Low Flow Sampling Settings: PSI: 150 Charge: 11 sec Exhaust: 22 sec

GPS
WGS 84 N 42° 49' 20.7"
W 111° 29' 06.0"

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/9/14 Well ID: MMW007

Task: GW Sampling Field Crew: A. Rettley / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): 34.15 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / Compressed Air

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
0950	34.15	unable to conduct		6.58	7.61	220.5	2.99	245.4	1.57
1000	37.41	Low Flow		6.71	7.15	214.0	1.99	233.2	1.59
1010	39.90			6.88	7.16	210.3	1.34	233.0	23.40
1020	47.10		30.0	6.85	7.16	191.6	1.26	233.3	51.18
1040	58.95	Purging Dry	70.0	6.83	7.17	196.5	1.34	233.8	44.2
1050	69.05	2.0	90.0	6.84	7.19	152.2	1.95	233.9	139.4
1110	74.65	2.0		6.84	7.21	154.8	2.24	235.4	37.9
1130	79.31	2.0	170.0	6.91	7.19	146.8	1.85	247.0	131.6
1145	Flow Rate adjusted for low Flow Purge								
1155	79.93	.46		6.57	7.19	143.2	1.67	246.5	4.20
1200	79.97	.46		6.59	7.22	144.7	1.69	246.1	3.59
1205	79.98	.46		6.60	7.18	143.6	1.64	245.3	4.45

Low Flow

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)
1205	79.98	.46		6.60	7.18	143.6	1.64	245.3	4.45

SAMPLE ID: 1405GW/MMW007-F,N **TIME:** 1205

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

GPS
WGS 84 = N 42° 51' 48.4"
W 111° 23' 37.2"

WELL SAMPLING FORM

Page: 1 of ____

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/12/14 Well ID: MMW009

Task: GW Monitoring Field Crew: A. Pattley / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): 213.71 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): 34.12 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
0925	213.81	.20	0	7.44	7.63	~~8.82~~ 179.2	8.82	626.8	9.72
0930	213.81	.20	1.5	7.37	7.26	167.9	6.48	629.2	7.77
0940	213.81	.40	4.0	7.95	7.22	22.3	.57	628.1	1.61
0950	213.81	.40	8.0	8.07	7.22	-59.4	.35	627.6	10.53
1005	213.89	.40	~~10.0~~ 14.0	8.19	7.21	-46.1	0	628.9	9.58
1020	213.89	.40	20.0	8.26	7.21	-21.3	0	630.5	2.79
1035	213.89	.40	26.0	8.31	7.20	-8.6	0	629.4	1.49
1050	213.89	.40	32.0	8.33	7.21	-0.3	0	630.1	1.27
1100	213.89	.40	36.0	8.30	7.21	-0.4	0	631.0	1.68

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)
1100	213.89	.40	36.0	8.30	7.21	-0.4	0	631.0	1.68

SAMPLE ID: 1405GWMMW009-F,U **TIME:** 1100

Final Low Flow Sampling Settings: PSI: 120 Charge: 17 sec Exhaust: 25 sec

GPS N 42°53'37.5"
WGS 84 W 111°25'48.5"

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/10/14 Well ID: MMW010

Task: GW Sampling Field Crew: A. Pettly / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): 0.90 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/compressed air

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2.74 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
1550	1.01		1.0	6.54	6.65	187.5	3.23	1618.7	71.25
1555	1.15	.30	~~2.5~~ 1.8	6.55	6.57	181.5	3.67	1668.0	22.35
1400	1.15	.30	3.30	6.76	6.57	181.3	3.45	1678.2	6.77
1405	1.15	.30	4.80	6.78	6.57	180.8	2.88	1676.3	4.49
1410	1.15	.30	6.30	6.65	6.57	179.4	2.82	1675.2	4.99
1415	1.15	.30	7.80	6.59	6.57	180.8	2.79	1677.3	4.21

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)
1415	1.15	.30	7.80	6.59	6.57	180.8	2.79	1677.3	4.21

SAMPLE ID: 1405GWMMW010-F,U **TIME:** 1415

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

GPS WGS84 N 42°52'22.0" W 111°27'54.2"

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/10/14 Well ID: MMW011

Task: GW Monitoring Field Crew: A. Pettley / B. Dicou

Measuring Point (MP): TOCIV Water Level (WL): 74.81 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / Compressed Air

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 7.72 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
1030	74.81	.20	0	6.68	7.45	80.7	8.28	685.4	1.54
1035	74.95	.20	1.0	7.27	7.35	99.3	7.21	726.8	4.23
1040	74.95	.20	2.0	7.48	7.34	105.3	5.82	775.1	4.64
1045	74.95	.20	3.0	7.52	7.34	101.3	5.79	781.7	4.94
1050	74.95	.20	4.0	7.02	7.34	103.1	5.94	782.1	2.14
1055	74.95	.20	5.0	7.04	7.34	104.9	5.78	782.8	4.29
1100	74.95	.20	6.0	7.40	7.34	105.6	5.56	780.1	2.08
1105	74.95	.20	7.0	7.35	7.34	104.9	5.62	783.9	2.67
1110	74.95	.20	8.0	7.45	7.34	106.1	5.63	781.2	4.43

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	74.95	.20	8.0	7.45	7.34	106.1	5.65	781.2	4.43

SAMPLE ID: 1405GWMMW011-F,U **TIME:** 1110

Final Low Flow Sampling Settings: PSI: 50 Charge: 7 sec Exhaust: 10 sec

GPS
WGS 84 N 42° 53' 48.0"
W 111° 29' 32.9"

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 05/12/14 Well ID: MMW012

Task: Spring 2014 Field Crew: A. Pettley B. Dicou

Measuring Point (MP): TOC 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): 61.05 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 @ 1315

GPS WGS84 N 42°53'28.5" W 111°25'56.1"

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.: 10503773.160101 Client: P4 Spring 2014 Date: 5/11/14 Well ID: MMW013

Task: GW Monitoring Field Crew: A. Pettley / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): 2.72 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder/compressed air

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 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
1040	2.74	.50	0	5.99	7.07	195.6	9.25	687.3	11.94
1045	2.75	.50	2.5	6.00	7.07	197.6	9.14	687.1	19.22
1050	2.75	.50	5.0	6.22	7.06	200.2	9.33	687.1	3.31
1055	2.75	.50	7.5	6.38	7.05	201.5	8.84	685.0	3.42
1100	2.75	.50	10.0	6.13	7.05	203.3	8.75	687.0	4.49
1105	2.75	.50	12.5	6.17	7.05	204.6	8.73	686.2	3.99

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)
1105	2.75	.50	12.5	6.17	7.05	204.6	8.73	686.2	3.99

SAMPLE ID: 1405GWMMW013-F,U **TIME:** 1105

Final Low Flow Sampling Settings: PSI: 10 Charge: 10 sec Exhaust: 9 sec

GPS N 42° 52' 08.8"
WGS 84 W 111° 24' 16.8"

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/11/14 Well ID: MNW017

Task: GW Monitoring Field Crew: A. Pettley / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): 35.49 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / Air compressed

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 4.36 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
1325	35.53	.08	0	12.78	7.88	178.0	8.80	1260.4	1.96
1330	35.64	.08	.30	8.09	7.11	203.4	8.76	1322.8	1.57
1335	35.74	.08	.60	8.71	6.87	210.0	6.34	1368.5	1.17
1345	35.70	.08	1.40	9.06	6.87	211.8	6.24	1346.6	1.05
1355	35.70	.08	2.20	10.36	6.87	214.0	6.06	1345.7	.99
1405	35.70	.08	3.0	10.45	6.87	215.0	5.99	1351.9	1.18
1415	35.70	.08	3.80	10.54	6.88	216.5	6.10	1347.2	1.67
1425	35.70	.08	4.60	10.47	6.87	217.4	6.14	1345.4	1.10

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)
1425	35.70	0.08	4.60	10.47	6.87	217.4	6.14	1345.4	1.10

SAMPLE ID: 1405GWMNW017-F, U **TIME:** 1425

Final Low Flow Sampling Settings: PSI: 30 Charge: 13 sec Exhaust: 29 sec

GPS N 42° 50' 01.9"
WGS84 W 111° 29' 54.2"

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/8/14 Well ID: MMW018

Task: GW Sampling Field Crew: A. Pettley / B. Dicou

Measuring Point (MP): _____ Water Level (WL): 9.02 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / Air Compressor

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 2.8 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
1500	9.02	.15	0	7.05	7.40	193.8	6.88	417.3	2.27
1515	9.05	.15	1.5	10.08	7.37	191.3	6.76	415.8	4.15
1520	9.12	.15	3.0	8.69	7.36	193.9	6.71	419.4	4.37
1525	9.16	.15	4.5	7.40	7.37	198.9	6.76	417.2	4.99
1530	9.16	.15	6.0	7.33	7.37	201.3	6.74	416.4	4.50
1535	9.16	.15	7.5	7.83	7.37	201.0	6.72	416.3	4.90
1540	9.16	.15	10.0	7.89	7.36	200.3	6.71	416.7	4.54

Begin Low Flow purge →

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)
1540	9.16	.15	10.0	7.89	7.36	200.3	6.71	416.7	4.54

SAMPLE ID: 1405GWMMW018-U,F **TIME:** 1540

Final Low Flow Sampling Settings: PSI: 20 Charge: 4 sec Exhaust: 27 sec

GPS WGS 84 N 42° 49' 41.2"
W 111° 28' 05.2"

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/7/14 Well ID: MMW020

Task: GW Sampling Field Crew: A. Pettley / B. Dicou

Measuring Point (MP): TOCN Water Level (WL): 283.85 ft below MP

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 25.18 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	283.85		1.0	8.71	7.65	199.5	8.57	789.0	13.70
1525	"		3.5	8.88	7.34	201.5	3.45	793.4	9.6
1535	"		5.0	8.77	7.34	197.9	4.09	774.3	3.58
1545	"		9.0	8.58	7.18	200.5	5.76	740.9	4.84
1555	"		13.0	8.85	7.17	192.0	5.47	743.0	2.86
1605	"		19.0	8.35	7.15	188.8	5.29	743.7	4.98
1615	"		24.5	8.80	7.15	186.8	5.51	744.2	3.27
1620	"		27.0	8.72	7.18	184.7	5.07	744.6	3.90

purge rate is not calculated due to Bladder malfunction

1615
1620

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)
1620	283.85	not calculated	27.0	8.72	7.18	184.7	5.07	744.6	3.90

SAMPLE ID: 1405GWMMW~~006~~ 020-U,F TIME: 1420

Final Low Flow Sampling Settings: PSI: 160 Charge: 21 sec Exhaust: 27 sec

GPS
WGS 84 N 42° 49' 36.7"
W 111° 29' 19.6"

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/7/14 Well ID: MMW021

Task: GW Sampling Field Crew: A. Pettley / B. Dicou

Measuring Point (MP): TOCN Water Level (WL): 210.80 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / Compressed Air

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 15.52 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
1040	210.90	Adjusting	for GF	8.72	7.51	214.0	8.26	625.6	4.05
1050	210.88	.20	3.30	8.77	7.40	203.9	6.05	629.2	24.26
1100	210.94	.40	5.50	9.51	7.38	200.4	5.67	629.9	31.93
1110	210.95	.40	9.50	9.60	7.37	197.3	5.51	630.2	59.60
1120	210.95	.40	12.0	9.20	7.37	199.0	5.53	630.0	23.0
1130	210.95	.40	16.0	8.97	7.37	198.1	5.21	628.2	4.30
1140	210.95	.40	20.0	8.95	7.37	198.9	5.17	629.4	4.71
1150	211.00	.40	24.0	8.86	7.38	200.3	5.16	629.7	2.61

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)
1150	211.00	.40	24.0	8.86	7.38	200.3	5.16	629.7	2.61

SAMPLE ID: 1405MMW021-F,U **TIME:** 1150

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

GPS N 42° 49' 35.7"
WGS 84 W 111° 29' 27.3"

WELL SAMPLING FORM

Page: 1 of ____

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/10/14 Well ID: MMW022

Task: GW Sampling Field Crew: A. Pettley / B. Dixon

Measuring Point (MP): TOCIV Water Level (WL): 207.95 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / Compressed Air

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 20.38 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	207.85		0	6.69	7.80	138.0	9.38	764.7	.99
1320	207.95		.80	7.13	7.52	143.0	8.75	854.2	1.22
1330 ~~1325~~	207.98	.15 3.0	~~1.70~~	7.33	7.13	149.4	3.29	916.9	1.41
1340	207.95	.15	6.30	7.56	7.13	146.0	3.87	916.0	1.19
1355	207.92	.15	8.55	7.43	7.14	146.4	4.10	926.2	3.64
1410	207.90	.15	10.80	7.22	7.14	147.7	4.15	925.1	1.84
1425	207.95	.15	13.05	7.06	7.15	149.6	4.14	925.4	1.31
1440	207.90	.15	15.30	7.52	7.14	150.0	4.17	924.6	4.63
1455	207.95	.15	17.55	7.54	7.14	153.0	4.20	922.6	3.22
1510	207.95	.15	19.80	7.21	7.15	152.1	4.17	925.1	1.95
1515 ~~1525~~	207.95	.15	20.40	7.42	7.15	154.5	4.19	924.9	2.14

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)
1515	207.95	.15	20.40	7.42	7.15	154.5	4.19	924.9	2.14

SAMPLE ID: 1405GWMMW022-F,U **TIME:** 1515

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

GPS
WGS 84 N 42° 53' 08.7"
W 111° 28' 21.7"

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/10/14 Well ID: MNIW023

Task: GW Sampling Field Crew: A. Pettley / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): 107.30 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / compressed air

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 22.12 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	107.33	1.0	4.0	8.79	7.08	~~[illegible]~~ -55.1	.36	958.9	2.50
0925	107.35	1.0	9.0	8.87	7.05	-67.2	.10	971.9	3.11
0930	107.35	1.0	14.0	8.88	7.05	-86.2	.03	985.1	3.63
0935	107.35	1.0	19.0	8.84	7.05	-93.1	.03	982.0	3.95
0940	107.35	1.0	24.0	8.89	7.05	-100.7	.02	981.2	4.99
0945	107.35	1.0	29.0	8.90	7.06	-100.3	.02	971.2	3.21

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	107.35	1.0	29.0	8.90	7.06	-100.3	.02	971.2	3.21

SAMPLE ID: 1405GWMNIW023-F,U **TIME:** 0945

Final Low Flow Sampling Settings: PSI: 95 Charge: 10 sec Exhaust: 10 sec

GPS WGS 84 N. 42° 54' 19.3"
W. 111° 30' 29.3"

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/11/14 Well ID: MWMW024

Task: GW Sampling Field Crew: A. Pettley / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): 58.83 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / Compressed Air.

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 12.7 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
1220	58.94	1.0	0	7.26	7.43	194.3	1.95	833.6	1.37
1225	58.94	1.0	5.0	7.33	7.24	196.9	3.15	810.1	2.06
1230	58.94	1.0	10.0	7.63	7.23	191.1	3.20	809.7	4.23
1235	58.94	1.0	15.0	7.36	7.23	185.5	3.17	809.9	2.70
1240	58.94	1.0	20.0	7.37	7.23	183.4	3.24	810.4	4.57
1245	58.94	1.0	25.0	7.39	7.23	182.2	3.26	810.9	3.40
1250	58.94	1.0	30.0	7.36	7.23	181.6	3.24	810.9	2.88

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: 1405GWMMW024-F, U **TIME:** 1250

Final Low Flow Sampling Settings: PSI: 105 Charge: 17 sec Exhaust: 9 sec

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/6/14 Well ID: MMW-025

Task: GW Sampling Field Crew: A. Pettkey / B. Dizon

Measuring Point (MP): TOCN Water Level (WL): 27.68 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
1005	27.68	.70	0	7.81	7.89	201.3	2.40	303.9	104.97
1015	35.05	.90	9.0	7.76	7.96	186.2	1.54	304.2	12.17
1025	38.40	.90	18.0	7.80	7.95	174.8	1.53	304.0	9.68
1035	41.75	1.0	28.0	7.78	7.91	168.6	1.50	304.3	3.52
1045	49.21	1.0	38.0	7.73	7.99	164.3	1.50	304.0	8.08
1055	52.40	1.1	49.0	7.78	7.98	165.7	1.51	303.8	10.19
1105	58.70	1.1	60.0	7.78	8.00	157.9	1.15	304.1	9.09
1115	62.24	1.2	72.0	7.68	7.98	161.6	1.03	304.0	6.39
1125	66.75	1.2	84.0	7.73	8.00	156.7	1.01	304.2	2.82
1135	70.75	1.1	95.0	7.79	7.99	153.0	1.00	304.2	2.70
1145	74.70	1.1	106.0	7.87	7.99	152.2	1.06	304.1	2.63
1155	80.04	1.0	116.0	7.77	7.99	151.4	1.00	304.0	2.38

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	140.91	1.0	248	7.68	8.00	152.4	1.33	303.9	1.41

SAMPLE ID: 1405MMW-025 **TIME:** 1405

Final ~~Low Flow~~ Purge Sampling Settings: PSI: 115 Charge: 16 sec Exhaust: 14 sec

GPS
WGS84 = N 42°51' 48.9"
W 111° 23' 34.7"

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/6/14 Well ID: MMW-025

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
1205	84.95	1.1	127	7.68	7.99	152.1	1.00	304.0	2.04
1215	89.40	1.1	138	7.68	7.99	154.5	1.01	304.0	1.97
1225	94.65	1.0	148	7.64	8.00	155.5	1.05	304.9	1.88
1235	99.93	1.0	158	7.64	8.00	157.7	1.06	303.9	1.69
1245	103.70	1.0	168	7.65	8.00	157.1	1.09	304.0	1.72
1255	108.52	1.0	178	7.66	8.02	155.1	1.15	303.9	1.66
1305	113.56	1.0	188	7.74	8.00	156.7	1.19	303.8	1.67
1315		1.0	198	7.69	8.00	154.8	1.24	304.0	1.71
1325		1.0	208	7.69	8.00	154.2	1.29	303.8	1.64
1335		1.0	218	7.69	8.00	154.7	1.32	304.0	1.69
1345	132.00	1.0	228	7.69	8.00	152.7	1.34	304.0	1.61
1355	136.50	1.0	238	7.69	8.00	152.3	1.31	303.9	1.37
1405	140.91	1.0	248	7.68	8.00	152.4	1.33	303.9	1.41

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/9/14 Well ID: NVMW026

Task: GW Sampling Field Crew: A. Rettley / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): 285.10 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): 21.7 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
1305	285.05	.60	0	8.55	7.73	172.1	2.76	427.1	2.62
1315	285.05	.60	2.0	10.16	7.72	167.8	0.69	427.7	7.59
1325	"	.60	8.0	10.81	7.73	165.2	1.08	428.0	.94
1335	"	"	14.0	9.52	7.74	164.8	1.08	426.5	.95
1345	"	"	20.0	9.64	7.72	163.4	1.00	426.7	1.96
1355	"	"	26.0	9.75	7.72	162.9	.92	426.3	1.94
1400	"	"	29.0	9.97	7.74	162.3	.80	425.9	3.16

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	285.05	.60	29.0	9.97	7.74	162.3	.80	425.9	3.16

SAMPLE ID: 140SGWMMW026-U,F **TIME:** 1400

Final Low Flow Sampling Settings: PSI: 205 Charge: 15 sec Exhaust: 17 sec

GPS WGS 84 N 42° 51' 56.3" W 111° 23' 28.5"

*An MS/MSD is taken at this well.

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/12/14 Well ID: MMW027

Task: GW Sampling Field Crew: A. Pettley / B. Dicou

Measuring Point (MP): TOCN Water Level (WL): 109.16 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / used nitrogen could be pulsed with compressed air.

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 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
1240	109.25	.50	1.5	7.18	7.64	132.4	7.19	1119.1	3.01
1245	109.25	.50	4.0	7.08	7.18	145.2	3.89	1082.7	1.58
1250	109.28	.50	6.50	7.15	7.17	156.9	3.65	1082.3	1.16
1255	109.28	.50	9.0	7.09	7.16	153.4	3.90	1081.6	1.80
1300	109.28	.50	11.5	7.11	7.16	152.3	3.85	1082.4	1.80

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)
1300	109.28	.50	11.50	7.11	7.16	152.3	3.85	1082.4	1.80

SAMPLE ID: 1405GWMMW027-F,U **TIME:** 1300

Final Low Flow Sampling Settings: PSI: 70 Charge: 11 sec Exhaust: 15 sec

GPS WGS 84 N 42°53'28.7" W 111°25'56.4"

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/10/14 Well ID: MNMW028

Task: GW Sampling Field Crew: A. Pettley / B. Dixon

Measuring Point (MP): _____ Water Level (WL): 70.62 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / Compressed Air

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 6.46 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
1200	70.63	.90	2.0	7.57	7.62	136.2	6.87	549.4	1.21
~~1205~~				~~7.64~~	~~7.62~~	~~128.5~~			~~3~~
1225	70.63	.90	24.5	7.64	7.62	128.5	6.75	549.3	3.03
1230	70.63	.90	29.0	7.61	7.62	129.4	6.73	548.8	4.45
1235	70.63	.90	33.5	7.61	7.62	130.2	6.72	548.9	5.00
1240	70.63	.90	38.0	7.56	7.62	131.2	6.73	548.6	4.25

Issues with water quality meter →

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)
1240	70.63	.90	38.0	7.56	7.62	131.2	6.73	548.6	4.25

SAMPLE ID: 1405GWMMW028 ~~[illegible]~~ -2-F,U **TIME:** 1240

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

Blind Duplicate 1405GWMMW028-2-F,U Time 1250

GPS WGS84 N 42°53'50.4" W 111°29'02.6"

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/8/14 Well ID: MWMW029

Task: GW Sampling Field Crew: A. Pettley / B. Dixon

Measuring Point (MP): Top of Grey Disc Water Level (WL): 15.90 ft below MP

Sampling Method (see applicable calculations below): _____ Device: Bladder / compressed Air

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 4.30 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
1140	15.90	0	1.5	7.40	7.26	253.2	5.89	1566.3	2.81
1145	16.05	.40	3.5	7.47	7.23	243.9	5.97	1545.2	2.05
1150	16.05	.40	5.5	7.50	7.23	242.6	5.99	1544.4	1.17
1155	16.05	.40	7.5	7.52	7.22	241.2	6.04	1546.3	1.22
1200	16.05	.40	9.5	7.49	7.20	240.4	6.15	1549.9	1.18
1205	16.05	.40	11.5	7.46	7.19	240.5	6.18	1558.7	1.18

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)
1205	16.05	.40	11.5	7.46	7.19	240.5	6.18	1558.7	1.18

SAMPLE ID: 1405GWMMW029-U,F **TIME:** 1205

Final Low Flow Sampling Settings: PSI: 40 Charge: 12 sec Exhaust: ~~10~~ 10 sec

GPS
WGS 84 N 42° 49' 34.6"
W 111° 28' 11.7"

WELL SAMPLING FORM

Page: _____ of _____

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: _____ Well ID: MMW030

Task: GW Sampling Field Crew: A. Pettky - B. Dixon

Measuring Point (MP): TOC N. Water Level (WL): 23.52 ft below MP

Sampling Method (see applicable calculations below): Purge & Sample Device: bladder pump/comp.

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
1800		.75		10.17	7.52	226.6	2.43	436.6	.60
1810	26.54			9.55	7.75	217.0	2.15	421.4	.58
1820	37.00	.75		9.21	7.74	220.3	2.10	419.7	.24
1825	This well will not sustain a flow rate. Matches historical								
	data. Purge dry and sample method.								
2225	98.05	.75		10.82	7.82	211.6	2.26	428.4	.35
5/6/14 0300	Well	pumped	Dry						
5/6/14 0810	133.30								
5/9/14 1550	36.60	Met 90%	Recharge	8.52	7.64	197.4	7.80	402.6	4.13
1600				8.64	7.86	202.2	3.42	402.7	3.18
1605				8.71	7.86	199.6	3.41	401.7	2.14
1610				8.81	7.86	198.1	3.39	402.1	2.15

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)
1610	36.60			8.81	7.86	198.1	3.39	402.1	2.15

SAMPLE ID: 1405GWMMW030-F,U **TIME:** 1610

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

GPS N 42° 49' 10.5"
WGS 84 W 111° 29' 20.0"

WELL SAMPLING FORM

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/6/14 Well ID: MMW031

Task: GW Sampling Field Crew: A. Pettey / B. Dixon

Measuring Point (MP): _____ Water Level (WL): 95.95 ft below MP

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

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 12.7 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
1635 ~~1645~~	95.95	0.20	0	8.29	7.75	156.7	7.58	263.9	1.20
1645 ~~1655~~	95.98	0.40	2.0	8.37	7.86	158.0	8.67	263.3	5.69
~~1658~~	96.00	0.40	6.0	8.65	7.90	159.7	8.37	262.6	3.05
1705	96.00	0.40	10.0	8.00	7.90	161.3	8.67	263.0	4.15
1715	96.00	0.40	14.0	8.78	7.90	162.6	8.33	263.1	2.93

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)
1715	96.00	0.40	14.0	8.78	7.90	162.6	8.33	263.1	2.93

SAMPLE ID: 1405MMW031 **TIME:** 1715

Final Low Flow Sampling Settings: PSI: 103 Charge: 7 sec Exhaust: 9 sec

WELL SAMPLING FORM

Page: 1 of ____

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/8/14 Well ID: MMW032

Task: GW Sampling Field Crew: A. Pettley / B. Dicon

Measuring Point (MP): Top of Grey Disc Water Level (WL): 19.05 ft below MP

Sampling Method (see applicable calculations below): ____ Device: Bladder / compressed Air

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): 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
0930	19.05	purging Dry	0	6.47	7.90	192.6	8.29	436.4	1.72
0940	19.35		1.5	6.21	7.51	197.6	6.35	389.3	2.86
0950	24.22		5.0	6.39	7.50	175.5	5.39	384.0	29.03
1000	29.10		12.0	6.37	7.50	172.1	5.58	381.2	32.95
1010	32.52	.750	27.0	6.33	7.52	170.3	5.81	380.2	83.49
1020	39.95	.750	42.0	6.50	7.58	190.7	6.99	384.5	1.51
1040	47.56	1.0	52.0	6.33	7.53	176.9	6.21	381.5	1.49
1050	54.89	1.0	62.0	6.33	7.54	171.7	6.25	381.2	1.46
1100	58.45	1.0	72.0	6.40	7.54	164.7	6.63	381.5	4.73
1110	60.27	1.0	82.0	6.39	7.55	161.7	6.17	389.9	11.34
1116	63.00	1.0	88.0	6.58	7.55	158.0	6.31	394.8	57.10
1116 well is Dry									

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)
5/11/14 0930	23.58	.60	19.0	6.14	7.48	177.1	6.51	395.4	2.54

5/11/14 **SAMPLE ID:** 1405GWMMW032-F,U **TIME:** 0930

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

*No transducer in well.

GPS WGS 84 = N 42° 50' 09.1"
W 111° 28' 21.7"

WELL SAMPLING FORM
Continued Stabilization Readings

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/11/14 Well ID: MMW032

well has recovered to 90%

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	17.70	.60	0	6.13	7.54	163.5	7.60	396.5	28.09
0905	20.00	.60	4.0	6.22	7.47	171.5	5.95	387.1	112.94
0910	20.98	.60	7.0	6.11	7.48	173.1	6.52	386.1	111.45
0915	21.71	.60	10.0	6.03	7.48	174.9	6.50	387.2	107.45
0920	21.95	.60	13.0	5.84	7.47	176.3	6.60	385.2	3.87
0925	23.33	.60	16.0	6.12	7.47	176.4	6.54	384.2	2.60
0930	23.58	.60	19.0	6.14	7.48	177.1	6.51	385.4	2.54

Initial water level is 17.45

WELL SAMPLING FORM

Page: 1 of ____

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/8/14 Well ID: MMW033

Task: GW Sampling Field Crew: A. Pettley / B. Dixon

Measuring Point (MP): Top of Grey Disc Water Level (WL): 8.30 ft below MP

Sampling Method (see applicable calculations below): _____ Device: Bladder / Compressed Air

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
1230	8.30	.5	0	6.67	7.94	91.8	.40	470.4	1.61
1240	12.74	.5	5.0	6.44	7.98	56.3	0	480.6	2.13
1250	17.59	.5	10.0	6.44	7.98	54.4	0	480.6	4.77
1300	20.90	.5	15.0	6.43	7.96	56.4	0	477.5	3.69
1310	24.33	.5	20.0	6.42	7.90	67.7	0	474.3	3.29
1320	26.95	.5	25.0	6.43	7.86	77.1	0	471.9	2.64
1330	29.35	.5	30.0	6.48	7.85	87.5	0	470.4	2.47
1340	31.95	.5	35.0	6.44	7.83	85.9	0	468.4	1.83
1350	33.78	.5	40.0	6.43	7.82	83.5	0	468.8	1.77
1355	34.65	.5	42.50	6.43	7.81	82.1	0	467.5	1.75

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)
1355	34.65	.5	42.50	6.43	7.81	82.1	0	467.5	1.75

SAMPLE ID: 1405GWMMW033-U,F **TIME:** 1355

Final Low Flow Sampling Settings: PSI: 80 Charge: 23 sec Exhaust: 9 sec

GPS
WGS 84 N 42° 49' 35.3"
W 111° 28' 12.3"

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/11/14 Well ID: MMW034

Task: GW Sampling Field Crew: A. Pettey / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): 10.33 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / Compressed Air

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 10.0 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
1120	10.33	.40	0	6.02	7.51	194.8	4.09	633.4	1.14
1125	10.55	.40	1.5	6.49	7.39	198.6	8.97	624.6	10.36
1130	10.58	.40	3.5	6.56	7.39	200.5	8.47	622.2	1.11
1135	10.58	.40	5.5	6.54	7.39	202.2	8.49	623.6	1.19
1140	10.58	.40	7.5	6.57	7.40	203.0	8.48	623.4	3.60
1145	10.58	.40	10.0	6.62	7.40	203.6	8.47	622.2	1.11

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	10.58	.40	10.0	6.62	7.40	203.6	8.47	622.2	1.11

SAMPLE ID: 1405GWMMW034-[redacted] 1-F,U **TIME:** _____

Final Low Flow Sampling Settings: PSI: 45 Charge: 9 sec Exhaust: 10 sec

A Blind Duplicate is taken at this well Named 1450GWMMW034-2-F,U. Timed 1155

GPS WGS 84 N42°52'08.5" W111°24'16.8"

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/12/14 Well ID: MMW035

Task: GW Sampling Field Crew: A. Pettley / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): 110.60 ft below MP

Sampling Method (see applicable calculations below): 12.32 Device: Bladder / Used Nitrogen, could be pumped with compressed air.

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): Low Flow 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
1150	110.65	.50	2.0	7.25	7.05	93.5	2.29	1430.7	1.57
1155	"	.50	4.5	7.23	7.02	110.0	2.13	1429.8	2.44
1200	"	.50	7.0	7.35	7.05	113.0	2.57	1430.7	2.32
1205	"	.50	9.5	7.10	7.02	119.8	2.24	1429.3	2.32
1210	"	.50	12.0	7.20	7.03	121.2	2.19	1430.0	2.45
1215	"	.50	14.5	7.24	7.03	122.5	2.21	1429.5	2.50

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	110.65	.50	14.5	7.24	7.03	122.5	2.21	1429.5	2.50

SAMPLE ID: 1405GWMMW035-F,U **TIME:** 1215

Final Low Flow Sampling Settings: PSI: 100 Charge: 9 sec Exhaust: 11 sec

An MS/MSD is taken at this well.

GPS WGS 84 N 42° 53' 29.1"
W 111° 25' 56.4"

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 05/12/14 Well ID: MMW036

Task: Spring 2014 Field Crew: B. Dicou A. Pettley

Measuring Point (MP): ~~[illegible]~~ TOC Water Level (WL): ~~[illegible]~~ 113.14 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: nitrogen/bladder pump

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 8.8 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
1450	113.20		0	6.01	7.84	22.7	8.11	429.9	14.99
1455	113.18	0.40	1.0	6.58	7.68	62.2	10.62	432.3	93.40
1500	113.14	0.40	3.0	7.30	7.62	88.0	8.23	431.6	43.22
1505	113.15	0.40	5.0	7.47	7.62	105.0	7.89	418.3	8.95
1510	113.18	0.40	7.0	7.60	7.62	106.8	7.95	431.4	9.99
1515	113.18	0.40	9.0	7.61	7.62	111.5	7.94	430.9	8.95
1520	113.18	0.40	11.0	7.67	7.62	115.4	7.82	431.4	9.21
1525	113.18	0.40	13.0	7.65	7.62	116.7	7.79	429.8	9.09

Continue stabilization readings on additional pages if necessary

GPS WGS84 N 42° 53' 26.1" W 111° 26' 07.6"

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)
1525	113.18	0.40	13.0	7.65	7.62	116.7	7.79	429.8	9.09

SAMPLE ID: 1405GWMMW036-U,F + MS/MSD **TIME:** 1525

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

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10503773.160101 Client: P4 Spring 2014 Date: 5/12/14 Well ID: MMW037

Task: GW Monitoring Field Crew: A. Pettley / B. Dixon

Measuring Point (MP): TOCN Water Level (WL): 119.90 ft below MP

Sampling Method (see applicable calculations below): Low Flow Device: Bladder / Nitrogen used / Compressed air could also be used.

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): 19.06 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	119.92		0	13.34	7.57	130.6	8.29	19.3	4.76
1355	119.95	.70	2.0	7.55	7.62	134.4	3.82	427.2	2.55
1400 ~~1340~~	119.95	.70	5.5	7.65	7.62	139.4	8.04	428.1	2.10
1405	119.95	.70	9.0	7.73	7.62	140.0	8.13	430.7	4.20
1410	119.95	.70	12.5	7.87	7.62	142.2	8.12	428.6	4.50
1415	119.95	.70	16.0	7.89	7.61	144.7	8.13	430.7	4.14
1420	119.95	.70	19.5	7.88	7.61	145.5	8.14	430.7	2.94

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)
1420	119.95	.70	19.5	7.88	7.61	145.5	8.14	430.7	2.94

SAMPLE ID: 1405GWMMW037-1-F,U. **TIME:** 1420

Final Low Flow Sampling Settings: PSI: 150 Charge: 16 sec Exhaust: 16 sec

Duplicate 1405GWMMW037-2-F,U Time 1430

GPS N 42° 53' 26.1"
WGS 84 W 111° 26' 06.9"

COC No. A 41312

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: MWH

Project Contact: Portia VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto Spring 2014

Project ID: 105037773

Sampler (print): E. Yeager J. Pierson

Signature: [illegible]

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Se SW6020A	Diss. Ca, Se SW6020A	Diss Ca, Mg, V SW6010B/C	Diss SO4 E300.0	TDS	Diss. Hardness SM2340B	Total Cd, Mn, Se SW6020A	Diss Se SW6020A	TDS	SO4 300.0						TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1405SWMST069-U		X	05/05/14	1700	W			X				X												
1405SWMST069-F		X		1700	W				X	X	X		X											
1405GW116A-U		X		1830	W									X		X								
1405GW116A-F		X		1830	W										X		X							
1405SWMST131-U		X	05/06/14	1025				X				X												
1405SWMST131-F		X		1025					X	X	X													
1405SWMST138-U		X		1100				X				X												
1405SWMST138-F		X		1100					X	X	X													
1405SWMST132-U		X		1150				X				X												
1405SWMST132-F		X		1150					X	X	X													
1405SWMST132-2-U		X		1155				X				X												
1405SWMST132-2-F		X		1155					X	X	X													
1405SWMST143-U		X		1330				X				X												
1405SWMST143-F		X		1330					X	X	X													
1405SWMST274-U		X		1415				X				X												
1405SWMST274-F		X		1415					X	X	X													
1405SWMDS026-U		X		1510				X				X												
1405SWMDS026-F		X		1510					X	X	X													
1405SWMST133-U		X		1620				X				X												
1405SWMST133-F		X		1620					X	X	X													

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[illegible]	05/07/14	0900	FedEx				

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 41247

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: MWH Americas

Project Contact: Betty Vanpelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto Idaho

Project ID: Monsanto 10503773

Sampler (print): Aaron Pettley, Brent Dicou

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	ANIONS 300.0	METALS SW6020A	METALS SW6020A	TDS 160.1	TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1405MMW025-U		X	5/06/14	1405	Water GW	2			X		X		
1405MMW025-F		X	5/06/14	1405	(GW)	2		X		X			
1405MBW006-U		X	5/06/14	1605	(GW)	2			X		X		
1405MBW006-F		X	5/06/14	1605	(GW)	2		X		X			
1405MMW031-U		X	5/6/14	1705	GW	2			X		X		
1405MMW031-F		X	5/6/14	1705	GW	2		X		X			

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	5/7/14	1100	Fed Ex	Fed Ex	5/7/14	1100	

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 41248

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: MWH Americas

Project Contact: Betty VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto Idaho

Project ID: Monsanto 10503773.160101

Sampler (print): Aaron Pettey

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Anions (300)	Metals (D) 6020A	Metals 6020A	TDS 160.1											TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1405MMW021-F		X	5/7/14	1150	W/G	2		X	X														
1405MMW021-U		X	5/7/14	1150	W/G	2				X	X												
1405GWMMW006-F		X	"	1445	"	2		X	X														
1405GWMMW006-U		X	"	1445	"	2				X	X												
1405GWMMW020-F		X	"	1620	"	2		X	X														
1405GWMMW020-U		X	"	1620	"	2				X	X												
1405GWMBW009-F		X	"	1745	"	2		X	X														
1405GWMBW009-U		X	"	1745	"	2				X	X												

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	5/8/14	0530	Fed Ex	Fed Ex	5/8/14	0530	

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 41313

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: MWH

Project Contact: Betty VanPelt

Contact Phone #: 801 617 3200

Turn Around Requirements: Standard

Location: Monsanto Spring 2014

Project ID: 16503773

Sampler (print): E. Yeager J. Pierson

Signature: E Yeager

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Se SW6020A	TDS	Diss Cd,Se SW6020A	Diss Ca,Mg,V SW6010B/C	Diss SO4 E300.0	Diss Hardness SM2340B										TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1405SWMTS025-U		X	05/07/14	0930	W			X	X															
1405SWMTS025-F				0930						X	X	X	X											
1405SWMST144-U				1015				X	X															
1405SWMST144-F				1015						X	X	X	X											
1405SWMST275-U				1105				X	X															
1405SWMST275-F				1105						X	X	X	X											
1405SWMST136-U				1200				X	X															
1405SWMST136-F				1200						X	X	X	X											
1405SWMST063-U				1330				X	X															
1405SWMST063-F				1330						X	X	X	X											
1405SWMST063-U-MS				1335				X	X															
1405SWMST063-F-MS				1335						X	X	X	X											
1405SWMST063-U-MSD				1340				X	X															
1405SWMST063-F-MSD				1340						X	X	X	X											
1405SWMST057-U				1430				X	X															
1405SWMST057-F				1430						X	X	X	X											
1405SWMST226-U				1545				X	X															
1405SWMST226-F				1545						X	X	X	X											
1405SWMST050-U				11030				X	X															
1405SWMST050-F				11030						X	X	X	X											

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
E Yeager	05/08/14	1800	Fed Ex				

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 41314

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: MWH

Project Contact: Bettu VanPelt

Contact Phone #: 801-917-3000

Turn Around Requirements: Standard

Location: Moab UT to Spring 2014

Project ID: 1E03773

Sampler (print): E.H. J.P.

Signature: [illegible]

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Se SW6020A	TDS	Diss Cd Se SW6020A	Diss Ca Mg V SW6010B	Diss SO4 E 300.0	Diss Hardness SM 2340B									TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1405SW MSG004-U		X	05/08/14	0900	W			X	X														
1405SW MSG004-F				0900						X	X	X	X										
1405SW MSG005-U				0930				X	X														
1405SW MSG005-F				0930						X	X	X	X										
1405SW MSG006-U	MS			0935				X	X														
1405SW MSG006-F	MS			0935						X	X	X	X										
1405SW MSG006-U	MSD			0940				X	X														
1405SW MSG006-F	MSD			0940						X	X	X	X										
1405SW MST089-U				1050				X	X														
1405SW MST089-F				1050						X	X	X	X										
1405SW MST089-U				1200				X	X														
1405SW MST089-F				1200						X	X	X	X										
1405SW MST089-U	MS			1205				X	X														
1405SW MST089-F	MS			1205						X	X	X	X										
1405SW MST089-U	MSD			1210				X	X														
1405SW MST089-F	MSD			1210						X	X	X	X										
1405SW MST090-U				1300				X	X														
1405SW MST090-F				1310						X	X	X	X										
1405SW MST090-U				1340				X	X														
1405SW MST090-F		X	X	1340	X					X	X	X	X										

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[illegible]	05/12/14	0800	FedEx				

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

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

COC No. A 41315

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: MWH

Project Contact: Betty VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: standard

Location: monsanto spring 2014

Project ID: 10503773

Sampler (print): E. Yeager J. Pierson

Signature: [signature]

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Se SW6020A	TDS	Diss Cd, Se SW6020A	Diss Ca, Mg, V SW6010B	Diss SO4 E300.0	Diss Hardness SM2340B										TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1405SWMSG006-U		X	05/08/14	1420	W			X	X															
1405SWMSG006-F				1420						X	X	X	X											
1405SWMSG007-U				1500				X	X															
1405SWMSG007-F				1500						X	X	X	X											
1405SWMST095-U				1515				X	X															
1405SWMST095-F				1515						X	X	X	X											
1405SWMST094-U				1610				X	X															
1405SWMST094-F				1610						X	X	X	X											
1405SWMST045-1-U			05/09/14	0930				X	X															
1405SWMST045-1-F				0930						X	X	X	X											
1405SWMST045-2-U				0935				X	X															
1405SWMST045-2-F				0935						X	X	X	X											
1405SWMST044-U				1145				X	X															
1405SWMST044-F				1145						X	X	X	X											
1405SWMDS034-U				1300				X	X															
1405SWMDS034-F				1300						X	X	X	X											
1405SWMDS030-1-U				1410				X	X															
1405SWMDS030-1-F				1410						X	X	X	X											
1405SWMDS030-2-U				1415				X	X															
1405SWMDS030-2-F				1415						X	X	X	X											

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	05/12/14	0800					

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 41252

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: MWH

Project Contact: Betty VanPelt

Contact Phone #: 801-607-3260

Turn Around Requirements: Standard

Location: Monsanto Spring 2014

Project ID: 16503773

Sampler (print): E. Yeager J. Pierson

Signature: [illegible]

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Se SW6020A	TDS	Diss Cd, Se SW6020A	Diss Ca, Mg V SW6010B	Diss SO4 E 300.0	Diss Hardness SM2340B	Cd, Mn, Se 6020A	TDS EPA 160.1	Se 6020A	SO4 300.0						TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1405SWMST067-U		X	05/09/14	1510	W			X	X															
1405SWMST067-F				1510						X	X	X	X											
1405GWMBW130-U				1530										X	X									
1405GWMBW130-F				1530												X	X							
1405GWMBW135-U			05/10/14	0915										X	X									
1405GWMBW135-F				0915												X	X							
1405GWMBW087-U				1050										X	X									
1405GWMBW087-F				1050												X	X							
1405GWMBW085-U				1210										X	X									
1405GWMBW085-F				1210												X	X							
1405GWMBW131-U				1510										X	X									
1405GWMBW131-F				1510												X	X							
1405GWMBW028-U				1640										X	X									
1405GWMBW028-F				1640												X	X							
1405GWMW15A-U				1750										X	X									
1405GWMW15A-F				1750												X	X							
~~1405SWMST066-U~~			~~05/11/14~~	~~0930~~				~~X~~	~~X~~															
~~1405SWMST066-F~~				~~0930~~						~~X~~	~~X~~	~~X~~	~~X~~											
1405SWMST019-U			05/11/14	0845				X	X															
1405SWMST019-F				0845						X	X	X	X											

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[illegible]	05/12/14	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 41253

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: MWH

Project Contact: Betty VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto Spring 2014

Project ID: 10503773

Sampler (print): E. Yeager J. Pierson

Signature: [signature]

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Total Se SW6020A	TDS	Diss Cd, Se SW6020A	Diss Ca, Mg, V SW6010B	Diss SO4 E 300.0	Diss Hardness SM2340B	Cd, Mn, Se 6020A	TDS EPA 160.1	Se 6020A	SO4 300.0	PCE EPA 8260B					TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1405SWMST066-U		X	05/11/14	0930	W			X	X															
1405SWMST066-F				0930						X	X	X	X											
1405SWMST020-U				1100				X	X															
1405SWMST020-F				1100						X	X	X	X											
1405GWMBW152-U				1220										X	X									
1405GWMBW152-F				1220												X	X							
1405GWMBW027-U				1350										X	X									
1405GWMBW027-F				1350												X	X							
1405GWSB07-PCE				1515														X						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	05/12/14	0800					

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 41254

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: MWH Americas

Project Contact: Betty VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto, Idaho

Project ID: Monsanto 10503773.160101

Sampler (print): Aaron Pettley

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

ADDITIONAL REQUIREMENTS

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Anions (300)	Metals (D) 6020A	Metals 6020A	TDS 160.1												TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1405GWMMW029-F		X	5/9/14	1205	GW	2		X	X															
1405GWMMW029-U		X	"	1205	GW	2				X	X													
1405GWMMW032-F		X	"	1355	"	2		X	X															
1405GWMMW032-U		X	"	1355	"	2				X	X													
1405GWMBW032-F		X	"	1440	"	2		X	X															
1405GWMBW032-U		X	"	1440	"	2				X	X													
1405GWMMW018-F		X	"	1540	"	2		X	X															
1405GWMMW018-U		X	"	1540	"	2				X	X													
1405GWMBW048-F		X	"	1650	"	2		X	X															
1405GWMBW048-U		X	"	1650	"	2				X	X													
1405GWMMW007-F		X	5/9/14	1205	"	2		X	X															
1405GWMMW007-U		X	"	1205	"	2				X	X													
1405GWMMW026-F		X	"	1400	"	2		X	X															
1405GWMMW026-U		X	"	1400	"	2				X	X													
1405GWMMW026-FMS		X	"	1400	"	2		X	X															
1405GWMMW026-UMS		X	"	1400	"	2				X	X													
1405GWMMW026-FMSD		X	"	1400	"	2		X	X															
1405GWMMW026-UMSD		X	"	1400	"	2				X	X													
1405GWMBW099-F		X	"	1445	"	2		X	X															
1405GWMBW099-U		X	"	1445	"	2				X	X													

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	05/12/14	0900					

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:
[signature]						

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

COC No. A 41251

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: MWH Americas

Project Contact: Betty VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto, Idaho

Project ID: Monsanto 10503773.160101

Sampler (print): Aaron Pettley

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp.	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Anions (300)	Metals (D) 6020A	Metals 6020A	TDS 160.1												TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1405GWMMW030-F		X	5/9/14	1610	GW	2		X	X															
1405GWMMW030-U		X	"	1610	"	2				X	X													
1405GWMMW023-F		X	5/10/14	0945	"	2		X	X															
1405GWMMW023-U		X	"	0945	"	2				X	X													
1405GWMMW011-F		X	"	1110	"	2		X	X															
1405GWMMW011-U		X	"	1110	"	2				X	X													
1405GWMMW028-1-F		X	"	1240	"	2		X	X															
1405GWMMW028-1-U		X	"	1240	"	2				X	X													
1405GWMMW028-2-F		X	"	1250	"	2		X	X															
1405GWMMW028-2-U		X	"	1250	"	2				X	X													
1405GWMMW022-F		X	"	1515	"	2		X	X															
1405GWMMW022-U		X	"	1515	"	2				X	X													
1405GWMMW010-F		X	"	1415	"	2		X	X															
1405GWMMW010-U		X	"	1415	"	2				X	X													
1405GWMMW032-F		X	5/11/14	0920	"	2		X	X															
1405GWMMW022-U		X	"	0920	"	2				X	X													
1405GWMMW013-F		X	"	1105	"	2		X	X															
1405GWMMW013-U		X	"	1105	"	2				X	X													
1405GWMMW034-1-F		X	"	1145	"	2		X	X															
1405GWMMW034-1-U		X	"	1145	"	2				X	X													

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	5/12/14	0800					

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:
[signature]						

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

COC No. A 41249

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: MWH Americas

Project Contact: Betty VanPelt

Contact Phone #: 901-617-3200

Turn Around Requirements: Standard

Location: Monsanto, Idaho

Project ID: Monsanto 10503773.160101

Sampler (print): Aaron Pettley

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Anions (300)	Metals (D) 6020A	Metals 6020A	TDS 160.1											TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1405GWMMW034-2-F		X	5/11/14	1155	GW			X	X														
1405GWMMW034-2-U		X	"	1155	"					X	X												
1405GWMMW024-F		X	"	1250	"			X	X														
1405GWMMW024-U		X	"	1250	"					X	X												
1405GWMMW017-F		X	"	1425	"			X	X														
1405GWMMW017-U		X	"	1425	"					X	X												

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	05/12/14	0800					

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:
[signature]						

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

COC No. A 41250

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: NIWH Americas

Project Contact: Betty VanPatt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto, Idaho

Project ID: 10503773.160101 Monsanto

Sampler (print): A. Pettley

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

ADDITIONAL REQUIREMENTS

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Anions (Filtered) 300	Metals (Filtered) 6020A	Metals 6020A	TDS 160.1											TOTAL # (LAB USE)	
1405GWMMW009-F		X	5/12/14	1100		2		X	X														
1405GWMMW009-U		X	"	1100		2				X	X												
1405GWMMW035-F		X	"	1215		2		X	X														
1405GWMMW035-U		X	"	1215		2				X	X												
1405GWMMW035-F MS		X	"	1215		2		X	X														
1405GWMMW035-U MS		X	"	1215		2				X	X												
1405GWMMW035-F MSD		X	"	1215		2		X	X														
1405GWMMW035-U MSD		X	"	1215		2				X	X												
1405GWMMW027-F		X	"	1300		2		X	X														
1405GWMMW027-U		X	"	1300		2				X	X												
1405GWMMW037-1-F		X	"	1420		2		X	X														
1405GWMMW037-1-U		X	"	1420		2				X	X												
1405GWMMW037-2-F		X	"	1430		2		X	X														
1405GWMMW037-2-U		X	"	1430		2				X	X												
1405GWMMW036-F		X	"	1525		2		X	X														
1405GWMMW036-U		X	"	1525		2				X	X												
1405GWMMW036-F MS		X	"	1525		2		X	X														
1405GWMMW036-U MS		X	"	1525		2				X	X												
1405GWMMW036-F MSD		X	"	1525		2		X	X														
1405GWMMW036-U MSD		X	"	1525		2				X	X												

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	5/13/14	1200	Fed Ex	Fed Ex	5/13/14	1200	

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 41184

158 Starlite Drive
Marietta, OH 45750

Microbac

CHAIN-OF-CUSTODY RECORD

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

Company Name: MWH

Project Contact: Betty VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto 2014

Project ID: 10503773

Sampler (print): E. Yeager

Signature: E. Yeager

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Cd, Mn, Se 6020A	TDS EPA 160.1	Se 6020A	SO4 300.0	Bn frac. of SVOC 8270C										TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1405GWMBW011-U		X	05/12/14	1215	W			X	X														
1405GWMBW011-F		X		1215						X	X												
1405GWMBW011-BN		X		1215								X											

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	5/13/14	1200	Fed Ex	Fed Ex	5/13/14	1200	

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

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

Monsanto
Spring Sampling
2013

L. Fahrig
A. Pettley

13

Returned to MMW030 after making
phone call to Rachel Roskelly about
recovery for the well. Rachel said
MWH could sample MMW030 if
has recovered to 75% and the
has. DTW = 51.95, TD of the well
intake is 155'. Well is sampled without
recovery. This well recovered to 79.2%.
Sampled 1305GW MMW030-U/F
WL 55.00, pR 0.173 gal/min, total 2.25 gal,
9.2°C, pH 7.64, ORP 111.4,
2.91, SC 357.3, NTUs 4.
: Downloaded datalogger.
turned the Nitrogen tanks and carrier
Degerstrom Machine shop. (3) Nitrogen
1 full, 1 Empty, 1 with 850 psi.
rned the radio and data logger cable
Monsanto mine office.
rrived at the Monsanto Machine
to unload the equipment, pack coolers,
field forms, and clean up.
eaving Monsanto for SLC Utah.
hipping (3) sample coolers and (6)
mple bottle coolers.

GWS

Monsanto
Spring Sampling
round
2014

5/5/14

A. Pettley

1200 Arrived in Soda Springs Idaho
to conduct Mansanto sampling.
1310 Arrived at Mine Office to recieve
training H&S.
1500 Arrived at Equipment shed to
calibrate equipment. YSI EXO
#3881.
pH 4 reading 3.84, calibrated to 4.00.
pH 7 reading 6.98, No calibration
pH 10 reading 9.98. No calibration
SPC reading 1417 No calibration
ORP 200 reading 224 mV No cal. needed
NTUs 0 reading - reading 0
NTU 100 reading 100 NTUs
1620 leaving Eqm. Shed for Mine
office.
1710 Arrived at Mine shop to pick up
compressor & wheel chocks. Jerry provided.
1730 Arrived at MMW030 DTW = 23.52
1800 Started purge at MMW030 Starting
parameters = flow rate .75 L/min Temp 10.11°C,
pH 7.52, ORP 226.6 mV, D.O. 2.43 mg/L,
SPC 436.6, NTUs 0.60.
1825 This well will not sustain a flow rate,
Purge dry & sample method.

5/5/14 A. Pettley

2225 Continued pumping well MMW030 purge & sample method. DTW = 98.05 Flow rate .75 L/min.

2300 Finished work for the day. MMW030 still purging.

5/6/14 A. Pettley

0730 Sampling crew stop & get ice, DI, bags for sampling.

0800 Arrived at MMW030 compressor stopped well DTW = 133.30 TOCN. well pumped dry ~ 03:00

0828 leaving site for equipment shop.

0930 Check, Calibration of water Quality meter. (YSI 12X0).

Solution Standard		Reading	
ORP	220	223	✓
pH	4.00	4.02	✓
pH	10.00	10.05	✓
SC	1413	1420	✓
Turb.	40	52	✓

Meter is Calibrated.

0940 arrived at MMW025 DTW = 27.68' started work.

1005 Started purge @ MMW025, begining parameters = pH 7.89, Temp 7.81, ORP 201.3, D.O. 2.40, SPC 303.9, NTUs 104.97. This well will Not sustain a Low Flow Purge criteria of > .3 ft drawdown. Matches historical purge record.

1120 Down-loaded transducer for MMW025, trans. battery @ 100%

GWS Monsanto Cloudy ~ 46°F
Spring 2014
B. Dicon
A. Pettley

5/6/14

1325 Arrived at MBW098 DTW: 0.90'
Begining parameters = pH 7.37, SPC 283.4, Temp 8.92, NTU 50.18, D.O. 4.55, ORP 177.2.
Purge ~ 5 L.

1335 MBW099 purged dry, will return and sample after recharge.

1405 Sampled 1405MMW025-U, F
Final parameters = Temp 7.68°C, pH 8.00, ORP 152.4, D.O. 1.33, SPC 303.9, NTU 1.41, Total vol 248 L. 1.0 L/min.
replaced lock with 4E11.

1500 Arrived at MBW135 DTW: 0.96'
started purge = pH 7.64, ORP 183.7, D.O. 1.95, SPC 415.7, NTU 3.27, Temp 6.21°C .35 L/min.

1515 Purged MBW135 Dry after 13.75 L. Will return and sample when recharged to 90%.

1545 Arrived at and started purge at MBW006, DTW = 2.91.
Starting parameters = Temp 5.29, pH 7.29, ORP 160.9, D.O. 7.40, SPC 982.1, NTU 19.30. 0.28 L/min

1605 Sampled 1405MBW006-U, F
Final pH 7.24, Temp 5.09, ORP 165.3, D.O. 7.17, SPC 976.7, NTU 2.08 @ .28 L/min total 5.6 L.

GWS Monsanto Rain 44°F
Spring 2014
B. Dicon
A. Pettley

5/6/14

1635 Arrived MMW031 to start sampling 95.95 TOCN. Started purge on well.

1715 Sampled 1405MMW031-U, F
Final parameters = Temp 8.78°C, pH 7.90, ORP 162.6, D.O. 8.33, SPC 263.1, NTU 2.93 Flow = 0.40 L/min. Total = 14.0 L. Downloaded Transducer

1730 Leaving the site for the day

5/7/14 A. Rettley / B. Dixon
Calibrate water quality Meter.
PH 10 Reading 10.00
PH 4 Reading 4.02
SC 1413 Reading 1420
ORP 220 " 222
0720 water meter Passed calibration
0930 Arrived at Agrium Mech. Shop to pick up Nitrogen tanks and support rack.
1020 Arrived at MMW~~006~~021 to start sample (210.80) DTW.
1040 Beginning Parameters: DTW 210.90, Temp 8.72°c, pH 7.51, ORP 214.0, D.O. 8.26, 625.6, NTUs 5. flow .20 L/min
1150 Sampled 1405MMW~~006~~021 U, F
Final parameters = WL 211.00, PR .40 L/min Total = 24.0 L, Temp 8.86°c, pH 7.32, ORP 200.3, D.O. 5.16, SPC 629.7, NTUs 2.61. Collected Transducer data.
1300 Arrived at MMW006 to start purge
DTW = 266.35, beginning parameters = temp 7.87°c, pH 7.85, ORP 197.0, D.O. 8.47, SPC 500.6, NTUs 11.23. .28 L/min

5/7/14
1445 Sampled 1405GWMMW006
Final = WL 266.49, PR 0.28 L/min, Vol 21.60 L, Temp 8.99°c, pH 7.71, ORP 189.5, D.O. 5.10, SPC 502.7, NTUs 5.00
collected Trans. info, No new lock needed
1515 Started purge on MMW020.
DTW = 283.85, parameters = Temp 8.71, pH 7.65, ORP 199.5, D.O. 8.57, SPC 789.0, NTU 13.70. 1.0 L.
1620 Sampled 1405GWMMW020-U, F
Final = WL 283.85, NA, Vol 27.0, Temp 8.72°c, pH 7.18, ORP 184.7, D.O. 5.07, SPC 744.6, NTU 3.70.
Downloaded Trans. No New lock needed.
1705 Started work at MBWD09.
WL = 1.70
1745 Sampled 1405GWMBW009-F, U
Final = WL 8.81, PR 0.20 L/min, Total 10.0 L, Temp 5.10°c, pH 6.74, ORP 59.2, D.O. 3.29, SPC 1027.8, NTUs 3.40.
1805 Signed out at Mine Office.

A. Pettley / B. Dicou

5/8/14 0705, Check Calibration on YSI water quality meter

Standard		Reading	OK
ORP	220	220	✓
SC	1413	1425	✓
PH	10	10.02	✓
PH	7	7.04	✓
Turb.	40	50	✓

* Water Quality Instrument in Calibration.

0830 Arrive at Monsanto Mim Plant to drop off 2 coolers GW/SW FedEx Air #800990239 2270 Picked up package from Geotec water quality meter

0930 Arrived at MMW032 DTW = 19.05, Starting parameters = Temp 6.47, pH 7.90, ORP 192.6, D.O. 8.29, SPC 436.4, NTUs 1.72
* No transducer in well.

1116 Pumped MMW032 dry after 88L. will return to sample on a different day

1140 Arrived at MMW029 and started purge DTW = 15.90. Starting parameters: Temp 7.40, pH 7.26, ORP 253.2, D.O. 5.89, SPC 1565.3, NTUs 2.81

5/8/14 A. Pettley

1205 Sampled 1405GWMMW029-U,F. Final parameters = WL 16.05, PR 0.40 L/min, Total 11.5 L, Temp 7.46, pH 7.19, ORP 240.5, D.O. 6.18, SPC 1558.7, NTUs 1.18
Collected Transducer data and replaced.

1230 Started work on MMW033 DTW = 8.30, 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

1355 Sampled 1405GWMMW033-U,F. Final = WL 34.65, PR 0.5 gpm, Total purge 42.50 gal, Temp 6.43°C, pH 7.81, ORP 82.1, D.O. Ø, SPC 467.5, NTUs 1.75.
Replaced Lock.

1420 Started work at MBW032 DTW = 8.08

1435 Sampled 1405GWMBW032, Final = WL 8.18, Vol 6.40 L, Temp 3.19, pH 7.30, ORP 187.3, D.O. 8.46, SPC 1412.4, NTUs 3.87.

B. Dicon
A. Pettley

5/8/14

1500 Started work on MMW018.
DTW = 9.02. Starting parameters:
flow .15, Temp 7.05°c, pH 7.40, ORP 193.8,
D.O. 6.88, SPC 417.3, NTU's 2.27.
1540 Sampled 1405 GWMMW018-U,F,
final parameters: WL 9.16, PR 0.15 L/min,
Total 10.0 L, Temp 7.89, pH 7.36, ORP 200.3,
D.O. 6.71, SPC 416.7, NTUs 4.54
New YELL lock added (old 8X removed)
No MS/MSD collected due to low purge rate.
1625 Arrived at MBW048
DTW 0.60.
1650 Sampled 1405 GWMBW048-U,F,
final parameters: WL 1.98, PR 0.40, Total 10.0,
Temp 3.58, pH 6.72, ORP 64.2, D.O. 0.05,
SPC 199.4, NTU 3.57.
Took photo.
1720 Signed out at the New Miami office.

B. Dicon
A. Pettley

5/9/14

0700 Started calibration on
EXO - YSI 3883 + 3882
- pH 7 @ 21.10°c reads 7.02 no cal. needed.
- pH 4 @ 19.63°c reading 4.05 no cal. needed.
- pH 10 buffer @ 19.91°c reading 10.03. no cal. needed.
- SPC conductivity buffer reading 1413 @ 19.95°c no cal.
- ORP 220 mv buffer reading 219.0 no cal needed.
- Turbidity 100 @ 19.27°c reading 130.00 calibrated to 100.00 good.
- Turbidity 40 @ 19.15°c reading 39.21, cal not needed.
- Turbidity Ø @ 15.55 reading Ø no cal needed
- D.O. reading 7.36 mg/L @ 15.67°c and 611.4 mmHg.

0950 At MMW007 DTW = 34.15
Temp 6.58, SC 245.4, D.O. 2.99,
pH 7.61, ORP 220.5, NTU 1.57.
1000 DTW 37.41, Temp 6.71, SC 233.2.

B. Dicon
A. Pettley

5/9/14

D.O 1.99, pH 7.15, ORP 214, TURB 14.42, 10.0 Liters purged.

1010 DTW 39.90, 18 Liters purged, Temp. 6.80, SC 233.0, D.O. 1.34, pH. 7.16, ORP 210.3, TURB 23.40

1020 MMW007 DTW = 47.10
Temp 6.85, SPC 233.3, D.O. 1.26, pH 7.16, ORP 191.6, NTUs 51.1
Total purge 30L.

1040 MMW007 DTW 58.85, Temp 6.83, SP 233.8, D.O. 1.34, pH 7.17, ORP 146.5, NTUs 44.2. @ 2L/min.

1050 MMW007, DTW 69.05, Temp 6.84, SPC 233.9, D.O. 1.95, pH 7.19, ORP 152.2, NTU 159.4 @ 2L min, Total 90 L

1110 MMW007 DTW: 74.65, Temp 6.84°c SPC 235.4, D.O. 2.24, pH 7.21, ORP 154.8, NTUs 37.09, 130L. total

1130 MMW007 DTW - 79.31, Temp 6.91°c SP 242.0, D.O. 1.85, pH 7.19, ORP 146.8 NTU 131.6, VOL 170L. Total

1145 Flow rate adjusted for MMW007 to meet Low Flow sampling @ DTW 79.93. preparing equipment for low Flow sampling.

B. Dicon
A. Pettley

5/9/14

1155 MMW007, DTW = 79.93, .4L/min Temp 6.57, SPC 246.5, D.O. 1.67, pH 7.19, ORP 143.2, NTUs 4.2,

1200 MMW007, DTW = 79.97, 0.4 L/min. Temp 6.59°c, SPC 246.1, D.O. 1.69, pH 7.22, ORP 144.7, NTU 3.59.

1205 MMW007, DTW = 79.98, @ .4 L/min, Temp 6.60, SPC 245.3, D.O. 1.64, pH 7.18, ORP 143.6, NTU 4.45,
Sampled 1405GWMMW007-F,U
- Replaced lock
- GPS WGS84 = N 42°51'48.4"
W 111°23'37.2"

1305 Arrived at MMW026 and started purge 285.10, beginning parameters = Temp 8.55°c, pH 7.73, ORP 172.1, D.O. 2.76, SPC 427.1, NTUs 2.62, .60 L/min.

1400 Collected sample 1405GWMMW026-U,F + MS/MSD. Find = WL 285.05, PR 0.6 L/min, Total 29.0 L, Temp 9.97°c, pH 7.74, ORP 162.3, D.O. 0.80, SPC 425.9, NTUs 3.16.
Collected transducer data, replaced x8 lock with YELL lock.

1425 Arrived at MBW099 to sample well DTW = 3.05 TOCN. exceeds 80% recovery

B. Dicou
A. Pettley

5/9/14

1445 Sampled 1405GWMBW099-U, F
Final = WL 11.10, PR 1.0 L/min, Temp 6.53, pH 6.99, ORP 193.0, D.O. 7.01, SPC 267.4, NTUs 4.55.
collected photo.

1515 Arrived at Desert Stream Mech. Shop to drop off empty Nitrogen tank.

1540 Arrived at the new Monsanto mine office to pick up a new radio

1550 Arrived at MMW030 to check recharge. DTW = 36.60 Well has recharged to 90%, continued with sample.

1610 Sampled 1405GWMMW030-U, F,
Final = Temp 8.81 C, pH 7.86, ORP 198.1, D.O. 3.39, SPC 402.1, NTUs 2.15.

1630 Signed out at the Monsanto new mine office.

B. Dicou
A. Pettley

5/10/14

0700 started calibration check of the EXO/YSI 3883 sond and 3882 hand held.

- pH 7 reading 7.05 NO calibration.
- pH 10 reading 9.98 no calibration
- pH 4 reading 4.07 NO calibration.
- SC 1413 Reading 1425 NO Cal.
- ORP 220 Reading 220.3 NO Cal.
- 100 NTUs reading 100.0 NO cal.
- 40 NTU reading 39.23 NO Cal.
- 0 NTUs reading 0.05 NO cal need
- D.O. reading 7.98 mg/L - Baro 612.2 mmHg

0825 Signed in at the Monsanto Mine office

0920 Arrived at the Henry Mine well of MMW023 to start purge on well - DTW = 107.30.
starting parameters: Temp 8.79 C, pH 7.08, ORP -55.7, D.O. 0.36, SPC 958.9, NTUs 2.50.

0945 Sampled 1405GWMMW023-F, U.
Temp 8.90 C, pH 7.06, ORP -100.3, D.O. 0.02, SPC 971.2, NTUs 3.21, PR 1.0 L/min, 29.0 L
NO New lock needed.

B. Dicou
A. Pettley

5/10/14

~~0920~~ 1030 AM Arrived at MMW011 to start Sampling - DTW = 74.81

Begining parameters: FR = 0.20 L/min, Temp 6.68°c, pH 7.45, ORP 80.7, D.O. 8.28, SPC 685.4, NTU 1.54.

1110 Sampled 1405GWMMW011-F,U

final = DTW 74.95, PR 0.20 L/min, Total = 8.0 L, Temp 7.45°c, pH 7.34, ORP 106.1, D.O. 5.63, SPC 781.2, NTUs 4.43.

New 4E11 lock added.

1155 Arrived at MMW028 to start the sample process. DTW = 70.62

1200 starting parameters = FR 0.90 L/min, Total 2.0 L, Temp 7.57, pH 7.62, ORP 136.2, D.O. 6.87, SPC 549.4, NTUs 1.21

1240 Sampled 1405GWMMW028-1-F,U and DUP 1405GWMMW028-2-F,U time 1250. final = 70.63 (WL), PR 0.90 L/min, Total 30.0 L, Temp 7.56°c, pH 7.62, ORP 131.2, D.O. 6.73, SPC 548.6, NTU 4.25. Has a 4E11 lock.

1515 Sampled 1405GWMMW022-F,U

final = WL 207.95, PR 0.15 L/min, Total 20.0 L, Temp 7.42°c, pH 7.15, ORP 154.5, D.O. 4.19, SPC 924.2, NTUs 2.14 / Downloaded Transducer Has 4E11 lock

pHly Cloudy 35°F

B. Dicou
A. Pettley

5/10/14

1550 Arrived at MMW010, DTW = 0.90 TOCN. Water level is above ground level.

begining parameters: WL 1.01, Temp 6.54°c, pH 6.65, ORP 187.5, D.O. 3.25, SPC 1618.7, NTU 71.25.

1415 Sampled 1405GWMMW010-F,U

Final DTW = 1.15, PR 0.30 L/min, vol 7.80 L, Temp 6.57, ORP 180.8, D.O. 2.79, SPC 1673, NTUs 4.21. Has 4E11 lock. Downloaded transducer

1715 Met with Surface water team and Finish GWS for the day

1800 Arrived at Airgas in Soda Springs and picked up (2) 300lL Nitrogen tanks that were procured by Terry Taylor (Rogerstorm).

1840 Leaving Airgas and finished for the day.

5/11/14 A. Pettley

0700 Calibrated EXO/YSI Sond 3883
Display 3882

pH 7 reading 6.98 @ 12.06°c No cal.
pH 4 reading 4.05 @ 11.22°c No cal
pH 10 reading 10.00 @ 10.85°c No cal
SPC 1413 reading 1430.4 @ 11.42°c calibrated to 1413 good
- NTU 40 reading 39.26 @ 10.67 No cal.
- NTU 100 reading 101.31 @ 10.66 No cal.
- NTU Ø reading 0.15 @ 21.85°c No cal.
- ORP 220 MV reading 224.2 MV @ 13.57 calibrated to 220 MV - good
- D.O. reading 6.85 mg/L @ 21.85°c
BARO 612.8 mm/Hg. No cal needed.

0805 Signed in at the mine office and picked up a new radio.

0820 Arrived at MMW015A to download the transducer.

0851 Arrived at MMW032 to collect a water sample DTW: 17.45

0930 Sampled 1405GWMMW032-U,F
Final DTW: 23.58, FR 0.60 L/min, Total 19.0 L, Temp 6.14°c, pH 7.48, ORP 177.1, D.O. 6.51, SPC 385.4, NTUs 2.54. Has a YE11 lock but no transducer.

5/11/14 A. Pettley

0950 Made an attempt to drive to MMW009, too muddy to reach the well turned around.

1040 Arrived at MMW013 to start sample. DTW = 2.72, Temp 5.99°c, pH 7.07, ORP 195.6, D.O. 9.25, SPC 687.3, NTUs 11.94.

1105 Sampled 1405GWMMW013-U,F, Final - WL 2.75, PR 0.50 L/min, Total 12.5 L, Temp 6.17°c, pH 7.05, ORP 204.6, D.O. 8.73, SPC 686.2, NTUs 3.99.
- Replaced X8 lock with YE11 lock
- Collected transducer data.

1120 Started work on MMW034 DTW = 10.33
Flow Rate 0.04 L/min, Temp 6.02°c, pH 7.51, ORP 194.8, D.O. 4.09, SPC 633.4, NTU 1.14

1145 Sampled 1405GWMMW034-1-U,F, with DUP 1405GWMMW034-2-U,F (1155). Final WL = 10.58, PR 0.40 L/min, Total 10.0 L, Temp 6.62°c, pH 7.40, ORP 203.6, D.O. 8.47, SPC 622.2, NTUs 1.11
- has X8 lock No YE11 replacement available
- No transducer.

1220 Arrived at MMW024 to start sampling by Low flow DTW = 58.83

GWS Monsanto Spring 2014 Cloudy ~40°F

B. Dicon
A. Pettley

5/11/14

1250 Sampled 1405GWMMW024-F,U
DTW = 58.94, Flow 1.0 L/min, Total 30.0,
Temp 7.36°c, pH 7.23 ORP 181.6,
D.O. 3.24, SPC 810.9, NTU 2.88.
• Collected transducer data.
• This well has a X8 lock did not have an extra 4E11 lock to replace it.

1325 Arrived at MMW017 to start Low flow sampling DTW = 35.49
PR 0.08, Temp 12.78, pH 7.88, ORP 178.0,
D.O. 8.80, SPC 1260.4, NTUs 1.96

1425 Sampled 1405GWMMW017-F,U
Final = DTW 35.70, PR 0.08 L/min,
Vol 4.60 L, Temp 10.47°c, pH 6.87,
ORP 217.4, D.O. 6.14, SPC 1345.4,
NTUs 1.10, Downloaded transducer data, this well has an X8 lock, no 4E11 lock available.

1545 Signed out at the Monsanto mine office.

GWS Monsanto Spring 2014 PTLY cloudy snow 30°F

B. Dicon
A. Pettley

5/12/14

0730 Started calibration on EXO / YSI 3883 / 3884
- pH 7 reading 7.02 @ 18.73°c No cal.
- pH 10.0 reading 10.01 @ 18.84°c No cal.
- pH 4.0 reading 4.05 @ 18.71°c No cal.
- Conductivity 1413 reading 1388.8 @ 18.23°c calibrated to 1413 18.71°c
- ORP 220 mV reading 214.0 calibrated to 220 mv good.
- NTU 40 reading 39.01 NTUs @ 18.63°c No cal.
- NTU 100 reading 101.01 NTUs @ 18.59°c No cal
- NTU 0 reading 0.0 NTUs @ 15.32°c
- D.O. reading 7.87 mg/L @ 15.73°c
BARO 619.3 mm/Hg.

0830 Arrived at the Monsanto Mine office to sign in for the day.

0925 Arrived at MMW009 to start Sampling process. DTW = 213.71
Begining parameters - 213.81, Temp 7.44,
pH 7.63, ORP 179.2, D.O. 8.82, SPC 626.8,
NTUs 9.72.

1100 Sampled 1405GWMMW009-F,U
Final WL = 213.89, PR 0.40, Total 36.0 L,
Temp 8.30, pH 7.21, ORP -0.4, D.O. 0,
SPC 631.0, NTUs 1.68, Downloaded Transducer.
has X8 lock, no 4E11's available

GWS Monsanto Spring 2014 — Snow ~32°F — B. Dicon, A. Pettley

5/12/14

1150 Arrived at MMW035 to start work. DTW: 110.60, beginning parameters PR 0.50 L/min, Total 7.0 Temp 7.25 pH 7.05, ORP 93.5, D.O. 2.29, SPC 1430.7, NTU's 1.57.

1215 Sampled 1405GWMMW035-U,F MS/MSD

final = 110.65 WL, PR 0.50 L/min, Total 14.5 L, Temp 7.24°C, pH 7.03, ORP 122.5, D.O. 2.21, SPC 1429.5, NTU 2.50,

- Downloaded transducer data
- This well has an X8 lock, no YELL to replace it.

1240 Arrived at MMW027 DTW: 109.16 beginning = 109.25 DTW, PR 0.5 L/min, Total 1.5 L, Temp 7.18°C, pH 7.64, ORP 132.4, D.O. 7.19, SPC 1119.1, NTU's 3.01

1300 Sampled 1405GWMMW027-F,U.

Final = WL 109.28, FR 0.5 L/min, Total 11.50 Temp 7.11°C, pH 7.16, ORP 152.3, D.O. 3.85, SPC 1082.4, NTU's 1.80.

- Downloaded Transducer data
- This well has an X8 lock

1315 At MMW012 well is DRY TD=61.05'

No sample, No transducer, and has an X8 lock attached.

GWS Monsanto Spring 2014 — Cloudy Snow — B. Dicon, A. Pettley

5/12/14

1325 At MBW07, DTW = 36.50 TD 39.30

Not set up to sample, need a bailer. conducted well survey

1350 Started work on MMW037 DTW: 119.90

beginning = 113.92 DTW, .70 flow, Temp 13.34°C, pH 7.57, ORP 130.6, D.O. 8.29, SPC 19.3, NTU's 4.76,

1420 Sampled 1405GWMMW037-1-F,U and DUP 1405GWMMW037-2-F,U (1430)

Final = 119.95, Flow 0.70 L/min, Total 19.5 L, Temp 7.88°C, pH 7.61, ORP 145.5, D.O. 8.14, SPC 430.7, NTU's 2.94

- This well has a X8 lock
- Downloaded Transducer calls.

1450 Started work on MMW036 - DTW 113.14

Starting = DTW 113.20, Temp 6.01°C, pH 7.84, ORP 22.7, D.O. 8.11, SPC 479.9, NTU 14.99

1525 Sampled 1405GWMMW036-U,F + MS/MSD

Final 113.18 DTW, PR 0.40 L/min, Total 13.0 L, Temp 7.65°C, pH 7.62, ORP 116.4, D.O. 7.79, SPC 429.8, NTU's 9.09. Sample with stable NTU's would not go below 9.

- Has X8 lock
- Downloaded Transducer data

GWS Monsanto Spring 2014 Sunny ~ 45°F

B. Dicou
A. Pettley

5/12/14

1600 Met with surface water sampling team near MMW009 to pick up a disposable bailer to attempt to sample MBW107.

1630 MBW107 Dry cannot sample.

1800 Arrive at the Monsanto mine office to sign out. Door locked. Emily Y. texted Rachel Rockelley to let her know that we have left the mine.

1830 Finished for the day.

GWS Monsanto Spring 2014

B. Dicou
A. Pettley

5/13/14

0630 organized paperwork

0830 Arrived at equipment shed to pack up equipment.

1000 Downloaded transducer data from MMW06A.

1030 Unloaded Nitrogen tank (3) and carrier at the Degerstorm mech. shop. (1) 300 lb. empty (2) other: full. (1) gas can, (4) chalks, (2) flags. returned. (Nathan) help us.

1045 Signed out at the mine office. returned key's to Rachels desk and transducer cradel to Cody's desk.

1120 Packing (3) coolers of sample

1400 Arrived at Fed Ex in Ogden to ship sample coolers and equipment.
(5) box for Geotech
(7) coolers for Microbac Lab.

19:30

to measure
level in
26 - needed
ey but it
t on key ring

5/5/14 1535 B. Dixon
Calibrate YSI water quality Meter.
PH 4 Reading 4.01
PH 7 " 7.02
PH 10 " 9.99
SC. Reading 1366. Calibrate to 1413.
ORP Reading at 239 Calibrate to 220 standard.
YSI Professional Plus meter Complete.

MSTOGA @ 16:35
H_2O Temp 11.9 °C
SC 2345 mS/cm
Cond 1756 mS/cm
pH 7.99
DO% 87.0 %
DO mg/L 9.37 mg/L
Turb 5.10 NTU
ORP 71.6 mV
Air Temp 13 °C
Sample Time - 1700
N 4740931.37
E 459982.19

Turbidity Standards

4.87 → 4.63 NTU

54 → 51.1

639 → 602

1750 arrive at MW16A

WL = 4.94' bTOC

Final Params:

1830 sample time

WL 5.39'

flow 0.07 L/min

T 5.5°C

pH 7.60

ORP -69.2 mV

DO 0.51 mg/L

SC µS/cm 1461

Turb 1.74

Leave site @ 19:10

5/6/14

On site 7:50

800 Check YSI probe calibration

ORP 220 mV → 233.8 mV

Cond 1413 @ 10°C 1020 → 1063 µS/cm

pH 7.0 → 7.10

10.0 → 10.06

	Depth	Flow m/s
8.1	2.9	~~0.33~~ 0.42
8.6	1.8	0.60
9.1	1.8	0.60
9.6	1.8	0.59
10.1	1.8	0.53
10.6	1.7	0.44
11.1	1.6	0.41
11.6	0.7	0.02
12.1	–	–

1010 Arrive @ MST 131

Water temp	7.8 °C
Specific Cond	282.3 mS/cm
Cond	184.4 mS/cm
TDS	–
Dissolved O_2	99.3 %
O_2	11.61 mg/L
pH	7.91
ORP	51.1 mV
Turbidity	7.04 NTU
Air Temp	10 °C

1025 Sample time 1025

1055 Arrive @ MST 128

Water temp	9.2 °C
Specific Cond	357.3
Cond	249.5
O_2 %	94.6
O_2 mg/L	10.73
pH	8.02
ORP	160.0
Turbidity	3.8
Air temp	11

11:00 Sample time

1140 Arrive @ MST 132

Water temp	9.9 °C	10.1 °C	
Specific Cond	339.7	339.3	mS/cm
Cond	241.8	242.7	mS/cm
O_2 %	89.2	87.5	%
O_2 mg/L	10.04	9.81	mg/L
pH	8.05	8.05	
ORP	145.4	140.3	mV
Turbidity	5.77	5.57	NTU
Air temp	11 °C		

1150/1155 Sample time

1325 Arrive @ MST 143

Water temp	12.6
Specific Cond	123.4
Cond	94.1
O_2 %	58.0
O_2 mg/L	6.16
pH	6.43
ORP	103.8
Turbidity	3.48
Air temp	13 °C

1330 Sample Time

1411 Arrive @ MST 274

Water Temp	8.9 °C
Specific Cond	450.5 µS/cm
Cond	312.0 µS/cm
O_2 %	99.0 %
O_2 mg/L	11.48 mg/L
pH	8.23
ORP	84.0 mV
Turbidity	1.32 NTU
Air Temp	14°C

1415 Sample time

1504 Arrive @ MD5026

water Temp	7.3°C
SC	1588 µS/cm @ 25°C
cond	1052 µS/cm
DO%	23.9
DO mg/L	2.89
pH	6.69
ORP	108.9
Turb	1.25 NTU
air Temp	11°C

1504 sample time

~~MSH 2~~

1550 Arrive @ MST 269 - DRY

1615 Arrive @ MSH33

Water Temp	12.7 °C
Specific Cond	174.7 µS/cm
Cond	133.7 µS/cm
O_2 %	93.9 %
O_2 mg/L	9.92 mg/L
pH	8.08
ORP	118.5 mV
Turbidity	30.9 NTU
Air Temp	11°C

1620 Sample time

5/7/14

0700 Check/Calibrate probe/turbidity meter

ORP 220 → 220.6

Cond 1413 @ 18°C 1225 → 1254

pH 7 → 7.04

pH 10 → 10.03

pH 4 → 4.06

Turbidity 4.87 → 4.60

54 → 51.5

639 → 603

0915 arrive @ MD5025

0930 sample time

H2O T 6.8°C

SC @ 25°C 1712 µs/cm

Cond 1117 µs/cm

DO % sat 26.2

DO mg/L 26.4

pH 6.40

ORP 12.1 mV

Turb 0.77 NTU

Air T 4°C

Flow: 15.10 sec 1.5L

15.88 sec 1.5L

18.19 sec 1.7L

0945 arrive @ MST 144

05/07/14

1015 sample time

H2O T 5.8°C

SC @ 25°C 570.6 µs/cm

cond 361.6 µs/cm

DO % 53.6

DO mg/L 6.67

pH 6.99

ORP 83.7

Turb 24.3

Air T 4°C

Flow: 2.25 sec 1.0L

2.06 sec 1.0L

2.31 sec 1.0L

1100 Arrive @ MST 275

1105 sample time

		Flow
H2O T	9.2°C	
SC @ 25°C	64.5	1.44s 3.0L
cond	47.1	1.47s 4.0L
DO %	89.7	1.50s 4.0L
DO mg/L	10.33	1.65s 4.0L
pH	7.73	
ORP	82.9	
Turb	8.89	
Air T	6	

~~Flow 2.28 sec 1.0~~

05/07/14

1150 Arrive @ MST136

1200 sample time

Air T °C	5
Water T °C	7.5
SC @ 25°C	395.6 µS/cm
Cond	260.3 µS/cm
DO %	40.0
DO mg/L	4.78
PH	7.12
ORP	101.4 mV
Turb	1.43 NTU

Flow:

1	2.41	1.0
2	2.57	1.0
3	2.47	1.0

~~@~~ 1247 arrive @ MST051 DRY

~~sample time~~

1312 arrive @ MST063

1330, 1335, 1340 sample + MS/MSD

Air T °C	3	3	3
Water T °C	4.4	4.4	4.4
SC @ 25°C	546.8	546.9	547.0 µS/cm
cond	332.0	332.0	332.0 µS/cm
DO %	40.2	40.2	40.2
DO mg/L	6.17	6.17	6.17

05/07/14

MST063 cont.

PH	7.22	7.22	7.22
ORP	41.9	41.9	41.9 mV
TURB	7.57	1.62	0.45 NTU

Flow: 2.13 sec 1.0L

2.06 sec 1.0L

2.15 sec 1.0L

1400 MST057 arrive

1430 sample time

Air T °C	2
Water T °C	7.1
SC @ 25°C	384.8
cond	253.8
DO %	76.4
DO mg/L	9.25
PH	8.03
ORP	38.0
Turb	1.19 NTU

Flow:

1	1.28 s	6.75 L
2	1.15 s	7.5 L
3	1.10	7.0 L
4	1.25	7.25 L

Pic 64

4746079.09 N.M

464111.21 M E

6395.36' E W

05/07/14
1524 arrive @ MST2226
1545 sample time
Air T °C 6
H_2O T °C 3.7
SC @ 25°C 232.8 µs/cm
Cond 138.0 µs/cm
DO% 74.0
DO mg/L 9.76
pH 7.22 ORP 76.1 mV
4745539.77 mN. Turb 2.58
4641638.37 mE.
elv 6518.30'

Flow	1	1.63 s	2.3
	2	1.47	2.5
	3	1.50	2.75
	4	1.60	2.75

1615 arrive @ MST050
1630 sample time
Air T °C 5
H_2O T °C 9.2
SC @ 25°C 317.9 µs/cm
Cond 220.9 µs/cm
DO% 86.7
DO mg/L 10.0

05/07/14
pH 8.64
ORP 106.4 mV
Turb 2.29
Flow: 7.09 s 0.5L
7.72 s 0.5L
7.00 s 0.5L
} MST050 cont.

1730 Back in town

ej 05/07/14

5/8/14

0700 Check calibration of YSI probe
ORP 220 → 218.7 mV
Cond 1413 @ 19°C 1251 µS/cm → 1305 µS/cm
Calibrate 1305 → 1225 µS/cm
pH 7 → 7.08
pH 10 → 10.03
pH 4 → 4.06
Turbidity 4.87 → 4.77
54 → 51.2
639 → 600

0825 sign in at mine office
0845 arrive @ MSG004
0900 sample time
air T°C
H_2O T°C
SC @ 25°C 497.6 µS/cm
Cond 302.1 µS/cm
DO% 71.1
DO mg/L 9.19
pH 7.65
ORP 33.2 mV
Turb 2.30 NTU
Flow could not be measured, too many locations spring is flowing from hillside

05/08/14
0925 arrive @ MSG005
0930 0935 0940 sample time + MS/MSD
air T°C 2.0
H_2O T°C 5.2
SC @ 25°C 550.9 µS/cm
cond 341.6 µS/cm
DO% 79.0
DO mg/L 9.66
pH 7.40
ORP 52.8 mV
Turb 0.22
Flow: 10.72s 5L
10.59s 5L
10.57s 5L
1015 arrive @ MBW130
WL: 0.08' bgs, TD 24.9' bgs
1034 pumped dry
1040 arrive @ MST092
1050 sample time
air T °C 2.0 pH 8.10
H_2O T °C 11.3 ORP 59.6 mV
µS/cm SC @ 25°C 372.9 Turb 4.9 NTU
µS/cm cond 275.5 Flow:
DO% 105.6 W/ Marsh
DO mg/L 11.57 McBirney

05/08/14
1135 arrive @ MST089
1200, 1205, 1210 sample + ms/msD

ET air	0	0	0
T °C water	12.3	12.3	12.3
SC @ 25°C	321.4	321.2	321.1 µs/cm
cond	243.6	243.2	243.0 µs/cm
DO %	105.5	103.7	103.2
DO mg/L	11.41	11.12	11.04
pH	7.99	7.95	7.94
ORP	74.4	74.4	74.9 mV
Turb	1.53	1.22	1.38 NTU

flow w/ marsh McBirney
1254 arrive @ MST090
sample time

air T °C	0°		
H_2O T °C	12.6		
SC @ 25°C	379.9 µs/cm		
cond	289.9 µs/cm		
DO %	98.1		
DO mg/L	10.43		
pH	8.26		
ORP	71.6 mV		
Turb	0.56		
Flow	1.69s	7.1L	1.4s 8.0L
	1.34s	8.25L	1.25s 8.3L

05/08/14
1330 arrive @ MST096
1340 sample time

air T °C	0°
H_2O T °C	13.4
SC @ 25°C	565.2 µs/cm
cond	439.3 µs/cm
DO %	87.9
DO mg/L	9.18
pH	7.91
ORP	21.9 mV
Turb	1.14 NTU

JP ~~1435~~ 1455 arrive @ MSG007
~~1440~~ 1500 sample time

Air Temp	0°C
Water Temp	6.7
Specific Cond	459.2 µs/cm @ 25°C
Cond	297.1 µs/cm
DO %	36.6
DO mg/L	4.50
pH	7.7
ORP	84.3 mV
Turb	12.6 NTU

05/08/14

1405 Arrive @ MSG00[illegible]6

1420 Sample Time

Air Temp	0 °C
Water Temp	5.6
Specific Cond	1279 @ 25°C µs/cm
Cond	806 µs/cm
O_2 %	72.1
O_2 mg/L	9.01
pH	7.30
ORP	59.6 mV
Turb	38.6 NTU

1505 arrive @ MST095,

1515 sample time

Air T °C	0
H_2O T °C	12.9
SC @ 25°C	713 µs/cm
cond	540 µs/cm
DO %	86.3
DO mg/L	9.10
pH	8.01
ORP	95.4 mV
Turb	0.58 NTU

1600 arrive @ MST094

1610 sample time

05/08/14

MST094 cont.

Air T °C	9
water T °C	10.8
SC @ 25°C	309.3 µs/cm
cond	225.3 µs/cm
DO %	82.2
DO mg/L	9.10
pH	7.99
ORP	120.8 mV
Turb	0.93 NTU

JP 05/08/14

5/9/14

0705 Check calibration on YSI probe

ORP 220 mV → 216.6 mV

Cond 1413@ 19°C 1257 µS/cm → 1238 µS/cm

pH 7 → 7.05

pH 10 → 10.01

pH 4 → 4.08

Turbidity 4.87 → 4.64 NTU

54 → 51.3 NTU

639 → 601 NTU

0830 sign in at mine office

0905 arrive @ MST045

0930, 0935 sample time + DUP

Air T °C 4

H_2O T °C 7.5

SC @ 25°C 505.0 µS/cm

cond 336.4 µS/cm

DO% 79.7

DO mg/L 9.50

pH 7.99

ORP 115.7 mV

Turb 7.33 NTU

1000 arrive @ ~~MST044~~ MBW152

Begin purge, WL = 14.46

1007 Dry, removed 2.45 L

05/09/14

1120 arrive @ MST044

1145 sample time

Air T °C 5

H_2O T °C 7.9

SC @ 25°C 503.6 µS/cm

Cond. 339.1 µS/cm

DO% 87.1

DO mg/L 10.31

pH 8.19

ORP 109.5 mV

Turb 3.98 NTU

1245 arrive @ MDS034

1300 sample time

Air T °C 5

H_2O T °C 7.7

SC @ 25°C 752 µS/cm

cond 504 µS/cm

DO% 29.6

DO mg/L 3.45

pH 7.51

ORP 126.4 mV

Turb 2.72 NTU

1400 arrive @ MDS036

1410, 1415 sample time + DUP

05/09/14

MDE0030 cont.

Air T °C	11	11
H2O T °C	7.6	7.6
SC @ 25°C	853	852 uS/cm
cond.	569	567 uS/cm
DO %	71.1	69.6
DO mg/L	8.60	8.32
pH	7.21	7.16
ORP	136	136 mV
Turb	1.91	0.58

1450 arrive @ MST067

1510 sample time

Air T °C 11

H2O T °C

SC @ 25°C

cond

DO %

DO mg/L

pH

ORP

Turb

1525 Arrive @ MBW 130

1530 Sample time

Air Temp 9°C

Water Temp 5.8°C

05/09/14

pH	7.59	
ORP	128.5	mV
DO mg/L	3.63	mg/L
Specific Cond	161.8	uS/cm
Turbidity	74.8	NTU

1645 leave mine office

05/09/14

5/10/14

1705 Check calibration on probe

ORP 220 mV → 225.2 mV

Cond 1413 @ 15°C 1147 → 1130 mS/cm

pH 7 → 7.08

pH 10 → 10.02

pH 4 → 4.07

Turbidity 4.87 → 4.70

54 → 52.2

~~DO%~~ 639 → 605

% DO 612.0 mmHg → 84.4% @ 18.2°C

0830 sign in at mine office

0900 arrive @ MBW135

WL 1.81' bgs

0915 sample time

WL 1.81' bgs

H_2O T 5.8°C

pH 7.78

ORP 88.2 mV

DO 1.50 mg/L

SC 413.2 µS/cm

Turb. 7.92

0957 arrive @ MBW087

WL = 0.756 ft below m.p.

1017 Begin pumping ~~at 101~~

05/10/14

1047 Final readings at MBW087

WL 1.00 ft below m.p.

Low flow rate QP ~~Purge rate~~ 0.12 L/min

Cumulative purge 3.63 L

Water temp 4.1 °C

pH 6.69

ORP 127.5 mV

DO 0.51 mg/L

Specific Cond 545.1 mS/cm

Turbidity 4.17 NTU

1130 Arrive @ MBW085

WL = 1.42 ft below m.p.

Purge rate

1136 Begin pumping at MBW085

1156 MBW085 pumped dry

1218 Final readings at MBW085

WL

Purge rate 0.6 L/min

Cumulative purge ~~3.6~~ QP 16.4

Water temp 3.1 °C

pH 6.99

ORP 196.1 mV

DO 8.48 mg/L

Specific Cond 342.9 mS/cm

Turbidity 4.99

05/10/14

1403 Arrive @ MBW131

WL = 1.60 ft below mp

~~Purge~~ Low flow rate 0.11 L/min

~~Cumulative Purge~~ JP

1510 ~~Water~~ JP Final Readings and Samples collected

WL = 1.70 ft below mp

Purge/Low Flow rate 0.11 L/min

Cumulative purge 5.94 L

Water Temp 4.6 °C

pH 6.52

ORP 158.3 mV

DO 5.19 mg/L

Specific Cond. 189.1 µS/cm

Turbidity 3.42 NTU

1600 Arrive at MBW028

1604 Begin purge @ 0.65 L/min

1640 Sample MBW028

Final Reading

Purge rate 1.0 L/min

Cumulative purge 20.80 L

Water temp 6.4 °C

pH 6.65

ORP 181.5 mV

DO 0.55 mg/L

Specific Cond. 1303 µS/cm

Turbidity 18.9 NTU

05/10/14

1700 Arrive @ MW15A

1710 Start pumping for low flow sampling

WL 19.64 ft below m.p.

Purge low flow rate 0.08 L/min

1746 Final Reading

WL 20.14 ft below mp.

Water temp 8.0 °C

pH 6.73

ORP 176.8 mV

DO 4.24 mg/L bubbles in tubing

Specific Cond 1658 µS/cm

Turbidity 0.27 NTU

1800 Lost suction on peri pump w/ 0.01 change in DTW during sampling. No change in pump rate, but it appears that the small change in head was enough to overcome the pressure required to draw water ≈ 25 ft.

- DTW increased as water fell out of the tube

1805 - Rate was increased to draw water back up the tube

- DTW ~~increased~~ JP decreased as the ~~rate~~ JP flows decreased w/ addition of capsule filter (≈ 0.065 L/min)

1813 - Flows at 0.065 L/min allowed water levels to rise in the casing from 20.25 to 20.17 ft (DTW)

JP 5/10/14

5/11/14

0710 Check calibration on YSI probe

ORP 220 → 226.8 mV

Cond 1413 @ 12°C ≈ 1050 → 1069 uS/cm

pH 7 → 7.06

pH 10 → 10.03

pH 4 → 4.05

Turbidity 4.87 → 4.75

54 → 51.6

639 → 602

0850 Arrive @ MST019

0845 Sample time @ MST019

Air temp 3°C

Water temp 6.3°C

Specific Cond 318.0 uS/cm

Cond 204.7 uS/cm

DO % 79.4 %

DO mg/L 9.74 mg/L

pH 8.15

ORP 110.6 mV

Turbidity 16.0 NTU

- Sampled using 8' pole extended into stream w/ tubing attached and extending 5-6" below surface. Water too high to enter w/ waders and sample/measure flow

0930 Arrive @ MST066

0930 Sample time

05/11/14

Air temp 3°C

Water temp 5.0°C

Specific Cond 450.9 uS/cm

Cond 279.0 uS/cm

DO % 99.6%

DO mg/L 12.66 mg/L

pH 7.75

ORP 36.6 mV

Turbidity 2.77 NTU

1045 Arrive @ MST020

1100 ~~Air Temp~~ Sample Time @ MST020

Water Temp 6.3°C

Specific Cond 317.7 uS/cm

Cond 204.5 uS/cm

DO % 82.8 %

DO mg/L 10.19 mg/L

pH 8.24

ORP 61.6

Turbidity 14.3

Air Temp 2°C

1150 Arrive at MBW152

1215 Sample time after purging MBW152 on 5/9/14

Water temp 6.3°C

pH 7.45

ORP 102.2 mV

05/11/14

DO mg/L 8.67 mg/L
Specific Cond 699.9 mS/cm
Turbidity 98.4 NTU

1310 Arrive @ MBW027
WL = 9.15 ft below m.p.
Low flow purge rate 0.08

1350 Final Readings
WL = 9.35 ft below m.p.
Water temp 5.3 C
pH 7.30
ORP 122.7 mV
DO 8.68 mg/L
Specific Cond 1055 mS/cm
Turbidity 2.28 NTU

1500 arrive @ SB07
WL 36.59', must bail
3-vol. : 3.11 gal
1515 sample time for PCE only
H2O T°C 9.6
pH 7.37
160.3 ORP mV
DO mg/L 2.82
1614 SC µS/cm
1632 NTU TURB
1530 sign out at Mine Office

05/12/14

0700 check cal. on probe
ORP 220 mV →
cond 1413 @ 15°C → 1229
pH 7 → 7.07
pH 10 → 9.98
pH 4 → 4.19
Turb 4.87 → 4.75
54 → 52.3
~~TDS~~ 639 → 598
0800 begin 7 cooler pack
1015 ship 7 coolers at plant. Overnight
1045 arrive @ MBW011
WL 0.73

H2O T°C	4.5	1127
pH	6.53	
ORP mV	153.9	
DO mg/L	1.55	
SC µS/cm	768.2	
Turb NTUs	30.8	
Cum. Vol purged	6.0L	

1122 start pump
1128 dry, removed ~6L
1215 sample time + BN samp.
1230 pack up supplies

05/12/14

1515 ship 9 empty coolers back to lab.

1636 at MBW112 - Dry

nad 83 4749016.51 m No.

464311.12 m E.

elev 6405.63 ft

1530 sign out

ew 05/12/14

05/13/14

0700 begin clean up, pack supplies

1030 return keys, radios to mine office.

1130 depart for SLC.

ew 05/12/14

A-2 2014 Fall Surface Water Sampling

TABLE A-3
2014 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											9/12/2014	1030
SW	MDS026	6.7	1658	1079	25.5	3.09	7.11	84.3	8.98	8.3	N/A	Flow can not be measured, seep is appx 25-30' across and minimal flow is coming out of entire length. Ponding in flat area on hill in tress is where the sample was collected.	9/12/2014	1015
SW	MDS030	9.8	843	598	15.9	1.76	7.22	-8	36.37	16.6	N/A	Flow along dump seep in deep vegetation and intermittent. Can not be measured.	9/12/2014	1615
SW	MDS034	DRY											9/12/2014	1445
SW	MSG004	7.8	603.4	405.3	14.5	1.69	7.31	-59.1	69.5	16.6	N/A	Flow exiting hill side in multiple locations across 15' width, can not be measured.	9/12/2014	1535
SW	MST019	13.7	337.7	264.6	87.2	9.05	7.93	-49.3	5.95	16.6	39	Flow measurement from USGS stream flow gauge station at 1710, stream gauge at 1.78'.	9/12/2014	1710
SW	MST020	13.1	317.5	245.6	105.2	11.09	8.83	55.9	2.92	16.6	53		9/12/2014	1800
SW	MST044	14.6	846	678	110.6	11.24	8.91	502	1.58	16.6	1.64		9/12/2014	1420
SW	MST045	14.5	864	691	105.7	10.7	8.9	100.5	1.92	10	1.12		9/12/2014	1320
SW	MST069	12.3	1679		61.3	6.33	8.12	-59.4	5.7	16.6	0.0153		9/12/2014	1650
SW	MST144	DRY											9/12/2014	1100
SW	MST274	0.8	485.3	261.1	81.5	11.65	8.15	139.9	1.43	8.3	0.0328		9/12/2014	9220
SW	MST275	DRY											9/12/2014	1120

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 2014 SW Sampling

Date 09 / 12 / 14 **Arrival Time** 1030

Field Personnel

E. Yeager **Signatures**

A. Pettey

SITE DESCRIPTION

Station Name West Dump Seep **Station Number** MDS025

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation ft **Datum** NAD 27 **Photo Number** ~~4~~ 3

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	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	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 – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Time** 1030 **Station Number** MDF025

Completed by: E. Yeager A. Peffley **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 – Fall 2014 SW Sampling

Date 09/12/14 **Arrival Time** 1004

Field Personnel

E. Yeager **Signatures**

A. Pettley

SITE DESCRIPTION

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

Latitude N Taken in Spring 2014 **Longitude** W

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

Site & Stream Description No flow observed, ponding ~20' radius.

Surface Water Characteristics (color, odor, appearance): Swampy, marsh, organic odor

SAMPLE COLLECTION

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

Sample ID: 1409SWMDS026, U, F **Sample Time:** 1015

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1015		
Water Temperature (°C)					6.7		
Specific Conductivity (µS/cm) @ 25° C					1658		
Conductivity (µS/cm)					1079		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					25.5		
Dissolved Oxygen (mg/L)					3.09		
pH					7.11		
ORP (mV)					84.3		
Turbidity (FTU)					8.98		
Air Temperature (~~°C~~) °F					47		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Time** 1004 **Station Number** MD50216

Completed by: ~~A. Pettley~~ E. Yeager **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

NA

* No flow observed, variable seepage width

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						

NA

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Arrival Time** 1605

Field Personnel

E. Yeager

A. Pettley

Signatures _____

SITE DESCRIPTION

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

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

Taken Spring 2014

Elevation ft **Datum** NAD 27 **Photo Number** ~~#~~ n/a

Site & Stream Description minimal flow and pooling in vegetated areas

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

SAMPLE COLLECTION

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

Sample ID: 1409SWMDS030-U,F **Sample Time:** 1615

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1615		
Water Temperature (°C)					9.8		
Specific Conductivity (µS/cm) @ 25° C					843		
Conductivity (µS/cm)					598		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					15.9		
Dissolved Oxygen (mg/L)					1.76		
pH					7.22		
ORP (mV)					-8.0		
Turbidity (FTU)					36.37		
Air Temperature ~~(°C)~~ °F					62		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09/12/14 **Time** 1105 **Station Number** MD5030

Completed by: E. Yeager A. Pettley **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow along dump seep in deep vegetation and intermitent. Can not be measured.

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 2014 SW Sampling

Date 09 / 12 / 14 **Arrival Time** 1445

Field Personnel

E. Yeager **Signatures**

A. Pettley

SITE DESCRIPTION

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

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

Taken in Spring 2014

Elevation 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	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	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 – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Time** 1445 **Station Number** MD5034

Completed by: E. Yeager A. Pentley **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 – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Arrival Time** 1525

Field Personnel

E. Yeager
A. Pettey

Signatures _____

SITE DESCRIPTION

Station Name Holmgren Spring **Station Number** MSG004

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

Taken Spring 2014

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

Site & Stream Description ~~Spring~~ Spring day lights on hill side, Flows through wide grassy channel

Surface Water Characteristics (color, odor, appearance): intermitent pools of water along channel, oily sheen to water

SAMPLE COLLECTION

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

Sample ID: 1409SWMSG004-U,F **Sample Time:** 1535

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1535		
Water Temperature (°C)					7.8		
Specific Conductivity (µS/cm) @ 25° C					603.4		
Conductivity (µS/cm)					405.3		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					14.5		
Dissolved Oxygen (mg/L)					1.69		
pH					7.31		
ORP (mV)					-59.1		
Turbidity (FTU)					69.5		
Air Temperature (~~°C~~) °F					62		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Time** 1525 **Station Number** MSG004

Completed by: E. Yeager A. Pettley **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Spring daylights on hillside appx 15' wide in grassy area. Can not measure

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 2014 SW Sampling

Date 09/12/14 **Arrival Time** 1705

Field Personnel

E. Yeager **Signatures**

A. Pettley

SITE DESCRIPTION

Station Name Blackfoot River Below Ballard Cr. **Station Number** MST019

Latitude N Collected Spring 2014 **Longitude** W

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

Site & Stream Description Free flowing, gravel bottom

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: 1409SWMST019-U,F **Sample Time:** 1710

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1710	~~1784~~	~~1910~~
Water Temperature (°C)					13.7		
Specific Conductivity (µS/cm) @ 25° C					337.7		
Conductivity (µS/cm)					264.6		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					87.2		
Dissolved Oxygen (mg/L)					9.05		
pH					7.93		
ORP (mV)					-49.3		
Turbidity (FTU)					5.95		
Air Temperature (~~°C~~ °F)					62		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Time** _____ **Station Number** MST019

Completed by: _____ **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 from USGS stream station collection @ 1710 09/12/14, streame gauge 1.78'

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 9 / 12 / 14 **Arrival Time** 1740

Field Personnel

E. Yeager **Signatures**

A. Pettley

SITE DESCRIPTION

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

Latitude N Collected Spring 2014. **Longitude** W

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

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: 1409SWMST020-U,F +MS/MSD **Sample Time:** 1800

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1800	1800	1800
Water Temperature (°C)					13.1	→	→
Specific Conductivity (µS/cm) @ 25° C					317.5	→	→
Conductivity (µS/cm)					245.6	→	→
TDS (g/L)					—	—	—
Dissolved Oxygen (% sat.)					105.2	→	→
Dissolved Oxygen (mg/L)					11.09	→	→
pH					8.83	→	→
ORP (mV)					55.9	→	→
Turbidity (FTU)					2.92	→	→
Air Temperature (°C) °F					62	→	→

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09/12/14 **Time** 1810 **Station Number** MST020

Completed by: E. Yeager A. Pettley **Checked by:**

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 2.0 ft **L.E.W.** 39.0 ft **Total Width** 40.0 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) ft/sec		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
2.0	1	0.65	-0.18	32	16	1.45	0.87
4.0	2	0.70	0.42	34	17	1.40	0.58
6.0	3	1.00	0.23	36	18	1.05	0.17
8.0	4	1.40	0.06	38	19	0.25	-0.01
10	5	1.70	0.76	40	20	n/a	
12	6	1.70	1.12				
14	7	1.50	0.92				
16	8	1.55	0.92				
18	9	1.65	0.75				
20	10	1.80	1.03				
22	11	1.65	1.76				
24	12	1.35	1.93				
26	13	1.25	1.61				
28	14	1.45	1.31				
30	15	1.45	1.41				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09/12 / 14 **Arrival Time** 1410

Field Personnel

E. Yeager **Signatures**

A. Pettley

SITE DESCRIPTION

Station Name ~~Little Blackfoot River above Henry Creek~~ immediately below Henry mine (1997 #24) **Station Number** MST044

Latitude N Collected Spring 2014 **Longitude** W ° ' "

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

Site & Stream Description Free flowing, rocky bottom with some algae growth

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: 1409SWMST044-U,F **Sample Time:** 1420

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1420		
Water Temperature (°C)					14.6		
Specific Conductivity (µS/cm) @ 25° C					846		
Conductivity (µS/cm)					678		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					110.6		
Dissolved Oxygen (mg/L)					11.24		
pH					8.91		
ORP (mV)					502		
Turbidity (FTU)					1.58		
Air Temperature (~~°C~~) °F					62		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Time** 1410 **Station Number** MST644

Completed by: E. Yeager A. Pettley **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 1.0 **ft** **L.E.W.** 8.2 **ft** **Total Width** 9.0 **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)
1.0	1	0.05	n/a				
1.5	2	0.60	0.26				
2.0	3	0.75	0.39				
2.5	4	0.80	0.46				
3.0	5	0.50	0.17				
3.5	6	0.75	-0.11				
4.0	7	0.80	1.33				
4.5	8	0.45	1.32				
5.0	9	0.50	0.73				
5.5	10	0.45	0.71				
6.0	11	0.40	0.32				
6.5	12	0.45	0.03				
7.0	13	0.30	-0.04				
7.5	14	0.25	-0.06				
8.0	15	0.25	-0.04				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Arrival Time** 1300

Field Personnel

E. Yeager **Signatures**

A. Petrey

SITE DESCRIPTION

Station Name ~~Collect~~ Little blackfoot River above Henry Creek **Station Number** MST045

Latitude N ° Collected in Spring 2014" **Longitude** W

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

Site & Stream Description Free flowing, muddy bottom with vegetation growth

Surface Water Characteristics (color, odor, appearance): clear, no odor, slight yellow tint.

SAMPLE COLLECTION

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

Sample ID: 1409SWMST045U,F **Sample Time:** 1320

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1320		
Water Temperature (°C)					14.5		
Specific Conductivity (µS/cm) @ 25° C					804		
Conductivity (µS/cm)					691		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					105.7		
Dissolved Oxygen (mg/L)					10.70		
pH					8.90		
ORP (mV)					100.5		
Turbidity (FTU)					1.92		
Air Temperature (~~°C~~) F°					50		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Time** 1300 **Station Number** MST045

Completed by: E. Yeager A. Pettey **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 7.80 ft L.E.W. 17.35 ft Total Width 38.4 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) Ft/sec		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
7.80	1	0.55	0.06	15.30	16	0.90	0.36
8.30	2	0.55	0.02	15.80	17	1.0	0.14
8.80	3	0.55	0.03	16.30	18	1.0	0.14
9.30	4	0.65	0.03	16.80	19	0.9	0.06
9.80	5	0.70	0.18	17.30	20	0.85	0.13
10.30	6	0.75	0.32				
10.80	7	0.80	0.13				
11.30	8	1.0	0.39				
11.80	9	0.90	0.46				
12.30	10	1.0	0.38				
12.80	11	1.05	0.05				
13.30	12	1.0	0.05				
13.80	13	1.0	0.11				
14.30	14	1.0	0.03				
14.80	15	1.0	-0.07				

16
17.35
7.80
9.55

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Arrival Time** 1635

Field Personnel

E. Yeager

A. Pettley

Signatures

SITE DESCRIPTION

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

Latitude N ° " **Longitude** W ° "

Taken in Spring 2014

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

Site & Stream Description minimal flow, depth of water 0.5", stream channel over grown with tall

Surface Water Characteristics (color, odor, appearance): slow flowing, very shallow, clear water

SAMPLE COLLECTION

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

Sample ID: 1409SNMST069-U,F +DUP **Sample Time:** 1650

Field Measurements

Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					1650	1650	
Water Temperature (°C)					12.3	12.3	
Specific Conductivity (µS/cm) @ 25° C					1679	1679	
Conductivity (µS/cm)					~~1679~~	~~1679~~	n/a
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					61.3	59.7	
Dissolved Oxygen (mg/L)					6.33	6.32	
pH					8.12	8.12	
ORP (mV)					-59.4	-59.4	
Turbidity (FTU)					5.70	5.70	
Air Temperature (°C)					62	62	

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Time** 1635 **Station Number** MST0069

Completed by: E. Yeager A. Pettey **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	3.7	1.5
2	2.8	1.25
3	2.7	1.25

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 – Fall 2014 SW Sampling

Date 09/12/2014 **Arrival Time** 1100

Field Personnel

A. Pettley **Signatures** _____

E. Yeager _____

SITE DESCRIPTION

Station Name West Pond Creek Headwaters, below West Pond **Station Number** MST144

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

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

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	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	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 – Fall 2014 SW Sampling

Date 09/12/14 **Time** 1100 **Station Number** MST144

Completed by: A. Pettley, E. Yeager **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 – Fall 2014 SW Sampling

Date 09/12/14 **Arrival Time** 0910

Field Personnel

E. Yeager **Signatures**

A. Pettley

SITE DESCRIPTION

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

Latitude N Collected Spring 2014 **Longitude** W ° ' "

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

Site & Stream Description

Free flowing, no odor, cold

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

SAMPLE COLLECTION

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

Sample ID: ~~1409MST274~~ 1409SWMST274-U,F **Sample Time:** 0920

Field Measurements							
Parameter	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	Sample 1	Sample 2	Sample 3
Time					0920		
Water Temperature (°C)					0.8		
Specific Conductivity (µS/cm) @ 25° C					485.3		
Conductivity (µS/cm)					261.1		
TDS (g/L)					—		
Dissolved Oxygen (% sat.)					81.5		
Dissolved Oxygen (mg/L)					11.65		
pH					8.15		
ORP (mV)					139.9		
Turbidity (FTU)					1.43		
Air Temperature (~~°C~~ F°)					47		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09/12/14 **Time** 0910 **Station Number** MST 274

Completed by: E. Yeager, A. Pettley **Checked by:** _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.9	1.8
2	2.0	2.0
3	2.2	1.9

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						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2014 SW Sampling

Date 09 / 12 / 14 **Arrival Time** 1120

Field Personnel

E. Yeager **Signatures** _____

A. Pettley _____

SITE DESCRIPTION

Station Name Tributary to Lone Pine Cr. **Station Number** MST275

Latitude N ° ′ ″ **Longitude** W ° ′ ″

Elevation _____ ft **Datum** NAD 27 **Photo Number** Taken in Springs 2014

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	Calibration	Calibration Check 1	Calibration Check 2	Calibration Check 3	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 2014 SW Sampling

Date 09/12/14 **Time** 1120 **Station Number** MST275

Completed by: E. Yeager A. Pettley **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						

COC No. A 44785

158 Starlite Drive
Marietta, OH 45750

MICROBAC®

CHAIN-OF-CUSTODY RECORD

Phone: 740-373-4071
Toll Free: 800-373-4071

Company Name: ~~[illegible]~~ MWH

Project Contact: Beth VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto

Project ID: Monsanto Fall SW 2014

Sampler (print): E. Yeager A. Pettey

Signature: [illegible]

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Metals Filtered	Metals unfiltered	Anions	TDS											TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1409SWMST274U		X	9/12/14	0920	SW				X	~~X~~	X												
1409SWMST274F		X	9/12/14	0920	SW			X		X	~~X~~												
1409SWMDS0210U		|	|	1015	|				X		X												
1409SWMDS0210F		|	|	1015	|			X		X												
1409SWMST045U		|	|	1320	|				X		X												
1409SWMST045F		|	|	1320	|			X		X												
1409SWMST044U		|	|	1420	|				X		X												
1409SWMST044F		|	|	1420	|			X		X												
1409SWMS6004U		|	|	1535	|				X		X											
1409SWMS6004F		|	|	1535	|			X		X												
1409SWMDS0230U		|	|	1615	|				X		X											
1409SWMDS0230F		|	|	1615	|			X		X												
1409SWMST009U-1		|	|	1050	|		~~X~~	X	~~X~~	X												unfiltered
1409SWMST009F-1		|	|	1050	|		X	~~X~~	X	~~X~~												filtered
1409SWMST009U-2		|	|	1050	|		~~X~~	X		X												unfiltered
1409SWMST009F-2		|	|	1050	|		X	~~X~~	X													filtered
1409SWMST019U		|	|	1710	|			X		X												
1409SWMST019F		|	|	1710	|		X		X													
1409SWMST020U		|	|	1800	|			X		X												
1409SWMST020F		|	|	1800	|		X		X													

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
[signature]	9/12/14	1100	FedEx				

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 44786

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: Beth VanPelt

Contact Phone #: 801-617-3200

Turn Around Requirements: Standard

Location: Monsanto

Project ID: Monsanto Fall SW 2014

Sampler (print): Aaron Pettley

Signature:

Program: ☐ CWA ☐ RCRA ☐ DOD ☐ AFCEE ☐ Other _____

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	Metals Filtered	Metals unfiltered	Anions	TDS											TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS
1409SWMST019-U	MS		09/12/14	1800	SW				X		X												
1409SWMST019-F	MS							X		X													
1409SWMST019-U	MSD								X		X												
1409SWMST019-F	MSD							X		X													

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Relinquished by: (Signature)	Date	Time	Received by: (Signature)
	9/15/14	1100					

Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

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

Monsanto
SW Fall 2014

Sunny ~ 32°F

E Yeager
A. Pettey

9/12/14

0805 Arrived at the Monsanto Ballard office to sign in and, check out radio, and pick up keys.

0845 At the machine shop to pick up WL indicator, backpacks

0910 Arrived at MST274

Parameters: 0.8°C, SC 485.3, C 261.1, DO% 81.5, DO mg/L 11.65, pH 8.15, NTU's 1.43. clear, cold flowing leaving site.

1015 Sampled 1409SWMDS026 U, F Temp 6.7°C, SC 1658, C 1079, DO% 25.5, D.O. mg/L 3.09, pH 7.11, ORP 84.3, NTU 8.98, Air 47

~~1100 Ap~~ 1030 MDS025 Dry, took photo.

1100 MST144 Dry, took photo.

1120 MST275 Dry, took photo

1200 arrive @ MMW009 WL 213.01' bTOC

1228 arrive @ MMW026 WL 285.73' bTOC

1300 arrive @ MST045

1320 sample MST045

H_2O 14.5°C DO% 105.7

SC @ 25 864 µs/cm DO 10.70 mg/L

cond µs/cm 691 pH 8.90

ORP 100.5 mV Turb 1.92 NTU Air 50°F

Monsanto
SW Fall 2014

Sunny ~ 60°F
E. Yeager
A. Puttley

09/12/14 (2)
1409 arrive @ MST044
1420 sample time
H_2O °C 14.6
SC @ 25 846 µs/cm
cond 1678 µs/cm
DO % 110.6
DO mg/L 11.24
pH 8.91
ORP 502 mV
Turb 1.58 NTU
Air °F 62
1445 MDS034 - DRY
1525 arrive @ MS6004
1535 sample MS6004
H_2O T °C 7.8
SC @ 25° 603.4 µs/cm
cond 405.3 µs/cm
DO % 14.5
DO mg/L 1.69
pH 7.31
ORP -59.1 mV
Turb 69.5 NTU
Air T °F 62
1605 arrive MDS030
1615 sample MDS030

Monsanto
SW Fall 2014

Sunny ~60°F
E. Yeager
A. Puttley

9/12/14 (3)
1615 1409 SWMDS030-4.F
Parameters = Temp 9.8 c, SC 843, C 598,
D.O.% 15.9, DO. mg/L = 1.76, pH 7.22,
O.R.P. -8.0, NTUs 36.37, Air 62
1635 arrive MST069
1650 sample MST 069 + DUP

H_2O °T	12.3	12.3
SC @ 25	1679	1679 µs/cm
cond	—	—
DO %	61.3	61.3
DO mg/L	6.33	6.32
pH	8.12	8.12
ORP	-59.4	-59.4
Turb	5.7	5.7
Air T °F	62	62

1705 arrive @ MST019
1710 sample MST019
H_2O °T 13.7 Air T °F 62
SC @ 25 337.7 µs/cm
cond 264.6 µs/cm
DO % 87.2%
DO mg/L 9.05
pH 7.93
ORP -49.3
Turb 5.95

Monsanto
SW Fall 2014

Sunny ~60F
E. Yeager
A. Pettley

09/12/14 (4)
1740 arrive @ MST020
1800 sample MST020 + MS/MSD
H2O T°C 13.1
SC @ 25 317.5 µs/cm
cond 245.6 µs/cm
DO% 105.2
DO mg/L 11.09
pH 8.83
ORP 55.9
Turb 2.92
Air T°F 62
1835 leave last site
1900 Arrived at Monsanto Mine
office to turn in keys & radio.
Aid key's being garbage ~~[illegible]~~ can
due to locked door.
1925 leaving site for the day.

APPENDIX B - STATION PHOTOGRAPHIC LOG INCLUDING GPS COORDINATES

MWH

Photographic Log

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 1

Survey Date:
5/5/2014

Photo Location:
MST069

Comments:
Latitude: 42°49'11.6351" , Longitude: -111°29'22.3238" , Elevation: 6340.5 ft, Horizontal Precision: 0.5 m

File Name:
IMG_0059189.jpg

Photograph ID: 2

Survey Date:
5/5/2014

Photo Location:
MW16A

Comments:
Latitude: 42°49'07.5434", Longitude: -111°29'23.6368", Elevation: 6335.7 ft, Horizontal Precision: 0.5 m

File Name:
IMG_0059190.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 3

Survey Date:
5/7/2014

Photo Location:
MST050

Comments:
Latitude: 42°50'55.0068" , Longitude: -111°29'51.9194" , Elevation: 6260.3 ft, Horizontal Precision: 0.9 m

File Name:
IMG_0064207.jpg

Photograph ID: 4

Survey Date:
5/8/2014

Photo Location:
MSG004

Comments:
Latitude: 42°49'16.9403" , Longitude: -111°28'12.4655", Elevation: 6600.2 ft, Horizontal Precision: 0.6 m

File Name:
IMG_0064208.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 5

Survey Date:
5/8/2014

Photo Location:
MSG005

Comments:
Latitude: 42°49'19.6093" , Longitude: -111°28'05.1719", Elevation: 6533.8 ft, Horizontal Precision: 0.8 m

File Name:
IMG_0064209.jpg

Photograph ID: 6

Survey Date:
5/8/2014

Photo Location:
MBW130

Comments:
Latitude: 42°49'39.8398" , Longitude: -111°27'12.9884", Elevation: 6389.9 ft, Horizontal Precision: 0.7 m

File Name:
IMG_0064210.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 7

Survey Date:
5/8/2014

Photo Location:
MST092

Comments:
Latitude: 42°49'39.6202" , Longitude: -111°27'06.6546", Elevation: 6387.3 ft, Horizontal Precision: 0.5 m

File Name:
IMG_0065211.jpg

Photograph ID: 8

Survey Date:
5/8/2014

Photo Location:
MST089

Comments:
Latitude: 42°49'27.4421" , Longitude: -111°26'20.5404", Elevation: 6371.6 ft, Horizontal Precision: 0.5 m

File Name:
IMG_0065212.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 9

Survey Date:
5/8/2014

Photo Location:
MST090

Comments:
Latitude: 42°49'27.6284" , Longitude: -111°26'52.2395", Elevation: 6392.3 ft, Horizontal Precision: 0.6 m

File Name:
IMG_0065213.jpg

Photograph ID: 10

Survey Date:
5/8/2014

Photo Location:
MST096

Comments:
Latitude: 42°49'30.1543" , Longitude: -111°27'45.3204", Elevation: 6436 ft, Horizontal Precision: 0.1 m

File Name:
IMG_0065214.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 11

Survey Date:
5/8/2014

Photo Location:
MSG006

Comments:
Latitude: 42°49'40.4012" , Longitude: -111°27'58.8233", Elevation: 6447.6 ft, Horizontal Precision: 0.1 m

File Name:
IMG_0065215.jpg

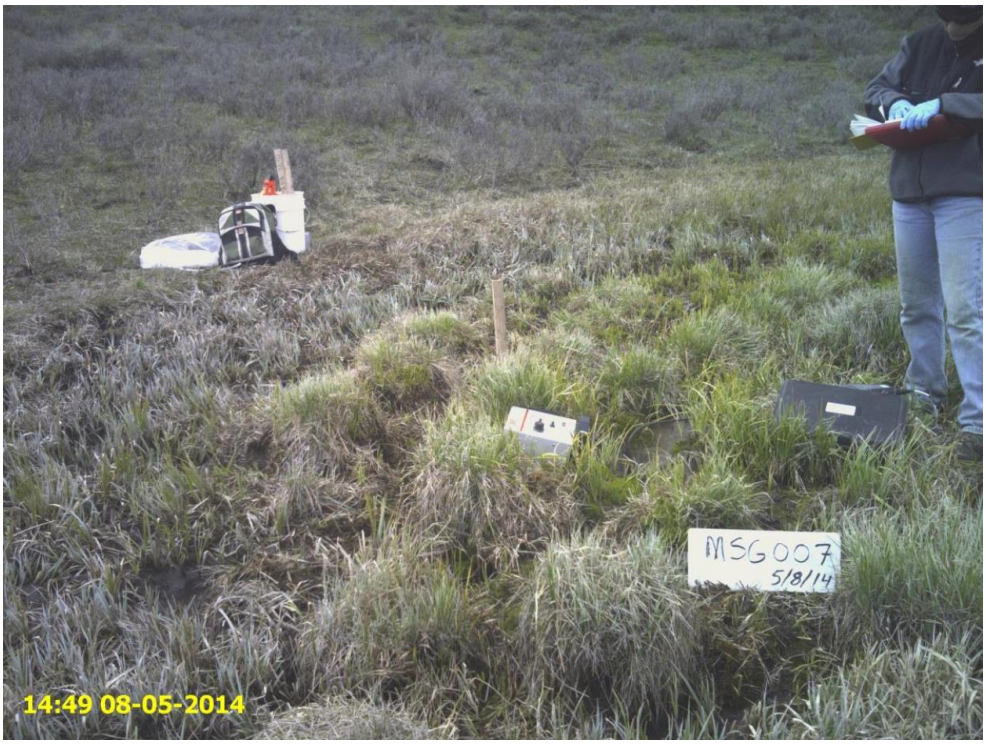
Photograph ID: 12

Survey Date:
5/8/2014

Photo Location:
MSG007

Comments:
Latitude: 42°49'37.8254" , Longitude: -111°27'51.5041", Elevation: 6434.5 ft, Horizontal Precision: 0.4 m

File Name:
IMG_0065216.jpg



Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 13

Survey Date:
5/8/2014

Photo Location:
MST095

Comments:
Latitude: 42°49'40.5636" , Longitude: -111°28'05.5484", Elevation: 6456.3 ft, Horizontal Precision: 0.4 m

File Name:
IMG_0065217.jpg

Photograph ID: 14

Survey Date:
5/8/2014

Photo Location:
MST094

Comments:
Latitude: 42°49'55.7080" , Longitude: -111°28'13.4292", Elevation: 6453.8 ft, Horizontal Precision: 0.1 m

File Name:
IMG_0065218.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 15

Survey Date:
5/9/2014

Photo Location:
MDS030

Comments:
Latitude: 42°49'42.9924",
Longitude:
-111°29'21.6233",
Elevation: 6490.8 ft,
Horizontal Precision: 0.7 m

File Name:
IMG_0065222.jpg

Photograph ID: 16

Survey Date:
5/9/2014

Photo Location:
MST067

Comments:
Latitude: 42°49'22.3975",
Longitude:
-111°29'41.0806",
Elevation: 6334.3 ft,
Horizontal Precision: 0.5 m

File Name:
IMG_0065223.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 17

Survey Date:
5/10/2014

Photo Location:
MBW135

Comments:
Latitude: 42°49'22.3975",
Longitude:
-111°29'45.5705",
Elevation: 6279 ft,
Horizontal Precision: 0.5 m

File Name:
IMG_0065224.jpg

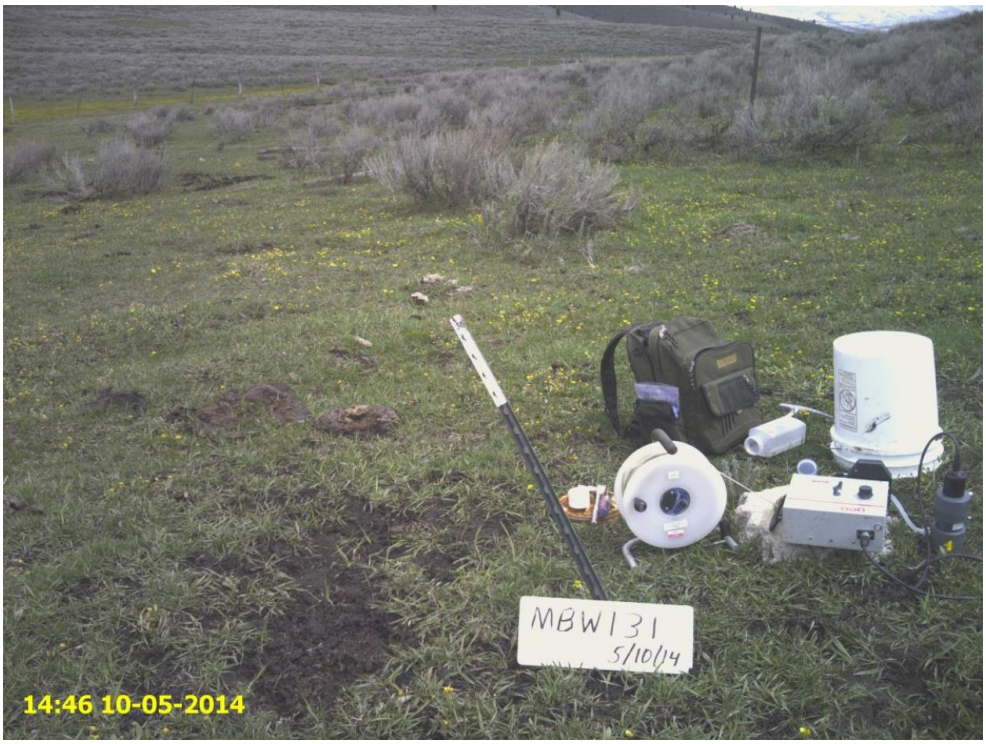
Photograph ID: 18

Survey Date:
5/10/2014

Photo Location:
MBW131

Comments:
Latitude: 42°50'24.0284",
Longitude:
-111°28'35.6423",
Elevation: 6462.3 ft,
Horizontal Precision: 0.1 m

File Name:
IMG_0065227.jpg



Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

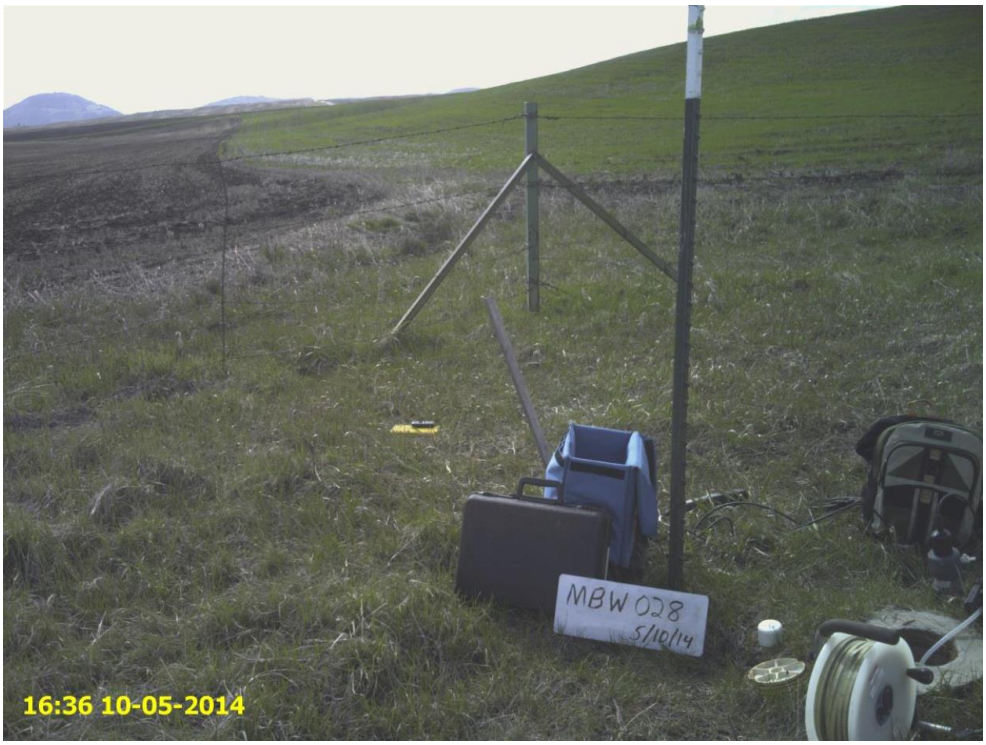
Photograph ID: 19

Survey Date:
5/10/2014

Photo Location:
MBW028

Comments:
Latitude: 42°49'34.3505",
Longitude:
-111°29'43.0541",
Elevation: 6337.8 ft,
Horizontal Precision: 0.5 m

File Name:
IMG_0066228.jpg



Photograph ID: 20

Survey Date:
5/10/2014

Photo Location:
MW15A

Comments:
Latitude: 42°49'36.1008",
Longitude:
-111°29'40.2216",
Elevation: 6359 ft,
Horizontal Precision: 0.1 m

File Name:
IMG_0066229.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 21

Survey Date:
5/11/2014

Photo Location:
MST019

Comments:
Latitude: 42°48'54.9200",
Longitude:
-111°30'23.9267",
Elevation: 6264.4 ft,
Horizontal Precision: 0.6 m

File Name:
IMG_0066230.jpg

Photograph ID: 22

Survey Date:
5/11/2014

Photo Location:
MST066

Comments:
Latitude: 42°48'57.0169",
Longitude:
-111°30'07.5251",
Elevation: 6273.4 ft,
Horizontal Precision: 0.5 m

File Name:
IMG_0067231.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 23

Survey Date:
5/11/2014

Photo Location:
MST020

Comments:
Latitude: 42°48'36.5299",
Longitude:
-111°30'03.8761",
Elevation: 6269.4 ft,
Horizontal Precision: 0.4 m

File Name:
IMG_0067232.jpg

Photograph ID: 24

Survey Date:
5/11/2014

Photo Location:
MBW027

Comments:
Latitude: 42°50'02.0821",
Longitude:
-111°29'54.3134",
Elevation: 6310.2 ft,
Horizontal Precision: 0.1 m

File Name:
IMG_0068234.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 25

Survey Date:
5/12/2014

Photo Location:
MBW011

Comments:
Latitude: 42°49'21.9829",
Longitude:
-111°29'41.2454",
Elevation: 6332.1 ft,
Horizontal Precision: 0.4 m

File Name:
IMG_0068235.jpg

Photograph ID: 26

Survey Date:
5/7/2014

Photo Location:
MMW006

Comments:
Latitude: 42 49' 20.7",
Longitude: -111 29' 06.0"

File Name:
IMG_0574.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 27

Survey Date:
5/6/2014

Photo Location:
MMW017

Comments:
Latitude: 42 50' 01.9",
Longitude: -111 29' 54.2"

File Name:
IMG_0566.JPG

Photograph ID: 28

Survey Date:
5/8/2014

Photo Location:
MMW018

Comments:
Latitude: 42 40' 41.2",
Longitude: '-111 28' 05.2"

File Name:
IMG_0601.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 29

Survey Date:
5/7/2014

Photo Location:
MMW020

Comments:
Latitude: 42 49' 36.7",
Longitude: -111 29' 19.6"

File Name:
IMG_0580.JPG

Photograph ID: 30

Survey Date:
5/7/2014

Photo Location:
MMW021

Comments:
Latitude: 42 49' 35.7",
Longitude: -111 29' 27.3"

File Name:
IMG_0584.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 31

Survey Date:
5/8/2014

Photo Location:
MMW029

Comments:
Latitude: 42 49' 34.6",
Longitude: -111 28' 11.7"

File Name:
IMG_0590.JPG

Photograph ID: 32

Survey Date:
5/9/2014

Photo Location:
MMW030

Comments:
Latitude: 42 49' 10.5",
Longitude: -111 29' 20.0"

File Name:
IMG_0610.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

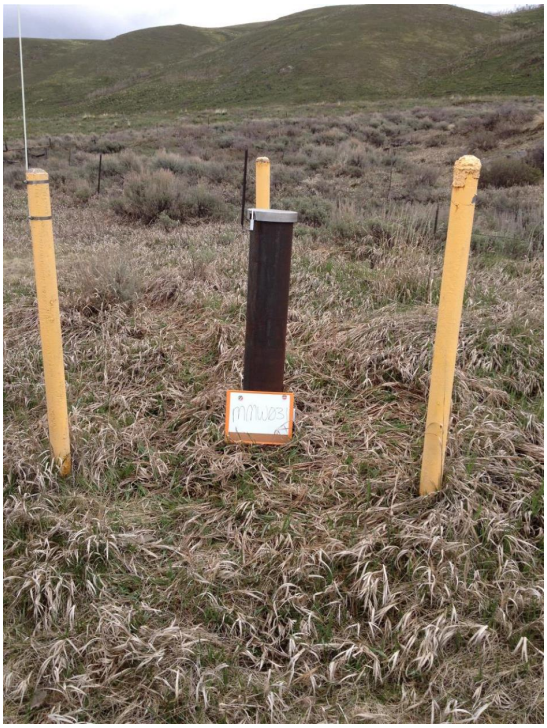
Photograph ID: 33

Survey Date:
5/9/2014

Photo Location:
MMW031

Comments:
Coordinates will be collected in 2015.

File Name:
IMG_0605.JPG



Photograph ID: 34

Survey Date:
5/11/2014

Photo Location:
MMW032

Comments:
Latitude: 42 50' 09.1",
Longitude: -111 28' 21.7"

File Name:
IMG_0643.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 35

Survey Date:
5/8/2014

Photo Location:
MMW033

Comments:
Latitude: 42 49' 35.3",
Longitude: -111 28' 12.3"

File Name:
IMG_0592.JPG

Photograph ID: 36

Survey Date:
5/8/2014

Photo Location:
MBW048

Comments:
Latitude: 42 50' 03.7",
Longitude: -111 27' 56.2"

File Name:
IMG_0599.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 37

Survey Date:
5/8/2014

Photo Location:
MBW032

Comments:
Latitude: 42 49' 34.4",
Longitude: -111 28' 11.2"

File Name:
IMG_0595.JPG

Photograph ID: 38

Survey Date:
5/6/2014

Photo Location:
MBW006

Comments:
Coordinates will be collected in 2015.

File Name:
IMG_0568.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Ballard Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 39

Survey Date:
5/7/2014

Photo Location:
MBW009

Comments:
Latitude: 42 49' 12.1",
Longitude: '-111 29' 49.8"

File Name:
IMG_0588.JPG

Photograph ID: 40

Survey Date:

Photo Location:

Comments:

File Name:

No Photo Applicable

MWH

Photographic Log

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 1

Photo Location:
MST131

Survey Date:
5/6/2014

Comments:
Latitude: 42°51'07.6373",
Longitude:
-111°22'33.6216",
Elevation: 6510 ft,
Horizontal Precision: 0.6 m

File Name:
IMG_0061191.jpg

Photograph ID: 2

Photo Location:
MST128

Survey Date:
5/6/2014

Comments:
Latitude: 42°51'07.5141",
Longitude:
-111°22'34.1749",
Elevation: 6517.8 ft,
Horizontal Precision: 0.4 m

File Name:
IMG_0061192.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 3

Photo Location:
MST132

Survey Date:
5/6/2014

Comments:
Latitude: 42°51'06.2509",
Longitude:
-111°22'32.0052",
Elevation: 6512.2 ft,
Horizontal Precision: 0.5 m

File Name:
IMG_0061193.jpg

Photograph ID: 4

Photo Location:
MST143

Survey Date:
5/6/2014

Comments:
Latitude: 42°51'31.4988",
Longitude:
-111°23'02.1566",
Elevation: 6539.9 ft,
Horizontal Precision: 0.4 m

File Name:
IMG_0061194.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 5

Photo Location:
MST274

Survey Date:
5/6/2014

Comments:
Latitude: 42°51'32.6998",
Longitude:
-111°23'33.3438",
Elevation: 6566.2 ft,
Horizontal Precision: 0.4 m

File Name:
IMG_0061195.jpg

Photograph ID: 6

Photo Location:
MDS026

Survey Date:
5/6/2014

Comments:
Latitude: 42°51'48.8097",
Longitude:
-111°23'38.8486",
Elevation: 6638.7 ft,
Horizontal Precision: 0.4 m

File Name:
IMG_0063196.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 7

Photo Location:
MST269

Survey Date:
5/6/2014

Comments:
Latitude: 42°52'16.5823",
Longitude:
-111°23'44.3630",
Elevation: 6643.9 ft,
Horizontal Precision: 0.4 m

File Name:
IMG_0063197.jpg

Photograph ID: 8

Photo Location:
MST133

Survey Date:
5/6/2014

Comments:
Latitude: 42°51'47.6488",
Longitude:
-111°23'52.7672",
Elevation: 6587.5 ft,
Horizontal Precision: 0.4 m

File Name:
IMG_0063198.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 9

Photo Location:
MDS025

Survey Date:
5/7/2014

Comments:
Latitude: 42°52'12.2744", Longitude: -111°24'14.2740", Elevation: 6680.5 ft, Horizontal Precision: 1.1 m

File Name:
IMG_0063199.jpg

Photograph ID: 10

Photo Location:
MST144

Survey Date:
5/7/2014

Comments:
Latitude: 42°52'16.0726", Longitude: -111°24'23.3168", Elevation: 6653.7 ft, Horizontal Precision: 0.6 m

File Name:
IMG_0063200.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 11

Photo Location:
MST136

Survey Date:
5/7/2014

Comments:
Latitude: 42°52'33.0779",
Longitude:
-111°25'05.2986",
Elevation: 6684.4 ft,
Horizontal Precision: 0.5 m

File Name:
IMG_0063202.jpg

Photograph ID: 12

Photo Location:
MBW087

Survey Date:
5/10/2014

Comments:
Latitude: 42°51'37.8960",
Longitude:
-111°23'42.6350",
Elevation: 6567.1 ft,
Horizontal Precision: 0.2 m

File Name:
IMG_0065225.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

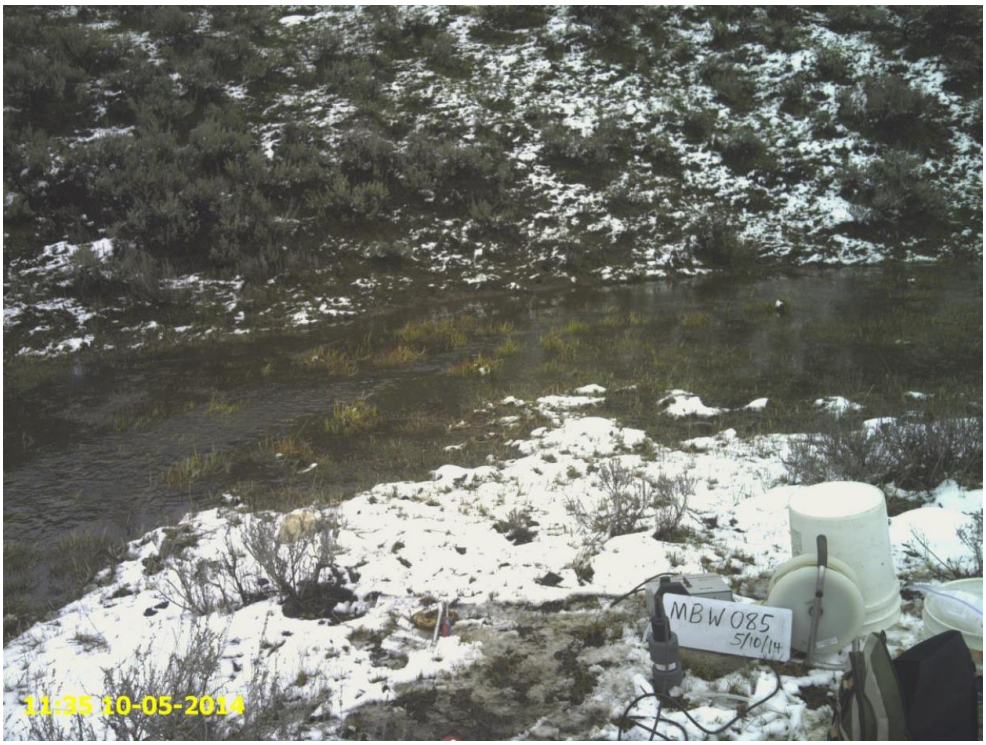
Photograph ID: 13

Photo Location:
MBW085

Survey Date:
5/10/2014

Comments:
Latitude: 42°51'56.0172",
Longitude:
-111°24'04.5677",
Elevation: 6602.7 ft,
Horizontal Precision: 0.4 m

File Name:
IMG_0065226.jpg



Photograph ID: 14

Photo Location:
MBW112

Survey Date:
5/12/2014

Comments:
Latitude: 42°53'34.4999",
Longitude:
-111°26'13.5294",
Elevation: 6391.8 ft,
Horizontal Precision: 0.5 m

File Name:
IMG_0068236.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 15

Photo Location:
MBW099

Survey Date:
5/9/2014

Comments:
Latitude: 42 51' 53.4",
Longitude: -111 23' 28.7"

File Name:
IMG_0609.JPG

Photograph ID: 16

Photo Location:
MBW107

Survey Date:
5/12/2014

Comments:
Latitude: 42 53' 28.3",
Longitude: -111 25' 56.0"

File Name:
IMG_0663.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 17

Photo Location:
MMW007

Survey Date:
5/9/2014

Comments:
Latitude: 42 51' 48.4",
Longitude: -111 23' 37.2"

File Name:
IMG_0605.JPG

Photograph ID: 18

Photo Location:
MMW009

Survey Date:
5/12/2014

Comments:
Latitude: 42 53' 37.5",
Longitude: -111 25' 48.5"

File Name:
IMG_0653.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 19

Photo Location:
MMW012

Survey Date:
5/12/2014

Comments:
Latitude: 42 53' 28.5",
Longitude: -111 25' 56.1"

File Name:
IMG_0660.JPG

Photograph ID: 20

Photo Location:
MMW013

Survey Date:
5/11/2014

Comments:
Latitude: 42 52' 08.8",
Longitude: -111 24' 16.8"

File Name:
IMG_0645.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 21

Photo Location:
MMW024

Survey Date:
5/11/2014

Comments:
Coordinates will be collected in 2015.

File Name:
IMG_0649.JPG

Photograph ID: 22

Photo Location:
MMW025

Survey Date:
5/6/2014

Comments:
Latitude: 42 51' 48.9",
Longitude: -111 23' 34.7"

File Name:
IMG_0566.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 23

Photo Location:
MMW026

Survey Date:
5/9/2014

Comments:
Latitude: 42 51' 56.3",
Longitude: -111 23' 28.8"

File Name:
IMG_0606.JPG

Photograph ID: 24

Photo Location:
MMW027

Survey Date:
5/12/2014

Comments:
Latitude: 42 53' 28.7",
Longitude: -111 25' 56.4"

File Name:
IMG_0659.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 25

Photo Location:
MMW034

Survey Date:
5/11/2014

Comments:
Latitude: 42 52' 08.5",
Longitude: -111 24' 16.8"

File Name:
IMG_0647.JPG

Photograph ID: 26

Photo Location:
MMW035

Survey Date:
5/12/2014

Comments:
Latitude: 42 53' 29.1",
Longitude: -111 25' 56.4"

File Name:
IMG_0657.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Enoch Valley Mine**	**Site Location:**	**Soda Springs**

Photograph ID: 27

Photo Location:
MMW036

Survey Date:
5/12/2014

Comments:
Latitude: 42 53' 26.1",
Longitude: -111 26' 07.6"

File Name:
IMG_0667.JPG

Photograph ID: 28

Photo Location:
MMW037

Survey Date:
5/12/2014

Comments:
Latitude: 42 53' 26.1",
Longitude: -111 26' 06.9"

File Name:
IMG_0664.JPG

MWH

Photographic Log

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Henry Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 1

Photo Location:
MST275

Survey Date:
5/7/2014

Comments:
Latitude: 42°52'01.6388",
Longitude:
-111°25'15.3728",
Elevation: 6746.1 ft,
Horizontal Precision: 0.6 m

File Name:
IMG_0063201.jpg

Photograph ID: 2

Photo Location:
MST051

Survey Date:
5/7/2014

Comments:
Latitude: 42°52'17.7060",
Longitude:
-111°28'57.6314",
Elevation: 6325.8 ft,
Horizontal Precision: 0.5 m

File Name:
IMG_0064203.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Henry Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 3

Photo Location:
MST063

Survey Date:
5/7/2014

Comments:
Latitude: 42°52'01.6981",
Longitude:
-111°27'06.8008",
Elevation: 6431.8 ft,
Horizontal Precision: 0.5 m

File Name:
IMG_0064204.jpg

Photograph ID: 4

Photo Location:
MST057

Survey Date:
5/7/2014

Comments:
Latitude: 42°51'59.2704",
Longitude:
-111°26'21.7414",
Elevation: 6379.1 ft,
Horizontal Precision: 0.8 m

File Name:
IMG_0064205.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Henry Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 5

Photo Location:
MST226

Survey Date:
5/7/2014

Comments:
Latitude: 42°51'41.9019", Longitude: -111°25'58.2823", Elevation: 6495.4 ft, Horizontal Precision: 1.1 m

File Name:
IMG_0064206.jpg

Photograph ID: 6

Photo Location:
MST045

Survey Date:
5/9/2014

Comments:
Latitude: 42°54'09.9125", Longitude: -111°29'36.2134", Elevation: 6272.6 ft, Horizontal Precision: 0.6 m

File Name:
IMG_0065219.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Henry Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 7

Photo Location:
MST044

Survey Date:
5/9/2014

Comments:
Latitude: 42°53'50.6553",
Longitude:
-111°29'25.3442",
Elevation: 6256.6 ft,
Horizontal Precision: 0.5 m

File Name:
IMG_0065220.jpg

Photograph ID: 8

Photo Location:
MDS034

Survey Date:
5/9/2014

Comments:
Latitude: 42°53'48.1263",
Longitude:
-111°29'10.8121",
Elevation: 6302 ft,
Horizontal Precision: 0.5 m

File Name:
IMG_0065221.jpg

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Henry Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 9

Photo Location:
MBW152

Survey Date:
5/11/2014

Comments:
Latitude: 42°54'13.1531",
Longitude:
-111°29'26.2140",
Elevation: 6283.3 ft,
Horizontal Precision: 0.9 m

File Name:
IMG_0067233.jpg

Photograph ID: 10

Photo Location:
MMW010

Survey Date:
5/10/2014

Comments:
Latitude: 42 52' 22.0",
Longitude: -111 27' 54.2"

File Name:
IMG_0639.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Henry Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 11

Photo Location:
MMW011

Survey Date:
5/10/2014

Comments:
Latitude: 42 53' 48.0",
Longitude: -111 29' 32.9"

File Name:
IMG_0631.JPG

Photograph ID: 12

Photo Location:
MMW022

Survey Date:
5/10/2014

Comments:
Latitude: 42 53' 08.7",
Longitude: -111 28' 21.7"

File Name:
IMG_0637.JPG

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Henry Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 13

Photo Location:
MMW023

Survey Date:
5/10/2014

Comments:
Latitude: 42 54' 19.3",
Longitude: -111 30' 29.3"

File Name:
IMG_0630.JPG

Photograph ID: 14

Photo Location:
MMW028

Survey Date:
5/10/2014

Comments:
Latitude: 42 53' 50.4",
Longitude: -111 29' 82.6"

File Name:
IMG_0633.JPG

MWH

Photographic Log

Client:	**Monsanto**	**Project:**	**Spring 2014**
Site Name:	**Henry Mine**	**Site Location:**	**Soda Springs, ID**

Photograph ID: 15	No Photo Applicable
Photo Location:	
Survey Date:	
Comments:	
File Name:	

APPENDIX C - 2014 SURFACE WATER AND GROUNDWATER ANALYTICAL DATA

C-1 2014 Surface Water and Groundwater Analyte List

C-2 2014 Surface Water Analytical Data

C-3a 2014 Groundwater Analytical Data

C-3b Semi-Volatile Organic Compounds Groundwater Analytical Data

C-1 2014 Surface Water and Groundwater Analyte List

TABLE C-1
2014 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: MBW011[e]	Unfiltered	BN fraction of SVOCs
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]These samples were an on- 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
SVOCs – semi-volatile organic compounds
TDS - Total Dissolved Solids
V - Vanadium

C-2 2014 Surface Water Analytical Data

TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MDS025**		**MDS026**		**MDS026**	
Location Type		**Deep Sump**		**Deep Sump**		**Deep Sump**	
Date Collected		**5/7/2014**		**5/6/2014**		**9/12/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**1010**	--	**883**	--	**1100**	--
Sulfate (as SO_4)	--	**960 D**	--	**661 D**	--	**780 D**	--
Total dissolved solids (Residue, filterable)	--	--	**1510**	--	**1270**	--	**1400**
Metals (mg/l)							
Cadmium	0.0006 mg/l	**0.00167**	--	**0.0051**	--	**0.001**	--
Calcium	--	**280**	--	**255**	--	**312**	--
Magnesium	--	**74.7**	--	**59.6**	--	**78.2**	--
Selenium	0.005 mg/l	**0.0427**	**0.0371**	**0.56 D**	**0.516 D**	**0.0118**	**0.0335**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
D Sample dilution required for analysis; reported values reflect the dilution.
E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MDS030**		**MDS030**		**MDS034**	
Location Type		**Deep Sump**		**Deep Sump**		**Deep Sump**	
Date Collected		**5/9/2014**		**9/12/2014**		**5/9/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**481**	--	**462**	--	**429**	--
Sulfate (as SO_4)	--	**137 D**	--	**165 D**	--	**128 D**	--
Total dissolved solids (Residue, filterable)	--	--	**550**	--	**532**	--	**450**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**162**	--	**157**	--	**118**	--
Magnesium	--	**18.7**	--	**17**	--	**32.9**	--
Selenium	0.005 mg/l	**0.908 D**	**0.684 D**	**0.846 D**	**0.981 D**	**0.0226**	**0.0164**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	**0.00556 F**	--

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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E	Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MSG004**		**MSG004**		**MSG005**	
Location Type		**Spring**		**Spring**		**Spring**	
Date Collected		**5/8/2014**		**9/12/2014**		**5/8/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**291**	--	**311**	--	**301**	--
Sulfate (as SO_4)	--	**37.6 J+**	--	**31.3**	--	**31.5 J+**	--
Total dissolved solids (Residue, filterable)	--	--	**338 J-**	--	**310**	--	**314 J-**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**75.6**	--	**80.8**	--	**84.9**	--
Magnesium	--	**24.7**	--	**26.6**	--	**21.7**	--
Selenium	0.005 mg/l	**0.0135**	**0.0206**	**0.00222**	**0.0146**	**0.0109**	**0.0111**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
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E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MSG006**		**MSG007**		**MST019**	
Location Type		**Spring**		**Spring**		**Stream**	
Date Collected		**5/8/2014**		**5/8/2014**		**5/11/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**759**	--	**242**	--	**163**	--
Sulfate (as SO_4)	--	**566 D**	--	**91.1**	--	**8.56**	--
Total dissolved solids (Residue, filterable)	--	--	**1020**	--	**276**	--	**172**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**231**	--	**65.6**	--	**50.3**	--
Magnesium	--	**44.3**	--	**18.9**	--	**9.13**	--
Selenium	0.005 mg/l	**0.248**	**0.243**	**0.0463**	**0.0494**	**0.00544**	**0.00569**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
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E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST019**		**MST020**		**MST020**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**9/12/2014**		**5/11/2014**		**9/12/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**162**	--	**167**	--	**161**	--
Sulfate (as SO_4)	--	**10.6**	--	**8.86**	--	**11**	--
Total dissolved solids (Residue, filterable)	--	--	**168**	--	**154**	--	**170**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**43.1**	--	**51.5**	--	**43.1**	--
Magnesium	--	**13.2**	--	**9.41**	--	**12.9**	--
Selenium	0.005 mg/l	**0.00274**	**0.0018**	**0.00552**	**0.00475**	**0.00145**	**0.00168**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST044**		**MST044**		**MST045**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/9/2014**		**9/12/2014**		**5/9/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**224**	--	**289**	--	**218**	--
Sulfate (as SO_4)	--	**58**	--	**165 D**	--	**58.8**	--
Total dissolved solids (Residue, filterable)	--	--	**280**	--	**512**	--	**292**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**60.4**	--	**63.5**	--	**59**	--
Magnesium	--	**17.7**	--	**31.7**	--	**17.1**	--
Selenium	0.005 mg/l	**0.00579 J+**	**0.000675 F**	**0.000894 F**	**0.00186**	**0.00107**	**0.00103**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST045 Dup**		**MST045 Average**		**MST045**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/9/2014**		**5/9/2014**		**9/12/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**224**	--	**221**	--	**295**	--
Sulfate (as SO_4)	--	**58.9**	--	**58.85**	--	**170 D**	--
Total dissolved solids (Residue, filterable)	--	--	**286**	--	**289**	--	**516**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**60.4**	--	**59.7**	--	**67**	--
Magnesium	--	**17.7**	--	**17.4**	--	**31.1**	--
Selenium	0.005 mg/l	**0.000664 F**	**0.000617 F**	**0.867**	**0.000824**	**0.000876 F**	**0.000988 F**
Vanadium	0.02 mg/l	<0.01	--	<10	--	<0.01	--

mg/l milligrams per liter.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST050**		**MST057**		**MST063**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/7/2014**		**5/7/2014**		**5/7/2014**	
Analyte/Methods (Units)							
Chemistry Parameters (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Hardness (as $CaCO_3$)	--	**134**	--	**191**	--	**275**	--
Sulfate (as SO_4)	--	**12.9**	--	**14.4**	--	**38**	--
Total dissolved solids (Residue, filterable)	--	--	**192**	--	**240**	--	**348**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**39.7**	--	**58.4**	--	**84.8**	--
Magnesium	--	**8.53**	--	**10.9**	--	**15.4**	--
Selenium	0.005 mg/l	**0.000551 F**	**0.000601 F**	<0.001	**0.000585 F**	**0.0123**	**0.0112**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST066**		**MST067**		**MST069**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/11/2014**		**5/9/2014**		**5/5/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**203**	--	**1070**	--	**1450**	--
Sulfate (as SO_4)	--	**51.5 D**	--	**894 D**	--	**1270 D**	--
Total dissolved solids (Residue, filterable)	--	--	**246**	--	**1380**	--	**2230**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	**0.00181**	--	<0.0006	--
Calcium	--	**54.9**	--	**306**	--	**440**	--
Magnesium	--	**16.1**	--	**74.6**	--	**84.4**	--
Selenium	0.005 mg/l	**0.0237**	**0.0245**	**0.336 D**	**0.299 D**	**1.71 D**	**1.85 D**
Vanadium	0.02 mg/l	<0.01	--	**0.0202**	--	<0.01	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
D Sample dilution required for analysis; reported values reflect the dilution.
E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST069**		**MST069 Dup**		**MST069 Average**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**9/12/2014**		**9/12/2014**		**9/12/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**1410**	--	**1420**	--	**1415**	--
Sulfate (as SO_4)	--	**1070 D**	--	**1050 D**	--	**1060**	--
Total dissolved solids (Residue, filterable)	--	--	**2020**	--	**2020**	--	**2020**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0	--
Calcium	--	**426**	--	**429**	--	**427.5**	--
Magnesium	--	**83.6**	--	**84.5**	--	**84.05**	--
Selenium	0.005 mg/l	**1.17 D**	**1.27 D**	**1.26 D**	**1.33 D**	**1.215**	**1.3**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.0	--

mg/l milligrams per liter.
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D Sample dilution required for analysis; reported values reflect the dilution.
E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST089**		**MST090**		**MST092**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/8/2014**		**5/8/2014**		**5/8/2014**	
Analyte/Methods (Units)							
Chemistry Parameters (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Hardness (as $CaCO_3$)	--	**163**	--	**202**	--	**194**	--
Sulfate (as SO_4)	--	**17.1**	--	**5.23 J+**	--	**34.9 J+**	--
Total dissolved solids (Residue, filterable)	--	--	**188**	--	**246 J-**	--	**206 J-**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**50.9**	--	**64.6**	--	**62.4**	--
Magnesium	--	**8.6**	--	**9.77**	--	**9.28**	--
Selenium	0.005 mg/l	**0.00185**	**0.00205**	<0.001	<0.001	**0.00145**	**0.00164**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST094**		**MST095**		**MST096**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/8/2014**		**5/8/2014**		**5/8/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**164**	--	**399**	--	**306**	--
Sulfate (as SO_4)	--	**5.64**	--	**205 D**	--	**131 D**	--
Total dissolved solids (Residue, filterable)	--	--	**164**	--	**472**	--	**346**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**54.4**	--	**111**	--	**93.3**	--
Magnesium	--	**6.95**	--	**29.2**	--	**17.6**	--
Selenium	0.005 mg/l	**0.00088 F**	**0.00089 F**	**0.103**	**0.1**	**0.0329**	**0.0314**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
D Sample dilution required for analysis; reported values reflect the dilution.
E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST128**		**MST131**		**MST132**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/6/2014**		**5/6/2014**		**5/6/2014**	
Analyte/Methods (Units)							
Chemistry Parameters (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Hardness (as $CaCO_3$)	--	**171**	--	**126**	--	**159**	--
Sulfate (as SO_4)	--	**32**	--	**19.7**	--	**29.1**	--
Total dissolved solids (Residue, filterable)	--	--	**204**	--	**170**	--	**212**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**52.3**	--	**39.7**	--	**49.1**	--
Magnesium	--	**9.75**	--	**6.56**	--	**8.88**	--
Selenium	0.005 mg/l	**0.00293**	**0.00299**	**0.00338**	**0.00348**	**0.00329**	**0.003**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
D Sample dilution required for analysis; reported values reflect the dilution.
E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST132 Dup**		**MST132 Average**		**MST133**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/6/2014**		**5/6/2014**		**5/6/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**159**	--	**159**	--	**77.6**	--
Sulfate (as SO_4)	--	**28.6**	--	**28.85**	--	**9.03**	--
Total dissolved solids (Residue, filterable)	--	--	**198**	--	**205**	--	**122**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**48.9**	--	**49**	--	**25.3**	--
Magnesium	--	**8.86**	--	**8.87**	--	**3.54**	--
Selenium	0.005 mg/l	**0.00318**	**0.00296**	**0.003235**	**0.00298**	**0.00212**	**0.0023**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
D Sample dilution required for analysis; reported values reflect the dilution.
E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST136**		**MST143**		**MST144**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/7/2014**		**5/6/2014**		**5/7/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**167**	--	**43.5**	--	**279**	--
Sulfate (as SO_4)	--	**37**	--	**2.32**	--	**177 D**	--
Total dissolved solids (Residue, filterable)	--	--	**262**	--	**96**	--	**416**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**52.6**	--	**12.1**	--	**79.8**	--
Magnesium	--	**8.55**	--	**3.24**	--	**19.5**	--
Selenium	0.005 mg/l	**0.00636**	**0.00681**	<0.001	**0.000515 F**	**0.38 D**	**0.37 D**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
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E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST226**		**MST274**		**MST274**	
Location Type		**Stream**		**Stream**		**Stream**	
Date Collected		**5/7/2014**		**5/6/2014**		**9/12/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Hardness (as $CaCO_3$)	--	**106**	--	**202**	--	**237**	--
Sulfate (as SO_4)	--	**14.1**	--	**49.7**	--	**36.4**	--
Total dissolved solids (Residue, filterable)	--	--	**146**	--	**246**	--	**266**
Metals (mg/l)							
Cadmium	0.0006 mg/l	<0.0006	--	<0.0006	--	<0.0006	--
Calcium	--	**33**	--	**65.6**	--	**77.8**	--
Magnesium	--	**5.72**	--	**9.26**	--	**10.3**	--
Selenium	0.005 mg/l	**0.00204**	**0.00218**	**0.00593**	**0.00539**	**0.00427**	**0.00385**
Vanadium	0.02 mg/l	<0.01	--	<0.01	--	<0.01	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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.
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TABLE C-2

SUMMARY OF 2014 SURFACE WATER RESULTS
P4 RI/FS

Location Identification		**MST275**	
Location Type		**Stream**	
Date Collected		**5/7/2014**	
Analyte/Methods (Units)			
Chemistry Parameters (mg/l)	**Screening Limits**	**Dissolved**	**Total**
Hardness (as $CaCO_3$)	--	**24.1**	--
Sulfate (as SO_4)	--	**1.72**	--
Total dissolved solids (Residue, filterable)	--	--	**82**
Metals (mg/l)			
Cadmium	0.0006 mg/l	<0.0006	--
Calcium	--	**6.88**	--
Magnesium	--	**1.68**	--
Selenium	0.005 mg/l	<0.001	<0.001
Vanadium	0.02 mg/l	<0.01	--

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
D Sample dilution required for analysis; reported values reflect the dilution.
E Data are estimated. Result exceeded calibration range; no dilution was analyzed.
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.
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C-3a 2014 Groundwater Analytical Data

TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MBW006**		**MBW009**		**MBW011**	
Location Type		**Bore Hole Well**		**Bore Hole Well**		**Bore Hole Well**	
Date Collected		**5/6/2014**		**5/7/2014**		**5/12/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**379 D**	--	**403 D**	--	**179 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**700**	--	**748**	--	**694**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.00811**	--	**0.344 D**	--	**0.108**
Selenium	0.05 mg/l	**0.443 D**	**0.43 D**	**0.00217**	**0.00206**	**0.579 D**	**0.744 D**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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UJ Potential low bias, possible false negative.

TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MBW027**		**MBW028**		**MBW032**	
Location Type		**Bore Hole Well**		**Bore Hole Well**		**Bore Hole Well**	
Date Collected		**5/11/2014**		**5/10/2014**		**5/8/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**349 D**	--	**585 D**	--	**748 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**676**	--	**1020**	--	**1120**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	**0.000323 F**	--	**0.000374 F**	--	**0.000602**
Manganese	0.05 mg/l	--	**0.0016 F**	--	**0.0764**	--	**0.00381**
Selenium	0.05 mg/l	**0.708 D**	**0.696 D**	**1.36 D**	**1.25 D**	**1.43 D,J**	**1.26 D,J**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MBW048**		**MBW085**		**MBW087**	
Location Type		**Bore Hole Well**		**Bore Hole Well**		**Bore Hole Well**	
Date Collected		**5/8/2014**		**5/10/2014**		**5/10/2014**	
Analyte/Methods (Units)							
Chemistry Parameters (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**5.44**	--	**20.8**	--	**24.9**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**128**	--	**188**	--	**310**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	**0.000332 F**	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.315 D**	--	**0.0133**	--	**0.0318**
Selenium	0.05 mg/l	<0.001 UJ	<0.001	**0.00193**	**0.00205**	**0.000735 F**	**0.000928 F**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MBW099**		**MBW130**		**MBW131**	
Location Type		**Bore Hole Well**		**Bore Hole Well**		**Bore Hole Well**	
Date Collected		**5/9/2014**		**5/9/2014**		**5/10/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**24.7**	--	**8.45**	--	**3.57**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**192 J-**	--	**156**	--	**118**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.0906**	--	**0.116**	--	**0.00188 F**
Selenium	0.05 mg/l	**0.00401**	**0.00182 J+**	**0.000539 F**	**0.000545 F**	**0.0028**	**0.00219**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MBW135**		**MBW152**		**MMW006**	
Location Type		**Bore Hole Well**		**Bore Hole Well**		**Monitoring Well**	
Date Collected		**5/10/2014**		**5/11/2014**		**5/7/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**48.6**	--	**113 D**	--	**85.4**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**222**	--	**350**	--	**308**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.0583**	--	**0.11**	--	<0.002
Selenium	0.05 mg/l	<0.001	<0.001	**0.00225**	**0.00188**	**0.105**	**0.104**

mg/l	milligrams per liter.
Bold	Bolded result indicates positively identified compound.
--	Not scheduled.
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 low bias.
J+	Data are estimated due to associated quality control data. Potential high bias.
UJ	Potential low bias, possible false negative.

TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MMW007**		**MMW009**		**MMW010**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/9/2014**		**5/12/2014**		**5/10/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**14.7**	--	**63.2**	--	**695 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**170 J-**	--	**374**	--	**1320**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	**0.00527**
Manganese	0.05 mg/l	--	**0.0456**	--	**0.0809**	--	**0.0256**
Selenium	0.05 mg/l	**0.00266 J+**	**0.00209 J+**	**0.000941 F**	<0.001	**0.171 J**	**0.166 J**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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.
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TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MMW011**		**MMW013**		**MMW017**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/10/2014**		**5/11/2014**		**5/11/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**119 D**	--	**196 D**	--	**494 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**458**	--	**456**	--	**1020**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	**0.000694**	--	<0.0006	--	**0.000447 F**
Manganese	0.05 mg/l	--	**0.00146 F**	--	**0.0276**	--	**0.00347**
Selenium	0.05 mg/l	0.00072 F,UJ	0.00067 F,UJ	**0.155 J**	**0.149 J**	**0.131 J**	**0.133 J**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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.
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TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MMW018**		**MMW020**		**MMW021**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/8/2014**		**5/7/2014**		**5/7/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**46.1**	--	**198 D**	--	**48.8**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**262**	--	**500**	--	**368**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	**0.0126**	--	<0.0006
Manganese	0.05 mg/l	--	**0.0408**	--	**0.00292**	--	<0.002
Selenium	0.05 mg/l	**0.0309 J**	**0.0302 J**	**0.349 D**	**0.333 D**	**0.0617**	**0.0593**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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.
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TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MMW022**		**MMW023**		**MMW024**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/10/2014**		**5/10/2014**		**5/11/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**291 D**	--	**201 D**	--	**258 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**640**	--	**610**	--	**542**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.0116**	--	**0.371 D**	--	<0.002
Selenium	0.05 mg/l	**0.042 J**	**0.0438 J**	<0.001 UJ	<0.001	**0.0898 J**	**0.0895 J**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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.
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TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MMW025**		**MMW026**		**MMW027**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/6/2014**		**5/9/2014**		**5/12/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**13.3**	--	**24.2**	--	**334 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**402**	--	**230**	--	**776**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.00177 F**	--	**0.00208**	--	**0.00319**
Selenium	0.05 mg/l	**0.000752 F**	**0.000551 F**	**0.00187 J**	**0.00165 J**	**0.861 D**	**0.785 D**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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.
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TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MMW028**		**MMW028 Dup**		**MMW028 average**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/10/2014**		**5/10/2014**		**5/10/2014**	
Analyte/Methods (Units)							
Chemistry Parameters (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**70.4**	--	**69.5**	--	**69.95**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**310**	--	**328**	--	**319**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.006
Manganese	0.05 mg/l	--	<0.002	--	**0.00143 F**	--	**0.00143 F**
Selenium	0.05 mg/l	**0.00298 J**	**0.00321 J**	**0.00313 J**	**0.00337 J**	**0.003055**	**0.00329**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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.
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TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MMW029**		**MMW030**		**MMW031**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/8/2014**		**5/9/2014**		**5/6/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**809 D**	--	**14.9**	--	**3.19**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**1250**	--	**190**	--	**158**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.00103 F**	--	**0.0377**	--	<0.002
Selenium	0.05 mg/l	**0.694 D**	**0.61 D**	**0.000554 F,J**	<0.001 J	**0.00109**	**0.00133**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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.
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J- Data are estimated due to associated quality control data. Potential low bias.
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UJ Potential low bias, possible false negative.

TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MMW032**		**MMW033**		**MMW034**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/11/2014**		**5/8/2014**		**5/11/2014**	
Analyte/Methods (Units)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Chemistry Parameters (mg/l)							
Sulfate (as SO_4)	250 mg/l	**5.55**	--	**27.2**	--	**162 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**204**	--	**276**	--	**314**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.00319**	--	**0.0334**	--	<0.002
Selenium	0.05 mg/l	**0.00198**	**0.00183 J**	<0.001	**0.000723 F**	**0.107 J**	**0.105 J**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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 low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MMW034 Dup**		**MMW034 average**		**MMW035**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/11/2014**		**5/11/2014**		**5/12/2014**	
Analyte/Methods (Units)							
Chemistry Parameters (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**128 D**	--	**145 D**	--	**512 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**544**	--	**429**	--	**1060**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.0191**	--	**0.0191**	--	**0.00132 F**
Selenium	0.05 mg/l	**0.899 D,J**	**0.937 D,J**	**0.503 D**	**0.521 D**	**1.36 D**	**1.36 D**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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 low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MMW036**		**MMW037**		**MMW037 Dup**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/12/2014**		**5/12/2014**		**5/12/2014**	
Analyte/Methods (Units)							
Chemistry Parameters (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**23.1**	--	**28.4**	--	**28.9**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**218**	--	**224**	--	**246**
Metals (mg/l)							**Total**
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.0294**	--	**0.0263**	--	**0.0455**
Selenium	0.05 mg/l	**0.0187**	**0.0183**	**0.0263**	**0.0264**	**0.0252**	**0.0259**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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 low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

TABLE C-3a

SUMMARY OF 2014 GROUNDWATER RESULTS
P4 RI/FS

Location Identification		**MMW037 average**		**MW15A**		**MW16A**	
Location Type		**Monitoring Well**		**Monitoring Well**		**Monitoring Well**	
Date Collected		**5/12/2014**		**5/10/2014**		**5/5/2014**	
Analyte/Methods (Units)							
Chemistry Parameters (mg/l)	**Screening Limits**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**
Sulfate (as SO_4)	250 mg/l	**28.65**	--	**722 D**	--	**672 D**	--
Total dissolved solids (Residue, filterable)	500 mg/l	--	**235**	--	**1280**	--	**1280**
Metals (mg/l)							
Cadmium	0.005 mg/l	--	<0.0006	--	<0.0006	--	<0.0006
Manganese	0.05 mg/l	--	**0.0359**	--	**0.00188 F**	--	**1.77 D**
Selenium	0.05 mg/l	**0.02575**	**0.02615**	**2.01 D**	**2.04 D**	**0.00125**	**0.00426**

mg/l milligrams per liter.
Bold Bolded result indicates positively identified compound.
-- Not scheduled.
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 low bias.
J+ Data are estimated due to associated quality control data. Potential high bias.
UJ Potential low bias, possible false negative.

C-3b Semi-Volatile Organic Compounds Groundwater Analytical Data

TABLE C-3b

SUMMARY OF 2014 SEMI-VOALTILE GROUNDWATER RESULTS
P4 RI/FS
(Page 1 of 2)

Location Identification		**MBW011**
Field Sample Identification		**1405GWMBW011-BN**
Date Collected		**5/12/2014**
Analyte/Methods (Units)		
Semi-Volatile Organic Compounds (µg/l)	**Screening Limits**	
1,2,4-Trichlorobenzene	70	<5.26
1,2-Dichlorobenzene	370	<5.26
1,3-Dichlorobenzene	NE	<5.26
1,4-Dichlorobenzene	75	<5.26
2,2'-oxybis(1-chloro)Propane	NE	<5.26
2,4,5-Trichlorophenol	50	<5.26
2,4,6-Trichlorophenol	6.2	<5.26
2,4-Dichlorophenol	110	<5.26
2,4-Dimethyl phenol	730	<5.26
2,4-Dinitrophenol	73	<26.3
2,4-Dinitrotoluene	70	<5.26
2,6-Dinitrotoluene	0.22	*<2.63*
2-Chloronaphthalene	2900	<5.26
2-Chlorophenol	180	<5.26
2-Methylnaphthalene	NE	<5.26
2-Methylphenol	NE	<5.26
2-Nitroaniline	370	<26.3
2-Nitrophenol	NE	<5.26
3,3'-Dichlorobenzidine	0.15	*<2.63*
3-Nitroaniline	NE	<26.3
4,6-Dinitro-2-methylphenol	NE	<26.3
4-Bromophenyl phenyl ether	NE	<5.26
4-Chloro-3-methylphenol	NE	<5.26
4-Chloroaniline	11	<5.26
4-Chlorophenyl phenyl ether	NE	<5.26
4-Nitroaniline	NE	<26.3
4-Nitrophenol	NE	<26.3
Acenaphthene	626	<5.26
Acenaphthylene	NE	<5.26
Anthracene	3130	<5.26
Benzo(a)anthracene	0.1	*<2.63*
Benzo(a)pyrene	0.2	*<2.63*
Benzo(b)fluoranthene	0.1	*<2.63*
Benzo(g,h,i)perylene	NE	<5.26
Benzo(k)fluoranthene	0.8	*<2.63*
Benzoic acid	150000	<26.3
Benzyl alcohol	3700	<5.26
Benzyl butyl phthalate	35	<5.26
bis(2-chloroethoxy) Methane	110	<5.26

TABLE C-3b

SUMMARY OF 2014 SEMI-VOALTILE GROUNDWATER RESULTS
P4 RI/FS
(Page 2 of 2)

Location Identification		**MBW011**
Field Sample Identification		**1405GWMBW011-BN**
Date Collected		**5/12/2014**
Analyte/Methods (Units)		
Semi-Volatile Organic Compounds (µg/l) (continue	**Screening Limits**	
bis(2-chloroethyl) Ether (2-Chloroethyl Ether)	120	<5.26
bis(2-ethylhexyl) Phthalate	NE	<10.5
Chrysene	4.8	*<2.63*
Di-n-butyl phthalate	8	<5.26
Di-n-octylphthalate	NE	<5.26
Dibenz(a,h)anthracene	NE	<5.26
Dibenzofuran	NE	<5.26
Diethyl Phthalate	37	<5.26
Dimethyl phthalate	29000	<5.26
Fluoranthene	NE	<5.26
Fluorene	417	<5.26
Hexachlorobenzene	417	<5.26
Hexachlorobutadiene	0.042	*<2.63*
Hexachloroethane	0.87	*<2.63*
Indeno(1,2,3-c,d)Pyrene	4.8	<5.26
Isophorone	NE	<5.26
n-Nitroso-di-n-propylamine	71	<5.26
n-Nitrosodiphenylamine	NE	<5.26
Naphthalene	14	<5.26
Nitrobenzene	210	<5.26
Pentachlorophenol	0.12	*<13.2*
Phenanthrene	0.17	*<2.63*
Phenol	NE	<5.26
Pyrene	1100	<5.26

µg/l	micrograms per liter.
Bold	Bolded result indicates positively identified compound.
NE	Not established.
Italic	Italicized result indicates analyte reported to the method detection limit.
--	Not scheduled.

TABLE 4-1 (FROM THE BALLARD FINAL RI) SCREENING LEVEL SUMMARY BY MEDIA					
Analyte	**Soil Screening Value[a] (mg/kg)**	**Vegetation Screening Value[b] (mg/kg)**	**Surface Water Screening Value (mg/L)**	**Sediment Screening Value (mg/kg)**	**Groundwater Screening Value (mg/L)**
Aluminum	77000[a]	1,000	0.087[c]	25,500[d]	0.2[e]
Antimony	0.27[m]	--	0.0056[f]	2.0[g]	0.006[e]
Arsenic	0.61[a]	30	0.01[f]	9.8[g]	0.01[h]
Barium	15000[a]	--	0.004[i]	--	2[e]
Beryllium	160[a]	--	0.00066[i]	--	0.004[e]
Boron	0.5[m]	150	0.0016[i]	--	7.3[j]
Cadmium	0.36[m]	10	0.0006[f]	0.99[g]	0.005[e]
Chloride	--	--	--	--	250[e]
Chromium	0.4[m]	100	0.000031[j]	43[g]	0.1[e]
Cobalt	13[m]	25	0.0047[j]	50[g]	0.011[j]
Copper	28[m]	40	0.011[f]	32[g]	1.3[e]
Fluoride	--	--	--	--	4[e]
Iron	55000[a]	500	0.16[k]	20,000[g]	0.3[e]
Lead	400[a]	100	0.0025[f]	35.8[g]	0.015[e]
Manganese	220[m]	2,000	0.05[c]	460[g]	0.05[e]
Mercury	0.1[m]	--	0.00077[c]	0.18[g]	0.002[e]
Molybdenum	2[m]	5	0.078[j]	--	0.18[j]
Nickel	38[m]	100	0.052[f]	23[g]	0.73[j]
Nitrate	130000[a]	--	--	--	10[e]
Nitrite	7800[a]	--	--	--	1[e]
Selenium	0.52[m]	5	0.005[f]	2.0[g]	0.05[e]
Silver	4.2[m]	--	0.0034[f]	1.0[g]	0.1[e]
Sulfate	--	--	--	--	250[e]
TDS	--	--	--	--	500[e]
Thallium	0.78	--	0.00024[f]	--	0.002[e]
Uranium	5[m]	--	0.0026[l]	--	0.03[h]
Vanadium	2[m]	50	0.02[l]	--	0.26[j]
Zinc	46[m]	500	0.12[f]	121[g]	5[e]
pH	--	--	--	--	6.5-8.5[e]

Notes:
mg/kg milligram per kilogram
mg/L milligram per liter
[a] USEPA Regional Screening Levels for Soil, Residential (USEPA, 2013a)[b] Mineral tolerance of animals, second revised edition (NRC, 2005)
[c] National Recommended Water Quality Criteria (USEPA, 2009b, 2013b); Freshwater Standards for Chronic Criteria (CCC)
[d] The ARCS TEL for freshwater sediment in NOAA SQuiRT (Buchman, 2008)
[e] State of Idaho Ground Water Quality Rule (IDAPA 58.01.11). Note that secondary MCLs are listed for pH, aluminum, chloride, iron, manganese, pH, silver, sulfate, TDS and zinc (IDEQ, 1996)
[f] State of Idaho Surface Water Quality for Aquatic Life (IDAPA 58.01.02); Chronic Criteria (CCC) or Water & Organisms (IDEQ, 2013a)
[g] USEPA Region 3 BTAG freshwater sediment screening benchmarks (USEPA, 2012)
[h] USEPA primary and secondary Maximum Contaminant Level (MCL), National Primary Drinking Water Regulations
[i] Chronic freshwater screening value in NOAA SQuiRT (Buchman, 2008)
[j] USEPA Regional Screening Levels (RSLs) for Water (USEPA, 2013a)
[k] Lowest Chronic Value (LCV) observed in freshwater daphnids. Source: ORNL, 1996a.
[l] Tier II Secondary Chronic Value. Source: ORNL, 1996a.
[m] Sources of soil-based benchmarks for evaluating potential effects of COPECs on lower trophic-level organisms include:
1. USEPA Eco-SSLs (USEPA, various dates).
2. ORNL (1996a, 1996b, 1997a, 1997b, 1997c).
3. Environmental Residue Effects Database (ERED) (USACE, 2010).
4. USEPA Ecotox Database (USEPA, 2013c).
5. Aquatox (USEPA, 2009d)

APPENDIX D - 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

July 15, 2014

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. VanPelt,

Enclosed are the final verification reports for the fractions listed below. These SDGs were received on June 9, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 31944:

SDG #	Fraction
L14050717	Metals by ICPMS SW-846 Method 6020
L14050718	Metals by ICP SW-846 Method 6010B
L14050719	Wet Chemistry
L14050736	
L14050737	
L14051013	
L14051049	

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

Attachment 1

EDD Stage 2B/4

LDC #31944 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Se (6020A)		(3) Metals (6020A)		Diss. Se (6020A)		Diss Cd, Se (6020A)		(3)Diss. Metals (6010B)		SO_4 (300.0)		Hard. (2340B)		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	L14050717	06/09/14	06/30/14	-	-	3	0	3	0	-	-	-	-	3	0	-	-	3	0																		
B	L14050718	06/09/14	06/30/14	-	-	1	0	1	0	-	-	-	-	1	0	-	-	1	0																		
C	L14050719	06/09/14	06/30/14	9	0	-	-	-	-	9	0	9	0	9	0	9	0	9	0																		
D	L14050736	06/09/14	06/30/14	-	-	4	0	4	0	-	-	-	-	4	0	-	-	4	0																		
E	L14050737	06/09/14	06/30/14	8	0	-	-	-	-	8	0	8	0	8	0	8	0	8	0																		
F	L14051013	06/09/14	06/30/14	19	0	-	-	-	-	19	0	-	-	17	0	-	-	19	0																		
G	L14051049	06/09/14	06/30/14	-	-	2	0	2	0	-	-	-	-	2	0	-	-	2	0																		
G	L14051049	06/09/14	06/30/14	-	-	5	0	5	0	-	-	-	-	5	0	-	-	5	0																		
Total	A/CR			36	0	15	0	15	0	36	0	17	0	49	0	17	0	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236

Shaded cells indicate Stage 4 validation (all other cells are Stage 2B review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

31944ST.wpd

Report# 31944A4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 15, 2014

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14050717

Sample Identification	Collection Date	Laboratory Sample Identification
1405MMW025-U	05/06/14	L14050717-01
1405MBW006-U	05/06/14	L14050717-03
1405MMW031-U	05/06/14	L14050717-05
1405MMW025-F	05/06/14	L14050717-02
1405MBW006-F	05/06/14	L14050717-04
1405MMW031-F	05/06/14	L14050717-06

Samples appeneded with "F" were analyzed as dissolved

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 6020 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. 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.

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 L14050717

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14050717

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14050717

No Sample Data Qualified in this SDG

LDC #: 31944A4b

SDG #: L14050717

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6/16/14

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: ~~Cd, Se, Mn~~ 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.	Technical holding times	A	Sampling dates: 5/6/14
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	3 MS/MSD non client.
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	A	#4
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	1405MMW025-U	11	MB	21		31	
2	1405MBW006-U	12		22		32	
3	1405MMW031-U	13		23		33	
4	1405MMW025-F	14		24		34	
5	1405MBW006-F	15		25		35	
6	1405MMW031-F	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 31944A4b

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	Ks	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
4-6	✓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

Report# 31944A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 17, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14050717

Sample Identification	Collection Date	Laboratory Sample Identification
1405MMW025-U	05/06/14	L14050717-01
1405MBW006-U	05/06/14	L14050717-03
1405MMW031-U	05/06/14	L14050717-05
1405MMW025-F	05/06/14	L14050717-02
1405MBW006-F	05/06/14	L14050717-04
1405MMW031-F	05/06/14	L14050717-06

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 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

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

VII. 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 reviewed for this SDG.

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 L14050717

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14050717

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14050717

No Sample Data Qualified in this SDG

LDC #: 31944A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer:
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-3	Air	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
4-6	S	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____

Comments:

Report# 31944B4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 15, 2014

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14050718

Sample Identification	Collection Date	Laboratory Sample Identification
1405GW16A-F	05/05/14	L14050718-01
1405GW16A-U	05/05/14	L14050718-02

Samples appended with "F" were analyzed as dissolved

Introduction

This data review covers 2 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 6020 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. 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.

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 L14050718

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14050718

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14050718

No Sample Data Qualified in this SDG

LDC #: 31944B4b
SDG #: L14050718
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 6/16/14
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ~~Cd, Se, Mn~~ Metals (EPA SW 846 Method 6020~~A~~)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/5/14
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	3 MS/MSD. non client
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	A	1405MM W025-F
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: A2

1	1405GW16A-F	11	MB	21		31	
2	1405GW16A-U	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 31944B4b

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	AQ	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
2	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

Report# 31944B6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 17, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14050718

Sample Identification	Collection Date	Laboratory Sample Identification
1405GW16A-F	05/05/14	L14050718-01
1405GW16A-U	05/05/14	L14050718-02
1405GW16A-UDUP	05/05/14	L14050718-02DUP

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 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

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

VII. 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 reviewed for this SDG.

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 L14050718

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14050718

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14050718

No Sample Data Qualified in this SDG

LDC #: 31944B6
SDG #: L14050718
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 6/16/14
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (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.	Technical holding times	A	Sampling dates: 5/5/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	No MS/Dup for SO4.
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS/LD
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	1405GW16A-F	11	MB	21		31	
2	1405GW16A-U	12		22		32	
3	#2 Dup	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 31944B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1	AQ	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
2	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
m3	AQ	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 _____ _____

Comments: _____

Report# 31944C4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 17, 2014

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14050719

Sample Identification	Collection Date	Laboratory Sample Identification
1405SWMST069-F	05/05/14	L14050719-02
1405SWMST131-F	05/06/14	L14050719-04
1405SWMST128-F	05/06/14	L14050719-06
1405SWMST132-1-F	05/06/14	L14050719-08
1405SWMST132-2-F	05/06/14	L14050719-10
1405SWMST143-F	05/06/14	L14050719-12
1405SWMST274-F	05/06/14	L14050719-14
1405SWMDS026-F	05/06/14	L14050719-16
1405SWMST133-F	05/06/14	L14050719-18

Introduction

This data review covers 9 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, Magnesium, 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. 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

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

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.

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 L14050719

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14050719

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14050719

No Sample Data Qualified in this SDG

LDC #: 31944C4a

SDG #: L14050719

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6/16/14

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6010B)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/5/14 - 5/6/14
II.	ICP/MS Tune	N	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/MSD, non client
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	
X.	ICP Serial Dilution	A	non client
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: As

1	1405SWMST069-F	11	MS	21		31	
2	1405SWMST131-F	12		22		32	
3	1405SWMST128-F	13		23		33	
4	1405SWMST132-1-F	14		24		34	
5	1405SWMST132-2-F	15		25		35	
6	1405SWMST143-F	16		26		36	
7	1405SWMST274-F	17		27		37	
8	1405SWMDS026-F	18		28		38	
9	1405SWMST133-F	19		29		39	
10		20		30		40	

Notes:

LDC #: 21944C4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-9	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

Report# 31944C4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 15, 2014

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14050719

Sample Identification	Collection Date	Laboratory Sample Identification
1405SWMST069-U	05/05/14	L14050719-01
1405SWMST131-U	05/06/14	L14050719-03
1405SWMST128-U	05/06/14	L14050719-05
1405SWMST132-1-U	05/06/14	L14050719-07
1405SWMST132-2-U	05/06/14	L14050719-09
1405SWMST143-U	05/06/14	L14050719-11
1405SWMST274-U	05/06/14	L14050719-13
1405SWMDS026-U	05/06/14	L14050719-15
1405SWMST133-U	05/06/14	L14050719-17
1405SWMST069-F	05/05/14	L14050719-02
1405SWMST131-F	05/06/14	L14050719-04
1405SWMST128-F	05/06/14	L14050719-06
1405SWMST132-1-F	05/06/14	L14050719-08
1405SWMST132-2-F	05/06/14	L14050719-10
1405SWMST143-F	05/06/14	L14050719-12
1405SWMST274-F	05/06/14	L14050719-14
1405SWMDS026-F	05/06/14	L14050719-16
1405SWMST133-F	05/06/14	L14050719-18
1405SWMST133-F-MS	05/06/14	L14050719-18MS
1405SWMST133-F-MSD	05/06/14	L14050719-18MSD

Samples appended with "F" were analyzed as dissolved

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 EPA SW 846 Method noted below:

- Method 6020 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. 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.

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

The results for the dissolved metals sample analysis were greater than the total metals sample analysis as follows:

Analyte	Concentration (mg/L)	
	1405SWMDS026-F	1405SWMDS026-U
Selenium	0.560	0.516

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 L14050719

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14050719

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14050719

No Sample Data Qualified in this SDG

LDC #: 31944C4b

SDG #: L14050719

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6/16/14

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Cd & Se (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.	Technical holding times	A	Sampling dates: 5/5/14 - 5/6/14
II.	ICP/MS Tune		
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	SW	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	1405SWMST069-U	11	1405SWMST131-F	21	MB	31	
2	1405SWMST131-U	12	1405SWMST128-F	22		32	
3	1405SWMST128-U	13	1405SWMST132-1-F	23		33	
4	1405SWMST132-1-U	14	1405SWMST132-2-F	24		34	
5	1405SWMST132-2-U	15	1405SWMST143-F	25		35	
6	1405SWMST143-U	16	1405SWMST274-F	26		36	
7	1405SWMST274-U	17	1405SWMDS026-F	27		37	
8	1405SWMDS026-U	18	1405SWMST133-F	28		38	
9	1405SWMST133-U	19	MS	29		39	
10	1405SWMST069-F	20	MSD	30		40	

Notes:

LDC #: 31944046

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)
1-9	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
10-18	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
19, 20	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
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, Si, CN^-,
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, Si, CN^-,
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, Si, CN^-,

Comments: Mercury by CVAA if performed

LDC #: 31944C4b

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer [illegible]

METHOD: Trace metals (EPA SW846 Method 6020)

#	Sample ID	Analyte	Diss Result (mg/l)	Total Result (mg/l)	Finding	Qualifications
1	17/8	Se	**0.560**	0.516	Diss > Total	Text

Comments:

Report# 31944C6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 17, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14050719

Sample Identification	Collection Date	Laboratory Sample Identification
1405SWMST069-U	05/05/14	L14050719-01
1405SWMST131-U	05/06/14	L14050719-03
1405SWMST128-U	05/06/14	L14050719-05
1405SWMST132-1-U	05/06/14	L14050719-07
1405SWMST132-2-U	05/06/14	L14050719-09
1405SWMST143-U	05/06/14	L14050719-11
1405SWMST274-U	05/06/14	L14050719-13
1405SWMDS026-U	05/06/14	L14050719-15
1405SWMST133-U	05/06/14	L14050719-17
1405SWMST069-F	05/05/14	L14050719-02
1405SWMST131-F	05/06/14	L14050719-04
1405SWMST128-F	05/06/14	L14050719-06
1405SWMST132-1-F	05/06/14	L14050719-08
1405SWMST132-2-F	05/06/14	L14050719-10
1405SWMST143-F	05/06/14	L14050719-12
1405SWMST274-F	05/06/14	L14050719-14
1405SWMDS026-F	05/06/14	L14050719-16
1405SWMST133-F	05/06/14	L14050719-18
1405SWMST133-UDUP	05/06/14	L14050719-17DUP

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, 7 days for method 160.1, and 180 days for method SM2340B) 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

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

VII. 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 reviewed for this SDG.

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 L14050719

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14050719

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14050719

No Sample Data Qualified in this SDG

LDC #: 31944C6
SDG #: L14050719
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 6/16/14
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (EPA Method 160.1), Hardness (SM2340B)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/5/14-5/6/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	No MS/Dup for SO4 non-client; MS/MSD for Hardness
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	1405SWMST069-U	11	1405SWMST131-F	21	MB	31	
2	1405SWMST131-U	12	1405SWMST128-F	22		32	
3	1405SWMST128-U	13	1405SWMST132-1-F	23		33	
4	1405SWMST132-1-U	14	1405SWMST132-2-F	24		34	
5	1405SWMST132-2-U	15	1405SWMST143-F	25		35	
6	1405SWMST143-U	16	1405SWMST274-F	26		36	
7	1405SWMST274-U	17	1405SWMDS026-F	27		37	
8	1405SWMDS026-U	18	1405SWMST133-F	28		38	
9	1405SWMST133-U	19	#9 Dup	29		39	
10	1405SWMST069-F	20		30		40	

Notes:

LDC #: 31944C6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-9	Aq	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
10-18	↓	pH TDS Cl F NO_3 NO_2 SO_4 ~~PO_4~~ ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 Hach ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
~#19	Aq	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

Report# 31944D4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 15, 2014

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14050736

Sample Identification	Collection Date	Laboratory Sample Identification
1405MMW021-U	05/07/14	L14050736-02
1405GWMMW006-U	05/07/14	L14050736-04
1405GWMMW020-U	05/07/14	L14050736-06
1405GWMBW009-U	05/07/14	L14050736-08
1405MMW021-F	05/07/14	L14050736-01
1405GWMMW006-F	05/07/14	L14050736-03
1405GWMMW020-F	05/07/14	L14050736-05
1405GWMBW009-F	05/07/14	L14050736-07

Samples appended with "F" were analyzed as dissolved

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 6020 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. 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).

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 L14050736

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14050736

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14050736

No Sample Data Qualified in this SDG

LDC #: 31944D4b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6/16/14

SDG #: L14050736

Page: 1 of 1

Laboratory: Microbac

Reviewer:

2nd Reviewer:

METHOD: ~~Cd, Se, Mn~~ 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.	Technical holding times	A	Sampling dates: 5/7/14
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	not dnt
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	A	not dnt
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All

1	1405MMW021-U	11	MB	21		31	
2	1405GWMMW006-U	12		22		32	
3	1405GWMMW020-U	13		23		33	
4	1405GWMBW009-U	14		24		34	
5	1405MMW021-F	15		25		35	
6	1405GWMMW006-F	16		26		36	
7	1405GWMMW020-F	17		27		37	
8	1405GWMBW009-F	18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 31944D4b

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: ✓
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4	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, Si, CN^-, ____
5-6	✓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

Report# 31944D6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 17, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14050736

Sample Identification	Collection Date	Laboratory Sample Identification
1405MMW021-U	05/07/14	L14050736-02
1405GWMMW006-U	05/07/14	L14050736-04
1405GWMMW020-U	05/07/14	L14050736-06
1405GWMBW009-U	05/07/14	L14050736-08
1405MMW021-F	05/07/14	L14050736-01
1405GWMMW006-F	05/07/14	L14050736-03
1405GWMMW020-F	05/07/14	L14050736-05
1405GWMBW009-F	05/07/14	L14050736-07

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 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

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

VII. 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 reviewed for this SDG.

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 L14050736

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14050736

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14050736

No Sample Data Qualified in this SDG

LDC #: 31944D6
SDG #: L14050736
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 6/16/14
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (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.	Technical holding times	A	Sampling dates: 5/7/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	~~A~~ N	~~[illegible]~~ [illegible] No MS/MSD for SO_4
VI.	Duplicates	A	TDS = Dup from L14050737
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

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

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: [illegible]

1	1405MMW021-U	11	MB	21		31	
2	1405GWMMW006-U	12		22		32	
3	1405GWMMW020-U	13		23		33	
4	1405GWMBW009-U	14		24		34	
5	1405MMW021-F	15		25		35	
6	1405GWMMW006-F	16		26		36	
7	1405GWMMW020-F	17		27		37	
8	1405GWMBW009-F	18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 31944D6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-4	Aq	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
5-6	↓	pH TDS Cl F NO_3 NO_2 (SO4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

Report# 31944E4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 17, 2014

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14050737

Sample Identification	Collection Date	Laboratory Sample Identification
1405SWMDS025-F	05/07/14	L14050737-02
1405SWMST144-F	05/07/14	L14050737-04
1405SWMST275-F	05/07/14	L14050737-06
1405SWMST136-F	05/07/14	L14050737-08
1405SWMST063-F	05/07/14	L14050737-10
1405SWMST057-F	05/07/14	L14050737-16
1405SWMST226-F	05/07/14	L14050737-18
1405SWMST050-F	05/07/14	L14050737-20
1405SWMST063-U-MS	05/07/14	L14050737-11
1405SWMST063-U-MSD	05/07/14	L14050737-13
1405SWMST063-F-MS	05/07/14	L14050737-12
1405SWMST063-F-MSD	05/07/14	L14050737-14

Introduction

This data review covers 10 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, Magnesium, 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. 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.

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 L14050737

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14050737

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14050737

No Sample Data Qualified in this SDG

LDC #: 31944E4a
SDG #: L14050737
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Stage 2B~~4~~

Date: 6/16/14
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6010B)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/7/14
II.	ICP/MS Tune	N	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	3 MS/MSD
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	
X.	ICP Serial Dilution	A	a non client sample
XI.	Sample Result Verification	N	~~Not reviewed for Stage 2B validation.~~
XII.	Overall Assessment of Data		
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ~~* Indicates sample underwent Stage 4 validation~~

1	1405SWMDS025-F	11	MB	21		31	
2	1405SWMST144-F	12		22		32	
3	1405SWMST275-F	13		23		33	
4	1405SWMST136-F*	14		24		34	
5	1405SWMST063-F	15		25		35	
6	1405SWMST057-F	16		26		36	
7	1405SWMST226-F	17		27		37	
8	1405SWMST050-F*	18		28		38	
9	1405SWMST063-FMS	19		29		39	
10	1405SWMST063-FMSD	20		30		40	

Notes:

LDC #: 31944B4a

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)
1-8	Ba	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
mg, 10	Ba	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

Report# 31944E4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 15, 2014

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14050737

Sample Identification	Collection Date	Laboratory Sample Identification
1405SWMDS025-U	05/07/14	L14050737-01
1405SWMST144-U	05/07/14	L14050737-03
1405SWMST275-U	05/07/14	L14050737-05
1405SWMST136-U	05/07/14	L14050737-07
1405SWMST063-U	05/07/14	L14050737-09
1405SWMST057-U	05/07/14	L14050737-15
1405SWMST226-U	05/07/14	L14050737-17
1405SWMST050-U	05/07/14	L14050737-19
1405SWMDS025-F	05/07/14	L14050737-02
1405SWMST144-F	05/07/14	L14050737-04
1405SWMST275-F	05/07/14	L14050737-06
1405SWMST136-F	05/07/14	L14050737-08
1405SWMST063-F	05/07/14	L14050737-10
1405SWMST057-F	05/07/14	L14050737-16
1405SWMST226-F	05/07/14	L14050737-18
1405SWMST050-F	05/07/14	L14050737-20
1405SWMST063-U-MS	05/07/14	L14050737-11
1405SWMST063-U-MSD	05/07/14	L14050737-13
1405SWMST063-F-MS	05/07/14	L14050737-12
1405SWMST063-F-MSD	05/07/14	L14050737-14

Samples appended with "F" were analyzed as dissolved

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 EPA SW 846 Method noted below:

- Method 6020 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. 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.

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

The results for the dissolved metals sample analysis were greater than the total metals sample analysis as follows:

Analyte	Concentration (mg/L)	
	1405SWMDS025-F	1405SWMDS025-U
Selenium	0.0427	0.0371

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 L14050737

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14050737

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14050737

No Sample Data Qualified in this SDG

LDC #: 31944E4b

VALIDATION COMPLETENESS WORKSHEET

Date: 6/16/14

SDG #: L14050737

Satge 2B~~4~~

Page: 1 of 1

Laboratory: Microbac

Reviewer:

2nd Reviewer:

METHOD: Cd & Se (EPA SW 846 Method 6020~~A~~)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/7/14
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	A	#9
XI.	Sample Result Verification	SW	~~Not reviewed for Stage 2B validation.~~
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:** ~~Indicates sample underwent Stage 4 validation~~

1	1405SWMDS025-U	11	1405SWMST275-F	21	MB	31	
2	1405SWMST144-U	12	1405SWMST136-F**	22		32	
3	1405SWMST275-U	13	1405SWMST063-F	23		33	
4	1405SWMST136-U**	14	1405SWMST057-F	24		34	
5	1405SWMST063-U	15	1405SWMST226-F	25		35	
6	1405SWMST057-U	16	1405SWMST050-F**	26		36	
7	1405SWMST226-U	17	1405SWMST063-UMS	27		37	
8	1405SWMST050-U**	18	1405SWMST063-UMSD	28		38	
9	1405SWMDS025-F	19	1405SWMST063-FMS	29		39	
10	1405SWMST144-F	20	1405SWMST063-FMSD	30		40	

Notes:

LDC #: 31944F6

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)
1-8	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
9-16	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
~17, 18	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
L19 ~	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 31944E4b

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 6 of 1
Reviewer: [illegible]
2nd Reviewer [illegible]

METHOD: Trace metals (EPA SW846 Method 6020)

#	Sample ID	Analyte	Diss Result (mg/l)	Total Result (mg/l)	Finding	Qualifications
1	9/1	Se	**0.0427**	0.0371	Diss > Total	Text

Comments:

Report# 31944E6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 24, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14050737

Sample Identification	Collection Date	Laboratory Sample Identification
1405SWMDS025-U	05/07/14	L14050737-01
1405SWMST144-U	05/07/14	L14050737-03
1405SWMST275-U	05/07/14	L14050737-05
1405SWMST136-U	05/07/14	L14050737-07
1405SWMST063-U	05/07/14	L14050737-09
1405SWMST057-U	05/07/14	L14050737-15
1405SWMST226-U	05/07/14	L14050737-17
1405SWMST050-U	05/07/14	L14050737-19
1405SWMDS025-F	05/07/14	L14050737-02
1405SWMST144-F	05/07/14	L14050737-04
1405SWMST275-F	05/07/14	L14050737-06
1405SWMST136-F	05/07/14	L14050737-08
1405SWMST063-F	05/07/14	L14050737-10
1405SWMST057-F	05/07/14	L14050737-16
1405SWMST226-F	05/07/14	L14050737-18
1405SWMST050-F	05/07/14	L14050737-20
1405SWMST063-U-MS	05/07/14	L14050737-11
1405SWMST063-U-MSD	05/07/14	L14050737-13
1405SWMST063-F-MS	05/07/14	L14050737-12
1405SWMST063-F-MSD	05/07/14	L14050737-14
1405SWMST144-UDUP	05/07/14	L14050737-03DUP

Introduction

This data review covers 21 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, EPA Method 160.1 for Total Dissolved Solids, and Standard Method 2340B for Hardness.

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 180 days for method SM2340B) 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 reviewed for this SDG.

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 L14050737

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14050737

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14050737

No Sample Data Qualified in this SDG

LDC #: 31944E6
SDG #: L14050737
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Stage 2B/~~4~~

Date: 6/16/14
Page: 1 of 1
Reviewer: w
2nd Reviewer: cr

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (EPA Method 160.1), Hardness (SM2340B)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/7/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	~~Not reviewed for Stage 2B validation.~~ ✓
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ~~** Indicates sample underwent Stage 4 validation~~ ✓

1	1405SWMDS025-U	11	1405SWMST275-F	21	#2 Dup	31	MB
2	1405SWMST144-U	12	1405SWMST136-F*	22		32	
3	1405SWMST275-U	13	1405SWMST063-F	23		33	
4	1405SWMST136-U*	14	1405SWMST057-F	24		34	
5	1405SWMST063-U	15	1405SWMST226-F	25		35	
6	1405SWMST057-U	16	1405SWMST050-F*	26		36	
7	1405SWMST226-U	17	1405SWMST063-U MS	27		37	
8	1405SWMST050-U*	18	1405SWMST063-U MSD	28		38	
9	1405SWMDS025-F	19	1405SWMST063-F MS	29		39	
10	1405SWMST144-F	20	1405SWMST063-F MSD	30		40	

Notes:

LDC #: 31944F6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-8	AQ	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
9-16	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 Hardness ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
14.15	AQ	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
17,18	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

Report# 31944F4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 15, 2014

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051013

Sample Identification	Collection Date	Laboratory Sample Identification
1405GWMMW029-U	5/8/14	L14051013-02
1405GWMMW033-U	5/8/14	L14051013-04
1405GWMBW032-U	5/8/14	L14051013-06
1405GWMMW018-U	5/8/14	L14051013-08
1405GWMBW048-U	5/8/14	L14051013-10
1405GWMMW026-U	5/9/14	L14051013-12
1405GWMMW030-U	5/9/14	L14051013-16
1405GWMMW023-U	5/10/14	L14051013-18
1405GWMMW011-U	5/10/14	L14051013-20
1405GWMMW028-1-U	5/10/14	L14051013-22
1405GWMMW028-2-U	5/10/14	L14051013-24
1405GWMMW022-U	5/10/14	L14051013-26
1405GWMMW010-U	5/10/14	L14051013-28
1405GWMMW032-U	5/11/14	L14051013-30
1405GWMMW013-U	5/11/14	L14051013-32
1405GWMMW034-1-U	5/11/14	L14051013-34
1405GWMMW034-2-U	5/11/14	L14051013-36
1405GWMMW-024-U	5/11/14	L14051013-38
1405GWMMW017-U	5/11/14	L14051013-40
1405GWMMW029-F	5/8/14	L14051013-01
1405GWMMW033-F	5/8/14	L14051013-03
1405GWMBW032-F	5/8/14	L14051013-05
1405GWMMW018-F	5/8/14	L14051013-07
1405GWMBW048-F	5/8/14	L14051013-09
1405GWMMW026-F	5/9/14	L14051013-11
1405GWMMW030-F	5/9/14	L14051013-15

1405GWMMW023-F	5/10/14	L14051013-17
1405GWMMW011-F	5/10/14	L14051013-19
1405GWMMW028-1-F	5/10/14	L14051013-21
1405GWMMW028-2-F	5/10/14	L14051013-23
1405GWMMW022-F	5/10/14	L14051013-25
1405GWMMW010-F	5/10/14	L14051013-27
1405GWMMW032-F	5/11/14	L14051013-29
1405GWMMW013-F	5/11/14	L14051013-31
1405GWMMW034-1-F	5/11/14	L14051013-33
1405GWMMW034-2-F	5/11/14	L14051013-35
1405GWMMW-024-F	5/11/14	L14051013-37
1405GWMMW017-F	5/11/14	L14051013-39
1405GWMBW032-F-MS	5/8/14	L14051013-05MS
1405GWMBW032-F-MSD	5/8/14	L14051013-05MSD
1405GWMMW017-U-MS	5/11/14	L14051013-40MS
1405GWMMW017-U-MSD	5/11/14	L14051013-40MSD

Samples appended with “F” were analyzed as dissolved

Introduction

This data review covers 42 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 6020 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. 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

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

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 1405GWMBW032-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).

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
1405GWMMW018-F	Selenium	17.40 (≤10)	1405GWMBW032-U 1405GWMMW018-U 1405GWMBW048-U 1405GWMMW026-U 1405GWMMW030-U 1405GWMMW023-U 1405GWMMW011-U 1405GWMMW028-1-U 1405GWMMW018-F 1405GWMBW048-F 1405GWMMW026-F 1405GWMMW030-F 1405GWMMW023-F 1405GWMMW011-F 1405GWMMW028-1-F 1405GWMMW028-2-F	J (all detects) UJ (all non-detects)	A

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1405GWMMW022-F	Selenium	13.20 (≤10)	1405GWMMW028-2-U 1405GWMMW022-U 1405GWMMW010-U 1405GWMMW032-U 1405GWMMW013-U 1405GWMMW034-1-U 1405GWMMW034-2-U 1405GWMMW-024-U 1405GWMMW017-U 1405GWMMW022-F 1405GWMMW010-F 1405GWMMW032-F 1405GWMMW013-F 1405GWMMW034-1-F 1405GWMMW034-2-F 1405GWMMW-024-F 1405GWMMW017-F	J (all detects) UJ (all non-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

The results for the dissolved metals sample analysis were greater than the total metals sample analysis as follows:

Analyte	Concentration (mg/L)	
	1405GWMMW029-F	1405GWMMW029-U
Selenium	0.694	0.610

Analyte	Concentration (mg/L)	
	1405GWMBW032-F	1405GWMBW032-U
Selenium	1.43	1.26

Analyte	Concentration (mg/L)	
	1405GWMMW034-2-F	1405GWMMW034-2-U
Selenium	0.899	0.937

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 L14051013

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L14051013	1405GWMBW032-U 1405GWMMW018-U 1405GWMBW048-U 1405GWMMW026-U 1405GWMMW030-U 1405GWMMW023-U 1405GWMMW011-U 1405GWMMW028-1-U 1405GWMMW018-F 1405GWMBW048-F 1405GWMMW026-F 1405GWMMW030-F 1405GWMMW023-F 1405GWMMW011-F 1405GWMMW028-1-F 1405GWMMW028-2-F 1405GWMMW028-2-U 1405GWMMW022-U 1405GWMMW010-U 1405GWMMW032-U 1405GWMMW013-U 1405GWMMW034-1-U 1405GWMMW034-2-U 1405GWMMW-024-U 1405GWMMW017-U 1405GWMMW022-F 1405GWMMW010-F 1405GWMMW032-F 1405GWMMW013-F 1405GWMMW034-1-F 1405GWMMW034-2-F 1405GWMMW-024-F 1405GWMMW017-F	Selenium	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D)	18

Metals - Laboratory Blank Data Qualification Summary - SDG L14051013

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14051013

No Sample Data Qualified in this SDG

LDC #: 31944F4b
SDG #: L14051013
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 6/16/14
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020~~A~~)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/8/14 - 5/11/14
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	SW	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	1405GWMMW029-U	11	1405GWMMW028-2-U	21	1405GWMMW033-F	31	1405GWMMW022-F
2	1405GWMMW033-U	12	1405GWMMW022-U	22	1405GWMBW032-F	32	1405GWMMW010-F
3	1405GWMBW032-U	13	1405GWMMW010-U	23	1405GWMMW018-F	33	1405GWMMW032-F
4	1405GWMMW018-U	14	1405GWMMW032-U	24	1405GWMBW048-F	34	1405GWMMW013-F
5	1405GWMBW048-U	15	1405GWMMW013-U	25	1405GWMMW026-F	35	1405GWMMW034-1-F
6	1405GWMMW026-U	16	1405GWMMW034-1-U	26	1405GWMMW030-F	36	1405GWMMW034-2-F
7	1405GWMMW030-U	17	1405GWMMW034-2-U	27	1405GWMMW023-F	37	1405GWMMW-024-F
8	1405GWMMW023-U	18	1405GWMMW-024-U	28	1405GWMMW011-F	38	1405GWMMW017-F
9	1405GWMMW011-U	19	1405GWMMW017-U	29	1405GWMMW028-1-F	39	#22 MS
10	1405GWMMW028-1-U	20	1405GWMMW029-F	30	1405GWMMW028-2-F	40	✓ MSD

Notes:

41 #19 MS
42 ✓ MSD

31944F4bW.wpd

LDC #: 31944F46

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)
1-19	Air	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
20-38	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
39-47	AQ	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-,
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, Si, CN^-,
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, Si, CN^-,
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, Si, CN^-,

Comments: Mercury by CVAA if performed

LDC #: 31944F4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA Method SW846 6020)

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) within the control limits of 20?

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
1	39/40		Se	-54.3				No qual, parent >4X.

Comments:

LDC #: 31944F4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6020)

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.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
1		23		Se	17.40	3-10, 23-30	J/UJ (18) 1A
2		31		Se	13.20	11-19, 31-38	J/UJ (18) 1A

Comments:

LDC #: 31944F4b

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: C
2nd Reviewer

METHOD: Trace metals (EPA SW846 Method 6020)

#	Sample ID	Analyte	Diss Result (mg/l)	Total Result (mg/l)	Finding	Qualifications
1	20/1	Se	**0.694**	0.610	Diss > Total	Text
2	22/3	Se	1.43	1.26		
3	36/17	Se	0.899	0.937		

Comments:

Report# 31944F6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 19, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051013

Sample Identification	Collection Date	Laboratory Sample Identification
1405GWMMW029-U	5/8/14	L14051013-02
1405GWMMW033-U	5/8/14	L14051013-04
1405GWMBW032-U	5/8/14	L14051013-06
1405GWMMW018-U	5/8/14	L14051013-08
1405GWMBW048-U	5/8/14	L14051013-10
1405GWMMW026-U	5/9/14	L14051013-12
1405GWMMW030-U	5/9/14	L14051013-16
1405GWMMW023-U	5/10/14	L14051013-18
1405GWMMW011-U	5/10/14	L14051013-20
1405GWMMW028-1-U	5/10/14	L14051013-22
1405GWMMW028-2-U	5/10/14	L14051013-24
1405GWMMW022-U	5/10/14	L14051013-26
1405GWMMW010-U	5/10/14	L14051013-28
1405GWMMW032-U	5/11/14	L14051013-30
1405GWMMW013-U	5/11/14	L14051013-32
1405GWMMW034-1-U	5/11/14	L14051013-34
1405GWMMW034-2-U	5/11/14	L14051013-36
1405GWMMW-024-U	5/11/14	L14051013-38
1405GWMMW017-U	5/11/14	L14051013-40
1405GWMMW029-F	5/8/14	L14051013-01
1405GWMMW033-F	5/8/14	L14051013-03
1405GWMBW032-F	5/8/14	L14051013-05
1405GWMMW018-F	5/8/14	L14051013-07
1405GWMBW048-F	5/8/14	L14051013-09
1405GWMMW030-F	5/9/14	L14051013-15

1405GWMMW023-F	5/10/14	L14051013-17
1405GWMMW011-F	5/10/14	L14051013-19
1405GWMMW028-1-F	5/10/14	L14051013-21
1405GWMMW022-F	5/10/14	L14051013-25
1405GWMMW010-F	5/10/14	L14051013-27
1405GWMMW032-F	5/11/14	L14051013-29
1405GWMMW013-F	5/11/14	L14051013-31
1405GWMMW034-1-F	5/11/14	L14051013-33
1405GWMMW034-2-F	5/11/14	L14051013-35
1405GWMMW-024-F	5/11/14	L14051013-37
1405GWMMW017-F	5/11/14	L14051013-39
1405GWMMW026-F	5/9/14	L14051013-11
1405GWMBW048-F-MS	5/8/14	L14051013-09MS
1405GWMBW048-F-MSD	5/8/14	L14051013-09MSD
1405GWMMW013-UDUP	5/11/14	L14051013-32DUP
1405GWMBW048-UDUP	5/8/14	L14051013-10DUP

Introduction

This data review covers 41 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.

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The following "Reason Codes" will be applied as applicable to the validated data:

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6 Initial Calibration
7 Initial Calibration Verification
8 Continuing Calibration Verification
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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 reviewed for this SDG.

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 L14051013

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14051013

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14051013

No Sample Data Qualified in this SDG

LDC #: 31944F6
SDG #: L14051013
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 6/16/14
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (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.	Technical holding times	A	Sampling dates: 5/8/14 - 5/11/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS/LCSD
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	1405GWMMW029-U	11	1405GWMMW028-2-U	21	1405GWMMW033-F	31	1405GWMMW032-F
2	1405GWMMW033-U	12	1405GWMMW022-U	22	1405GWMBW032-F	32	1405GWMMW013-F
3	1405GWMBW032-U	13	1405GWMMW010-U	23	1405GWMMW018-F	33	1405GWMMW034-1-F
4	1405GWMMW018-U	14	1405GWMMW032-U	24	1405GWMBW048-F	34	1405GWMMW034-2-F
5	1405GWMBW048-U	15	1405GWMMW013-U	25	1405GWMMW030-F	35	1405GWMMW-024-F
6	1405GWMMW026-U	16	1405GWMMW034-1-U	26	1405GWMMW023-F	36	1405GWMMW017-F
7	1405GWMMW030-U	17	1405GWMMW034-2-U	27	1405GWMMW011-F	37	1405GWMMW026-F
8	1405GWMMW023-U	18	1405GWMMW-024-U	28	1405GWMMW028-1-F	38	MS
9	1405GWMMW011-U	19	1405GWMMW017-U	29	1405GWMMW022-F	39	MSD
10	1405GWMMW028-1-U	20	1405GWMMW029-F	30	1405GWMMW010-F	40	~~Dup~~

Notes: 41 #15 Dup
42 #5 Dup

LDC #: 31944F6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-19	~~TDS~~ AQ	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
20-37		pH TDS Cl F NO_3 NO_2 (SO4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
38-39	AQ	pH TDS Cl F NO_3 NO_2 (SO4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
40-43		pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

Report# 31944G4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 15, 2014

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051049

Sample Identification	Collection Date	Laboratory Sample Identification
1405GWMMW009-U	05/12/14	L14051049-02
1405GWMMW035-U**	05/12/14	L14051049-04
1405GWMMW027-U**	05/12/14	L14051049-10
1405GWMMW037-1-U**	05/12/14	L14051049-12
1405GWMMW037-2-U	05/12/14	L14051049-14
1405GWMMW036-U**	05/12/14	L14051049-16
1405GWMBW011-U**	05/12/14	L14051049-21
1405GWMMW009-F	05/12/14	L14051049-01
1405GWMMW035-F**	05/12/14	L14051049-03
1405GWMMW027-F**	05/12/14	L14051049-09
1405GWMMW037-1-F**	05/12/14	L14051049-11
1405GWMMW037-2-F	05/12/14	L14051049-13
1405GWMMW036-F**	05/12/14	L14051049-15
1405GWMBW011-F**	05/12/14	L14051049-22
1405GWMMW035-U-MS	05/12/14	L14051049-06
1405GWMMW035-U-MSD	05/12/14	L14051049-08
1405GWMMW036-U-MS	05/12/14	L14051049-18
1405GWMMW036-U-MSD	05/12/14	L14051049-20
1405GWMMW035-F-MS	05/12/14	L14051049-05
1405GWMMW035-F-MSD	05/12/14	L14051049-07
1405GWMMW036-F-MS	05/12/14	L14051049-17
1405GWMMW036-F-MSD	05/12/14	L14051049-19

Samples appended with "F" were analyzed as dissolved
**Indicates sample underwent Stage 4 review

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 6020 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. 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 1405GWMMW035-U-MS and 1405GWMMW035-F-MS, 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).

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.

The results for the dissolved metals sample analysis were greater than the total metals sample analysis as follows:

Analyte	Concentration (mg/L)	
	1405GWMMW027-F**	1405GWMMW027-U**
Selenium	0.861	0.785

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 L14051049

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14051049

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14051049

No Sample Data Qualified in this SDG

LDC #: 31944G4b

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 6/17/14

SDG #: L14051049

Page: 1 of 1

Laboratory: Microbac

Reviewer:

2nd Reviewer:

METHOD: ~~Cd & Se~~ Metals (EPA SW 846 Method 6020~~A~~)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/12/14
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	A	non client
XI.	Sample Result Verification	~~A~~ SW	Not reviewed for Stage 2B validation.
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:** Indicates sample underwent Stage 4 validation

1	1405GWMMW009-U	11	1405GWMMW037-1-F**	21	1405GWMMW036-F-MS	31	MB
2	1405GWMMW035-U**	12	1405GWMMW037-2-F	22	1405GWMMW036-F-MSD	32	
3	1405GWMMW027-U**	13	1405GWMMW036-F**	23		33	
4	1405GWMMW037-1-U**	14	1405GWMBW011-F**	24		34	
5	1405GWMMW037-2-U	15	1405GWMMW035-U-MS	25		35	
6	1405GWMMW036-U**	16	1405GWMMW035-U-MSD	26		36	
7	1405GWMBW011-U**	17	1405GWMMW036-U-MS	27		37	
8	1405GWMMW009-F	18	1405GWMMW036-U-MSD	28		38	
9	1405GWMMW035-F**	19	1405GWMMW035-F-MS	29		39	
10	1405GWMMW027-F**	20	1405GWMMW035-F-MSD	30		40	

Notes:

LDC #: 319446b

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: [illegible]
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 #: 31944G4b

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
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%~~ 90-130% (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)?		✓		performed on a non client sample, all < 50X MDL
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 #: 31944g-b

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)
1-7	Ag	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
8-14	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
15-18	Ba	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
19-21	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 31944G4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA Method SW846 6020)

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) within the control limits of 20?

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
1	15/16		Se	208	250			No qual, parent >4X.
2	19/20		Se	274	149			

Comments:

LDC #: 31944G4b

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer [illegible]

METHOD: Trace metals (EPA SW846 Method 6020)

#	Sample ID	Analyte	Diss Result (mg/l)	Total Result (mg/l)	Finding	Qualifications
1	10/3	Se	**0.861**	0.785	Diss > Total	Text

Comments:

LDC #: 31944H

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

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

%R = Found x 100 / True

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

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L) mg/L	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV	ICP/MS (Initial calibration)	Mn	49.76 ug/L	50 ug/L	99.5	99.5	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Se	0.0512 mg/L	0.0500 mg/L	102	102	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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

LDC #: 31944G46

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: [illegible]
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	ICP interference check	Se	110.2	100	110	110	Y
LCS	Laboratory control sample	Cd	0.67	0.625	108	108	↓
S1	Matrix spike	Se	(SSR-SR) 0.0657	0.0625	105	105	↓
S1D	Duplicate	Mn	65.7	66.7	1.57	1.53	↓
MS	ICP serial dilution						

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

TOTCLC.4SW

LDC #: 31944946

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
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 _____ 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

Recalculation:

#2 Mn = 0.589 ug/L × 100 ml / 40 ml = 1.32 ug/L = 0.00132 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	2	Mn	0.00132	0.00132	Y
2	3	Se	0.785	0.785	
3	4	Mn	0.0263	0.0263	
4	6	Se	0.0183	0.0183	
5	7	Mn	0.108	0.108	
6	9	Se	1.36	1.36	
7	10	Se	0.861 ~~0.785~~	0.861	
8	11	Se	0.0263	0.0263	
9	13	Se	0.0187	0.0187	
10	14	Se	0.579	0.579	

Note: _____

Report# 31944G6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 17, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051049

Sample Identification	Collection Date	Laboratory Sample Identification
1405GWMMW009-U	05/12/14	L14051049-02
1405GWMMW035-U**	05/12/14	L14051049-04
1405GWMMW027-U**	05/12/14	L14051049-10
1405GWMMW037-1-U**	05/12/14	L14051049-12
1405GWMMW037-2-U	05/12/14	L14051049-14
1405GWMMW036-U**	05/12/14	L14051049-16
1405GWMBW011-U**	05/12/14	L14051049-21
1405GWMMW009-F	05/12/14	L14051049-01
1405GWMMW035-F**	05/12/14	L14051049-03
1405GWMMW027-F**	05/12/14	L14051049-09
1405GWMMW037-1-F**	05/12/14	L14051049-11
1405GWMMW037-2-F	05/12/14	L14051049-13
1405GWMMW036-F	05/12/14	L14051049-15
1405GWMBW011-F**	05/12/14	L14051049-22
1405GWMMW035-U-MS	05/12/14	L14051049-06
1405GWMMW035-U-MSD	05/12/14	L14051049-08
1405GWMMW036-U-MS	05/12/14	L14051049-18
1405GWMMW036-U-MSD	05/12/14	L14051049-20
1405GWMMW035-F-MS	05/12/14	L14051049-05
1405GWMMW035-F-MSD	05/12/14	L14051049-07
1405GWMMW036-F-MS	05/12/14	L14051049-17
1405GWMMW036-F-MSD	05/12/14	L14051049-19
1405GWMMW027-UDUP	05/12/14	L14051049-10DUP

**Indicates sample underwent Stage 4 review

Introduction

This data review covers 23 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).

For 1405GWMMW035-F-MS/MSD, no data were qualified for Sulfate percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration.

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 L14051049

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14051049

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14051049

No Sample Data Qualified in this SDG

LDC #: 31944G6
SDG #: L14051049
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

Date: 6/17/14
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (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.	Technical holding times	A	Sampling dates: 5/12/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	Not reviewed for Stage 2B validation.
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:** Indicates sample underwent Stage 4 validation

1	1405GWMMW009-U	11	1405GWMMW037-1-F**	21	1405GWMMW036-F-MS	31	
2	1405GWMMW035-U**	12	1405GWMMW037-2-F	22	1405GWMMW036-F-MSD	32	
3	1405GWMMW027-U**	13	1405GWMMW036-F**	23	#3 Rep	33	
4	1405GWMMW037-1-U**	14	1405GWMBW011-F**	24		34	
5	1405GWMMW037-2-U	15	1405GWMMW035-U-MS	25		35	
6	1405GWMMW036-U**	16	1405GWMMW035-U-MSD	26		36	
7	1405GWMBW011-U**	17	1405GWMMW036-U-MS	27		37	
8	1405GWMMW009-F	18	1405GWMMW036-U-MSD	28		38	
9	1405GWMMW035-F**	19	1405GWMMW035-F-MS	29		39	
10	1405GWMMW027-F**	20	1405GWMMW035-F-MSD	30		40	

Notes:

LDC #: 319446

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
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 #: 319446

VALIDATION FINDINGS CHECKLIST

Reviewer:
2nd Reviewer:

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

LDC #: 219446 b

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-7	A2	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
8-14	✓	pH TDS Cl F NO_3 NO_2 (SO4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
w 15-18, 23	A2	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
19-22	✓	pH TDS Cl F NO_3 NO_2 (SO4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

LDC #: 31944G6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See cover

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 QAPP? 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) within the control limits of 20?

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
1	19/20		SO4	57.7	57.8			>4X, No qual, Text

Comments:

LDC #: 31944G6

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: W
2nd Reviewer: G

Method: Inorganics, Method See cover

The correlation coefficient (r) for the calibration of SO4 was recalculated.Calibration date: 2/24/14

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	SO4	s1	1	0.124	0.9974	0.9953	Y
		s2	5	0.6257			
		s3	20	2.6149			
		s4	40	5.454			
		s5	60	8.4791			
		s6	120	18.5303			
CCV 20237 Calibration verification	SO4	40	39.3		1.75	1.59	Y
Calibration verification							
Calibration verification							

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

LDC #: 31944 G6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, Method Cel Conv

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	SO4	40.03	40.0	100	102	Y
LS	Matrix spike sample	TDS	(SSR-SR) 514	500	103	103	
21/22	Duplicate sample	SO4	64.70	66.15	2.22	2.30	

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

TOTCLC.6

LDC #: 3194466

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
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 SO_4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $y = 0.1378x - 0.0158$

Recalculation: $\frac{(14.1+0.0158)5}{0.1378} = 512.2$ mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	2	TDS	1060	1060	Y
2	3		776 ~~1570~~	776	
3	4		224	224	
4	6		218	218	
5	7		694	694	
3 6	9	SO_4	~~526~~ 512	512	
9 7	10		~~343~~ 334	334	
11 8	11		~~29.1~~ 28.4	28.4	
13 9	13		~~23.7~~ 28.9	29.1	
22 10	14		~~184~~ ~~23.1~~ 179	179	

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

July 15, 2014

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. VanPelt,

Enclosed are the final verification reports for the fractions listed below. These SDGs were received on June 10, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 31945:

SDG #	Fraction
L14051062	Metals by ICPMS SW-846 Method 6020
L14051063	Metals by ICP SW-846 Method 6010B
L14051174	Wet Chemistry
L14051179	
L14051531	

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

Attachment 1

EDD Stage 2B/4

LDC #31945 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Se (6020A)		(3) Metals (6020A)		Diss. Se (6020A)		Diss Cd, Se (6020A)		(3)Diss. Metals (6010B)		SO_4 (300.0)		Hard. (2340B)		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	L14051062	06/10/14	07/01/14	15	0	-	-	-	-	15	0	15	0	15	0	15	0	15	0																		
B	L14051063	06/10/14	07/01/14	-	-	3	0	3	0	-	-	-	-	3	0	-	-	3	0																		
C	L14051174	06/10/14	07/01/14	-	-	6	0	6	0	-	-	-	-	6	0	-	-	6	0																		
D	L14051179	06/10/14	07/01/14	4	0	-	-	-	-	4	0	4	0	4	0	4	0	4	0																		
E	L14051531	06/10/14	07/01/14	-	-	2	0	2	0	-	-	-	-	3	0	-	-	2	0																		
Total	A/CR			19	0	11	0	11	0	19	0	19	0	31	0	19	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	159

Shaded cells indicate Stage 4 validation (all other cells are Stage 2B review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

31945ST.wpd

Report# 31945A4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 17, 2014

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051062

Sample Identification	Collection Date	Laboratory Sample Identification
1405SWMST089-F	05/08/14	L14051062-02
1405SWMST096-F	05/08/14	L14051062-04
1405SWMSG006-F	05/08/14	L14051062-06
1405SWMSG007-F	05/08/14	L14051062-08
1405SWMST095-F	05/08/14	L14051062-10
1405SWMST094-F	05/08/14	L14051062-12
1405SWMST045-1-F	05/09/14	L14051062-14
1405SWMST045-2-F	05/09/14	L14051062-16
1405SWMST044-F	05/09/14	L14051062-18
1405SWMDS034-F	05/09/14	L14051062-20
1405SWMDS030-1-F	05/09/14	L14051062-22
1405SWMST067-F	05/09/14	L14051062-24
1405SWMST019-F	05/11/14	L14051062-26
1405SWMST066-F	05/11/14	L14051062-28
1405SWMST020-F	05/11/14	L14051062-30

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 EPA SW 846 Method noted below:

- Method 6010B ICP: Calcium, Magnesium, 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. 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 L14051386-05MS/MSD, no data were qualified for Calcium percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration and is a non-client sample.

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

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 L14051062

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14051062

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14051062

No Sample Data Qualified in this SDG

LDC #: 31945A4a

SDG #: L14051062

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 6/17/14

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010B)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/8/14 - 5/11/14
II.	ICP/MS Tune	N	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	~~SW~~ N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	1405SWMST089-F	11	1405SWMDS030-1-F	21	MB	31	
2	1405SWMST096-F	12	1405SWMST067-F	22		32	
3	1405SWMSG006-F	13	1405SWMST019-F	23		33	
4	1405SWMSG007-F	14	1405SWMST066-F	24		34	
5	1405SWMST095-F	15	1405SWMST020-F	25		35	
6	1405SWMST094-F	16		26		36	
7	1405SWMST045-1-F	17		27		37	
8	1405SWMST045-2-F	18		28		38	
9	1405SWMST044-F	19		29		39	
10	1405SWMDS034-F	20		30		40	

Notes:

LDC #: 31945A1

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)
1-15	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 31945A4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer:
2nd Reviewer: a

METHOD: Trace metals (EPA Method SW846 6010B)

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) within the control limits of 20?

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
1	L14051386-05		Ca		6.00			No qual, parent >4X and a non client sample.

Comments:

Report# 31945A4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 15, 2014

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051062

Sample Identification	Collection Date	Laboratory Sample Identification
1405SWMST089-U	05/08/14	L14051062-01
1405SWMST096-U	05/08/14	L14051062-03
1405SWMSG006-U	05/08/14	L14051062-05
1405SWMSG007-U	05/08/14	L14051062-07
1405SWMST095-U	05/08/14	L14051062-09
1405SWMST094-U	05/08/14	L14051062-11
1405SWMST045-1-U	05/09/14	L14051062-13
1405SWMST045-2-U	05/09/14	L14051062-15
1405SWMST044-U	05/09/14	L14051062-17
1405SWMDS034-U	05/09/14	L14051062-19
1405SWMDS030-1-U	05/09/14	L14051062-21
1405SWMST067-U	05/09/14	L14051062-23
1405SWMST019-U	05/11/14	L14051062-25
1405SWMST066-U	05/11/14	L14051062-27
1405SWMST020-U	05/11/14	L14051062-29
1405SWMST089-F	05/08/14	L14051062-02
1405SWMST096-F	05/08/14	L14051062-04
1405SWMSG006-F	05/08/14	L14051062-06
1405SWMSG007-F	05/08/14	L14051062-08
1405SWMST095-F	05/08/14	L14051062-10
1405SWMST094-F	05/08/14	L14051062-12
1405SWMST045-1-F	05/09/14	L14051062-14
1405SWMST045-2-F	05/09/14	L14051062-16
1405SWMST044-F	05/09/14	L14051062-18
1405SWMDS034-F	05/09/14	L14051062-20

1405SWMDS030-1-F	05/09/14	L14051062-22
1405SWMST067-F	05/09/14	L14051062-24
1405SWMST019-F	05/11/14	L14051062-26
1405SWMST066-F	05/11/14	L14051062-28
1405SWMST020-F	05/11/14	L14051062-30
1405SWMST045-1-U-MS	05/09/14	L14051062-13MS
1405SWMST045-1-U-MSD	05/09/14	L14051062-13MSD
1405SWMST020-F-MS	05/11/14	L14051062-30MS
1405SWMST020-F-MSD	05/11/14	L14051062-30MSD

Samples appended with "F" were analyzed as dissolved

Introduction

This data review covers 34 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 6020 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. 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.

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

The results for the dissolved metals sample analysis were greater than the total metals sample analysis as follows:

Analyte	Concentration (mg/L)	
	1405SWMDS034-F	1405SWMDS034-U
Selenium	0.0226	0.0164

Analyte	Concentration (mg/L)	
	1405SWMDS030-1-F	1405SWMDS030-1-U
Selenium	0.908	0.684

Analyte	Concentration (mg/L)	
	1405SWMST067-F	1405SWMST067-U
Selenium	0.336	0.299

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 L14051062

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14051062

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14051062

No Sample Data Qualified in this SDG

LDC #: 31945A4b

SDG #: L14051062

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 6/17/14

Page: 1 of 1

Reviewer: ✓

2nd Reviewer: ✓

METHOD: Cd & Se (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.	Technical holding times	A	Sampling dates: 5/8/14 - 5/11/14
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	SW	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All

1	1405SWMST089-U	11	1405SWMDS030-1-U	21	1405SWMST094-F	31	#7 - MS
2	1405SWMST096-U	12	1405SWMST067-U	22	1405SWMST045-1-F	32	↓ - MSD
3	1405SWMSG006-U	13	1405SWMST019-U	23	1405SWMST045-2-F	33	#30 - MS
4	1405SWMSG007-U	14	1405SWMST066-U	24	1405SWMST044-F	34	↓ - MSD
5	1405SWMST095-U	15	1405SWMST020-U	25	1405SWMDS034-F	35	MB
6	1405SWMST094-U	16	1405SWMST089-F	26	1405SWMDS030-1-F	36	
7	1405SWMST045-1-U	17	1405SWMST096-F	27	1405SWMST067-F	37	
8	1405SWMST045-2-U	18	1405SWMSG006-F	28	1405SWMST019-F	38	
9	1405SWMST044-U	19	1405SWMSG007F	29	1405SWMST066-F	39	
10	1405SWMDS034-U	20	1405SWMST095-F	30	1405SWMST020-F	40	

Notes:

LDC #: 31954A46

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)
1-15	[illegible]	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
16-30	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
OC 31-34	[illegible]	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 31945A4b

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: w
2nd Reviewer: a

METHOD: Trace metals (EPA SW846 Method 6020)

#	Sample ID	Analyte	Diss Result (mg/L)	Total Result (mg/L)	Finding	Qualifications
1	25/10	Se	**0.0226**	0.0164	Diss > Total	Text
2	26/11	Se	0.908	0.684		
3	27/12	Se	0.336	0.299		

Comments:

Report# 31945A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 17, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051062

Sample Identification	Collection Date	Laboratory Sample Identification
1405SWMST089-U	05/08/14	L14051062-01
1405SWMST096-U	05/08/14	L14051062-03
1405SWMSG006-U	05/08/14	L14051062-05
1405SWMSG007-U	05/08/14	L14051062-07
1405SWMST095-U	05/08/14	L14051062-09
1405SWMST094-U	05/08/14	L14051062-11
1405SWMST045-1-U	05/09/14	L14051062-13
1405SWMST045-2-U	05/09/14	L14051062-15
1405SWMST044-U	05/09/14	L14051062-17
1405SWMDS034-U	05/09/14	L14051062-19
1405SWMDS030-1-U	05/09/14	L14051062-21
1405SWMST067-U	05/09/14	L14051062-23
1405SWMST019-U	05/11/14	L14051062-25
1405SWMST066-U	05/11/14	L14051062-27
1405SWMST020-U	05/11/14	L14051062-29
1405SWMST089-F	05/08/14	L14051062-02
1405SWMST096-F	05/08/14	L14051062-04
1405SWMSG006-F	05/08/14	L14051062-06
1405SWMSG007-F	05/08/14	L14051062-08
1405SWMST095-F	05/08/14	L14051062-10
1405SWMST094-F	05/08/14	L14051062-12
1405SWMST045-1-F	05/09/14	L14051062-14
1405SWMST045-2-F	05/09/14	L14051062-16
1405SWMST044-F	05/09/14	L14051062-18

1405SWMDS034-F	05/09/14	L14051062-20
1405SWMDS030-1-F	05/09/14	L14051062-22
1405SWMST067-F	05/09/14	L14051062-24
1405SWMST019-F	05/11/14	L14051062-26
1405SWMST066-F	05/11/14	L14051062-28
1405SWMST020-F	05/11/14	L14051062-30
1405SWMST019-F-MS	05/11/14	L14051062-26MS
1405SWMST019-F-MSD	05/11/14	L14051062-26MSD
1405SWMST019-U-DUP	05/11/14	L14051062-25DUP
1405SWMST094-U-DUP	05/08/14	L14051062-11DUP
1405SWMDS034-U-DUP	05/09/14	L14051062-19DUP

Introduction

This data review covers 35 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, EPA Method 160.1 for Total Dissolved Solids, and Standard Method 2340B for Hardness.

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 180 days for method SM2340B) 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 reviewed for this SDG.

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 L14051062

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14051062

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14051062

No Sample Data Qualified in this SDG

LDC #: 31945A6
SDG #: L14051062
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 6/17/14
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (EPA Method 160.1), Hardness (SM2340B)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/8/14 - 5/11/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	1405SWMST089-U	11	1405SWMDS030-1-U	21	1405SWMST094-F	31	#28 - MS
2	1405SWMST096-U	12	1405SWMST067-U	22	1405SWMST045-1-F	32	↓ - MSD
3	1405SWMSG006-U	13	1405SWMST019-U	23	1405SWMST045-2-F	33	#13 - Dup
4	1405SWMSG007-U	14	1405SWMST066-U	24	1405SWMST044-F	34	#6 - Dup
5	1405SWMST095-U	15	1405SWMST020-U	25	1405SWMDS034-F	35	#10 - Dup
6	1405SWMST094-U	16	1405SWMST089-F	26	1405SWMDS030-1-F	36	
7	1405SWMST045-1-U	17	1405SWMST096-F	27	1405SWMST067-F	37	MB
8	1405SWMST045-2-U	18	1405SWMSG006-F	28	1405SWMST019-F	38	
9	1405SWMST044-U	19	1405SWMSG007F	29	1405SWMST066-F	39	
10	1405SWMDS034-U	20	1405SWMST095-F	30	1405SWMST020-F	40	

Notes:

LDC #: 31945A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-15	Air	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
16-30	↓	pH TDS Cl F NO_3 NO_2 SO4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 Hardness ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
31, 32	Air	pH TDS Cl F NO_3 NO_2 SO4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
33-35	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments: _____

Report# 31945B4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 15, 2014

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051063

Sample Identification	Collection Date	Laboratory Sample Identification
1405GWMBW130-U	5/9/14	L14051063-01
1405GWMBW152-U	5/11/14	L14051063-03
1405GWMBW027-U	5/11/14	L14051063-05
1405GWMBW130-F	5/9/14	L14051063-02
1405GWMBW152-F	5/11/14	L14051063-04
1405GWMBW027-F	5/11/14	L14051063-06

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 6020 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. 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

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

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).

Manganese results were outside the QC limits; results were not qualified since the original sample (L14051249-08) was greater than 4X the spike amount and is a non-client sample.

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

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 L14051063

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14051063

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14051063

No Sample Data Qualified in this SDG

LDC #: 31945B4b

SDG #: L14051063

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/~~4~~

Date: 6/17/14

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6020~~A~~)

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

	Validation Area		Comments
I.	Technical holding times	A SW	Sampling dates: 5/9/14 - 5/11/14
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	~~Not reviewed for Stage 2B validation.~~
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ~~* Indicates sample underwent Stage 4 validation~~

1	1405GWMBW130-U	11	MB	21		31	
2	1405GWMBW152-U	12		22		32	
3	1405GWMBW027-U	13		23		33	
4	1405GWMBW130-F	14		24		34	
5	1405GWMBW152-F	15		25		35	
6	1405GWMBW027-F	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 31945B46

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	Air	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
4-6	Air	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 31945B4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA Method SW846 6020)

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) within the control limits of 20?

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
1	L14051249-08		Mn	-240	1130			No qual, parent >4X and a non client sample.

Comments:

Report# 31945B6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 11, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051063

Sample Identification	Collection Date	Laboratory Sample Identification
1405GWMBW130-U	5/9/14	L14051063-01
1405GWMBW152-U	5/11/14	L14051063-03
1405GWMBW027-U	5/11/14	L14051063-05
1405GWMBW130-F	5/9/14	L14051063-02
1405GWMBW152-F	5/11/14	L14051063-04
1405GWMBW027-F	5/11/14	L14051063-06
1405GWMBW130-FDUP	5/9/14	L14051063-02DUP

Introduction

This data review covers 7 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).

The laboratory indicated that the IDs were switched between samples 1405GWMBW130-U and 1405GWMBW130-F; however, the correct analysis was performed. It was confirmed that sample 1405GWMBW130-U was filtered and sample 1405GWMBW130-F was unfiltered.

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

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

VI. Spike Sample Analysis

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

VII. 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 reviewed for this SDG.

VIII(b). Overall Assessment of Data

The overall assessment of data was acceptable.

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

Wet Chemistry - Data Qualification Summary - SDG L14051063

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14051063

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14051063

No Sample Data Qualified in this SDG

LDC #: 31945B6
SDG #: L14051063
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Stage ~~A~~ B

Date: 6/17/14
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (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.	Technical holding times	~~SW~~ A	Sampling dates: 5/9/14 - 5/11/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	No MS/Dup for ~~300.~~ SO4
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	~~SW~~ A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	1405GWMBW130-U	11	MB	21		31	
2	1405GWMBW152-U	12		22		32	
3	1405GWMBW027-U	13		23		33	
4	1405GWMBW130-F	14		24		34	
5	1405GWMBW152-F	15		25		35	
6	1405GWMBW027-F	16		26		36	
7	#4 Dup	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: Lab confirmed the sample ID for 1/4 were switched ~~but~~ and #1 is filtered and #4 is unfiltered.

LDC #: 31945B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
~~1-3~~	~~RS~~	~~pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____~~
~~4-6~~	~~↓~~	~~pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____~~
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
1		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
2,3		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
4		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
5,6		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

Report# 31945C4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 15, 2014

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051174

Sample Identification	Collection Date	Laboratory Sample Identification
1405GWMBW135-U	5/10/14	L14051174-01
1405GWMBW087-U	5/10/14	L14051174-03
1405GWMBW085-U	5/10/14	L14051174-05
1405GWMBW131-U	5/10/14	L14051174-07
1405GWMBW028-U	5/10/14	L14051174-09
1405GWMW15A-U	5/10/14	L14051174-11
1405GWMBW135-F	5/10/14	L14051174-02
1405GWMBW087-F	5/10/14	L14051174-04
1405GWMBW085-F	5/10/14	L14051174-06
1405GWMBW131-F	5/10/14	L14051174-08
1405GWMBW028-F	5/10/14	L14051174-10
1405GWMW15A-F	5/10/14	L14051174-12

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 6020 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. 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

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

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.

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

The results for the dissolved metals sample analysis were greater than the total metals sample analysis as follows:

Analyte	Concentration (mg/L)	
	1405GWMBW028-F	1405GWMBW028-U
Selenium	1.25	1.36

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 L14051174

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14051174

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14051174

No Sample Data Qualified in this SDG

LDC #: 31945C4b
SDG #: L14051174
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 6/18/14
Page: 1 of 1
Reviewer: [illegible]
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.	Technical holding times	A	Sampling dates: 5/10/14
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS/MSD from L1405179
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	SW	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All

1	1405GWMBW135-U	11	1405GWMBW028-F	21		31	
2	1405GWMBW087-U	12	1405GWMW15A-F	22		32	
3	1405GWMBW085-U	13	MB	23		33	
4	1405GWMBW131-U	14		24		34	
5	1405GWMBW028-U	15		25		35	
6	1405GWMW15A-U	16		26		36	
7	1405GWMBW135-F	17		27		37	
8	1405GWMBW087-F	18		28		38	
9	1405GWMBW085-F	19		29		39	
10	1405GWMBW131-F	20		30		40	

Notes:

LDC #: 31945C46

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-6	Soil	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
7-12	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-

Comments: Mercury by CVAA if performed

LDC #: 31945C4b

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer [illegible]

METHOD: Trace metals (EPA SW846 Method 6020)

#	Sample ID	Analyte	Diss Result (mg/l)	Total Result (mg/l)	Finding	Qualifications
1	11/5	Se	**1.25**	1.36	Diss > Total	Text

Comments:

Report# 31945C6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 23, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051174

Sample Identification	Collection Date	Laboratory Sample Identification
1405GWMBW135-U	5/10/14	L14051174-01
1405GWMBW087-U	5/10/14	L14051174-03
1405GWMBW085-U	5/10/14	L14051174-05
1405GWMBW131-U	5/10/14	L14051174-07
1405GWMBW028-U	5/10/14	L14051174-09
1405GWMW15A-U	5/10/14	L14051174-11
1405GWMBW135-F	5/10/14	L14051174-02
1405GWMBW087-F	5/10/14	L14051174-04
1405GWMBW085-F	5/10/14	L14051174-06
1405GWMBW131-F	5/10/14	L14051174-08
1405GWMBW028-F	5/10/14	L14051174-10
1405GWMW15A-F	5/10/14	L14051174-12
1405GWMW15A-UDUP	5/10/14	L14051174-11DUP

Introduction

This data review covers 13 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

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

VI. Spike Sample Analysis

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

VII. 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 reviewed for this SDG.

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 L14051174

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14051174

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14051174

No Sample Data Qualified in this SDG

LDC #: 31945C6
SDG #: L14051174
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 6/18/14
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (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.	Technical holding times	A	Sampling dates: 5/10/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	No MS/Dup for SO4
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All

1	1405GWMBW135-U	11	1405GWMBW028-F	21	MD	31	
2	1405GWMBW087-U	12	1405GWMW15A-F	22		32	
3	1405GWMBW085-U	13	#6 Dup	23		33	
4	1405GWMBW131-U	14		24		34	
5	1405GWMBW028-U	15		25		35	
6	1405GWMW15A-U	16		26		36	
7	1405GWMBW135-F	17		27		37	
8	1405GWMBW087-F	18		28		38	
9	1405GWMBW085-F	19		29		39	
10	1405GWMBW131-F	20		30		40	

Notes:

LDC #: 71945C6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-6	AQ	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
7-12	✓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
13	AQ	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

Report# 31945D4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 20, 2014

Matrix: Water

Parameters: Metals by ICP SW 846 Method 6010B

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051179

Sample Identification	Collection Date	Laboratory Sample Identification
1405SWMSG004-F	5/8/14	L14051179-02
1405SWMSG005-F	5/8/14	L14051179-04
1405SWMST092-F	5/8/14	L14051179-10
1405SWMST090-F	5/8/14	L14051179-16
1405SWMSG005-F-MS	5/8/14	L14051179-06
1405SWMSG005-F-MSD	5/8/14	L14051179-08

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 6010B ICP: Calcium, Magnesium, 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. 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 1405SWMSG005-F-MS/MSD, no data were qualified for Calcium percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration.

Samples 1405SWMST089-F-MS and 1405SWMST089-F-MSD were not spiked as specified on the chain-of-custodies. The laboratory received the parent sample at a different time and is therefore not included in this SDG.

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.

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 L14051179

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14051179

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14051179

No Sample Data Qualified in this SDG

LDC #: 31945D4a

SDG #: L14051179

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Stage 2B~~T~~4

Date: 6/18/14

Page: 1 of 1

Reviewer: MH

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010B)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/8/14
II.	ICP/MS Tune	N	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	Lcy
IX.	Internal Standard (ICP-MS)	N	
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	A	~~Not reviewed for Stage 2B validation~~.
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:** ~~Indicates sample underwent Stage 4 validation~~

1	1405SWMSG004-F**	11	MB	21		31	
2	1405SWMSG005-F	12		22		32	
3	1405SWMST092-F	13		23		33	
4	1405SWMST090-F**	14		24		34	
5	1405SWMSG005-F-MS	15		25		35	
6	1405SWMSG005-F-MSD	16		26		36	
7	~~1405SWMST089-F-MS~~	17		27		37	
8	~~1405SWMST089-F-MSD~~	18		28		38	
9		19		29		39	
10		20		30		40	

Notes: # 7/8 were not spiked. the parent sample was in SDG 1405062. Text

LDC #: 31945D4a

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
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 #: 31945D4c

VALIDATION FINDINGS CHECKLIST

Reviewer:
2nd Reviewer:

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 #: 31945D4a

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)
1-4	SO	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
MS-6	SO	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 31945D4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA Method SW846 6010B)

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) within the control limits of 20?

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
1	5/6		Ca		74.6			No qual, parent >4X

Comments:

LDC #: 31945D4a

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

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

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

%R = Found / 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	ICP (Initial calibration)	V	0.9907	1	99.1	99.1	Y
	ICP/MS (Initial calibration)						
	CVAA (Initial calibration)						
CCV	ICP (Continuing calibration)	Mg	10.265	10	103	103	Y
	ICP/MS (Continuing calibration)						
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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

LDC #: 31945D4a

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: [illegible]
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	ICP interference check	V	0.244	0.250	97.6	97.6	Y
LCS	Laboratory control sample	V	0.6105	0.625	97.7	97.7	
5	Matrix spike	Mg	(SSR-SR) 5.93	6.25	94.9	94.9	
5/6	Duplicate	Ca	89.6	90.2	0.667	0.693	
7	ICP serial dilution	Ca	42.159	41.601	1.34	1.34	

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

LDC #: 31945D4a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
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 _____ 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

Recalculation:

#3 $Mg = \frac{2.4226\ mg/L \times 50\ ml}{40\ ml} = 9.28\ mg/L$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	1	Mg	24.7	24.7	Y
2	2	Ca	84.9	84.9	
3	3	Mg	9.28	9.28	
4	4	Ca	64.6	64.6	

Note: _____

Report# 31945D4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 20, 2014

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051179

Sample Identification	Collection Date	Laboratory Sample Identification
1405SWMSG004-U	5/8/14	L14051179-01
1405SWMSG005-U	5/8/14	L14051179-03
1405SWMST092-U	5/8/14	L14051179-09
1405SWMST090-U	5/8/14	L14051179-15
1405SWMSG004-F	5/8/14	L14051179-02
1405SWMSG005-F	5/8/14	L14051179-04
1405SWMST092-F	5/8/14	L14051179-10
1405SWMST090-F	5/8/14	L14051179-16
1405SWMSG005-U-MS	5/8/14	L14051179-05
1405SWMSG005-U-MSD	5/8/14	L14051179-07
1405SWMSG005-F-MS	5/8/14	L14051179-06
1405SWMSG005-F-MSD	5/8/14	L14051179-08

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 6020 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.

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-MS 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

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

VIII. 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).

Samples 1405SWMST089-U-MS, 1405SWMST089-U-MSD, 1405SWMST089-F-MS, and 1405SWMST089-F-MSD were not spiked as specified on the chain-of-custodies. The laboratory received the parent sample at a different time and is therefore not included in this SDG.

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-MS 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.

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 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.

XII(a). Sample Result Verification

All sample result verifications were acceptable.

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 L14051179

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14051179

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14051179

No Sample Data Qualified in this SDG

LDC #: 31945D4b

SDG #: L14051179

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Stage ~~2B~~/4

Date: 6/18/14

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Cd & Se (EPA SW 846 Method 6020~~A~~)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/8/14
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	A	~~Not reviewed for Stage 2B validation.~~
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ~~** Indicates sample underwent Stage 4 validation~~

1	1405SWMSG004-U	11	~~1405SWMST089-U-MS~~	21	MB	31	
2	1405SWMSG005-U	12	~~1405SWMST089-U-MSD~~	22		32	
3	1405SWMST092-U	13	1405SWMSG005-F-MS	23		33	
4	1405SWMST090-U	14	1405SWMSG005-F-MSD	24		34	
5	1405SWMSG004-F	15	~~1405SWMST089-F-MS~~	25		35	
6	1405SWMSG005-F	16	~~1405SWMST089-F-MSD~~	26		36	
7	1405SWMST092-F	17		27		37	
8	1405SWMST090-F	18		28		38	
9	1405SWMSG005-U-MS	19		29		39	
10	1405SWMSG005-U-MSD	20		30		40	

Notes: #11, 12, 15, 16 were not spiked, the parent sample was in SDG 1405L062, Text.

LDC #: 31945D4b

VALIDATION FINDINGS CHECKLIST

Reviewer:
2nd Reviewer:

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?	✓			

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VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
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%~~ 70-130% (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)?		✓		SD ~~was~~ was performed but in ND sample
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.			✓	

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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)
1-4	A2	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
5-8	✓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
9,10	A2	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
13,14	✓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 31945D4b

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: [illegible]
2nd Reviewer: OZ

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

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

%R = Found / 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	ICP/MS (Initial calibration)	Cd	50.14 ug/L	50 ug/L	100	100	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Se	0.0519 mg/L	0.0500 mg/L	104	104	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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

LDC #: 31945D4b

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: [illegible]
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	ICP interference check	Se	104.9	100	105	105	Y
LCS	Laboratory control sample	Cd	0.0622	0.0625	99.6	99.6	
13	Matrix spike	Se	(SSR-SR) 0.0638	0.0625	102	102	
10/11	Duplicate	Se	0.0765	0.0782	2.20	2.31	
MD	ICP serial dilution						

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

LDC #: 31945b4b

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
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 _____ 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

Recalculation:

#1 Se = 8.2595 ug/L × 100 ml / 40 ml = 20.649 ug/L
= 0.020649 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	1	Se	0.0206	0.0206	
2	2	Se	0.0111	0.0111	
3	3	Se	0.00164	0.00164	
4	4	Se	ND	ND	
5	5	Se	0.0135	0.0135	
6	6	Se	0.0109	0.0109	
7	7	Se	0.00145	0.00145	
8	8	Se	ND	ND	

Note: _____

Report# 31945D6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 20, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051179

Sample Identification	Collection Date	Laboratory Sample Identification
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1405SWMST092-F	5/8/14	L14051179-10
1405SWMST090-F	5/8/14	L14051179-16
1405SWMSG005-U-MS	5/8/14	L14051179-05
1405SWMSG005-U-MSD	5/8/14	L14051179-07
1405SWMSG005-F-MS	5/8/14	L14051179-06
1405SWMSG005-F-MSD	5/8/14	L14051179-08
1405SWMSG005-F-DUP	5/8/14	L14051179-08-DUP

Introduction

This data review covers 13 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, EPA Method 160.1 for Total Dissolved Solids, and Standard Method 2340B for Hardness.

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.

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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.

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A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

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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 180 days for method 2340B) were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
1405SWMSG004-U 1405SWMSG005-U 1405SWMST092-U 1405SWMST090-U 1405SWMSG005-U-MS 1405SWMSG005-U-MSD 1405SWMSG005-F-DUP	Total dissolved solids	8 days	7 days	J- (all detects) UJ (all nondetects)	P

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) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
1405SWMSG005-F-MS/MSD (1405SWMSG004-F 1405SWMSG005-F 1405SWMST092-F 1405SWMST090-F)	Sulfate	120 (90-110)	119 (90-110)	-	J+ (all detects)	A

Samples 1405SWMST089-U-MS, 1405SWMST089-U-MSD, 1405SWMST089-F-MS, and 1405SWMST089-F-MSD were not spiked as specified on the chain-of-custodies. The laboratory received the parent sample at a different time and is therefore not included in this SDG.

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.

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 L14051179

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L14051179	1405SWMSG004-U 1405SWMSG005-U 1405SWMST092-U 1405SWMST090-U	Total dissolved solids	J- (all detects) UJ (all nondetects)	P	Preservation and holding times	1
L14051179	1405SWMSG004-F 1405SWMSG005-F 1405SWMST092-F 1405SWMST090-F	Sulfate	J+ (all detects)	A	Spike sample analysis	16

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14051179

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14051179

No Sample Data Qualified in this SDG

LDC #: 31945D6
SDG #: L14051179
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Stage ~~2B/4~~ 4

Date: 6/18/14
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (EPA Method 160.1), Hardness (SM2340B)

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 5/8/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	~~Not reviewed for Stage 2B validation.~~
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ~~** Indicates sample underwent Stage 4 validation~~

1	1405SWMSG004-U~~*~~	11	~~1405SWMST089-U-MS~~	21	MB	31	
2	1405SWMSG005-U	12	~~1405SWMST089-U-MSD~~	22		32	
3	1405SWMST092-U	13	1405SWMSG005-F-MS	23		33	
4	1405SWMST090-U~~*~~	14	1405SWMSG005-F-MSD	24		34	
5	1405SWMSG004-F~~*~~	15	~~1405SWMST089-F-MS~~	25		35	
6	1405SWMSG005-F	16	~~1405SWMST089-F-MSD~~	26		36	
7	1405SWMST092-F	17	# 14-Dup	27		37	
8	1405SWMST090-F~~*~~	18		28		38	
9	1405SWMSG005-U-MS	19		29		39	
10	1405SWMSG005-U-MSD	20		30		40	

Notes: #11, 12, 15, 16 were not spiked, the parent sample was the SDG 1405L062 Text.

LDC #: 31945D6

VALIDATION FINDINGS CHECKLIST

Reviewer: VW
2nd Reviewer: OR

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 #: 3194506

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
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 #: 31945D6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-4	AQ	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
5-8	AQ	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 Hardness ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
M13,14	AQ	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
9,10,17	✓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

LDC #: 31945D6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:		160.1					
Parameters:		TDS					
Technical holding time:		7 days					
Sample ID	**Sampling date**	**Analysis date**	**Analysis date**	**Analysis date**	**Analysis date**	**Analysis date**	**Qualifier**
1-4, 9, 10, 17	5/8/14	5/16/14	(8 days)				J-/UJ/P (1)

LDC #: 31945D6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover

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 QAPP? 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) within the control limits of 20?

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
1	13/14		SO4	120 (90-110)	119 (90-110)		5-8	J+det/A (16)

Comments:

LDC #: 319806

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: OR
2nd Reviewer: SM

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of SO4 was recalculated.Calibration date: 11/6/13

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. (ng/mL)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	SO4	s1	1.0	0.118	0.99678	0.99693	Y
		s2	5	0.606			
		s3	20	2.568			
		s4	40	5.341			
		s5	60	8.429			
		s6	120	18.571			
CCV01:17 Calibration verification	SO4	40	40.348	5.459	%D 0.871	%D 0.853	Y
Calibration verification							
Calibration verification							

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

LDC #: 31948D6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: [illegible]
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	Sb	40.3	40.0	101	101	Y
9	Matrix spike sample	Tl	(SSR-SR) 49.0	50.0	98	98	
13/14	Duplicate sample	Sb	79.0	79.4	0.505	0.472	

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

LDC #: 31945D6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
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 _____ reported with a positive detect were recalculated and verified using the following equation:

Concentration = Recalculation:

#5 $SO_4 = \frac{5.081 + 0.0203}{0.1358} = 37.56$ mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	1	TDS	338	338	Y
2	2		314	314	
3	3		206	206	
4	4		246	246	
5	5	SO_4	37.6	37.6	
6	6	Hardness	201	201	
7	7	SO_4	34.9	34.9	
8	8	Hardness	202	202	

Note: _____

RECALC.6

Report# 31945E4b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 15, 2014

Matrix: Water

Parameters: Metals by ICPMS SW 846 Method 6020

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051531

Sample Identification	Collection Date	Laboratory Sample Identification
1405GWMBW099-U	5/9/14	L14051531-02
1405GWMMW007-U	5/9/14	L14051531-04
1405GWMBW099-F	5/9/14	L14051531-01
1405GWMMW007-F	5/9/14	L14051531-03

Introduction

This data review covers 4 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 6020 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. 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 with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Selenium	0.228 ug/L	All samples in SDG L14051531

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1405GWMBW099-U	Selenium	0.00182 mg/L	0.00182J+ mg/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
1405GWMBW007-U	Selenium	0.00209 mg/L	0.00209J+ mg/L
1405GWMBW007-F	Selenium	0.00266 mg/L	0.00266J+ mg/L

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

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

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).

Manganese and Selenium results were outside the QC limits; results were not qualified since the original sample (L14051499-07) is a non-client sample.

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.

Selenium results were outside the QC limits; data were not qualified since the original sample (L14051501-02) concentration was less than 50 times the MDL and is a non-client sample.

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

The results for the dissolved metals sample analysis were greater than the total metals sample analysis as follows:

Analyte	Concentration (mg/L)	
	1405GWMBW099-F	1405GWMBW099-U
Selenium	0.00401	0.00182

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 L14051531

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14051531

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
L14051531	1405GWMBW099-U	Selenium	0.00182J+ mg/L	A	10
L14051531	1405GWMBW007-U	Selenium	0.00209J+ mg/L	A	10
L14051531	1405GWMBW007-F	Selenium	0.00266J+ mg/L	A	10

Metals - Field Blank Data Qualification Summary - SDG L14051531

No Sample Data Qualified in this SDG

LDC #: 31945E4b

SDG #: L14051531

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 6/18/14

Page: 1 of 1

Reviewer: [illegible]

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.	Technical holding times	A	Sampling dates: 5/9/14
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	SW	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All

1	1405GWMBW099-U	11	MB	21		31	
2	1405GWMBW007-U	12		22		32	
3	1405GWMBW099-F	13		23		33	
4	1405GWMBW007-F	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 31945 24b

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)
1,2	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
3,4	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 31945E4b

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer:
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6020) Preparation factor applied: 2.5X, 40 mL to 100 mL
Sample Concentration units, unless otherwise noted: mg/L Associated Samples: All (J+,10)

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	1	2	4							
Se			0.228	0.00285	0.00182	0.00209	0.00266							

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 #: 31945E4b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer:
2nd Reviewer:

METHOD: Trace metals (EPA Method SW846 6020)

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) within the control limits of 20?

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
1	L14051499-07		Mn	-662	-966			No qual, parent >4X and a non client sample.
			Se	161	160			No qual, non client sample.

Comments:

LDC #: 31945E4b

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6020)

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.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
1		L14051501-02		Se	21.9	All	< 50X MDL and non client, No qual

Comments:

LDC #: 31945E4b

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer [illegible]

METHOD: Trace metals (EPA SW846 Method 6020)

#	Sample ID	Analyte	Diss Result (mg/l)	Total Result (mg/l)	Finding	Qualifications
1	3/1	Se	**0.00401**	0.00182	Diss > Total	Text

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: June 25, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14051531

Sample Identification	Collection Date	Laboratory Sample Identification
1405GWMBW099-U	5/9/14	L14051531-02
1405GWMMW007-U	5/9/14	L14051531-04
1405GWMBW099-F	5/9/14	L14051531-01
1405GWMMW007-F	5/9/14	L14051531-03
1405GWMMW028-2-F	5/10/14	L14051531-07
1405GWMBW099-F-MS	5/9/14	L14051531-01MS
1405GWMBW099-F-MSD	5/9/14	L14051531-01MSD
1405GWMBW099-UDUP	5/9/14	L14051531-02DUP

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 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 with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
1405GWMBW099-U 1405GWMMW007-U 1405GWMBW099-UDUP	Total dissolved solids	14 days	7 days	J- (all detects) UJ (all nondetects)	P

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 reviewed for this SDG.

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 L14051531

SDG	Sample	Analyte	Flag	A or P	Reason	Reason Code
L14051531	1405GWMBW099-U 1405GWMMW007-U	Total dissolved solids	J- (all detects) UJ (all nondetects)	P	Technical holding time	1

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14051531

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14051531

No Sample Data Qualified in this SDG

LDC #: 31945E6
SDG #: L14051531
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 6/18/14
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (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.	Technical holding times	SW	Sampling dates: 5/9/14 - 5/10/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS/0
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: A2

1	1405GWMBW099-U	11	MB	21		31	
2	1405GWMBW007-U	12		22		32	
3	1405GWMBW099-F	13		23		33	
4	1405GWMBW007-F	14		24		34	
5	1405GWMBW028-2-F	15		25		35	
6	M	16		26		36	
7	#3 MS	17		27		37	
8	↓ MSD	18		28		38	
9	#1 Dup	19		29		39	
10		20		30		40	

Notes:

LDC #: 31945E6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
3-5	Aq	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
1, 2	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
6, 7, 8	Aq	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
↓ 9	↓	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

LDC #: 31945E6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:		160.1					
Parameters:		TDS					
Technical holding time:		7 days					
Sample ID	**Sampling date**	**Analysis date**	**Analysis date**	**Analysis date**	**Analysis date**	**Analysis date**	**Qualifier**
1, 2, 9	5/9/14	5/23/14	(14 days)				J-/UJ/P (1)

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

November 6, 2014

SUBJECT: Monsanto, P4 Production LLC, Data Verification

Dear Ms. VanPelt,

Enclosed are the final verification reports for the fractions listed below. These SDGs were received on October 17, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #32889:

SDG #	Fraction
L14090921	Metals by ICP SW-846 Method 6010B Metals by ICPMS SW-846 Method 6020 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

Attachment 1

EDD Stage 2B/4

LDC #32889 (MWH Americas, Inc.-Walnut Creek / Monsanto, P4 Production LLC)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Se (6020A)		Diss Cd, Se (6020A)		(3)Diss. Metals (6010B)		SO_4 (300.0)		Hard. (2340B)		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	L14090921	10/17/14	11/07/14	9	0	9	0	9	0	9	0	9	0	9	0																						
A	L14090921	10/17/14	11/07/14	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 validation (all other cells are Stage 2B review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs

32889ST.wpd

Report# 32889A4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: October 29, 2014

Matrix: Water

Parameters: Dissolved Metals by ICP SW 846 Method 6010B

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14090921

Sample Identification	Collection Date	Laboratory Sample Identification
1409SWMST274-F**	09/12/14	L14090921-02**
1409SWMDS026-F	09/12/14	L14090921-04
1409SWMST045-F	09/12/14	L14090921-06
1409SWMST044-F	09/12/14	L14090921-08
1409SWMSG004-F	09/12/14	L14090921-10
1409SWMDS030-F	09/12/14	L14090921-12
1409SWMST069-F-1	09/12/14	L14090921-14
1409SWMST069-F-2	09/12/14	L14090921-16
1409SWMST019-F	09/12/14	L14090921-18
1409SWMST020-F	09/12/14	L14090921-20
1409SWMST019-F MS	09/12/14	L14090921-22
1409SWMST019-F MSD	09/12/14	L14090921-24

**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 6010B ICP: Calcium, Magnesium, 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. 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 dissolved 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.

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 L14090921

No Sample Data Qualified in this SDG

Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG L14090921

No Sample Data Qualified in this SDG

Dissolved Metals - Field Blank Data Qualification Summary - SDG L14090921

No Sample Data Qualified in this SDG

LDC #: 32889A4a

SDG #: L14090921

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 10/21/14

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Dissolved Metals (EPA SW 846 Method 6010B)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/12/14
II.	ICP/MS Tune	NA	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	NA	
X.	ICP Serial Dilution	A	#1
XI.	Sample Result Verification	NA	not reviewed for stage 2B
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: for stage 4

1	1409SWMST274-F **	11	1409SWMST019-F MS	21	MB	31	
2	1409SWMDS026-F	12	1409SWMST019-F MSD	22		32	
3	1409SWMST045-F	13		23		33	
4	1409SWMST044-F	14		24		34	
5	1409SWMSG004-F	15		25		35	
6	1409SWMDS030-F	16		26		36	
7	1409SWMST069-F-1	17		27		37	
8	1409SWMST06~~6~~-F-2	18		28		38	
9	1409SWMST019-F	19		29		39	
10	1409SWMST020-F	20		30		40	

Notes:

LDC #: 32889 A4a

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
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 #: 32889 Ark

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
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 #: 57884A4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10	A2	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
11, 12	A2	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 32889A4a

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: iv
2nd Reviewer: a

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

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

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$

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 (~~µg~~ m/L)	True (~~µg~~ m/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
IW	ICP (Initial calibration)	Mg	9.89	10	98.9	98.9	Y
	ICP/MS (Initial calibration)						
	CVAA (Initial calibration)						
CCV	ICP (Continuing calibration)	√	1.01	1.00	101	101	Y
	ICP/MS (Continuing calibration)						
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments:

LDC #: 32869A4a

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: [illegible]
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	ICP interference check	✓	0.250	0.250	100	100	✓
LCS	Laboratory control sample	Ca	6.14	6.25	98.2	98.2	↓
11	Matrix spike	✓	(SSR-SR) 0.635	0.625	102	102	↓
11/12	Duplicate	Mg	18.84	18.78	0.319	0.319	↓
1	ICP serial dilution	Ca	62.795	62.263	0.85	0.85	✓

Comments: _____

TOTCLC.4SW

LDC #: 32889A4a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: CN

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 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

Recalculation:

$Ca = 62.263\ mg/L \times \frac{50\ ml}{40\ ml} = 77.83\ mg/L$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	1	Ca	77.8	77.8	Y
		Mg	10.3	10.3	Y

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: November 3, 2014

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14090921

Sample Identification	Collection Date	Laboratory Sample Identification
1409SWMST274-U**	09/12/14	L14090921-01**
1409SWMDS026-U	09/12/14	L14090921-03
1409SWMST045-U	09/12/14	L14090921-05
1409SWMST044-U	09/12/14	L14090921-07
1409SWMSG004-U	09/12/14	L14090921-09
1409SWMDS030-U	09/12/14	L14090921-11
1409SWMST069-U-1	09/12/14	L14090921-13
1409SWMST069-U-2	09/12/14	L14090921-15
1409SWMST019-U	09/12/14	L14090921-17
1409SWMST020-U	09/12/14	L14090921-19
1409SWMST274-F**	09/12/14	L14090921-02**
1409SWMDS026-F	09/12/14	L14090921-04
1409SWMST045-F	09/12/14	L14090921-06
1409SWMST044-F	09/12/14	L14090921-08
1409SWMSG004-F	09/12/14	L14090921-10
1409SWMDS030-F	09/12/14	L14090921-12
1409SWMST069-F-1	09/12/14	L14090921-14
1409SWMST069-F-2	09/12/14	L14090921-16
1409SWMST019-F	09/12/14	L14090921-18
1409SWMST020-F	09/12/14	L14090921-20
1409SWMST019-U MS	09/12/14	L14090921-21
1409SWMST019-U MSD	09/12/14	L14090921-23
1409SWMST019-F MS	09/12/14	L14090921-22
1409SWMST019-F MSD	09/12/14	L14090921-24

**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 6020 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.

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-MS 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-MS serial dilution analysis was performed by the laboratory. The analysis criteria of ±10% difference for values greater than 100 times the lower limit of quantitation (i.e., the method detection limits [MDLs]).

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 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.

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 L14090921

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG L14090921

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG L14090921

No Sample Data Qualified in this SDG

LDC #: 32889A4b

SDG #: L14090921

Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 10/21/14

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: Cd & Se (EPA SW 846 Method 6020~~A~~)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/12/14
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	ICP Serial Dilution	A	#3 <50 X MRL.
XI.	Sample Result Verification	A**	Not reviewed for stage 2B
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** stage 4

1	1409SWMST274-U**	11	1409SWMST274-F**	21	1409SWMST019-U MS	31	MB
2	1409SWMDS026-U	12	1409SWMDS026-F	22	1409SWMST019-U MSD	32	
3	1409SWMST045-U	13	1409SWMST045-F	23	1409SWMST019-F MS	33	
4	1409SWMST044-U	14	1409SWMST044-F	24	1409SWMST019-F MSD	34	
5	1409SWMSG004-U	15	1409SWMSG004-F	25		35	
6	1409SWMDS030-U	16	1409SWMDS030-F	26		36	
7	1409SWMST069-U-1	17	1409SWMST069-F-1	27		37	
8	1409SWMST069-U-2	18	1409SWMST069-F-2	28		38	
9	1409SWMST019-U	19	1409SWMST019-F	29		39	
10	1409SWMST020-U	20	1409SWMST020-F	30		40	

Notes: ~~Samples appended with 'F' analyzed as dissolved.~~

LDC #: 32889f6

VALIDATION FINDINGS CHECKLIST

Reviewer:
2nd Reviewer:

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 #: 32889 84b

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
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%~~ 70-130 (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)?			✓	<50X MDL
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 #: 52869A4b

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)
1-10	AQ	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
11-20	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
21-30	AQ	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
31-40	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____
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, Si, CN^-, ____

Comments: Mercury by CVAA if performed

LDC #: 32889 A4b

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: iv
2nd Reviewer: 9

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

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

$$\%R = \frac{Found}{True} \times 100$$

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	ICP/MS (Initial calibration)	Cd	50.2	50 ug/L	100	100	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV	ICP/MS (Continuing calibration)	Se	48.1	0.0500 ug/L	96.2	96.3	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments:

LDC #: 32889 Atb

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: [illegible]
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	ICP interference check	Se	104	100	104	104	Y
LCS	Laboratory control sample	Cd	0.0626	0.0625	100	100	
23	Matrix spike	Se	(SSR-SR) 0.0633	0.0625	101	101	
23/24	Duplicate	Cd	0.0648	0.0624	3.77	3.78	
MA	ICP serial dilution						

Comments:

TOTCLC.4SW

LDC #: 32889A4b

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: [illegible]
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, 11 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

Recalculation:

#1 Se = 1.5408 ug/L × 100 ml / 40 ml = 3.852 ug/L
= 0.003852 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	1	Se	0.00385	0.00385	Y
2	11	Se	0.00427	0.00427	Y

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: November 3, 2014

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: Microbac Laboratories, Inc.

Sample Delivery Group (SDG): L14090921

Sample Identification	Collection Date	Laboratory Sample Identification
1409SWMST274-U**	09/12/14	L14090921-01**
1409SWMDS026-U	09/12/14	L14090921-03
1409SWMST045-U	09/12/14	L14090921-05
1409SWMST044-U	09/12/14	L14090921-07
1409SWMSG004-U	09/12/14	L14090921-09
1409SWMDS030-U	09/12/14	L14090921-11
1409SWMST069-U-1	09/12/14	L14090921-13
1409SWMST069-U-2	09/12/14	L14090921-15
1409SWMST019-U	09/12/14	L14090921-17
1409SWMST020-U	09/12/14	L14090921-19
1409SWMST274-F**	09/12/14	L14090921-02**
1409SWMDS026-F	09/12/14	L14090921-04
1409SWMST045-F	09/12/14	L14090921-06
1409SWMST044-F	09/12/14	L14090921-08
1409SWMSG004-F	09/12/14	L14090921-10
1409SWMDS030-F	09/12/14	L14090921-12
1409SWMST069-F-1	09/12/14	L14090921-14
1409SWMST069-F-2	09/12/14	L14090921-16
1409SWMST019-F	09/12/14	L14090921-18
1409SWMST020-F	09/12/14	L14090921-20
1409SWMST019-U MS	09/12/14	L14090921-21
1409SWMST019-U MSD	09/12/14	L14090921-23
1409SWMST019-F MS	09/12/14	L14090921-22
1409SWMST019-F MSD	09/12/14	L14090921-24

**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 methods noted below:

- EPA Method 300.0 for Sulfate, EPA Method 160.1 for Total Dissolved Solids, and Standard Method 2340B for Hardness.

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 L14090921

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG L14090921

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG L14090921

No Sample Data Qualified in this SDG

LDC #: 32889A6
SDG #: L14090921
Laboratory: Microbac

VALIDATION COMPLETENESS WORKSHEET
Stage 2B / 4

Date: 10/21/14
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Sulfate (EPA Method 300.0), Total Dissolved Solids (EPA Method 160.1), Hardness (SM2340B)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/12/14
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	
VI.	Duplicates	N	
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	~~N~~ A	Not reviewed for Stage 2B
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ~~A2~~ ** Stage 4

1	1409SWMST274-U **	11	1409SWMST274-F **	21	1409SWMST019-U MS	31	
2	1409SWMDS026-U	12	1409SWMDS026-F	22	1409SWMST019-U MSD	32	
3	1409SWMST045-U	13	1409SWMST045-F	23	1409SWMST019-F MS	33	
4	1409SWMST044-U	14	1409SWMST044-F	24	1409SWMST019-F MSD	34	
5	1409SWMSG004-U	15	1409SWMSG004-F	25	MB	35	
6	1409SWMDS030-U	16	1409SWMDS030-F	26		36	
7	1409SWMST069-U-1	17	1409SWMST069-F-1	27		37	
8	1409SWMST069-U-2	18	1409SWMST06~~F~~9-2	28		38	
9	1409SWMST019-U	19	1409SWMST019-F	29		39	
10	1409SWMST020-U	20	1409SWMST020-F	30		40	

Notes:

LDC #: 32089A6

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
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 #: 32889 B6

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
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 #: 32889A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 6 of 6
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-10	AS	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
11-20	↓	pH TDS Cl F NO_3 NO_2 (SO4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 (Hardness) ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
N 3,4	AS	pH TDS Cl F NO_3 NO_2 (SO4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
↓ 1,N	↓	pH (TDS) Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 ____ ____

Comments:

LDC #: 32889A6

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: Inorganics, Method See cover

The correlation coefficient (r) for the calibration of SO4 was recalculated.Calibration date: 6/11/14

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	SO4	s1	1	0.105	*0.998155*	0.997115	Y
		s2	5	0.593			
		s3	20	2.535			
		s4	40	5.305			
		s5	60	8.44			
		s6	120	18.716			
CCV Calibration verification	SO4	40	37.6		%D 6.0	%D 6.1	Y
Calibration verification							
Calibration verification							

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

LDC #: 32889A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: [illegible]
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	492	500	98.4	98.4	Y
23	Matrix spike sample	SO4	(SSR-SR) 39.6	40.0	99	~~[illegible]~~ 99	
21/22	Duplicate sample	TDS	668	662	0.902	0.902	

Comments:

TOTCLC.6

LDC #: 32889A6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
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 1, 11 reported with a positive detect were recalculated and verified using the following equation:

Concentration = Recalculation:

$SO_4 = \frac{Area + 0.0712}{0.1461}$ #11 $SO_4 = \frac{5.347 + 0.0712}{0.1461} = 36.4$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	1	Tb	266	266	Y
2	11	SO_4	~~39.0~~ 36.4	36.4	Y
		Hardness	237	237	↓

Note:

RECALC.6

APPENDIX E – COMMENTS AND COMMENT RESPONSES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
IDAHO OPERATIONS OFFICE
950 West Bannock, Suite 900
Boise, Idaho 83702

February 2, 2015

Rachel Roskelley
Sr. Environmental Engineer
Monsanto Company
Soda Springs Operations
1853 Highway 34
Soda Springs, Idaho 83276

Re: A/T approval of responses to comments on P4's *2014 Data Summary Report.*

Dear Ms. Roskelley,

The Agencies and Tribes (A/T) have reviewed the above referenced deliverable, submitted pursuant to the 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 (or 2009 AOC). The initial draft of the data summary report was submitted to the A/Ts on December 8, 2015. The A/T provided comments on the Draft 2014 DSR on January 2, 2015. P4's written responses to the comments were provided to the A/T's on January 14, 2015. The responses are satisfactory. Please incorporate the responses into a final version of the deliverable and submit for approval.

Please contact me if you have questions. I can be reached at 208-378-5763 or electronically at tomten.dave@epa.gov.

Sincerely,

//s//

Dave Tomten
Remedial Project Manager

cc: Vance Drain, MWH (electronic version only)
Cary Faulk, Integrated-Geosolutions (electronic version only)
Mike Rowe, IDEQ – Pocatello
Sandi Fisher, US FWS - Chubbuck
Kelly Wright, Shoshone Bannock Tribes
Susan Hanson (for the tribes)
Talia Martin, Shoshone Bannock Tribes (electronic version only)
Mary Kaufman, FS – Pocatello (electronic version only)
Colleen O'Hara-Epperly, BLM (electronic version only)
Bob Blaesing, BIA (electronic version only)

Printed on Recycled Paper

Dennis Smith, CH2MHill (electronic version only)
Gary Billman, IDL – Pocatello (electronic version only)
Charles Allbritton, EPA Records Center (electronic version only)

Attachment

Comments on P4's *2014 Data Summary Report Draft Revision 0*, prepared by MWH for P4 Production LLC, dated December 2014.

General Comment

The report appears to be consistent with the methods and objectives described in the *P4 Long-Term Surface Water and Groundwater Monitoring Plan - Final Rev 1 – 2014.* Changes recommended in previous DSR reports were addressed/incorporated into this document.

In Section 3.3 (page 6-7), the third party data validation discusses the validation process for Levels lll and lV, and states that "the validated data were of sufficient quality to support the project objective (i.e., end use)" and that Laboratory Data Consultants (LDC) "showed that the overall assessment of the data was found to be acceptable". As the document is structured, the reader is left to sift through all the individual sample delivery groups (SDG) assessment forms to verify the statement and conclusion. In future data deliverables, consider including some form of summary information tables to better illustrate and support the conclusions presented.

Specific and Editorial Comments

Section Acronyms and Abbreviations, page iii. Change "A/T" to "A/Ts."

Section Acronyms and Abbreviations, page iii. Under "COPEC" change definition to "contaminants of potential ecological concern" to be consistent with "COPC."

Section 1.1.1, page 2, paragraph 4, line 1. Change "constituents" to "contaminants" in both occurrences for consistency with Acronyms and Abbreviations.

Section 2.1, page 4, paragraph 3, line 2. Unitalicize "*and the SOP*" and insert a comma to read ". . . *Samples* and the SOP, *Low* . . ."

Section 2.1, page 4, paragraph 5, line 9. Delete the space to read "NAD27" for consistency.

Section 2.1, page 4, paragraph 5, lines 9 & 10. Change to ". . . precise surveys. As surveys . . ."

Section 2.1, page 4, paragraph 5, line 12. Change "Site" to "Sites."

Section 3.3, page 7, bullet 8. Add a comma to read "i.e.," for consistency.

Section 3.4, page 8, paragraph 1, line 1. Change "ATs'" to "A/Ts'."

Section 3.4, page 8, paragraph 1, line 4. Delete the space to read "SAP/QAPP" for consistency.

Table 2-1. For the column headings, follow the border style used for Table 2-2.

Table 3-1. There are a few cases where dissolved surface selenium concentrations exceed the total concentrations (eg. MDS030 5/9/2014 Se), but for the most part these fall within the realm of normal sampling and laboratory error. A notable exception is pointed out in the following comment.

Table 3-3, page 1 of 4, row Selenium, column MST044, Stream, 5/9/2014. There looks to be almost a magnitude of difference between the dissolved and total fractions. Discuss possible reasons. See also Table C-2, page 6 of 17.

Table 3-3, page 2 of 4, row Selenium, column MST045 Average, Stream, 5/9/2014. Change the dissolved fraction to "0.000867." See also Table C-2, page 7 of 17.

Table 3-4a, page 3 of 8, rows Sulfate, Total dissolved solids, Cadmium, Manganese, Selenium, Column MBW130, Bore Hole Well, 5/9/2014. Switch the Sulfate and Selenium values under the Total column to the Dissolved column. Switch the Total dissolved solids, Cadmium, Manganese, and Selenium values under the Dissolved column to the Total column. See also Table C-3a, page 4 of 16.