

APPENDIX A

FIELD DOCUMENTATION



Corporate Office:

121 S. Jackson St., Moscow, Idaho 83843
Ph: (208) 882-7858; Fax: (208) 883-3785

Other Office Locations:

Kellogg, Idaho

Boise, Idaho

Deer Lodge, Montana

Las Vegas, Nevada

Pasco, Washington

TECHNICAL MEMORANDUM

To: Don Carpenter, IDEQ, Boise

From: Robin Nimmer, TerraGraphics, Moscow

Date: October 7, 2016

Project Code: IDEQ C985 16028-09-02

Subject: Summary of the April 2016 Semi-Annual Water Monitoring Event at the East Mission Flats Repository

The purpose of this memorandum is to summarize the East Mission Flats Repository (EMFR) April 2016 Semi-Annual Water Monitoring event and present the data. An evaluation and discussion of the results will be completed in the 2016 annual water monitoring report for EMFR.

1 Sampling Summary

Figure 1 shows the locations of the seven groundwater monitoring wells, one decontamination well, two piezometers, and two floodwater levelogger sites in the vicinity of EMFR.

A detailed description of the field sampling, handling, documentation, and analytical procedures is provided in the *Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) for Water Monitoring at the East Mission Flats Repository, Revision No. 2* (TerraGraphics 2014), hereinafter referred to as the EMFR SAP/QAPP; and *Sample Plan Alteration Form (SPAF) #1 of the EMFR SAP/QAPP* (TerraGraphics 2015a), hereinafter referred to as SPAF #1.

Samples were collected from all seven of the groundwater monitoring wells on April 5, 2016.

All field and analytical procedures were conducted according to the EMFR SAP/QAPP and subsequent SPAF (TerraGraphics 2014, 2015a), with the exception that no resampling was conducted based on the prediction limits because the U.S. Environmental Protection Agency (USEPA) is completing an optimization review of past data that may result in changes to the prediction limits or sampling approach currently in use.

Attachment A contains the field sheets for each sampled well.

2 Water Levels and Hydrographs

Figure 2 shows hydrographs of the water levels recorded by levelloggers at seven monitoring wells and two floodwater monitoring locations in the immediate vicinity of the repository and data from the U.S. Geological Survey (USGS) Gage Station 12413500 on the Coeur d'Alene River near Cataldo, Idaho (USGS 2015) through April 2016.

Since the last monitoring event in October 2015, no water was detected at the floodwater levellogger sites or in piezometers 10-EMF-PZ-A and 10-EMF-PZ-B. The field sampling crew downloaded levelloggers at LL-1, LL-2, and piezometers 10-EMF-PZ-A and 10-EMF-PZ-B during the April semi-annual event.

3 Groundwater Monitoring Results

The hydraulic gradient observed during the April 2016 Sampling Event is generally to the west (Figure 3). The historical gradient is to the southwest, although the gradient does shift depending on the river level. Data from 09-EMF-MW-C Deep and 08-EMF-MW-E are not used to develop groundwater elevation contours because 09-EMF-MW-C Deep is screened deeper than the other monitoring wells, and 08-EMF-MW-E appears to be in a different hydrologic unit from the other wells based on water levels and water quality data.

Table 1 and Figure 4 display the cumulative field parameter data for the groundwater sites. The specific conductance values measured at 07-EMF-MW-B, 07-EMF-MW-C, and 08-EMF-MW-F; dissolved oxygen (DO) values measured at 09-EMF-MW-C Deep and 07-EMF-MW-D; and oxidation reduction potential (ORP) values measured at 09-EMF-MW-C Deep in April 2016 were the highest yet recorded at these sites. The meter was calibrated at the start of the day and checked at the end of the day, and the data were considered acceptable.

Table 2 and Figure 5 display the cumulative groundwater sample results for dissolved metals.

Dissolved metal concentrations for this project are compared to the groundwater total metal regulatory thresholds because no specific dissolved metal regulatory thresholds exist, and it is assumed that dissolved concentrations are indicators of contamination in groundwater under all conditions (CH2M Hill 2006). There were no dissolved metal regulatory threshold exceedences in groundwater for the April 2016 sampling event.

Dissolved cadmium and zinc at 08-EMF-MW-F exceeded the PLs of 0.001 milligrams per liter (mg/L) and 3.82 mg/L, respectively, and dissolved zinc exceeded the PLs of 0.0264 mg/L at 07-EMF-MW-B and 2.03 mg/L at 07-EMF-MW-C in the April 2016 semi-annual event. A statistically significant increase (SSI) was previously declared for cadmium and zinc at 08-EMF-MW-F and zinc and 07-EMF-MW-C based on prior sampling results. Although zinc at 07-EMF-MW-B qualifies for resampling, no resampling is being conducted at this time because the USEPA is completing an optimization review of past data that may result in changes to the prediction limits or sampling approach currently in use.

Attachment B contains the USEPA Contract Laboratory Program (CLP) analytical results (dissolved cations and dissolved metals). Attachment C contains the SVL analytical results (dissolved anions and total alkalinity).

The data from the April 2016 Semi-Annual sampling event were considered acceptable, and no laboratory or field data were rejected. The following data were qualified as estimates (*J*) as discussed in the data quality review (TerraGraphics 2016):

- Dissolved arsenic results at 07-EMF-MW-A, 07-EMF-MW-B, 07-EMF-MW-C, 07-EMF-MW-D, 08-EMF-MW-E, 08-EMF-MW-F (original only), and 09-EMF-MW-C-Deep because the results were greater than the method detection limit (MDL) but less than the contract required quantitation limit (CRQL)
- Dissolved cadmium results at 07-EMF-MW-D because the results were greater than the MDL but less than the CRQL
- Dissolved lead results at 08-EMF-MW-F (duplicate only) because the results were greater than the MDL but less than the CRQL
- Dissolved potassium at 07-EMF-MW-A and 08-EMF-MW-F (duplicate only) because the result was greater than the MDL but less than the CRQL
- Dissolved zinc results at 07-EMF-MW-B, 08-EMF-MW-E, and 09-EMF-MW-C-Deep due to the field blank results
- Dissolved calcium, magnesium, and sodium results due to differences when comparing results to historical data

Any qualified data should be reviewed by an experienced data analyst before data analysis and interpretation.

4 References

CH2M Hill, 2006. Environmental Monitoring Plan, Operable Unit 2, Bunker Hill Mining and Metallurgical Complex Superfund Site. Prepared for USEPA Region 10. January.

TerraGraphics, 2014. Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) for Water Monitoring at the East Mission Flats Repository, Revision No. 2. December.

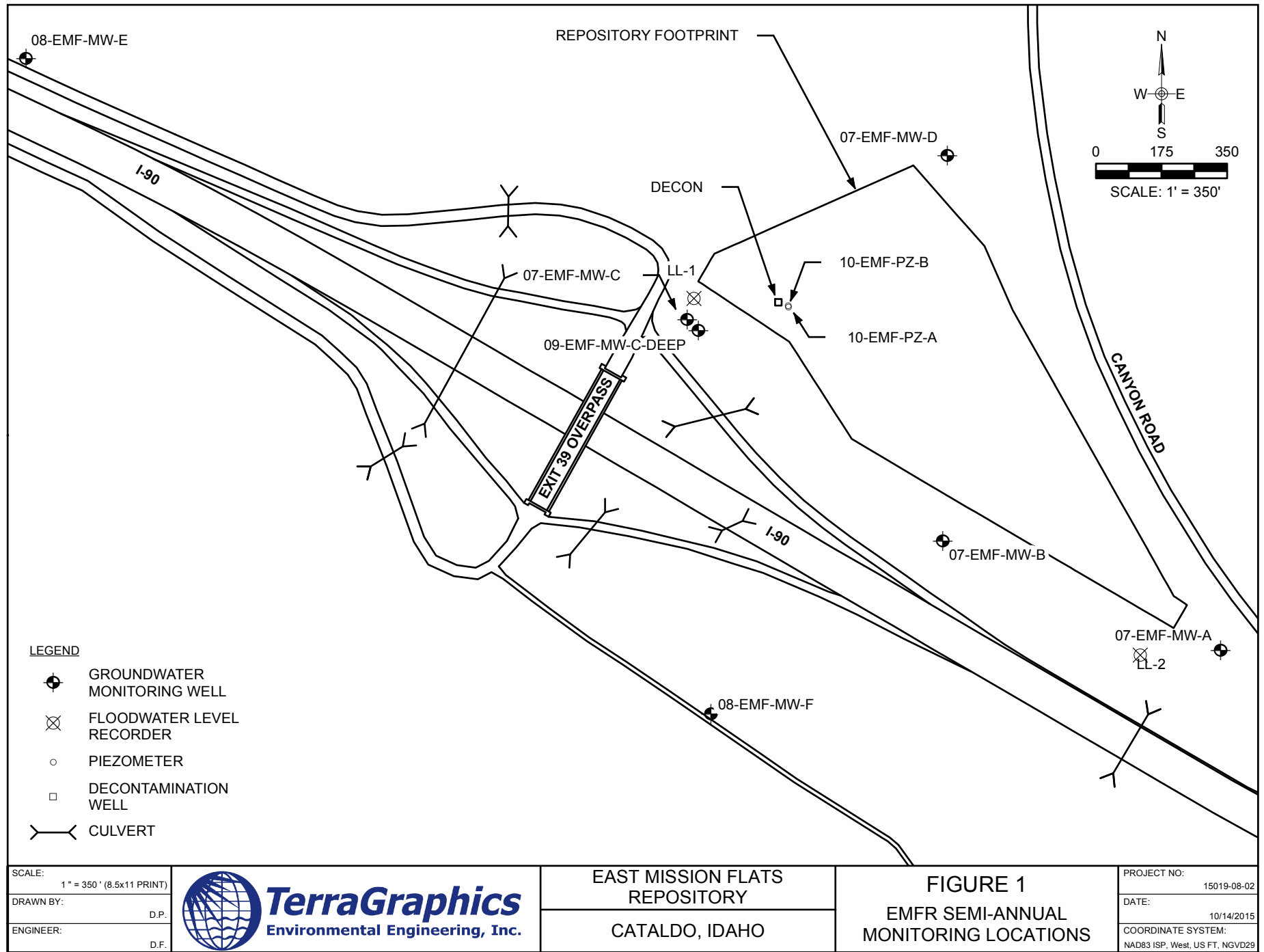
TerraGraphics, 2015a. Sample Plan Alteration Form #1 of the Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) for Water Monitoring at the East Mission Flats Repository, Revision No. 2. June.

TerraGraphics, 2015b. Prediction Limit Approach for East Mission Flats Repository – White Paper. June.

TerraGraphics, 2016. QA/QC Review of the April 2016 Semi-Annual Water Monitoring Event at the East Mission Flats Repository. Memorandum. October.

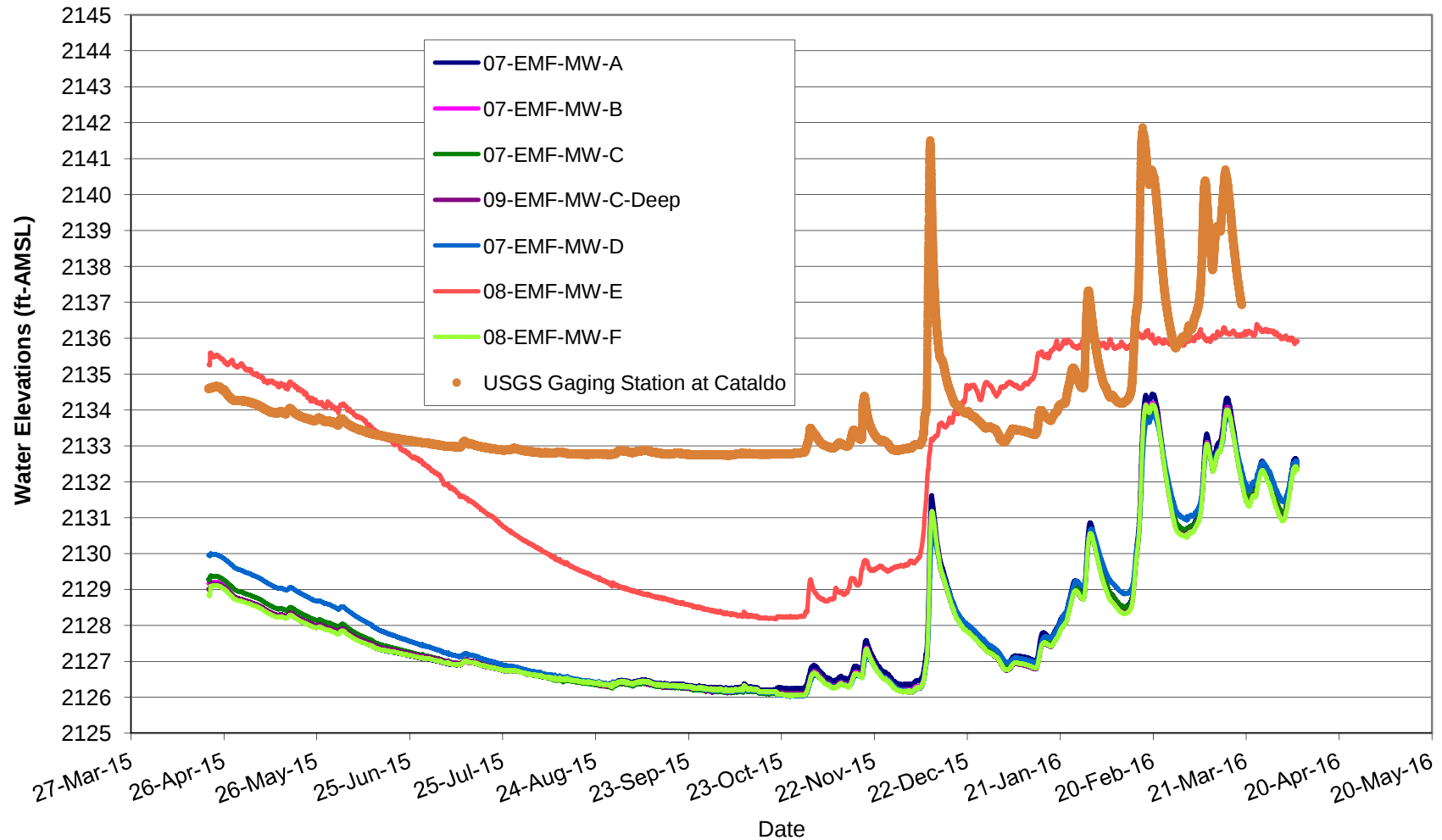
U.S. Geological Survey (USGS), 2016. 12413500 Coeur d'Alene River NR Cataldo ID, http://waterdata.usgs.gov/id/nwis/uv/?site_no=12413500. April.

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SCALE: 1" = 350' (8.5x11 PRINT)		EAST MISSION FLATS REPOSITORY	FIGURE 1 EMFR SEMI-ANNUAL MONITORING LOCATIONS	PROJECT NO: 15019-08-02
DRAWN BY:		CATALDO, IDAHO		DATE: 10/14/2015
ENGINEER:				COORDINATE SYSTEM: NAD83 ISP, West, US FT, NGVD29
D.F.				

Figure 2. Water Levels at EMFR Monitoring Wells Compared to River Stage at Cataldo



Notes:

- All elevations are based on the NGVD29 datum

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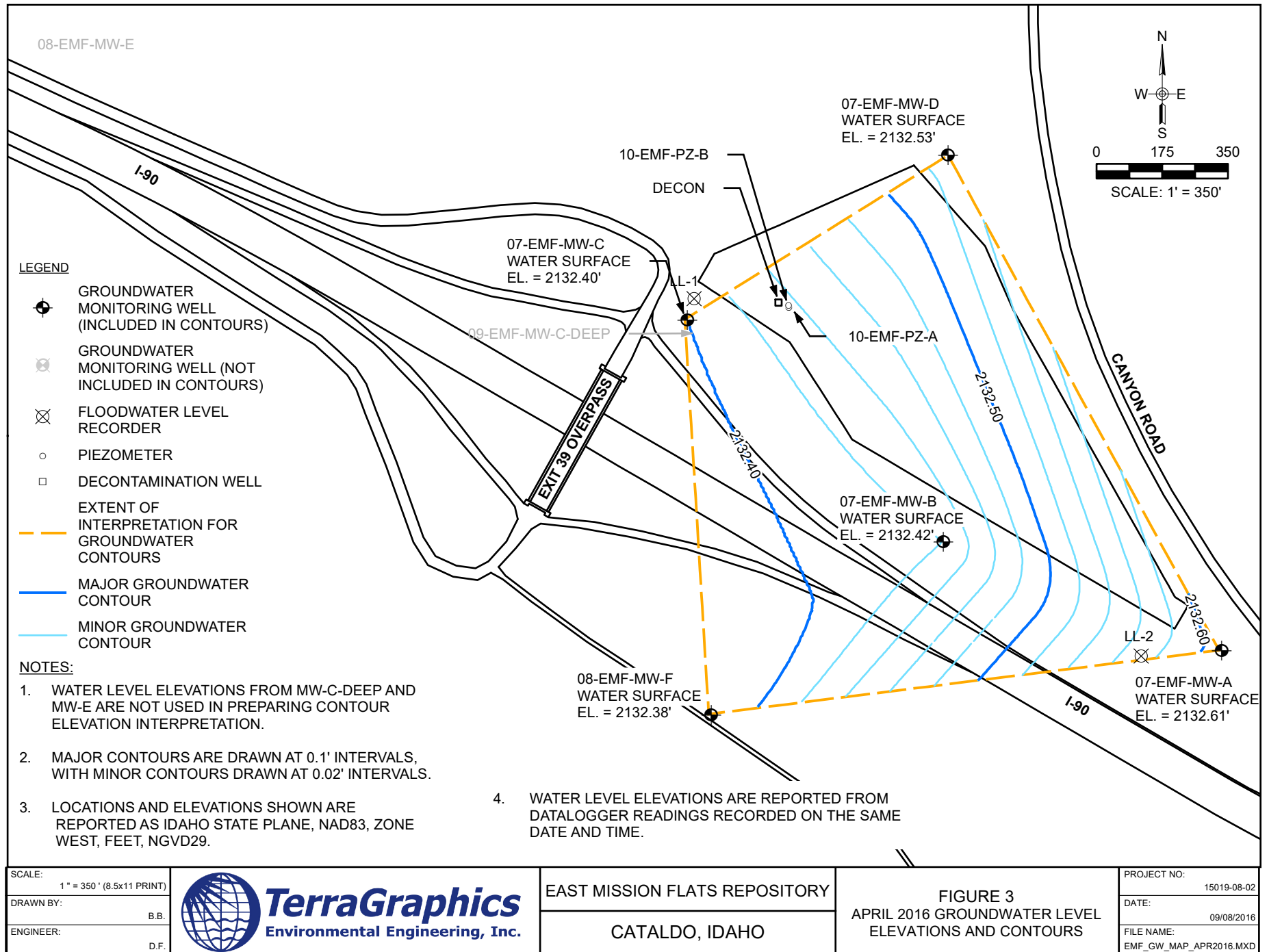


Figure 4. Field Parameter Data at EMFR Groundwater Sites

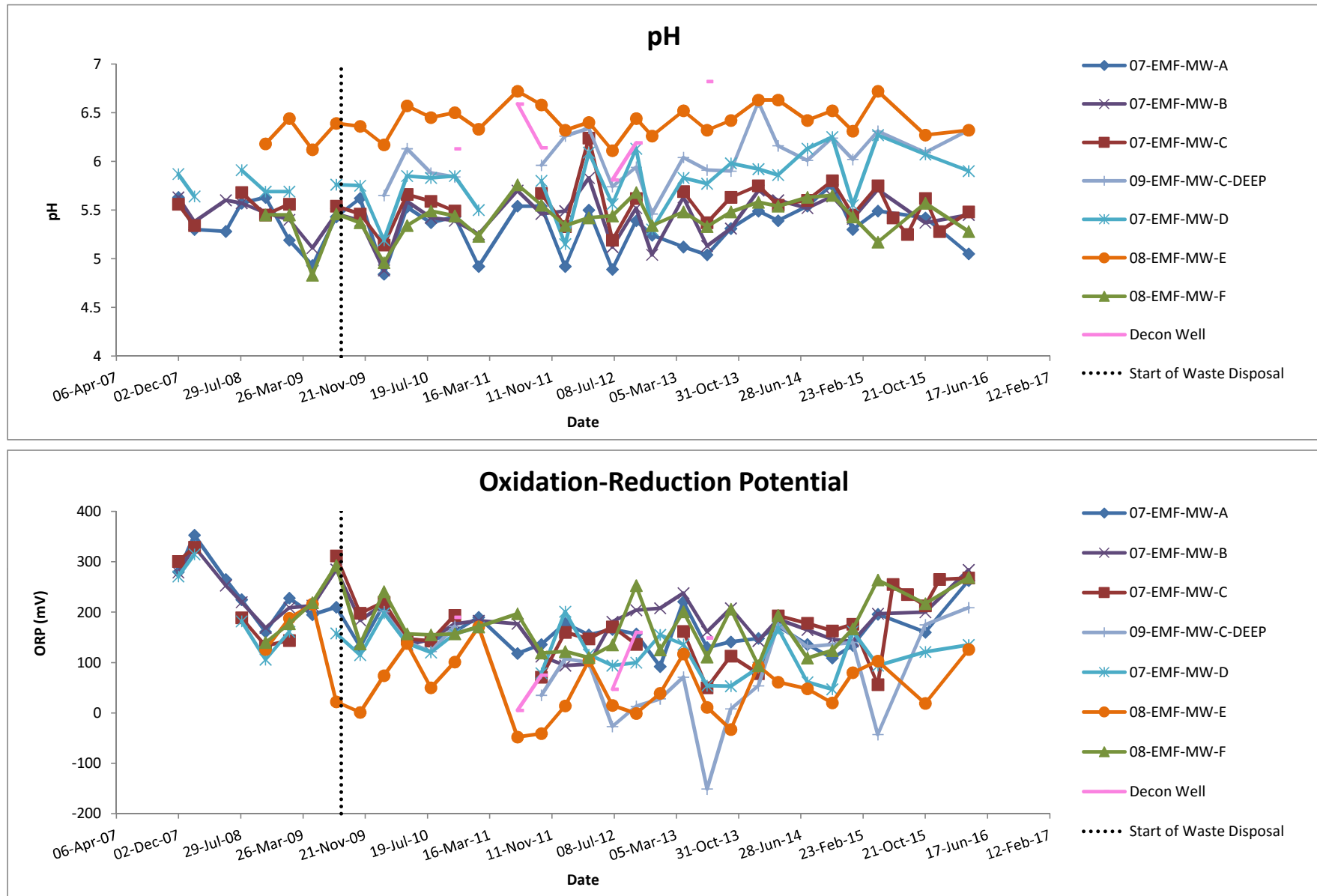


Figure 4. Field Parameter Data at EMFR Groundwater Sites

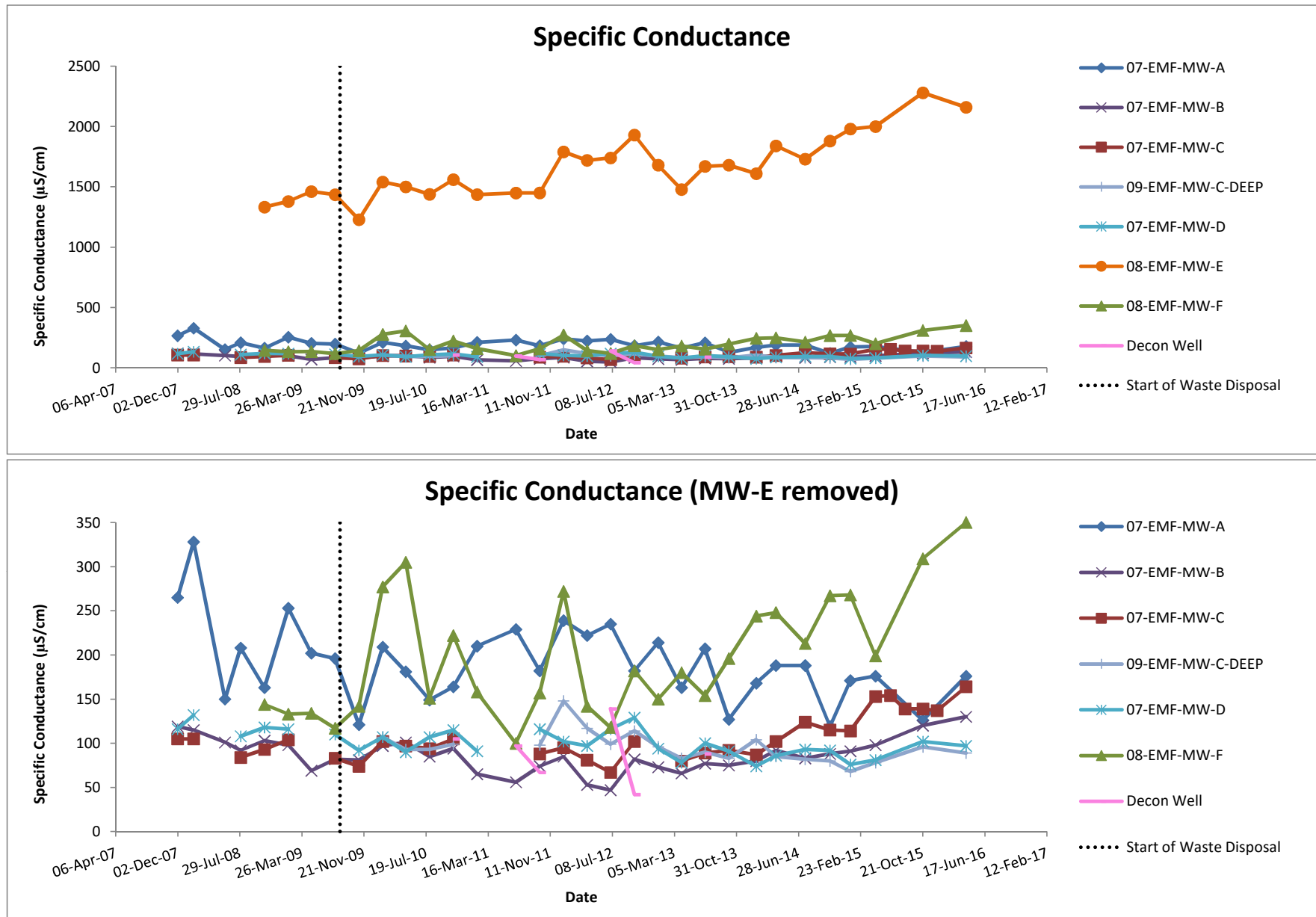


Figure 4. Field Parameter Data at EMFR Groundwater Sites

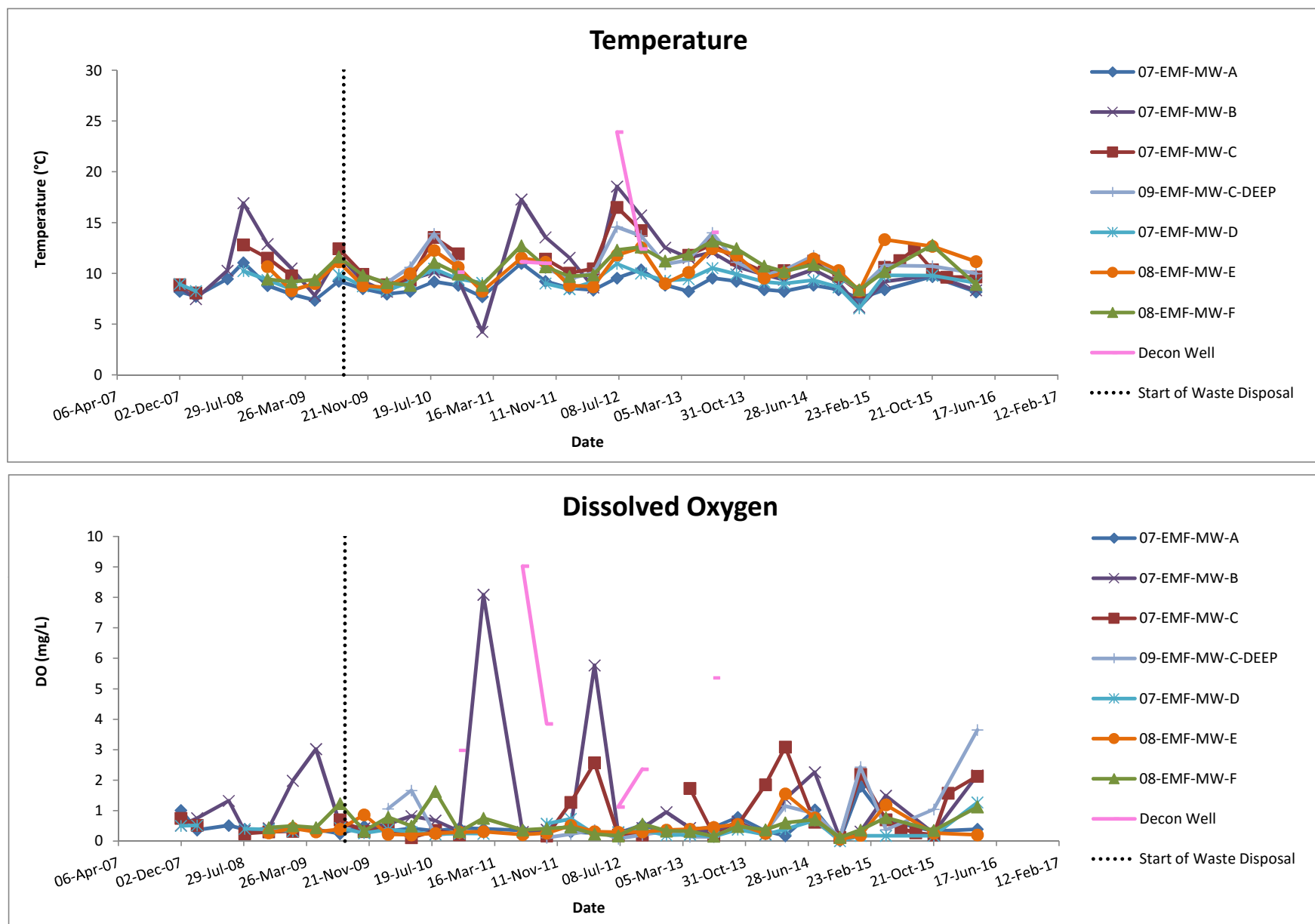


Figure 5. Dissolved Metals Data at EMFR Groundwater Sites

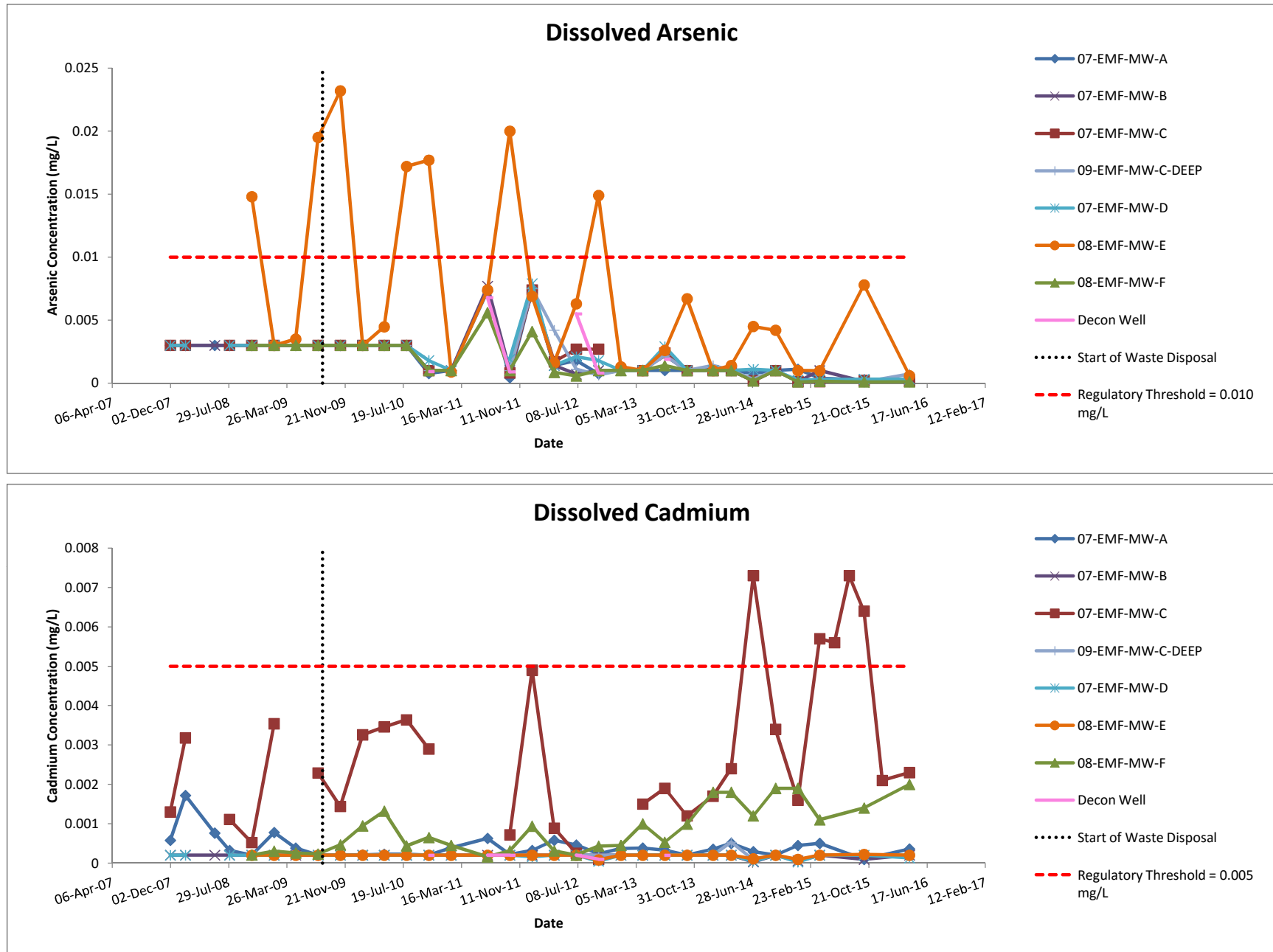
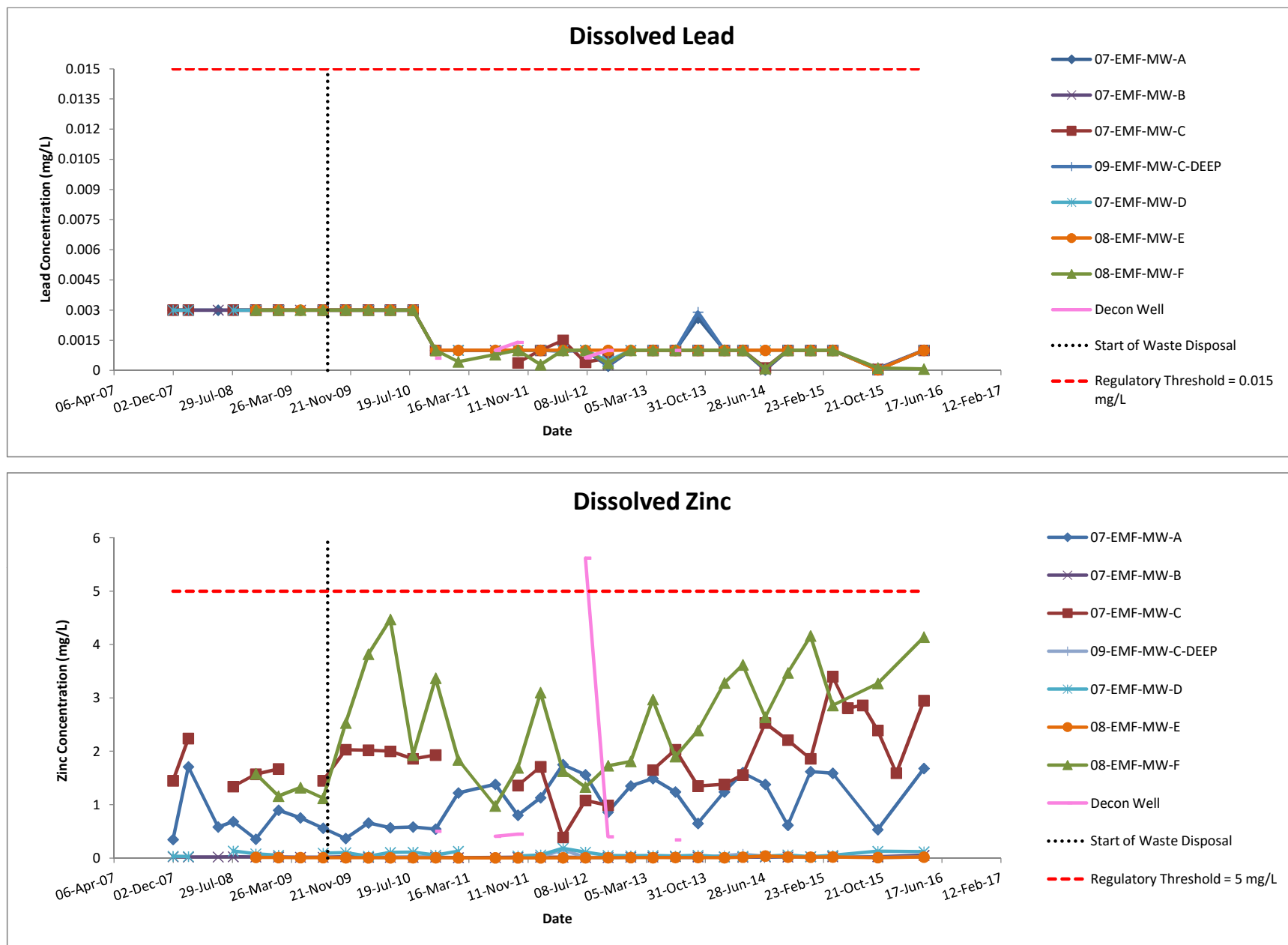


Figure 5. Dissolved Metals Data at EMFR Groundwater Sites



*Dissolved antimony not shown as it has never been detected at EMFR.

Table 1
Field Parameter Data
East Mission Flats Repository

Well	Parameter					
	Date	pH	Specific Conductance (μS/cm)	Temperature (°C)	DO (mg/L)	ORP (mV)
07-EMF-MW-A	11-Dec-07	5.63	265	8.21	1.01	280
	25-Feb-08	5.30	328	7.73	0.36	353
	3-Jun-08	5.28	150	9.45	0.51	265
	19-Aug-08	5.57	208	11.05	0.39	225
	10-Nov-08	5.63	163	8.79	0.34	161
	4-Feb-09	5.19	253	7.95	0.39	228
	7-May-09	4.93	202	7.35	0.38	195
	10-Aug-09	5.43	196	9.23	0.24	210
	11-Nov-09	5.62	121	8.49	0.48	131
	25-Feb-10	4.84	209	7.97	0.32	216
	19-May-10	5.53	181	8.21	0.42	147
	25-Aug-10	5.37	149	9.17	0.33	142
	16-Nov-10	5.43	164	8.81	0.43	161
	10-Feb-11	4.92	210	7.69	0.40	190
	6-Jul-11	5.54	229	10.98	0.35	118
	24-Oct-11	5.54	182	9.21	R	136
	25-Jan-12	4.92	239	8.54	0.30	178
	10-Apr-12	5.50	222	8.34	0.26	155
	31-Jul-12	4.89	235	9.53	0.26	166
	29-Oct-12	5.39	182	10.35	0.52	157
	23-Jan-13	5.24	214	8.84	0.30	92
	2-Apr-13	5.12	163	8.23	0.39	221
	23-Jul-13	5.04	207	9.54	0.45	130
	17-Oct-13	5.31	127	9.22	0.78	141
	15-Jan-14	5.49	168	8.39	0.33	148
	1-Apr-14	5.39	188	8.23	0.17	172
	23-Jul-14	5.54	188	8.83	1.02	136
	27-Oct-14	5.76	119	8.39	0.01	109
	14-Jan-15	5.30	171	7.51	1.8 J	134
	21-Apr-15	5.49	176	8.38	0.69	196
	21-Oct-15	5.42	126	9.68	0.32	160
	5-Apr-16	5.05	176	8.17	0.39	263
07-EMF-MW-B	10-Dec-07	5.63	119	8.71	0.51	279
	25-Feb-08	5.38	115	7.46	0.75	330
	3-Jun-08	5.60	101	10.26	1.32	253
	19-Aug-08	5.57	92	16.92	0.34	220
	10-Nov-08	5.47	103	12.88	0.42	169
	4-Feb-09	5.40	98	10.48	1.98	209
	7-May-09	5.11	69	7.8	3.02	213
	10-Aug-09	5.46	82	11.81	0.55	285
	11-Nov-09	5.39	81	9.24	0.42	184
	25-Feb-10	4.88	97	8.2	0.55	216
	19-May-10	5.59	101	9.37	0.82	135
	25-Aug-10	5.42	85	10.13	0.67	146
	16-Nov-10	5.39	94	9.44	0.32	177
	10-Feb-11	5.25	65	4.24	8.09	183
	6-Jul-11	5.70	56	17.28	0.30	177
	24-Oct-11	5.46	74	13.55	0.37 J	112
	25-Jan-12	5.49	85	11.53	0.47	94
	10-Apr-12	5.83	53	8.61	5.77	97
	31-Jul-12	5.12	47	18.55	0.28	181
	29-Oct-12	5.52	82	15.71	0.43	204
	24-Jan-13	5.04	73	12.53	0.95	208
	2-Apr-13	5.63	66	11.54	0.43	238
	23-Jul-13	5.13	77	12.06	0.27	161
	17-Oct-13	5.31	75	10.67	0.64	208
	15-Jan-14	5.70	80	9.88	0.22	143
	1-Apr-14	5.60	92	9.38	1.39	186
	23-Jul-14	5.52	83	10.38	2.26	165
	27-Oct-14	5.64	88	9.10	0.11	146
	14-Jan-15	5.41	91	6.68	0.31	142
	21-Apr-15	5.71	98	9.17	1.49	197
	21-Oct-15	5.37	120	9.80	0.26	200
	5-Apr-16	5.45	130	8.33	2.16	284

Well	Parameter					
	Date	pH	Specific Conductance (µS/cm)	Temperature (°C)	DO (mg/L)	ORP (mV)
07-EMF-MW-C	10-Dec-07	5.56	105	8.89	0.75	301
	25-Feb-08	5.34	105	8.07	0.52	329
	3-Jun-08	NS	NS	NS	NS	NS
	19-Aug-08	5.68	84	12.81	0.24	189
	10-Nov-08	5.45	93	11.51	0.3	133
	3-Feb-09	5.56	104	9.76	0.32	144
	7-May-09	NS	NS	NS	NS	NS
	10-Aug-09	5.54	83	12.42	0.7	312
	11-Nov-09	5.46	74	9.91	0.31	198
	25-Feb-10	5.14	102	8.89	0.42	220
	19-May-10	5.66	97	9.33	0.11 J	147
	25-Aug-10	5.59	94	13.54	0.35	143
	16-Nov-10	5.49	105	11.94	0.21	194
	10-Feb-11	NS	NS	NS	NS	NS
	6-Jul-11	NS	NS	NS	NS	NS
	24-Oct-11	5.67	88	11.41	0.17 J	71
	25-Jan-12	5.33	95	10.03	1.27	160
	10-Apr-12	6.24	81	10.45	2.57	147
	31-Jul-12	5.19	67	16.51	0.2	171
	29-Oct-12	5.62	102	14.22	0.20	136
	23-Jan-13	NS	NS	NS	NS	NS
	2-Apr-13	5.69	80	11.78	1.73	162
	23-Jul-13	5.37	89	12.85	0.2	50
	17-Oct-13	5.63	92	11.36	0.52	113
	15-Jan-14	5.75	87	10.14	1.85	78
	1-Apr-14	5.55	102	10.27	3.09	193
	23-Jul-14	5.6	124	11.21	0.62	178
	27-Oct-14	5.80	115	9.71	0.12	163
	14-Jan-15	5.45	114	8.16	2.19	176
	21-Apr-15	5.75	153	10.60	0.70	56
	18-Jun-15	5.42	154	11.26	0.41	255
	13-Aug-15	5.25	139	12.37	0.27	235
	21-Oct-15	5.62	139	10.36	0.20	213
	15-Dec-15	5.28	137	9.63	1.57	265
	5-Apr-16	5.48	164	9.64	2.13	268
09-EMF-MW-C Deep	25-Feb-10	5.65	107	9.07	1.06	201
	19-May-10	6.13	93	10.60	1.66	141
	25-Aug-10	5.88	93	13.90	0.21	122
	16-Nov-10	5.84	99	10.79	0.26	172
	10-Feb-11	NS	NS	NS	NS	NS
	6-Jul-11	NS	NS	NS	NS	NS
	24-Oct-11	5.96	98	10.52	0.11	35
	25-Jan-12	6.26	148	9.46	0.23	108
	10-Apr-12	6.34	117	10.03	0.36	100
	31-Jul-12	5.74	99	14.56	0.08	-27
	29-Oct-12	5.94	114	13.70	0.20	13
	23-Jan-13	5.46	96	10.90	0.32	28
	2-Apr-13	6.04	83	11.29	0.14	71
	23-Jul-13	5.91	90	13.99	0.13	-151
	17-Oct-13	5.9	83	11.09	0.50	8
	15-Jan-14	6.61	104	9.82	0.29	54
	1-Apr-14	6.16	85	10.31	1.15	176
	23-Jul-14	6.01	82	11.72	0.90	131
	27-Oct-14	6.24	80	9.67	0.11	136
	14-Jan-15	6.02	68	8.36	2.43	140
	21-Apr-15	6.31	78	10.78	0.37	-43
	21-Oct-15	6.09	96	10.71	1.04	175
	5-Apr-16	6.32	89	9.98	3.65	209

Well	Parameter					
	Date	pH	Specific Conductance (µS/cm)	Temperature (°C)	DO (mg/L)	ORP (mV)
07-EMF-MW-D	10-Dec-07	5.87	116	8.95	0.5	271
	25-Feb-08	5.64	132	8.26	0.51	315
	3-Jun-08	NS	NS	NS	NS	NS
	19-Aug-08	5.91	108	10.22	0.4	182
	10-Nov-08	5.69	118	9.34	0.38	106
	3-Feb-09	5.69	116	8.43	0.32	161
	7-May-09	NS	NS	NS	NS	NS
	11-Aug-09	5.76	110	9.87	0.43	158
	11-Nov-09	5.75	92	8.72	0.26	115
	25-Feb-10	5.19	107	8.32	0.38	198
	19-May-10	5.85	90	9.13	0.30	138
	25-Aug-10	5.83	107	10.46	0.22	120
	16-Nov-10	5.85	115	9.44	0.25	157
	10-Feb-11	5.50	91	9.07	0.24	170
	6-Jul-11	NS	NS	NS	NS	NS
	25-Oct-11	5.80	116	9	0.57 J	79
	26-Jan-12	5.15	102	8.44	0.73	201
	10-Apr-12	6.09	97	9.16	0.23	116
	1-Aug-12	5.56	116	10.95	0.29	94
	30-Oct-12	6.13	129	9.99	0.36	100
	24-Jan-13	5.30	94	9.27	0.19	155
	2-Apr-13	5.83	78	9.43	0.21	136
	23-Jul-13	5.77	100	10.52	0.15	54
	17-Oct-13	5.98	91	9.91	0.38	53
	15-Jan-14	5.92	74	9.15	0.21	90
	1-Apr-14	5.86	86	9.00	0.39	168
	23-Jul-14	6.13	93	9.32	0.68	61
	27-Oct-14	6.25	92	8.63	0.00	47
	14-Jan-15	5.55	76	6.55	0.17	162
	21-Apr-15	6.27	81	9.80	0.17	94
	21-Oct-15	6.07	102	9.77	0.17	121
	5-Apr-16	5.90	97	9.05	1.27	135
08-EMF-MW-E	10-Nov-08	6.18	1,332	10.66	0.27	126
	3-Feb-09	6.44	1,379	8.29	0.42	188
	7-May-09	6.12	1,461	8.99	0.3	216
	11-Aug-09	6.39	1,435	11.14	0.39	22
	11-Nov-09	6.36	1,228	8.77	0.86	1
	25-Feb-10	6.17	1,540	8.61	0.22	74
	19-May-10	6.57	1,500	9.96	0.20	138
	25-Aug-10	6.45	1,438	12.26	0.25	50
	16-Nov-10	6.50	1,560	10.61	0.29	101
	10-Feb-11	6.33	1,436	8.23	0.31	171
	6-Jul-11	6.72	1,449	11.52	0.21	-48
	24-Oct-11	6.58	1,450	11.1	0.26	-41
	26-Jan-12	6.32	1,790	8.79	0.51	14
	11-Apr-12	6.40	1,720	8.67	0.31	104
	1-Aug-12	6.11	1,740	11.81	0.29	15
	29-Dec-12	6.44	1,930	12.53	0.30	-1
	23-Jan-13	6.26	1,680	8.99	0.36	39
	2-Apr-13	6.52	1,478	10.10	0.39	117
	23-Jul-13	6.32	1,670	12.43	0.45	11
	17-Oct-13	6.42	1,680	11.79	0.55	-33
	15-Jan-14	6.63	1,610	9.53	0.25	93
	1-Apr-14	6.63	1,840	10.01	1.55	61
	23-Jul-14	6.42	1,730	11.44	0.76	48
	27-Oct-14	6.52	1,880	10.28	0.06	20
	14-Jan-15	6.31	1,980	8.27	0.19	80
	21-Apr-15	6.72	2,000	13.33	1.19	103
	21-Oct-15	6.27	2,280	12.66	0.26	19
	5-Apr-16	6.32	2,160	11.16	0.20	126

Well	Parameter					
	Date	pH	Specific Conductance (µS/cm)	Temperature (°C)	DO (mg/L)	ORP (mV)
08-EMF-MW-F	11-Nov-08	5.45	144	9.43	0.44	140
	3-Feb-09	5.45	133	9.16	0.5	177
	7-May-09	4.83	134	9.37	0.44	219
	10-Aug-09	5.46	117	11.63	1.23	293
	11-Nov-09	5.37	142	9.81	0.33	137
	25-Feb-10	4.96	277	9.07	0.78	241
	19-May-10	5.34	305	8.82	0.49	157
	25-Aug-10	5.49	151	11.08	1.63	155
	16-Nov-10	5.44	222	9.94	0.31	157
	10-Feb-11	5.23	158	8.82	0.75	171
	6-Jul-11	5.76	100	12.72	0.36	197
	25-Oct-11	5.55	157	10.65	0.41 J	119
	26-Jan-12	5.34	272	9.70	0.46	122
	11-Apr-12	5.42	142	9.85	0.23	110
	1-Aug-12	5.44	118	12.29	0.17	135
	30-Oct-12	5.68	182	12.59	0.56	253
	23-Jan-13	5.34	150	11.22	0.33	125
	2-Apr-13	5.48	180	11.87	0.32	201
	23-Jul-13	5.33	154	13.18	0.16	111
	17-Oct-13	5.48	196	12.45	0.48	206
	15-Jan-14	5.58	244	10.72	0.37	94
	1-Apr-14	5.54	248	10.17	0.6	194
	23-Jul-14	5.63	213	10.86	0.7	109
	27-Oct-14	5.65	267	9.85	0.12	124
	14-Jan-15	5.43	268	8.38	0.36	167
	22-Apr-15	5.17	199	10.16	0.77	264
	21-Oct-15	5.57	309	12.78	0.35	217
	5-Apr-16	5.28	350	8.90	1.12	269
Decon Well	16-Nov-10	6.13	105	10.12	2.98	190
	10-Feb-11	NS	NS	NS	NS	NS
	6-Jul-11	6.59	97	11.14	9.03	5
	25-Oct-11	6.14	67	11.00	3.85	75
	26-Jan-11	NS	NS	NS	NS	NS
	10-Apr-12	NS	NS	NS	NS	NS
	1-Aug-12	5.81	139	23.92	1.12	47
	30-Oct-12	6.19	42	12.40	2.36	160
	23-Jan-13	NS	NS	NS	NS	NS
	2-Apr-13	NS	NS	NS	NS	NS
	24-Jul-13	6.82	88	14.05	5.36	149
	17-Oct-13	NS	NS	NS	NS	NS
	15-Jan-14	NS	NS	NS	NS	NS
	1-Apr-14	NS	NS	NS	NS	NS
sampling discontinued after April 2014						

Notes:

°C = degrees Celsius

mg/L = milligrams per liter

mV = millivolts

µS/cm = microSiemens per centimeter

amsl = above mean sea level

DO = Dissolved oxygen

ORP = Oxidation-reduction potential

NS = Not sampled

R = Rejected

J = Estimate

 = Data from the recent sampling events.

Table 2
Groundwater Monitoring Results
Dissolved Metals
East Mission Flats Repository

Well No.	Sample Date	Constituents (mg/L)				
		Antimony	Arsenic	Cadmium	Lead	Zinc
07-EMF-MW-A	11-Dec-07	0.003 U	0.003 U	0.000578 J	0.003 U	0.347 J
	25-Feb-08	0.003 U	0.003 U	0.00172	0.003 U	1.71 J
	3-Jun-08	0.003 U	0.003 U	0.000763	0.003 U	0.582
	19-Aug-08	0.003 U	0.003 U	0.000321	0.003 U	0.683
	10-Nov-08	0.003 U	0.003 U	0.0002 U	0.003 U	0.353
	4-Feb-09	0.003 U	0.003 U	0.000777	0.003 U	0.898
	7-May-09	0.003 U	0.003 U	0.000382	0.003 U	0.753
	10-Aug-09	0.003 U	0.003 U	0.000204	0.003 U	0.558
	11-Nov-09	0.003 U	0.003 U	0.0002 U	0.003 U	0.368
	25-Feb-10	0.003 U	0.003 U	0.000208	0.003 U	0.657
	19-May-10	0.003 U	0.003 U	0.000225	0.003 U	0.568
	25-Aug-10	0.003 U	0.003 U	0.000227	0.003 U	0.584
	16-Nov-10	0.002 U	0.00076 J	0.0002 U	0.001 U	0.544 J
	10-Feb-11	0.002 U	0.001 U	0.00039	0.001 U	1.22 J
	6-Jul-11	0.002 U	0.0073 J*	0.00063	0.001 U	1.38
	24-Oct-11	0.002 U	0.00044 J	0.000220	0.001 UJ	0.804
	25-Jan-12	0.0020 U	0.0074 J*	0.00032	0.001 U	1.13
	10-Apr-12	0.002 U	0.0014	0.00058	0.001 U	1.75
	31-Jul-12	0.002 U	0.0018	0.00046	0.001 U	1.56
	29-Oct-12	0.002 U	0.00075 J	0.00023	0.00022 J	0.862 J
	23-Jan-13	0.002 U	0.001 U	0.00037	0.001 U	1.35
	2-Apr-13	0.002 U	0.001 U	0.00038	0.001 U	1.49
	23-Jul-13	0.002 U	0.001 U	0.00033	0.001 U	1.24
	17-Oct-13	0.002 U	0.001 U	0.0002 U	0.0026	0.648
	15-Jan-14	0.002 U	0.0011	0.00035	0.001 U	1.24 J
	1-Apr-14	0.002 U	0.001 U	0.00050	0.001 U	1.600 J
	23-Jul-14	0.002 U	0.00076 J	0.00029	0.000025 J	1.38 J
	27-Oct-14	0.002 U	0.001 U	0.0002 U	0.001 U	0.616
	14-Jan-15	NS	0.0011	0.00045	0.001 U	1.62 J
	21-Apr-15	NS	0.00039 J	0.00050	0.001 U	1.59 J
	21-Oct-15	NS	0.00026 J	0.000097 J	0.000039 J	0.533 J
	5-Apr-16	NS	0.00012 J	0.00036	0.0010 U	1.68
07-EMF-MW-B	10-Dec-07	0.003 U	0.003 U	0.0002 U	0.003 U	0.0243 J
	25-Feb-08	0.003 U	0.003 U	0.0002 U	0.003 U	0.0198 J
	3-Jun-08	0.003 U	0.003 U	0.0002 U	0.003 U	0.0212
	19-Aug-08	0.003 U	0.003 U	0.0002 U	0.003 U	0.0244
	10-Nov-08	0.003 U	0.003 U	0.0002 U	0.003 U	0.0197
	4-Feb-09	0.003 U	0.003 U	0.0002 U	0.003 U	0.0210
	7-May-09	0.003 U	0.003 U	0.0002 U	0.003 U	0.0168
	10-Aug-09	0.003 U	0.003 U	0.0002 U	0.003 U	0.0160
	11-Nov-09	0.003 U	0.003 U	0.0002 U	0.003 U	0.0264
	25-Feb-10	0.003 U	0.003 U	0.0002 U	0.003 U	0.0153
	19-May-10	0.003 U	0.003 U	0.0002 U	0.003 U	0.0157
	25-Aug-10	0.003 U	0.003 U	0.0002 U	0.003 U	0.0157
	16-Nov-10	0.002 U	0.001 U	0.0002 U	0.001 U	0.0187 J
	10-Feb-11	0.002 U	0.001 U	0.0002 U	0.001 U	0.0091 J*
	6-Jul-11	0.002 U	0.0077 J*	0.0002 U	0.001 U	0.0126
	24-Oct-11	0.002 U	0.001 U	0.0002 U	0.001 UJ	0.0148 J*
	25-Jan-12	0.002 U	0.0073 J*	0.0002 U	0.001 U	0.0180
	10-Apr-12	0.002 U	0.0014	0.0002 U	0.001 U	0.0162
	31-Jul-12	0.002 U	0.00071 J	0.0002 U	0.001 U	0.0142
	29-Oct-12	0.002 U	0.001 U	0.0002 U	0.00028 J	0.0121 J
	24-Jan-13	0.002 U	0.001 U	0.0002 U	0.001 U	0.0181
	2-Apr-13	0.002 U	0.001 U	0.0002 U	0.001 U	0.0197
	23-Jul-13	0.002 U	0.0022 J*	0.0002 U	0.001 U	0.0285 J*
	17-Oct-13	0.002 U	0.001 U	0.0002 U	0.001 U	0.0227
	15-Jan-14	0.002 U	0.001 U	0.0002 U	0.001 U	0.0226 J
	1-Apr-14	0.002 U	0.001 U	0.0002 U	0.001 U	0.0182 J
	23-Jul-14	0.002 U	0.00016 J	0.000031 J	0.000037 J	0.0219 J
	27-Oct-14	0.002 U	0.001 U	0.0002 U	0.001 U	0.0207
	14-Jan-15	NS	0.00011 J	0.000058 J	0.001 U	0.0268 J
	21-Apr-15	NS	0.001 U	0.0002 U	0.001 U	0.0254 J*
	21-Oct-15	NS	0.00013 J	0.000093 J	0.000083 J	0.0266 J*
	5-Apr-16	NS	0.00011 J	0.00020 U	0.0010 U	0.0505 J*

Well No.	Sample Date	Constituents (mg/L)				
		Antimony	Arsenic	Cadmium	Lead	Zinc
07-EMF-MW-C	10-Dec-07	0.003 U	0.003 U	0.0013 J	0.003 U	1.45 J
	25-Feb-08	0.003 U	0.003 U	0.00318	0.003 U	2.24 J
	3-Jun-08	NS	NS	NS	NS	NS
	19-Aug-08	0.003 U	0.003 U	0.00111	0.003 U	1.34
	10-Nov-08	0.003 U	0.003 U	0.000522	0.003 U	1.57
	3-Feb-09	0.003 U	0.003 U	0.00354	0.003 U	1.67
	7-May-09	NS	NS	NS	NS	NS
	10-Aug-09	0.003 U	0.003 U	0.00229	0.003 U	1.45
	11-Nov-09	0.003 U	0.003 U	0.00144	0.003 U	2.03
	25-Feb-10	0.003 U	0.003 U	0.00326	0.003 U	2.02
	19-May-10	0.003 U	0.003 U	0.00346	0.003 U	2.00
	25-Aug-10	0.003 U	0.003 U	0.00364	0.003 U	1.86
	16-Nov-10	0.002 U	0.001 U	0.0029	0.001 U	1.93 J
	10-Feb-11	NS	NS	NS	NS	NS
	6-Jul-11	NS	NS	NS	NS	NS
	24-Oct-11	0.002 U	0.00081 J	0.00072	0.00038 J	1.36
	25-Jan-12	0.002 U	0.0074 J*	0.0049	0.001 U	1.71
	10-Apr-12	0.002 U	0.0017 J*	0.00089	0.0015	0.388
	31-Jul-12	0.002 U	0.0027	0.00025	0.00041 J	1.08
	29-Oct-12	0.002 U	0.0027	0.00010 J	0.00061 J	0.988 J
	23-Jan-13	NS	NS	NS	NS	NS
	2-Apr-13	0.002 U	0.001 U	0.0015	0.001 U	1.65
	23-Jul-13	0.002 U	0.0024 J*	0.0019	0.001 U	2.03
	17-Oct-13	0.002 U	0.001 U	0.0012	0.001 U	1.35
	15-Jan-14	0.002 U	0.001 U	0.0017	0.001 U	1.38 J
	1-Apr-14	0.002 U	0.001 U	0.0024	0.001 U	1.56 J
	23-Jul-14	0.002 U	0.00019 J	0.0073	0.00012 J	2.53 J
	27-Oct-14	0.002 U	0.001 U	0.0034	0.001 U	2.21
	14-Jan-15	NS	0.00013 J	0.0016	0.001 U	1.86 J
	21-Apr-15	NS	0.00013 J	0.0057	0.001 U	3.4 J
	18-Jun-15	NS	NS	0.0056	NS	2.8
	13-Aug-15	NS	NS	0.0073	NS	2.86 J
	21-Oct-15	NS	0.00022 J	0.0064	0.000051 J	2.39 J
	15-Dec-15	NS	NS	0.0021 J	NS	1.59
	5-Apr-16	NS	0.00015 J	0.0023	0.0010 U	2.95
09-EMF-MW-C Deep	25-Feb-10	0.003 U	0.003 U	0.0002 U	0.003 U	0.0113
	19-May-10	0.003 U	0.003 U	0.0002 U	0.003 U	0.005 U
	25-Aug-10	0.003 U	0.003 U	0.0002 U	0.003 U	0.0317
	16-Nov-10	0.002 U	0.001 U	0.0002 U	0.001 U	0.0216 J
	10-Feb-11	NS	NS	NS	NS	NS
	6-Jul-11	NS	NS	NS	NS	NS
	24-Oct-11	0.002 U	0.001 U	0.0002 U	0.001 UJ	0.0167
	25-Jan-12	0.002 U	0.0075 J*	0.0002 U	0.001 U	0.0191
	10-Apr-12	0.002 U	0.0042 J*	0.0002 U	0.00095 J	0.154
	31-Jul-12	0.002 U	0.0011	0.0002 U	0.001 U	0.0116
	29-Oct-12	0.002 U	0.00065 J	0.0002 U	0.00028 J	0.0032 J
	23-Jan-13	0.002 U	0.001 U	0.0002 U	0.001 U	0.0226
	2-Apr-13	0.002 U	0.001 U	0.0002 U	0.001 U	0.0237
	23-Jul-13	0.002 U	0.0022 J*	0.0002 U	0.001 U	0.0088 J*
	17-Oct-13	0.002 U	0.001 U	0.0002 U	0.0029	0.0096 J*
	15-Jan-14	0.002 U	0.0014	0.0002 U	0.001 U	0.0463 J
	1-Apr-14	0.002 U	0.001 U	0.00053	0.001 U	0.0724 J
	23-Jul-14	0.002 U	0.00029 J	0.00009 J	0.000079 J	0.0328 J
	27-Oct-14	0.002 U	0.001 U	0.0002 U	0.001 U	0.0222
	14-Jan-15	NS	0.0002 J	0.000045 J	0.001 U	0.012 J
	21-Apr-15	NS	0.00032 J	0.0002 U	0.001 U	0.0304 J
	21-Oct-15	NS	0.000087 J	0.0002 U	0.000047 J	0.0133 J*
	5-Apr-16	NS	0.00073 J	0.00020 U	0.0010 U	0.0208 J*

Well No.	Sample Date	Constituents (mg/L)				
		Antimony	Arsenic	Cadmium	Lead	Zinc
07-EMF-MW-D	10-Dec-07	0.003 U	0.003 U	0.0002 U	0.003 U	0.0326 J
	25-Feb-08	0.003 U	0.003 U	0.0002 U	0.003 U	0.0285 J
	3-Jun-08	NS	NS	NS	NS	NS
	19-Aug-08	0.003 U	0.003 U	0.0002 U	0.003 U	0.132
	10-Nov-08	0.003 U	0.003 U	0.0002 U	0.003 U	0.0794
	3-Feb-09	0.003 U	0.003 U	0.0002 U	0.003 U	0.0531
	7-May-09	NS	NS	NS	NS	NS
	11-Aug-09	0.003 U	0.003 U	0.0002 U	0.003 U	0.0918
	11-Nov-09	0.003 U	0.003 U	0.0002 U	0.003 U	0.103
	25-Feb-10	0.003 U	0.003 U	0.0002 U	0.003 U	0.0352
	19-May-10	0.003 U	0.003 U	0.0002 U	0.003 U	0.105
	25-Aug-10	0.003 U	0.003 U	0.0002 U	0.003 U	0.109
	16-Nov-10	0.002 U	0.0018	0.0002 U	0.001 U	0.0563 J
	10-Feb-11	0.002 U	0.001 U	0.0002 U	0.001 U	0.127 J*
	6-Jul-11	NS	NS	NS	NS	NS
	25-Oct-11	0.002 U	0.0019	0.0002 U	0.001 UJ	0.0395
	26-Jan-12	0.002 U	0.0079 J*	0.00016 J	0.001 U	0.0584
	10-Apr-12	0.002 U	0.0014	0.0002 U	0.001 U	0.184
	1-Aug-12	0.002 U	0.0021	0.0002 U	0.001 U	0.112
	30-Oct-12	0.002 U	0.0018	0.00005 J	0.00047 J	0.0464 J
	24-Jan-13	0.002 U	0.001 U	0.0002 U	0.001 U	0.0425
	2-Apr-13	0.002 U	0.001 U	0.0002 U	0.001 U	0.0466
	23-Jul-13	0.002 U	0.0029 J*	0.0002 U	0.001 U	0.0387 J*
	17-Oct-13	0.002 U	0.001 U	0.0002 U	0.001 U	0.0537
	15-Jan-14	0.002 U	0.001 U	0.0002 U	0.001 U	0.0210 J
	1-Apr-14	0.002 U	0.001 U	0.0002 U	0.001 U	0.0326 J
	23-Jul-14	0.002 U	0.0011	0.000048 J	0.001 U	0.0331 J
	27-Oct-14	0.002 U	0.001 U	0.0002 U	0.001 U	0.0587
	14-Jan-15	NS	0.00024 J	0.000028 J	0.001 U	0.0251 J
	21-Apr-15	NS	0.00027 J	0.0002 U	0.001 U	0.0506 J
	21-Oct-15	NS	0.00032 J	0.0002 U	0.000037 J	0.127 J
	5-Apr-16	NS	0.00031 J	0.00013 J	0.0010 U	0.118
08-EMF-MW-E	10-Nov-08	0.003 U	0.0148	0.0002 U	0.003 U	0.0141
	3-Feb-09	0.003 U	0.003 U	0.0002 U	0.003 U	0.01 U
	7-May-09	0.003 U	0.0035	0.0002 U	0.003 U	0.00889
	11-Aug-09	0.003 U	0.0195	0.0002 U	0.003 U	0.00848
	11-Nov-09	0.003 U	0.0232	0.0002 U	0.003 U	0.00671
	25-Feb-10	0.003 U	0.003 U	0.0002 U	0.003 U	0.00599
	19-May-10	0.003 U	0.00447	0.0002 U	0.003 U	0.00633
	25-Aug-10	0.003 U	0.0172	0.0002 U	0.003 U	0.00687
	16-Nov-10	0.002 U	0.0177	0.0002 U	0.001 U	0.0069 J
	10-Feb-11	0.002 U	0.00089 J	0.0002 U	0.001 U	0.0042 J
	6-Jul-11	0.002 U	0.0074 J*	0.0002 U	0.001 U	0.0048 J
	24-Oct-11	0.002 U	0.020	0.0002 U	0.001 UJ	0.0045
	26-Jan-12	0.002 U	0.0069 J*	0.0002 U	0.001 U	0.0051 J*
	11-Apr-12	0.002 U	0.002	0.0002 U	0.001 U	0.0063 J*
	1-Aug-12	0.002 U	0.0063	0.0002 U	0.001 U	0.0064
	29-Oct-12	0.002 U	0.0149	0.00008 J	0.001 U	0.0071 J*
	23-Jan-13	0.002 U	0.0013	0.0002 U	0.001 U	0.0091 J*
	2-Apr-13	0.002 U	0.001 U	0.0002 U	0.001 U	0.0083 J*
	23-Jul-13	0.002 U	0.0026 J*	0.0002 U	0.001 U	0.0124 J*
	17-Oct-13	0.002 U	0.0067	0.0002 U	0.001 U	0.0120 J*
	15-Jan-14	0.002 U	0.001 U	0.0002 U	0.001 U	0.0073 J
	1-Apr-14	0.002 U	0.0014	0.0002 U	0.001 U	0.0175 J
	23-Jul-14	0.002 U	0.0045	0.0001 J	0.001 U	0.0392 J
	27-Oct-14	0.002 U	0.0042	0.0002 U	0.001 U	0.0198
	14-Jan-15	NS	0.001	0.000096 J	0.001 U	0.0175 J
	21-Apr-15	NS	0.00099 J	0.0002 U	0.001 U	0.0218 J*
	21-Oct-15	NS	0.0078	0.00022	0.000032 J	0.0090 J*
	5-Apr-16	NS	0.00059 J	0.00020 U	0.0010 U	0.0188 J*

Well No.	Sample Date	Constituents (mg/L)				
		Antimony	Arsenic	Cadmium	Lead	Zinc
08-EMF-MW-F	11-Nov-08	0.003 U	0.003 U	0.000205	0.003 U	1.58
	3-Feb-09	0.003 U	0.003 U	0.000304	0.003 U	1.16
	7-May-09	0.003 U	0.003 U	0.000258	0.003 U	1.32
	10-Aug-09	0.003 U	0.003 U	0.00023	0.003 U	1.12
	11-Nov-09	0.003 U	0.003 U	0.000464	0.003 U	2.53
	25-Feb-10	0.003 U	0.003 U	0.000947	0.003 U	3.82
	19-May-10	0.003 U	0.003 U	0.00132	0.003 U	4.47
	25-Aug-10	0.003 U	0.003 U	0.000436	0.003 U	1.93
	16-Nov-10	0.002 U	0.001 U	0.00065	0.001 U	3.37 J
	10-Feb-11	0.002 U	0.001 U	0.00045	0.00043 J	1.84 J
	6-Jul-11	0.002 U	0.0056 J*	0.00016 J	0.00079 J	0.976
	25-Oct-11	0.002 U	0.001 U	0.00031	0.001 UJ	1.69
	26-Jan-12	0.002 U	0.0041 J*	0.00094	0.00029 J	3.10
	11-Apr-12	0.002 U	0.00086 J	0.00031	0.001 U	1.63
	1-Aug-12	0.002 U	0.00057 J	0.0002 U	0.001 U	1.33
	30-Oct-12	0.002 U	0.001 U	0.00043	0.00036 J	1.73 J
	23-Jan-13	0.002 U	0.001 U	0.00045	0.001 U	1.81
	2-Apr-13	0.002 U	0.001 U	0.0010	0.001 U	2.97
	23-Jul-13	0.002 U	0.0014 J*	0.00053	0.001 U	1.90
	17-Oct-13	0.002 U	0.001 U	0.00099	0.001 U	2.39
	15-Jan-14	0.002 U	0.001 U	0.0018	0.001 U	3.28 J
	1-Apr-14	0.002 U	0.001 U	0.0018	0.001 U	3.62 J
	23-Jul-14	0.002 U	0.00017 J	0.0012	0.000098 J	2.64 J
	27-Oct-14	0.002 U	0.001 U	0.0019	0.001 U	3.47
	14-Jan-15	NS	0.0001 J	0.0019	0.001 U	4.16 J
	22-Apr-15	NS	0.00014 J	0.0011	0.001 U	2.86 J
	21-Oct-15	NS	0.00010 J	0.0014	0.00012 J	3.27 J
	5-Apr-16	NS	0.00011 J	0.0020	0.000070 J	4.14
Decon Well	16-Nov-10	0.002 U	0.00092 J	0.0002 U	0.00061 J	0.504 J
	10-Feb-11	NS	NS	NS	NS	NS
	6-Jul-11	0.002 U	0.0068 J*	0.0002 U	0.001 U	0.407
	25-Oct-11	0.002 U	0.0009 J	0.0002 U	0.0014 J	0.449
	26-Jan-12	NS	NS	NS	NS	NS
	10-Apr-12	NS	NS	NS	NS	NS
	1-Aug-12	0.002 U	0.0055	0.0002 U	0.00063 J	5.62
	30-Oct-12	0.002 U	0.00080 J	0.000099 J	0.001 U	0.401 J
	23-Jan-13	NS	NS	NS	NS	NS
	2-Apr-13	NS	NS	NS	NS	NS
	24-Jul-13	0.002 U	0.00190 J*	0.0002 U	0.001 U	0.342
	17-Oct-13	NS	NS	NS	NS	NS
	15-Jan-14	NS	NS	NS	NS	NS
	1-Apr-14	NS	NS	NS	NS	NS
Regulatory Threshold		0.006 ^a	0.01 ^a	0.005 ^a	0.015 ^a	5.0 ^b

Notes:

mg/L = milligrams per liter

NS = Not sampled

U = Concentration was not detected (detection limits used by the laboratories are the contract required quantitation limit, the reporting limit, or the method detection limit, depending on the laboratory).

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

J* = The result is an estimated quantity. This analyte was detected in both the sample and an associated field blank sample during the same sampling event.

a. National Primary Drinking Water Regulation (Maximum Contaminant Level)

b. National Secondary Drinking Water Regulation

Antimony no longer analyzed for as of December 2014.

	= Value exceeds the regulatory threshold
	= Data from the recent sampling events.

Attachment A
Field Sheets



TerraGraphics
Environmental Engineering, Inc.

Groundwater Sampling Record

Project: East Mission Flats Repository				Well Number: 67-EMF-MW-A				
Project Number: 15019-08-02-01				Sample Number: (67-EMF-MW-A) 040516				
Location:				Weather: Partly Sunny 44°				
Date: 04/05/2016				Sampler(s): GM/RJK				
[De-Ionized Water Date:]								
Depth to Bottom (ft): 29.59				Purge Time: 12 min				
Depth to Water (ft): 8.97				Purge Method: Low Flow				
DTB-DTW (ft):				Volume Measurement Method:				
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):				
Conversion Factors (height x factor= 1 well volume)		¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611
GROUNDWATER DATA								[1 L = 0.2642 gal • 1 gal = 3.7854 L]
Purged Volume (gal)	Time	pH	Spec. Cond. (µS/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)	
					mg/L	%		
	00:00	4.87	0.145	8.62	5.31	49.3	273	
	08:00	5.08	0.177	8.18	0.48	4.4	264	
	10:00	5.06	0.177	8.20	0.43	3.9	263	
	12:00	5.05	0.176	8.17	0.39	3.6	263	
Sampling Date: 04/05/2016			Sampling Method: Low Flow			Time Sampled: 10:10		
Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab		
Poly	1L	HNO3	Y	Y	DM, Cations	CLP		
Poly	500mL	none	Y	N	Alkalinity	SVL		
Poly	500mL	none	Y	Y	Anions	SVL		
Chain-of-Custody: Yes/No			Duplicate Sample Number:					
Chain-of-Custody Number:			QC Sample Number:			Time:		
Notes:								
Deviations/Observations: Very rusty color								
Picture Log:								
Expendable Supplies Used: Standard Filter 1 Hi-Cap Masterflex								

1 bottle



Groundwater Sampling Record

Project: East Mission Flats Repository				Well Number: 07-EMF-MW-B			
Project Number: 15019-08-02-01				Sample Number: (07-EMF-MW-B) 040516			
Location:				Weather: Partly Sunny 45°			
Date: 04/05/2016				Sampler(s): GM/RJK			
[De-Ionized Water Date:]							
Depth to Bottom (ft): 30.25				Purge Time: 14 min			
Depth to Water (ft): 6.74				Purge Method: Low Flow			
DTB-DTW (ft):				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611

GROUNDWATER DATA

[1 L = 0.2642 gal • 1 gal = 3.7854 L]

Purged Volume (gal)	Time	pH	Spec. Cond. (mS/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	6.11	0.123	8.41	6.25	57.8	262
	10:00	5.48	0.129	8.44	2.22	20.7	283
	12:00	5.47	0.129	8.32	2.19	20.2	283
	14:00	5.45	0.130	8.33	2.16	19.9	284

Sampling Date: 04/05/2016 Sampling Method: Low Flow Time Sampled: 10:44

Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab
Poly	1L	HNO3	Y	Y	DM, Cations	CLP
Poly	500mL	none	Y	N	Alkalinity	SVL
Poly	500mL	none	Y	Y	Anions	SVL

Chain-of-Custody: Yes/No

Duplicate Sample Number:

Chain-of-Custody Number:

QC Sample Number:

Time:

Notes:

Deviations/Observations:

Picture Log:

Expendable Supplies Used: 1 Standard Filter Hi-Cap Masterflex

1 bottle



Groundwater Sampling Record

Project: East Mission Flats Repository				Well Number: 07-EMF-MW-C			
Project Number: 15019-08-02-01				Sample Number: (07-EMF-MW-C) 040516			
Location:				Weather: Partly Sunny 48°			
Date: 04/05/2016				Sampler(s): GM/RJK			
[De-Ionized Water Date:]							
Depth to Bottom (ft): 30.32				Purge Time: 16 min			
Depth to Water (ft): 4.27				Purge Method: Low Flow			
DTB-DTW (ft):				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611

GROUNDWATER DATA

[1 L = 0.2642 gal • 1 gal = 3.7854 L]

Purged Volume (gal)	Time	pH	Spec. Cond. (µS/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	7.27	0.135	9.41	4.25	40.2	215
	12:00	5.51	0.164	9.52	2.19	20.8	264
	14:00	5.50	0.163	9.57	2.18	20.7	266
	16:00	5.48	0.164	9.64	2.13	20.3	268

Sampling Date: 04/05/2016 Sampling Method: Low Flow Time Sampled: 11:58

Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab
Poly	1L	HNO3	Y	Y	DM, Cations	CLP
Poly	500mL	none	Y	N	Alkalinity	SVL
Poly	500mL	none	Y	Y	Anions	SVL

Chain-of-Custody: Yes/No Duplicate Sample Number:

Chain-of-Custody Number: QC Sample Number: Time:

Notes:

Deviations/Observations:

Picture Log:

Expendable Supplies Used: 1 Standard Filter Hi-Cap Masterflex

1 bottle



TerraGraphics
Environmental Engineering, Inc.

Groundwater Sampling Record

Project: East Mission Flats Repository				Well Number: 09-EMF-MW-C DEEP			
Project Number: 15019-08-02-01				Sample Number: (09-EMF-MW-C DEEP) 0V0516			
Location:				Weather: Partly Sunny 46°			
Date: 04/05/2016				Sampler(s): GM/RJK			
[De-Ionized Water Date:]							
Depth to Bottom (ft): 98.30				Purge Time: 36 min			
Depth to Water (ft): 4.16				Purge Method: Low Flow			
DTB-DTW (ft):				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611

GROUNDWATER DATA

[1 L = 0.2642 gal • 1 gal = 3.7854 L]

Purged Volume (gal)	Time	pH	Spec. Cond. (µS/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	6.23	0.092	9.25	6.06	57.1	209
	32:00	6.27	0.089	9.61	3.65	34.7	209
	34:00	6.28	0.089	9.72	3.57	34.0	209
	36:00	6.32	0.089	9.98	3.65	35.0	209

Sampling Date: 04/05/2016

Sampling Method: Low Flow

Time Sampled: 11:33

Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab
Poly	1L	HNO3	Y	Y	DM, Cations	CLP
Poly	500mL	none	Y	N	Alkalinity	SVL
Poly	500mL	none	Y	Y	Anions	SVL

Chain-of-Custody: Yes/No

Duplicate Sample Number:

Chain-of-Custody Number:

QC Sample Number:

Time:

Notes: DO rising and falling just outside of stabilization range (11:23)

Deviations/Observations:

Picture Log:

Expendable Supplies Used: 1 Standard Filter Hi-Cap Masterflex

1 bottle



FB

Project: East Mission Flats Repository				Well Number: 07-EMF-MW-D			
Project Number: 15019-08-02-01				Sample Number: (07-EMF-MW-D)040516			
Location:				Weather: Mostly Cloudy 48°			
Date: 04/05/2016				Sampler(s): GM/RJK			
[De-Ionized Water Date: 3/21/2016]							
Depth to Bottom (ft): 30.35				Purge Time: 48 min			
Depth to Water (ft): 5.09				Purge Method: Low Flow			
DTB-DTW (ft):				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611
GROUNDWATER DATA [1 L = 0.2642 gal • 1 gal = 3.7854 L]							
Purged Volume (gal)	Time	pH	Spec. Cond. (µS/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	7.91	0.108	9.19	4.59	43.2	98
	44:00	5.88	0.097	9.06	1.34	12.6	134
	46:00	5.90	0.097	9.07	1.29	12.1	135
	48:00	5.90	0.097	9.05	1.27	12.0	135
Sampling Date: 04/05/2016		Sampling Method: Low Flow			Time Sampled: 13:45		
Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab	
Poly	1L	HNO3	Y	Y	DM, Cations	CLP	
Poly	500mL	none	Y	N	Alkalinity	SVL	
Poly	500mL	none	Y	Y	Anions	SVL	
Chain-of-Custody: Yes/No			Duplicate Sample Number:				
Chain-of-Custody Number:			QC Sample Number: (07-EMF-MW-D)040516-E Time: 15:15				
Notes: DO valves rising and falling just outside of stabilization range RJK							
Deviations/Observations:							
Picture Log:							
Expendable Supplies Used: Standard Filter Hi-Cap Masterflex							

$$\begin{array}{r} 25.26 \\ \times 652 \\ \hline 1515600 \\ 1263000 \\ 509200 \\ \hline 16460320 \end{array}$$

2 bottles
1646952

$$\begin{array}{r} .45 \\ 45 \\ \hline 225 \\ 1800 \\ \hline 20.25 \end{array}$$



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MS/D

Groundwater Sampling Record

Project: East Mission Flats Repository				Well Number: 08-EMF-MW-E			
Project Number: 15019-08-02-01				Sample Number: (08-EMF-MW-E)040516			
Location:				Weather: Partly Sunny 49°			
Date: 04/05/2016				Sampler(s): GM/RJK			
[De-Ionized Water Date:]							
Depth to Bottom (ft): 27.38				Purge Time: 20 min			
Depth to Water (ft): 5.17				Purge Method: Low Flow			
DTB-DTW (ft):				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611

GROUNDWATER DATA

[1 L = 0.2642 gal • 1 gal = 3.7854 L]

Purged Volume (gal)	Time	pH	Spec. Cond. (µS/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	6.51	2.19	10.29	5.88	57.3	190
	16:00	6.34	2.16	10.70	0.23	2.3	136
	18:00	6.33	2.17	10.95	0.21	2.1	131
	20:00	6.32	2.16	11.16	0.20	2.0	126

Sampling Date: 04/05/2016

Sampling Method: Low Flow

Time Sampled: 12:36

Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab
Poly	1L	HNO3	Y	Y	DM, Cations	CLP
Poly	500mL	none	Y	N	Alkalinity	SVL
Poly	500mL	none	Y	Y	Anions	SVL

Chain-of-Custody: Yes/No

Duplicate Sample Number:

Chain-of-Custody Number:

QC Sample Number:

Time:

Notes:

Deviations/Observations:

Picture Log:

Expendable Supplies Used: Standard Filter \ Hi-Cap Masterflex

1 bottle



TerraGraphics
Environmental Engineering, Inc.

DVP

Groundwater Sampling Record

Project: East Mission Flats Repository				Well Number: 08-EMF-MW-F			
Project Number: 15019-08-02-01				Sample Number: (08-EMF-MW-F) 040516			
Location:				Weather: cloudy 50°			
Date: 04/05/2016				Sampler(s): GM/RJK			
[De-Ionized Water Date:]							
Depth to Bottom (ft): 31.63				Purge Time: 46 min			
Depth to Water (ft): 6.66				Purge Method: Low Flow			
DTB-DTW (ft):				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611

GROUNDWATER DATA

[1 L = 0.2642 gal • 1 gal = 3.7854 L]

Purged Volume (gal)	Time	pH	Spec. Cond. (µS/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	7.02	0.301	9.78	6.35	60.6	168
	42:00	5.30	0.349	8.85	1.13	10.6	262
	44:00	5.29	0.348	8.88	1.11	10.4	266
	46:00	5.28	0.350	8.90	1.12	10.5	269

Sampling Date: 04/05/2016

Sampling Method: Low Flow

Time Sampled: 14:48

Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab
Poly	1L	HNO3	Y	Y	DM, Cations	CLP
Poly	500mL	none	Y	N	Alkalinity	SVL
Poly	500mL	none	Y	Y	Anions	SVL
						RTK

Chain-of-Custody: Yes/No

Duplicate Sample Number: (08-EMF-MW-F) 040516-B

Chain-of-Custody Number:

QC Sample Number:

Time:

Notes: PO values rising and falling just outside of stabilization range

Deviations/Observations:

Picture Log:

Expendable Supplies Used: Standard Filter 1 Hi-Cap Masterflex

2 batteries

Attachment B
CLP Analytical Results

CASE NUMBER	SAMPLE DELIVERY GROUP	SAMPLE ID	CAS NUMBER	ANALYTE	FINAL RESULT	RESULT UNITS	FINAL VALIDATION QUALIFIER	IDEQ QUALIFIER	COMB QUALIFIER	DATA VAL LABEL	SAMPLE ADJUSTED CRQL	SAMPLE ADJUSTED MDL	LAB RESULT	LAB QUALIFIERS	METHOD CRQL	NONMOISTURE SAMPLE ADJUSTED CRQL	CRQL UNITS	INSTRUMEN T MDL	NONMOISTURE SAMPLE ADJUSTED MDL	MDL UNITS	SAMPLE DATE TIME	LAB SAMPLE TYPE	SPIKE ADDED	STATION LOCATION	SCRIBE SAMPLE NUMBER	PARENT SAMPLE NAME	PARENT SAMPLE LOCATION	LAB REPLICATE TYPE	SAMPLE SOURCE
46090	MJHF30	MJHF34D	7440-38-2	Arsenic	0.57	ug/L	J		J	S4VEM	1.0	0.11	0.57	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 12:36:00	Duplicate			(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MWD		FIELD
46090	MJHF30	MJHF34D	7440-43-9	Cadmium	0.20	ug/L	U		U	S4VEM	0.20	0.054	0.20	U	0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 12:36:00	Duplicate			(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MWD		FIELD
46090	MJHF30	MJHF34D	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 12:36:00	Duplicate			(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MWD		FIELD
46090	MJHF30	MJHF34D	7440-66-6	Zinc	18.4	ug/L				S4VEM	2.0	0.13	18.4		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 12:36:00	Duplicate			(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MWD		FIELD
46090	MJHF30	MJHF30	7440-38-2	Arsenic	0.12	ug/L	J		J	S4VEM	1.0	0.11	0.12	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 10:10:00	Field_Sample	07-EMF-MW-A		(07-EMF-MW-A) 040516 DM				FIELD
46090	MJHF30	MJHF30	7440-43-9	Cadmium	0.36	ug/L				S4VEM	0.20	0.054	0.36		0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 10:10:00	Field_Sample	07-EMF-MW-A		(07-EMF-MW-A) 040516 DM				FIELD
46090	MJHF30	MJHF30	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 10:10:00	Field_Sample	07-EMF-MW-A		(07-EMF-MW-A) 040516 DM				FIELD
46090	MJHF30	MJHF30	7440-66-6	Zinc	1680	ug/L				S4VEM	2.0	0.13	1680		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 10:10:00	Field_Sample	07-EMF-MW-A		(07-EMF-MW-A) 040516 DM				FIELD
46090	MJHF30	MJHF31	7440-38-2	Arsenic	0.11	ug/L	J		J	S4VEM	1.0	0.11	0.11	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 10:44:00	Field_Sample	07-EMF-MW-B		(07-EMF-MW-B) 040516 DM				FIELD
46090	MJHF30	MJHF31	7440-43-9	Cadmium	0.20	ug/L	U		U	S4VEM	0.20	0.054	0.20	U	0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 10:44:00	Field_Sample	07-EMF-MW-B		(07-EMF-MW-B) 040516 DM				FIELD
46090	MJHF30	MJHF31	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 10:44:00	Field_Sample	07-EMF-MW-B		(07-EMF-MW-B) 040516 DM				FIELD
46090	MJHF30	MJHF31	7440-66-6	Zinc	50.5	ug/L		J+	J+	S4VEM	2.0	0.13	50.5		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 10:44:00	Field_Sample	07-EMF-MW-B		(07-EMF-MW-B) 040516 DM				FIELD
46090	MJHF30	MJHF32	7440-38-2	Arsenic	0.73	ug/L	J		J	S4VEM	1.0	0.11	0.73	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 11:33:00	Field_Sample	09-EMF-MW-C-DEEP		(09-EMF-MW-C-DEEP) 040516 DM				FIELD
46090	MJHF30	MJHF32	7440-43-9	Cadmium	0.20	ug/L	U		U	S4VEM	0.20	0.054	0.20	U	0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 11:33:00	Field_Sample	09-EMF-MW-C-DEEP		(09-EMF-MW-C-DEEP) 040516 DM				FIELD
46090	MJHF30	MJHF32	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 11:33:00	Field_Sample	09-EMF-MW-C-DEEP		(09-EMF-MW-C-DEEP) 040516 DM				FIELD
46090	MJHF30	MJHF32	7440-66-6	Zinc	20.8	ug/L		J+	J+	S4VEM	2.0	0.13	20.8		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 11:33:00	Field_Sample	09-EMF-MW-C-DEEP		(09-EMF-MW-C-DEEP) 040516 DM				FIELD
46090	MJHF30	MJHF33	7440-38-2	Arsenic	0.15	ug/L	J		J	S4VEM	1.0	0.11	0.15	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 11:58:00	Field_Sample	07-EMF-MW-C		(07-EMF-MW-C) 040516 DM				FIELD
46090	MJHF30	MJHF33	7440-43-9	Cadmium	2.3	ug/L			U	S4VEM	0.20	0.054	2.3		0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 11:58:00	Field_Sample	07-EMF-MW-C		(07-EMF-MW-C) 040516 DM				FIELD
46090	MJHF30	MJHF33	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 11:58:00	Field_Sample	07-EMF-MW-C		(07-EMF-MW-C) 040516 DM				FIELD
46090	MJHF30	MJHF33	7440-66-6	Zinc	2950	ug/L				S4VEM	40.0	2.6	2950	D	2	40.0	ug/L	0.13	2.6	ug/L	04/05/2016 11:58:00	Field_Sample	07-EMF-MW-C		(07-EMF-MW-C) 040516 DM				FIELD
46090	MJHF30	MJHF34	7440-38-2	Arsenic	0.59	ug/L	J		J	S4VEM	1.0	0.11	0.59	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 12:36:00	Field_Sample	08-EMF-MW-E		(08-EMF-MW-E) 040516 DM				FIELD
46090	MJHF30	MJHF34	7440-43-9	Cadmium	0.20	ug/L	U		U	S4VEM	0.20	0.054	0.20	U	0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 12:36:00	Field_Sample	08-EMF-MW-E		(08-EMF-MW-E) 040516 DM				FIELD
46090	MJHF30	MJHF34	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 12:36:00	Field_Sample	08-EMF-MW-E		(08-EMF-MW-E) 040516 DM				FIELD
46090	MJHF30	MJHF34	7440-66-6	Zinc	18.8	ug/L		J+	J+	S4VEM	2.0	0.13	18.8		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 12:36:00	Field_Sample	08-EMF-MW-E		(08-EMF-MW-E) 040516 DM				FIELD
46090	MJHF30	MJHF35	7440-38-2	Arsenic	0.31	ug/L	J		J	S4VEM	1.0	0.11	0.31	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 13:45:00	Field_Sample	07-EMF-MW-D		(07-EMF-MW-D) 040516 DM				FIELD
46090	MJHF30	MJHF35	7440-43-9	Cadmium	0.13	ug/L	J		J	S4VEM	0.20	0.054	0.13	J	0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 13:45:00	Field_Sample	07-EMF-MW-D		(07-EMF-MW-D) 040516 DM				FIELD
46090	MJHF30	MJHF35	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 13:45:00	Field_Sample	07-EMF-MW-D		(07-EMF-MW-D) 040516 DM				FIELD
46090	MJHF30	MJHF35	7440-66-6	Zinc	118	ug/L				S4VEM	2.0	0.13	118		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 13:45:00	Field_Sample	07-EMF-MW-D		(07-EMF-MW-D) 040516 DM				FIELD
46090	MJHF30	MJHF36	7440-38-2	Arsenic	1.0	ug/L	U		U	S4VEM	1.0	0.11	1.0	U	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 15:15:00	Field_Sample	07-EMF-MW-D		(07-EMF-MW-D) 040516-E DM				FIELD
46090	MJHF30	MJHF36	7440-43-9	Cadmium	0.20	ug/L	U		U	S4VEM	0.20	0.054	0.20	U	0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 15:15:00	Field_Sample	07-EMF-MW-D		(07-EMF-MW-D) 040516-E DM				FIELD
46090	MJHF30	MJHF36	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 15:15:00	Field_Sample	07-EMF-MW-D		(07-EMF-MW-D) 040516-E DM				FIELD
46090	MJHF30	MJHF36	7440-66-6	Zinc	7.2	ug/L				S4VEM	2.0	0.13	7.2		2	2.0	ug/L	0.13	0.13	ug/L	04/05/2016 15:15:00	Field_Sample	07-EMF-MW-D		(07-EMF-MW-D) 040516-E DM				FIELD
46090	MJHF30	MJHF37	7440-38-2	Arsenic	0.11	ug/L	J		J	S4VEM	1.0	0.11	0.11	J	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 14:48:00	Field_Sample	08-EMF-MW-F		(08-EMF-MW-F) 040516 DM				FIELD
46090	MJHF30	MJHF37	7440-43-9	Cadmium	1.9	ug/L			U	S4VEM	0.20	0.054	1.9		0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 14:48:00	Field_Sample	08-EMF-MW-F		(08-EMF-MW-F) 040516 DM				FIELD
46090	MJHF30	MJHF37	7439-92-1	Lead	1.0	ug/L	U		U	S4VEM	1.0	0.061	1.0	U	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 14:48:00	Field_Sample	08-EMF-MW-F		(08-EMF-MW-F) 040516 DM				FIELD
46090	MJHF30	MJHF37	7440-66-6	Zinc	4140	ug/L				S4VEM	40.0	2.6	4140	D	2	40.0	ug/L	0.13	2.6	ug/L	04/05/2016 14:48:00	Field_Sample	08-EMF-MW-F		(08-EMF-MW-F) 040516 DM				FIELD
46090	MJHF30	MJHF38	7440-38-2	Arsenic	1.0	ug/L	U		U	S4VEM	1.0	0.11	1.0	U	1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 02:48:00	Field_Sample	08-EMF-MW-F		(08-EMF-MW-F) 040516-C DM				FIELD
46090	MJHF30	MJHF38	7440-43-9	Cadmium	2.0	ug/L				S4VEM	0.20	0.054	2.0		0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 02:48:00	Field_Sample	08-EMF-MW-F		(08-EMF-MW-F) 040516-C DM				FIELD
46090	MJHF30	MJHF38	7439-92-1	Lead	0.070	ug/L	J		J	S4VEM	1.0	0.061	0.070	J	1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 02:48:00	Field_Sample	08-EMF-MW-F		(08-EMF-MW-F) 040516-C DM				FIELD
46090	MJHF30	MJHF38	7440-66-6	Zinc	4080	ug/L				S4VEM	40.0	2.6	4080	D	2	40.0	ug/L	0.13	2.6	ug/L	04/05/2016 02:48:00	Field_Sample	08-EMF-MW-F		(08-EMF-MW-F) 040516-C DM				FIELD
46090	MJHF30	LCS007	7440-38-2	Arsenic	1.8	ug/L				S4VEM	1.0	0.11	1.8		1	1.0	ug/L	0.11	0.11	ug/L		Laboratory_Con 2							LAB
46090	MJHF30	LCS007	7440-43-9	Cadmium	0.38	ug/L				S4VEM	0.20	0.054	0.38		0.2	0.20	ug/L	0.054	0.054	ug/L		Laboratory_Con 0.4							LAB
46090	MJHF30	LCS007	7439-92-1	Lead	1.7	ug/L				S4VEM	1.0	0.061	1.7		1	1.0	ug/L	0.061	0.061	ug/L		Laboratory_Con 2							LAB
46090	MJHF30	LCS007	7440-66-6	Zinc	4.1	ug/L				S4VEM	2.0	0.13	4.1		2	2.0	ug/L	0.13	0.13	ug/L		Laboratory_Con 4							LAB
46090	MJHF30	MJHF34S	7440-38-2	Arsenic	38.4	ug/L				S4VEM	1.0	0.11	38.4		1	1.0	ug/L	0.11	0.11	ug/L	04/05/2016 12:36:00	Matrix_Spike	40		(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-E		FIELD
46090	MJHF30	MJHF34S	7440-43-9	Cadmium	46.1	ug/L				S4VEM	0.20	0.054	46.1		0.2	0.20	ug/L	0.054	0.054	ug/L	04/05/2016 12:36:00	Matrix_Spike	50		(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-E		FIELD
46090	MJHF30	MJHF34S	7439-92-1	Lead	18.7	ug/L				S4VEM	1.0	0.061	18.7		1	1.0	ug/L	0.061	0.061	ug/L	04/05/2016 12:36:00	Matrix_Spike	20		(08-EMF-MW-E) 040516 DM	MJHF34	08-EMF-MW-E		FIELD
46090	MJHF30																												

CASE NUMBER	SAMPLE DELIVERY GROUP	SAMPLE ID	CAS NUMBER	ANALYTE	FINAL RESULT	RESULT UNITS	FINAL VALIDATION QUALIFIER	IDEQ QUALIFIER	COMB QUALIFIER	DATA VAL LABEL	SAMPLE ADJUSTED CRQL	SAMPLE ADJUSTED MDL	LAB RESULT	LAB QUALIFIERS	NONMOISTURE				NONMOISTURE				LAB SAMPLE TYPE	SPIKE ADDED	STATION LOCATION	SCRIBE SAMPLE NUMBER	PARENT SAMPLE NAME	PARENT SAMPLE LOCATION	LAB REPLICATE TYPE	SAMPLE SOURCE
															METHOD	ADJUSTED	CRQL	INSTRUMEN	ADJUSTED	MDL	UNITS	SAMPLE DATE TIME								
46090	MJHF30	MJHF38	7440-70-2	Calcium	19700	ug/L				S4VEM	40.0	16.3	19700		40	40.0	ug/L	16.3	16.3	ug/L	04/05/2016 02:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516-C	DM				FIELD
46090	MJHF30	MJHF38	7439-95-4	Magnesium	9660	ug/L				S4VEM	60.0	25.5	9660		60	60.0	ug/L	25.5	25.5	ug/L	04/05/2016 02:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516-C	DM				FIELD
46090	MJHF30	MJHF38	7440-09-7	Potassium	86.4	ug/L	J		J	S4VEM	500	60.4	86.4	J	500	500	ug/L	60.4	60.4	ug/L	04/05/2016 02:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516-C	DM				FIELD
46090	MJHF30	MJHF38	7440-23-5	Sodium	24900	ug/L				S4VEM	500	158	24900		500	500	ug/L	158	158	ug/L	04/05/2016 02:48:00	Field_Sample		08-EMF-MW-F	(08-EMF-MW-F) 040516-C	DM				FIELD
46090	MJHF30	LCS001	7440-70-2	Calcium	85.5	ug/L				S4VEM	40.0	16.3	85.5		40	40.0	ug/L	16.3	16.3	ug/L				Laboratory_Con 80						LAB
46090	MJHF30	LCS001	7439-95-4	Magnesium	112	ug/L				S4VEM	60.0	25.5	112		60	60.0	ug/L	25.5	25.5	ug/L				Laboratory_Con 120						LAB
46090	MJHF30	LCS001	7440-09-7	Potassium	995	ug/L				S4VEM	500	60.4	995		500	500	ug/L	60.4	60.4	ug/L				Laboratory_Con 1000						LAB
46090	MJHF30	LCS001	7440-23-5	Sodium	986	ug/L				S4VEM	500	158	986		500	500	ug/L	158	158	ug/L				Laboratory_Con 1000						LAB
46090	MJHF30	PBW001	7440-70-2	Calcium	40.0	ug/L	U		U	S4VEM	40.0	16.3	40.0	U	40	40.0	ug/L	16.3	16.3	ug/L				Method_Blank						LAB
46090	MJHF30	PBW001	7439-95-4	Magnesium	60.0	ug/L	U		U	S4VEM	60.0	25.5	60.0	U	60	60.0	ug/L	25.5	25.5	ug/L				Method_Blank						LAB
46090	MJHF30	PBW001	7440-09-7	Potassium	500	ug/L	U		U	S4VEM	500	60.4	500	U	500	500	ug/L	60.4	60.4	ug/L				Method_Blank						LAB
46090	MJHF30	PBW001	7440-23-5	Sodium	500	ug/L	U		U	S4VEM	500	158	500	U	500	500	ug/L	158	158	ug/L				Method_Blank						LAB

Highlighted columns IDEQ QUALIFIER and COMB QUALIFIER entered by TerraGraphics to show all data qualifiers.
Entire electronic data deliverable is available upon request.

Attachment C
SVL Analytical Results

																	IDEQ	COMB																
CASE	SDG	EPASAMP	LABID	MATRIX	QC CODE	SMPQUAL	ANDATE	ANTIME	CASNUM	ANALYTE	STATE	CONC	UNITS	RLIMIT	MDL	LABQUAL	QUAL	QUAL	SMPDATE	VALDQAL	PRPDATE	LRDATE	LEVEL	PERSOLD	SMPWTWTL	FINLVOL	METHOD	STATLOC	PERCENT_RECOVERY	TRUE_VALUE	RPD			
W615098	W615098	PBW	W615098-BLK1	WATER	LRB	.	4/6/2016	7:30	471341 (CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U	U	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	Blank	.	.	.				
W615098	W615098	PBW	W615098-BLK1	WATER	LRB	.	4/6/2016	7:30	471341 (HCO3)	Alkalinity-HCO3	Total	1	mg/L as CaCO3	1	.	U	U	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	Blank	.	.	.				
W615098	W615098	PBW	W615098-BLK1	WATER	LRB	.	4/6/2016	7:30	471341 (OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U	U	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	Blank	.	.	.				
W615098	W615098	PBW	W615098-BLK1	WATER	LRB	.	4/6/2016	7:30	471341 (ALK)	Alkalinity-Total	Total	1	mg/L as CaCO3	1	.	U	U	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	Blank	.	.	.				
W615098	W615098	LCSW	W615098-BS1	WATER	LCM	.	4/6/2016	7:35	471341 (HCO3)	Alkalinity-HCO3	Total	107	mg/L as CaCO3	1	.	.	.	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	LCS	108	99.3	.				
W615098	W615098	LCSW	W615098-BS1	WATER	LCM	.	4/6/2016	7:35	471341 (ALK)	Alkalinity-Total	Total	107	mg/L as CaCO3	1	.	.	.	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	LCS	108	99.3	.				
W615098	W615098	(08-EMF-MW-E)040516DUP1	W615098-DUP1	WATER	LD2	.	4/6/2016	8:01	471341 (CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U	U	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-E)040516	.	.	.				
W615098	W615098	(08-EMF-MW-E)040516DUP1	W615098-DUP1	WATER	LD2	.	4/6/2016	8:01	471341 (HCO3)	Alkalinity-HCO3	Total	493	mg/L as CaCO3	1	.	.	.	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-E)040516	.	.	1.4				
W615098	W615098	(08-EMF-MW-E)040516DUP1	W615098-DUP1	WATER	LD2	.	4/6/2016	8:01	471341 (OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U	U	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-E)040516	.	.	.				
W615098	W615098	(08-EMF-MW-E)040516DUP1	W615098-DUP1	WATER	LD2	.	4/6/2016	8:01	471341 (ALK)	Alkalinity-Total	Total	493	mg/L as CaCO3	1	.	.	.	4/6/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(08-EMF-MW-E)040516	.	.	1.4				
W615158	W615158	PBW	W615158-BLK1	WATER	LRB	.	4/8/2016	12:37	16887006 CL	Dissolved	0.2	mg/L	.	0.2	0.07	U	U	4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	Blank	.	.	.				
W615158	W615158	PBW	W615158-BLK1	WATER	LRB	.	4/8/2016	12:37	14808798 SO4	Dissolved	0.3	mg/L	.	0.3	0.13	U	U	4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	Blank	.	.	.				
W615158	W615158	LCSW	W615158-BS1	WATER	LCM	.	4/8/2016	12:46	16887006 CL	Dissolved	2.91	mg/L	.	0.2	0.07	.	.	4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	LCS	96.9	3	.				
W615158	W615158	LCSW	W615158-BS1	WATER	LCM	.	4/8/2016	12:46	14808798 SO4	Dissolved	10.4	mg/L	.	0.3	0.13	.	.	4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	LCS	104	10	.				
W615158	W615158	(08-EMF-MW-E)040516MS1	W615158-MS1	WATER	LSF	.	4/8/2016	14:34	16887006 CL	Dissolved	411	mg/L	.	10	3.3	.	.	4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	(08-EMF-MW-E)040516	R>4S	.	3	.			
W615158	W615158	(08-EMF-MW-E)040516MS1	W615158-MS1	WATER	LSF	.	4/8/2016	14:34	14808798 SO4	Dissolved	141	mg/L	.	15	6.5	.	.	4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	(08-EMF-MW-E)040516	R>4S	.	10	.			
W615158	W615158	(08-EMF-MW-E)040516MSD1	W615158-MSD1	WATER	LSFD	.	4/8/2016	14:44	16887006 CL	Dissolved	412	mg/L	.	10	3.3	.	.	4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	(08-EMF-MW-E)040516	R>4S	3	0.3	.			
W615158	W615158	(08-EMF-MW-E)040516MSD1	W615158-MSD1	WATER	LSFD	.	4/8/2016	14:44	14808798 SO4	Dissolved	142	mg/L	.	15	6.5	.	.	4/8/2016	.	4/8/2016	4/15/2016	LOW	0	5	5	EPA 300.0	(08-EMF-MW-E)040516	R>4S	10	1.1	.			
W615158	W6D0042	(07-EMF-MW-A)040516	W6D0042-01	WATER	FLD	.	4/8/2016	13:06	16887006 CL	Dissolved	11.1	mg/L	.	0.2	0.07	.	.	4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-A)040516	.	.	.	.			
W615158	W6D0042	(07-EMF-MW-A)040516	W6D0042-01	WATER	FLD	.	4/8/2016	15:14	14808798 SO4	Dissolved	52.5	mg/L	.	1.5	0.65	.	.	4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-A)040516	.	.	.	.			
W615098	W6D0042	(07-EMF-MW-A)040516	W6D0042-01	WATER	FLD	.	4/6/2016	8:21	471341 (CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U	U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-A)040516	.	.	.	.			
W615098	W6D0042	(07-EMF-MW-A)040516	W6D0042-01	WATER	FLD	.	4/6/2016	8:21	471341 (HCO3)	Alkalinity-HCO3	Total	8.7	mg/L as CaCO3	1	.	.	U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-A)040516	.	.	.	.			
W615098	W6D0042	(07-EMF-MW-A)040516	W6D0042-01	WATER	FLD	.	4/6/2016	8:21	471341 (OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U	U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-A)040516	.	.	.	.			
W615098	W6D0042	(07-EMF-MW-A)040516	W6D0042-01	WATER	FLD	.	4/6/2016	8:21	471341 (ALK)	Alkalinity-Total	Total	8.7	mg/L as CaCO3	1	.	.	.	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-A)040516	.	.	.	.			
W615158	W6D0042	(07-EMF-MW-B)040516	W6D0042-02	WATER	FLD	.	4/8/2016	13:16	16887006 CL	Dissolved	11.4	mg/L	.	0.2	0.07	.	.	4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-B)040516	.	.	.	.			
W615158	W6D0042	(07-EMF-MW-B)040516	W6D0042-02	WATER	FLD	.	4/8/2016	13:16	14808798 SO4	Dissolved	24.8	mg/L	.	0.3	0.13	.	.	4/5/2016	.	4/8/2016	4/15/2016	LOW	0	5	5.05	EPA 300.0	(07-EMF-MW-B)040516	.	.	.	.			
W615098	W6D0042	(07-EMF-MW-B)040516	W6D0042-02	WATER	FLD	.	4/6/2016	8:26	471341 (CO3)	Alkalinity-CO3	Total	1	mg/L as CaCO3	1	.	U	U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-B)040516	.	.	.	.			
W615098	W6D0042	(07-EMF-MW-B)040516	W6D0042-02	WATER	FLD	.	4/6/2016	8:26	471341 (HCO3)	Alkalinity-HCO3	Total	15.5	mg/L as CaCO3	1	.	.	U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-B)040516	.	.	.	.			
W615098	W6D0042	(07-EMF-MW-B)040516	W6D0042-02	WATER	FLD	.	4/6/2016	8:26	471341 (OH)	Alkalinity-OH	Total	1	mg/L as CaCO3	1	.	U	U	4/5/2016	.	4/6/2016	4/15/2016	LOW	0	50	50	SM 2320B	(07-EMF-MW-B)040516	.	.	.	.			

Corporate Office:

121 S. Jackson St., Moscow, Idaho 83843
Ph: (208) 882-7858; Fax: (208) 883-3785

Other Office Locations:

Kellogg, Idaho

Boise, Idaho

Deer Lodge, Montana

Las Vegas, Nevada

Pasco, Washington

TECHNICAL MEMORANDUM

To: Christina Johnson, MFA, Kellogg

CC: Alan Hughes, MFA, Vancouver

From: Greg Malone, TerraGraphics, Kellogg
Robin Nimmer, TerraGraphics, Moscow

Date: November 30, 2016

Project Code: 16001-05-01

Subject: **Field Summary for the East Mission Flats Repository (EMFR) Second 2016 Bi-Annual Sampling Event**

The purpose of this technical memorandum is to summarize the field activities for ongoing bi-annual monitoring at the East Mission Flats Repository (EMFR). This technical memorandum contains a description of the second 2016 bi-annual sampling event, as well as any deviations from the sampling plans (TerraGraphics 2014, 2015, MFA 2016).

1 Field Trip Summary

TerraGraphics' field crew conducted water sampling on October 25, 2016 at EMFR. The field crew visited a total of seven groundwater monitoring locations as listed below.

- o 07-EMF-MW-A
- o 07-EMF-MW-B
- o 07-EMF-MW-C
- o 07-EMF-MW-D
- o 08-EMF-MW-E
- o 08-EMF-MW-F
- o 09-EMF-MW-C DEEP

Groundwater sample collection, handling, and labeling followed the Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) (TerraGraphics 2014) and the EMFR Sample Plan Alteration Form (SPAF) #1 and #2 (TerraGraphics 2015, MFA 2016), with any deviations listed in Section 2. The field crew also visited the two piezometers located in the waste mass to download water level data. Both piezometers at the time of download were dry.

2 Sample Collection and Field Data

The field crew collected a total of 10 samples: 7 groundwater sites and 3 quality assurance/quality control (QA/QC) samples. A “sample” represents all of the bottles collected at a particular site. All samples were collected in accordance with the QAPP and both SPAFs. There were no deviations from the QAPP and SPAFs.

QA/QC samples were collected from the following locations:

- Duplicate sample: 08-EMF-MW-E
- Filter blank sample: 08-EMF-MW-F
- Matrix spike/matrix spike duplicate (MS/D) sample: 07-EMF-MW-B

Groundwater samples were shipped to the Pace Laboratory for analysis of dissolved metals and cations. Short hold time samples were submitted to Silver Valley Laboratory (SVL) for analysis of alkalinity and dissolved anions.

Low-flow sampling techniques were implemented using dedicated QED micropurge pumps to collect water quality samples at all groundwater sites. Field parameters were measured at all monitoring locations and include pH, temperature (in degrees Celsius [°C]), specific conductance (in microSiemens per centimeter [$\mu\text{S}/\text{cm}$]), dissolved oxygen (DO, in milligrams per liter [mg/L]), oxidation-reduction potential (ORP, in millivolts [mV]), and turbidity (in Nephelometric Turbidity Units [NTU]). Depth to water was also measured. Field parameter data are presented in Table 1 and depth to water and calculated water column heights for all groundwater wells are presented in Table 2.

Table 1. Water Quality Parameters

Site	Date	Parameter					
		pH	Specific Conductance ($\mu\text{S}/\text{cm}$)	Temperature (°C)	DO (mg/L)	ORP (mV)	Turbidity (NTU)
07-EMF-MW-A	25-Oct-16	5.37	129	9.68	0.86	117	203
07-EMF-MW-B	25-Oct-16	5.47	129	10.20	0.89	139	1.03
07-EMF-MW-C	25-Oct-16	5.66	145	10.53	0.63	158	0.00
07-EMF-MW-D	25-Oct-16	6.25	107	9.79	0.59	19	307
08-EMF-MW-E	25-Oct-16	6.22	2090	12.43	0.77	9	19.8
08-EMF-MW-F	25-Oct-16	5.62	276	10.43	0.82	115	1.45
09-EMF-MW-C DEEP	25-Oct-16	6.11	88	10.31	1.71	130	5.90

Table 2. EMFR Depth to Water and Water Column Heights

Site	Date	Depth to Water (feet)	Depth to Bottom (feet)	Height of Water Column (feet)
07-EMF-MW-A	25-Oct-16	13.04	29.61	16.57
07-EMF-MW-B	25-Oct-16	10.74	30.30	19.56
07-EMF-MW-C	25-Oct-16	8.25	30.35	22.10
07-EMF-MW-D	25-Oct-16	9.10	30.35	21.25
08-EMF-MW-E	25-Oct-16	6.51	27.44	20.93
08-EMF-MW-F	25-Oct-16	10.76	31.69	20.93
09-EMF-MW-C DEEP	25-Oct-16	8.20	98.27	90.07

3 Electronic Data

All seven electronic pressure transducers at groundwater sites plus two piezometer sites in the repository were downloaded and corrected with the barometric pressure transducer installed in monitoring well BH-SF-E-0104-U, as part of OU2, because the barologger at EMFR was not functioning. The barometric pressure transducer used to correct water level data at BCR was removed and installed at site 08-EMF-MW-F during this event, because it was no longer needed at BCR. All data in upcoming events will be corrected using this on-site barometric pressure transducer. All data were of acceptable quality and submitted to MFA.

Two electronic pressure transducers used to monitor floodwater are currently installed at EMFR. Both transducers were downloaded on November 30, 2016 and corrected using both the OU2 and newly installed EMFR barologger. The pressure transducer at site LL-2 is functioning properly while the pressure transducer at site LL-1 is malfunctioning. When the two electronic pressure transducers are corrected using the OU2 barologger, they display a positive psi value, which indicates the presence of water. However, the pressure transducer at LL-1 also displays numerous negative spikes associated with increased temperature values. When the pressure transducer at site LL-2 is corrected using the EMFR barologger, level values approach zero, indicative of no water present. When the pressure transducer at site LL-1 is corrected using the EMFR barologger, level values drop 0.20 feet below zero. TerraGraphics will work with MFA to troubleshoot both electronic pressure transducers installed at the two floodwater locations.

4 References

TerraGraphics Environmental Engineering, Inc. (TerraGraphics), 2014. Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) for Water Monitoring at the East Mission Flats Repository. December.

TerraGraphics, 2015. QAPP Addendum Sample Plan Alteration Form #1. June.

MFA, 2016. QAPP Addendum Sample Plan Alteration Form #2. September.



Project: East Mission Flats Repository				Well Number: 07-EMF-MW-A			
Project Number: 15019-08 16001-05-01				Sample Number: EMF-07-EMF-MW-A-20161025-GW			
Location: EMFL				Weather: cloudy, 50°F			
Date: 10/25/16				Sampler(s): SH/GM			
[De-Ionized Water Date:]							
Depth to Bottom (ft): 29.61				Purge Time: 14:00			
Depth to Water (ft): 13.04				Purge Method: Low Flow			
DTB-DTW (ft):				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611

$$[1 \text{ L} = 0.2642 \text{ gal} \cdot 1 \text{ gal} = 3.7854 \text{ L}]$$

Purged Volume (gal)	Time	pH	Spec. Cond. (mS/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	6.03	0.170	10.35	7.55	72.9	140
	10:00	5.40	0.130	9.68	0.94	9.0	116
	12:00	5.39	0.130	9.67	0.88	8.4	116
	14:00	5.37	0.129	9.68	0.86	8.1	117

Sampling Date:	10/25/16	Sampling Method: Low Flow	Time Sampled:	10:05
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Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab
Poly	250mL	HNO3	Y	Y	DM, Cations	Pace
Poly	500mL	none	Y	N	Alkalinity	SVL
Poly	500mL	none	Y	Y	Anions	SVL

Chain-of-Custody: Yes/No

Duplicate Sample Number:

Chain-of-Custody Number:

QC Sample Number:

Time:

Notes: Turbidity = 203 NTU

Deviations/Observations:

Picture Log: 0119 facing East

Expendable Supplies Used: 1 Hi-cap



TerraGraphics
Environmental Engineering, Inc.

MS/D

Groundwater Sampling Record

Project: East Mission Flats Repository				Well Number: 07-EMF-MW-B			
Project Number: 16001-05-01				Sample Number: EMFR-07-EMF-MW-B-20161025-6W			
Location: EMFR				Weather: cloudy, 50°F			
Date: 10/25/16				Sampler(s): GM/SH			
[De-Ionized Water Date:]							
Depth to Bottom (ft): 30.30				Purge Time: 12:00			
Depth to Water (ft): 10.74				Purge Method: Low Flow			
DTB-DTW (ft): -				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611

GROUNDWATER DATA

[1 L = 0.2642 gal • 1 gal = 3.7854 L]

Purged Volume (gal)	Time	pH	Spec. Cond. (m S/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	6.25	0.125	10.43	7.52	73.2	121
	8:00	5.52	0.128	10.21	0.97	9.4	136
	10:00	5.51	0.129	10.20	0.92	8.9	137
	12:00	5.47	0.129	10.20	0.89	8.6	139

Sampling Date: 10/25/16 Sampling Method: Low Flow Time Sampled: 10:50

Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab
Poly	250mL	HNO3	Y	Y	DM, Cations	Pace
Poly	500mL	none	Y	N	Alkalinity	SVL
Poly	500mL	none	Y	Y	Anions	SVL

Chain-of-Custody: Yes/No

Duplicate Sample Number:

Chain-of-Custody Number:

QC Sample Number:

Time:

Notes: Turbidity = 1.03 NTU

Deviations/Observations:

Picture Log: 0120 facing SE

Expendable Supplies Used: 1 standard



TerraGraphics
Environmental Engineering, Inc.

Groundwater Sampling Record

Project: East Mission Flats Repository				Well Number: 09-EMF-MW-CDEEP			
Project Number: 16001-05-01				Sample Number: EMFR-09-EMF-MW-CDEEP-20161025-66			
Location: EMFR				Weather: cloudy, 50°F			
Date: 10/25/16				Sampler(s): GM, SH			
[De-Ionized Water Date:]							
Depth to Bottom (ft): 98.27				Purge Time: 10:00			
Depth to Water (ft): 8.20				Purge Method: Low Flow			
DTB-DTW (ft):				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611

GROUNDWATER DATA

[1 L = 0.2642 gal • 1 gal = 3.7854 L]

Purged Volume (gal)	Time	pH	Spec. Cond. (m S/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	6.20	0.086	10.57	3.14	30.6	122
	6:00	6.12	0.088	10.31	1.78	17.3	129
	8:00	6.13	0.088	10.33	1.74	16.9	131
	10:00	6.11	0.088	10.31	1.71	16.6	130

Sampling Date: 10/25/16 Sampling Method: Low Flow Time Sampled: 11:25

Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab
Poly	250mL	HNO3	Y	Y	DM, Cations	Pace
Poly	500mL	none	Y	N	Alkalinity	SVL
Poly	500mL	none	Y	Y	Anions	SVL

Chain-of-Custody: Yes/No

Duplicate Sample Number:

Chain-of-Custody Number:

QC Sample Number:

Time:

Notes: Turbidity = 5.90 NTU

Deviations/Observations: small chunks of flock (light yellow color)

Picture Log: 0121 facing NE

Expendable Supplies Used: 1 standard filter



TerraGraphics

Environmental Engineering, Inc.

Groundwater Sampling Record

Project: East Mission Flats Repository				Well Number: 07-EMF-MW-C			
Project Number: 16001-05-01				Sample Number: EMFR-07-EMF-MW-C-20161025-GW			
Location: EMFR				Weather: cloudy, 55°F			
Date: 10/25/16				Sampler(s): GM, SH			
[De-Ionized Water Date:]							
Depth to Bottom (ft): 8.25 30.35				Purge Time: 10:00			
Depth to Water (ft): 8.25				Purge Method: Low Flow			
DTB-DTW (ft):				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611

GROUNDWATER DATA

[1 L = 0.2642 gal • 1 gal = 3.7854 L]

Purged Volume (gal)	Time	pH	Spec. Cond. (mS/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	6.39	0.144	10.77	3.74	36.8	142
	6:00	5.67	0.145	10.52	0.70	6.8	156
	8:00	5.65	0.145	10.53	0.64	6.3	157
	10:00	5.66	0.145	10.53	0.63	6.0	158

Sampling Date: 10/25/16 Sampling Method: Low Flow Time Sampled: 11:50

Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab
Poly	250mL	HNO3	Y	Y	DM, Cations	Pace
Poly	500mL	none	Y	N	Alkalinity	SVL
Poly	500mL	none	Y	Y	Anions	SVL

Chain-of-Custody: Yes/No

Duplicate Sample Number:

Chain-of-Custody Number:

QC Sample Number:

Time:

Notes: Turbidity = 0.00 NTU

Deviations/Observations:

Picture Log: 0122 facing S

Expendable Supplies Used: 1 standard filter



TerraGraphics
Environmental Engineering, Inc.

DUP

Groundwater Sampling Record

Project: East Mission Flats Repository				Well Number: 08-EMF-MW-E			
Project Number: 16001.05-01				Sample Number: EMFR-08-EMF-MW-E-20161025-6W			
Location: EMFR				Weather: cloudy, 55°F			
Date: 10/25/16				Sampler(s): 6M, SH			
[De-Ionized Water Date:]							
Depth to Bottom (ft): 27.44				Purge Time: 14:00			
Depth to Water (ft): 6.51				Purge Method: Low Flow			
DTB-DTW (ft):				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611

GROUNDWATER DATA

[1 L = 0.2642 gal • 1 gal = 3.7854 L]

Purged Volume (gal)	Time	pH	Spec. Cond. (mS/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	6.30	2.02	12.31	6.57	67.2	138
	10:00	6.20	2.08	12.28	0.84	8.6	19
	12:00	6.21	2.09	12.27	0.78	8.0	14
	14:00	6.22	2.09	12.43	0.77	7.8	9

Sampling Date: 10/25/16 Sampling Method: Low Flow Time Sampled: 12:30

Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab
Poly	250mL	HNO3	Y	Y	DM, Cations	Pace
Poly	500mL	none	Y	N	Alkalinity	SVL
Poly	500mL	none	Y	Y	Anions	SVL

Chain-of-Custody: Yes/No Duplicate Sample Number: EMFR-08-EMF-MW-E-20161025-6W-B

Chain-of-Custody Number: QC Sample Number: Time: 12:30

Notes: Turbidity = 19.8 NTU

Deviations/Observations:

Picture Log: 0123 facing N

Expendable Supplies Used: 1 Hi-Cap



Project: East Mission Flats Repository				Well Number: 07-EMF-MW-D			
Project Number: 16001-05-01				Sample Number: EMFR-07-EMF-MW-D-20161025-GW			
Location: EMFR				Weather: partly cloudy, 55°F			
Date: 10/25/16				Sampler(s): GM, SH			
[De-Ionized Water Date:]							
Depth to Bottom (ft):				Purge Time: 14:00			
Depth to Water (ft): 9.10				Purge Method: Low Flow			
DTB-DTW (ft):				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611

$$[1 \text{ L} = 0.2642 \text{ gal} \cdot 1 \text{ gal} = 3.7854 \text{ L}]$$

Purged Volume (gal)	Time	pH	Spec. Cond. (<u>m</u> S/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	7.32	0.106	10.48	4.56	44.4	-23
	10:00	6.32	0.106	9.81	0.64	6.1	15
	12:00	6.29	0.107	9.78	0.61	5.8	17
	14:00	6.25	0.107	9.79	0.59	5.7	19

Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab
Poly	250mL	HNO3	Y	Y	DM, Cations	Pace
Poly	500mL	none	Y	N	Alkalinity	SVL
Poly	500mL	none	Y	Y	Anions	SVL

Notes: Turbidity = 307 NTU

Deviations/Observations:

Picture Log: 0124 facing E

Expendable Supplies Used: 1 Hi-Lap



TerraGraphics
Environmental Engineering, Inc.

FB

Groundwater Sampling Record

Project: East Mission Flats Repository				Well Number: 08-EMF-MW-F			
Project Number: 16001-05-01				Sample Number: EMFR-08-EMF-MW-F-20161025-GW			
Location: EMFR				Weather: partly cloudy, 55°F			
Date: 10/25/16				Sampler(s): GM, SH			
[De-Ionized Water Date: 082316-01]							
Depth to Bottom (ft): 31.69				Purge Time: 14:00			
Depth to Water (ft): 10.76				Purge Method: Low Flow			
DTB-DTW (ft):				Volume Measurement Method:			
1 Well Volume (gal):				Purge Volume (Volume x 3) (gal):			
Conversion Factors (height x factor= 1 well volume)	¾" diameter 0.023	1" diameter 0.041	1 ½" diameter 0.092	2" diameter 0.163	4" diameter 0.652	6" diameter 1.469	8" diameter 2.611

GROUNDWATER DATA

[1 L = 0.2642 gal • 1 gal = 3.7854 L]

Purged Volume (gal)	Time	pH	Spec. Cond. (µm S/cm)	Temp (°C)	Dissolved Oxygen		ORP (mV)
					mg/L	%	
	00:00	6.20	0.286	10.91	5.94	58.5	68
	10:00	5.67	0.276	10.42	0.85	8.3	106
	12:00	5.64	0.276	10.51	0.82	8.0	110
	14:00	5.62	0.276	10.43	0.82	8.0	115

Sampling Date:			Sampling Method: Low Flow		Time Sampled: 14:10	
Container	Volume	Preservative	Cooled	Filtered	Analyte	Lab
Poly	250mL	HNO3	Y	Y	DM, Cations	Pace
Poly	500mL	none	Y	N	Alkalinity	SVL
Poly	500mL	none	Y	Y	Anions	SVL

Chain-of-Custody: Yes/No	Duplicate Sample Number:
Chain-of-Custody Number:	QC Sample Number: EFNM-08-EMF-MW-F-20161025-FB
Notes: Turbidity = 1.45 NTU	

Deviations/Observations:

Picture Log: 0125 facing W
Expendable Supplies Used: 2 standard filter

10/25/16

10/25/16

EMFR

16001-05-01

27
CM/SH

CALIBRATE MP20: TEMP 16.44°C

PH: 4.00/7.00 ORP: 246 mV COND: 1.413 μ S/cm

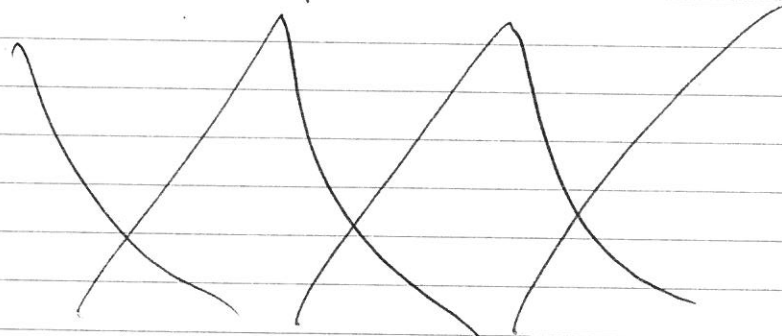
DO: 100% BP: 699

SITES SAMPLED

<u>SITE:</u>	<u>QC:</u>	<u>TIME:</u>
07-EMF-MW-A		10:05
07-EMF-MW-B	MS/D	10:50
09-EMF-MW-COEEP		11:25
07-EMF-MW-C		11:50
08-EMF-MW-E	DUP-B	12:30
07-EMF-MW-D		13:15
08-EMF-MW-F	FB @ 14:30	14:10

METER CHECK: TEMP 17.17°C

PH: 4.02/6.98 ORP: 242 mV

COND: 1.437 μ S/cm DO: 103.7%

GTM

Note in the Rain.