



MEMORANDUM

TO: Craig Cameron, U.S. Environmental Protection Agency
FROM: Don Carpenter *Donald Carpenter*
DATE: September 24, 2014
SUBJECT: March 2014 Floodwater Monitoring Results for the East Mission Flats Repository

1 Purpose and Introduction

The purpose of this memorandum is to summarize the results of floodwater sampling conducted at the East Mission Flats Repository (EMFR) on March 10 and March 12, 2014. The objective of the sampling was to measure the quality of floodwater entering and receding from the area surrounding the EMFR. This sampling effort was not part of a regular monitoring program but was conducted opportunistically as flooding occurred at the site.

2 Field Sampling Summary

Floodwater sample locations are shown on Figure 1 and described in Table 1. The locations of water level loggers installed to monitor the elevation of floodwater surrounding the repository are shown on Figure 1. Sampling was initiated on March 10, 2014 when floodwater was observed entering the area surrounding EMFR through the culvert under Interstate-90 (I-90) at EMF-SW-A and the culverts under the I-90 westbound on-ramp and Dredge Road, west of the EMFR site (Figure 1). The National Weather Service predicted that the Coeur d'Alene River at Cataldo would peak the evening of March 10, 2014 (NOAA 2014). The actual stage peak of 45.17 feet above the gauge baseline (2,100.00 feet above mean sea level) was recorded by the USGS Station (12413500) near Cataldo at 4 p.m. on that day. The flood event sampled had approximately a 3-year recurrence interval. A hydrograph of the Coeur d'Alene River near Cataldo and the floodwater elevation surrounding the repository is shown on Figure 2, and presents elevations from March 3, 2014 through March 20, 2014.

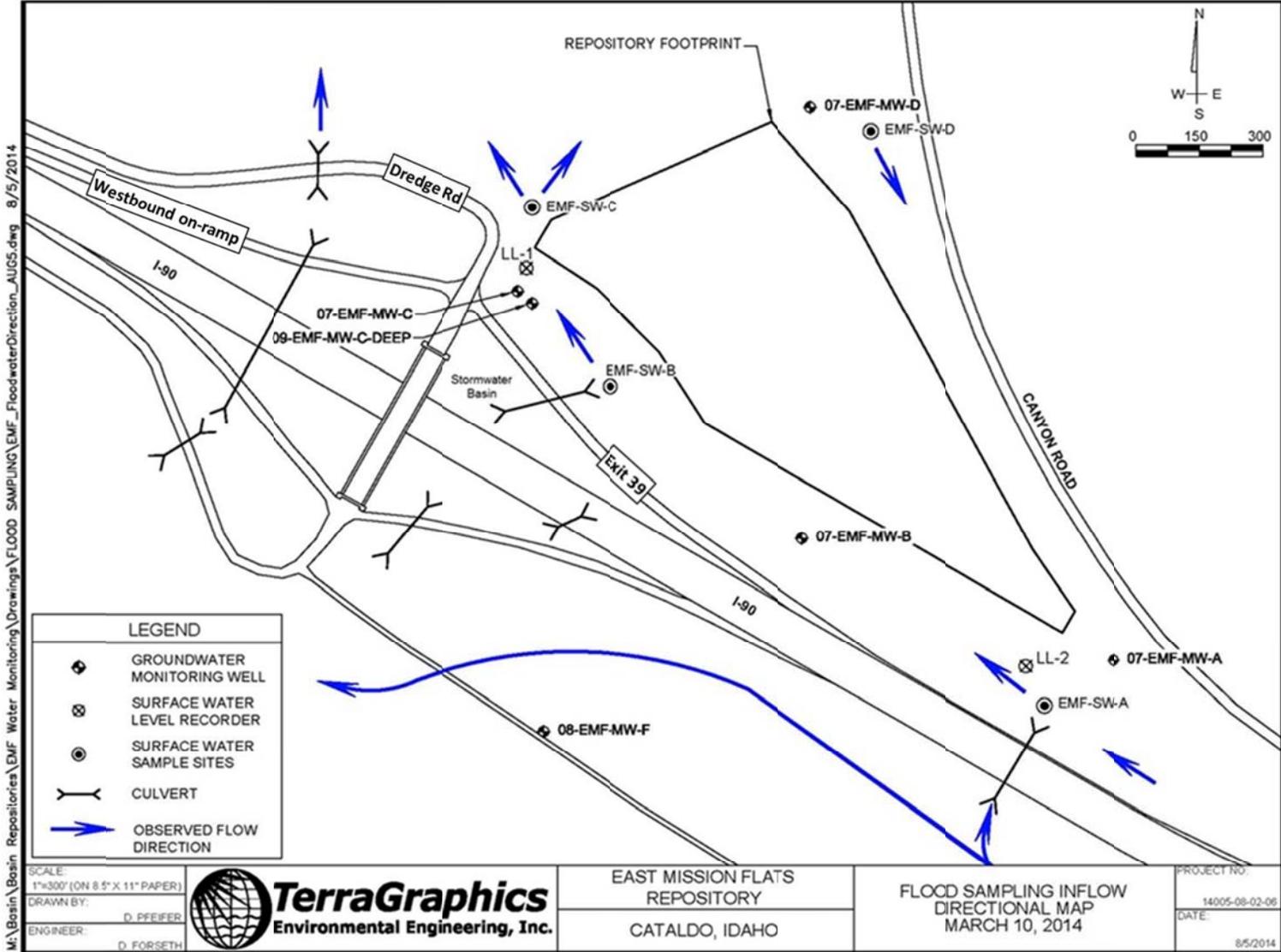


Figure 1: East Mission Flats Repository March 10, 2014 floodwater sample locations and incoming floodwater flow direction.

Table 1: East Mission Flats Repository floodwater sample location information.

Site No.	Water Action		Physical Location Description
	10-Mar-14	12-Mar-14	
EMF-SW-A	Flowing NW	Flowing SE	Located at the mouth of culvert just south of the Institutional Controls Program dump pad. This location represents the CDA River floodwater entering and leaving the area through the culvert under I-90.
EMF-SW-B	Stagnant/slightly flowing NW	Stagnant/slightly flowing SE	Located southwest of the repository at the mouth of a culvert draining the stormwater basin between I-90 and the exit 39 westbound off-ramp. This location represents incoming floodwater flowing through the area from the southeast and receding floodwater flowing through the area from the northwest.
EMF-SW-C	Stagnant/slightly flowing N	Stagnant/slightly flowing S	Located west of the repository near the access road bridge. This location represents a combination of CDA River floodwaters and water from the wetlands northwest of the repository.
EMF-SW-D	Flowing SE	Flowing SE	Located northeast of the repository and southeast of MW-D, between Canyon Road and the repository. This sample location represents the floodwater conveyed through the side channel running parallel to Canyon Road.

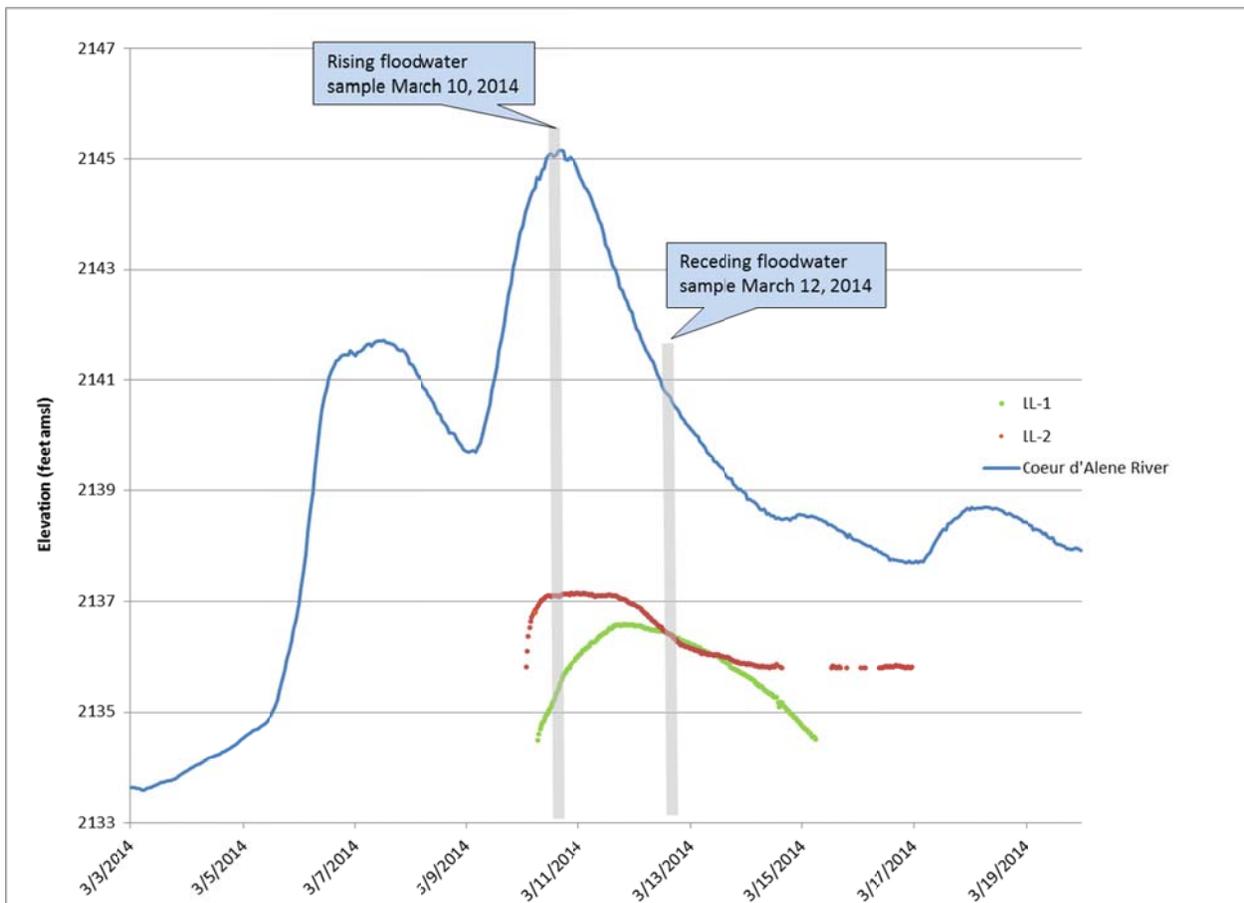


Figure 2: Coeur d'Alene River stage near Cataldo, Idaho and floodwater level logger data at the East Mission Flats Repository.

Floodwater samples were collected on two separate days. On each sampling occasion, samples were collected from four locations intended to represent the various hydrologic zones around EMFR (Table 1). The first set of samples was collected on March 10, 2014, beginning at 1:33 p.m. and ending at 3:04 p.m. while water levels were rising in the area surrounding EMFR. Based on peak water levels recorded on two water level loggers located near the repository, floodwater continued flowing into the area surrounding the repository for approximately 12 to 30 hours after the first sample was collected. A second set of samples was collected on March 12, 2014, beginning at 12:03 p.m. and ending at 1:17 p.m. as the floodwater surrounding EMFR was receding from the area. The second set of samples was collected after the stage height on the Coeur d'Alene River dropped approximately 4 feet from the peak levels. The recession limb sample was collected approximately 16 to 22 hours after peak water levels were recorded in the area surrounding the repository.

Field parameters were measured during sample collection and included pH, conductivity, temperature, dissolved oxygen (DO), and oxidation-reduction potential (ORP). The samples were delivered to SVL Analytical, Inc. (SVL) in Kellogg, Idaho for analysis of total and dissolved metals (antimony, arsenic, cadmium, lead, and zinc), alkalinity, dissolved anions, total and dissolved cations, and total hardness.

All field and analytical procedures followed the guidelines set forth in the *Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) for Groundwater and Surface Water Monitoring at the East Mission Flats Repository* (TerraGraphics 2010), hereinafter referred to as the EMFR SAP/QAPP. All field procedures are documented in the SAP/QAPP Addendum (TerraGraphics 2014).

3 Field Observations

Water was entering EMFR from the Coeur d'Alene River through a 24-inch diameter culvert at EMF-SW-A. The water depth within the culvert was 20 inches, and the flow through the culvert was estimated to be 83% of the culvert's capacity. Water discharging from the culvert near EMF-SW-A was observed flowing northwest toward EMF-SW-B (Figure 1). At EMF-SW-B, the mouth of the nearby culvert was under water by more than one foot. No discharge was observed from the culvert near SW-B which corresponds to the absence of water in the stormwater basin between I-90 and the exit 39 westbound off-ramp. Surrounding floodwater continued flowing to the northwest toward monitoring well MW-C-Deep and the repository access road bridge. Water was observed discharging from monitoring well MW-C-Deep suggesting an upward gradient during the flood event. North of the access road bridge at SW-C water continued flowing toward the northwest, however, water was also observed flowing back toward the southwest along the riprapped toe of the repository. Water at EMF-SW-D was observed flowing southeast in the side channel along Canyon Road.

The field crew observed water receding from EMFR on March 12, 2014. Water was observed flowing out of the area surrounding EMFR through the culvert at EMF-SW-A. At the time of sample collection the floodwater elevation northwest of the repository at floodwater level logger LL-1 was one foot higher in elevation when compared to the elevation recorded during collection of the incoming floodwater sample (Figure 2). The floodwater elevation in this area had completely submerged monitoring wells 09-EMF-MW-C-Deep and 09-EMF-MW-C. The floodwater elevation southeast of the repository near floodwater level logger LL-2 was more than 0.5 feet lower in elevation compared to the elevation recorded during collection of the incoming floodwater sample (Figure 2). The receding floodwater was observed flowing slowly in the opposite direction from the incoming floodwater (Figure 1) at every site except EMF-SW-D, where floodwater continued to flow southeast alongside Canyon Road. The absence of a change in flow direction at EMF-SW-D and the southeasterly flow observed at EMF-SW-C suggests the potential for a secondary source of water and contaminants entering the site from the contaminated wetlands located to the north. Determining the actual source of the contaminants measured in the floodwater may not be possible.

4 Results

Water quality results for total recoverable and dissolved metals are the focus of this memo and are summarized below. Metals data are provided in Attachment A. Non-metals data are provided in Attachment B. Non-metals water chemistry data were reviewed for potential changes in floodwater chemistry between sample events but no significant changes were observed (Attachment B, Figure B-1). The SVL laboratory reports are provided in Attachment C. Photographs are provided in Attachment D. Total and dissolved antimony and arsenic were not detected in any samples and are not discussed further.

Measured lead concentrations are shown in Figure 3. A 30% error bar was added to the figure for reference. Total lead concentrations at all sites decreased from the March 10 to the March 12 sampling event. Dissolved lead was only detected at EMF-SW-D for both events and also decreased from the March 10 to the March 12 event.

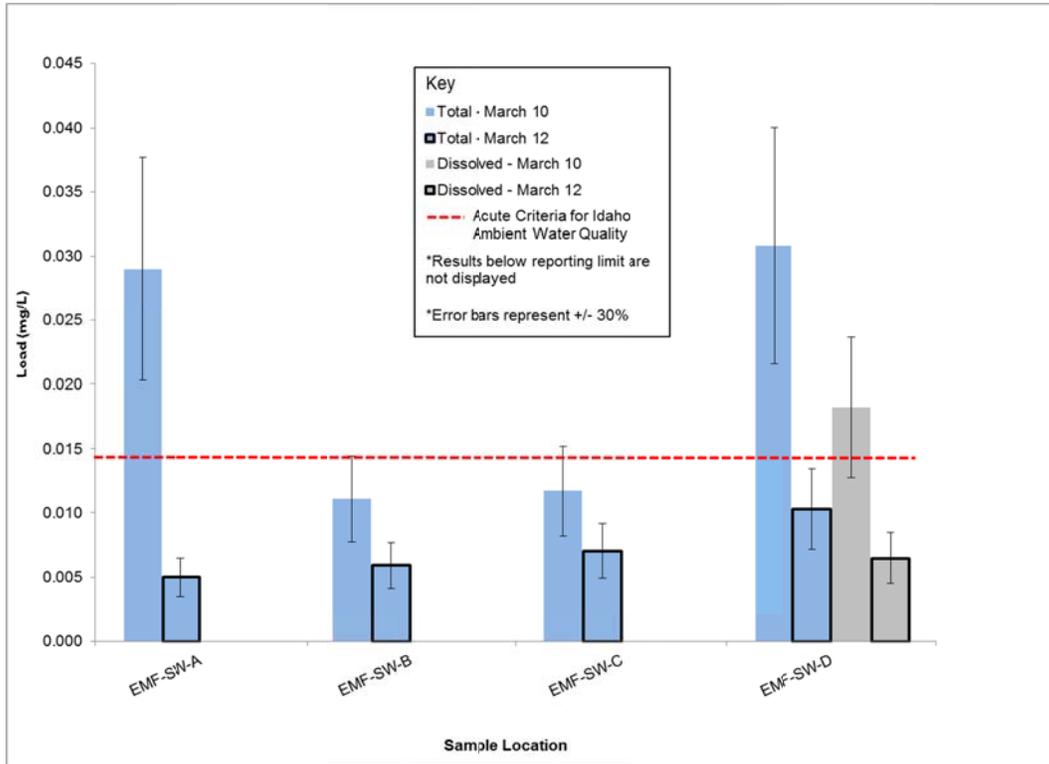


Figure 3: East Mission Flats Repository floodwater lead concentrations.

Measured cadmium concentrations are shown in Figure 4. Although in general, increases in total and dissolved cadmium concentrations were observed, the difference in concentration between the single samples collected during the March 10 and the March 12 sampling event are not large enough to support the conclusion that a difference in concentration is present. The difficulty identifying a difference in concentration is associated with the low concentrations measured, the small differences in concentration between the samples, and several factors associated with sampling and analysis. For example, the split sample duplicates collected during the event show as much as 19% difference in cadmium concentrations during laboratory analysis. This type of analytical variability is visible in Figure 4 at site SW-D. The March 12 results at SW-D for dissolved cadmium are greater than the March 12 results for total cadmium. Dissolved concentrations cannot exceed total concentrations because the total concentration is the sum of both dissolved and particulate concentration. Some type of analytical variability is associated with most analytical methods and the cadmium results were within the expected range of variability as determined during quality control checks. In addition to the analytical variability associated with the laboratory method, the collection of a single sample at each location does not reflect the variability in concentration that occurs through time during the flood event. The changes in concentration over the duration of the flood event are unknown.

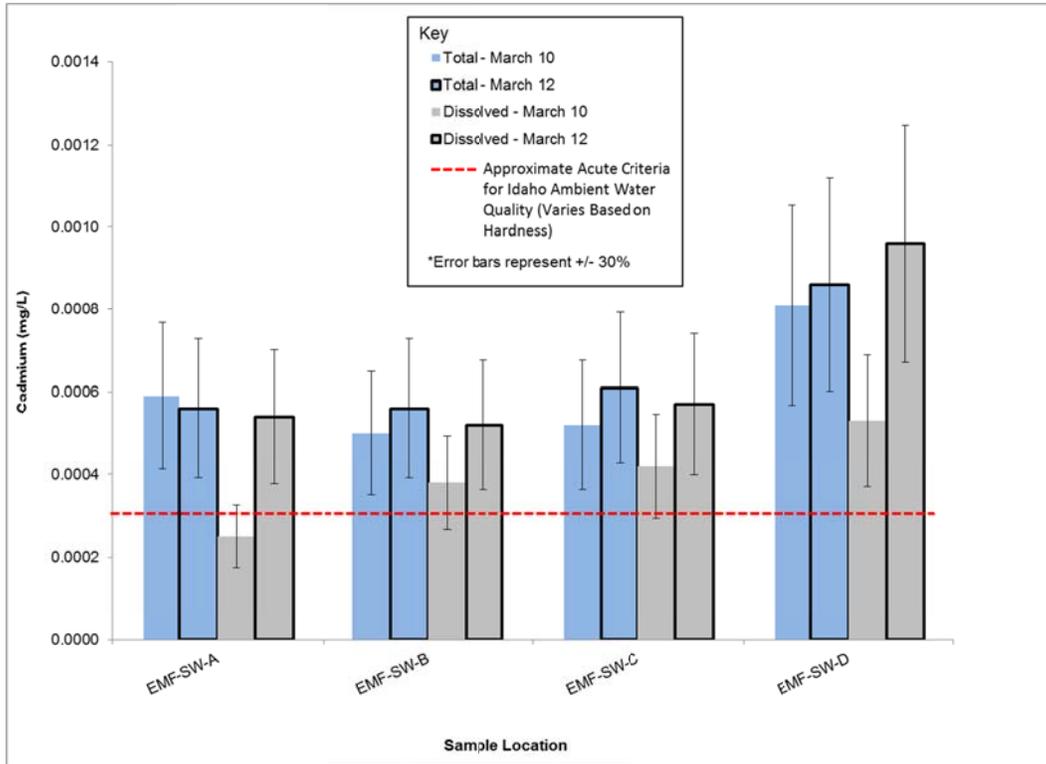


Figure 4: East Mission Flats Repository floodwater cadmium concentration.

In general, total and dissolved zinc concentrations increased at all sites from the March 10 to the March 12 sampling event (Figure 5). The increased concentration resulting from comparison of single samples is not great enough to conclude that a difference in concentration is actually present. Similar to cadmium, the split sample duplicate collected during the event show as much as 25% difference in zinc concentrations during laboratory analysis and dissolved concentrations exceeded total concentrations at SW-D.

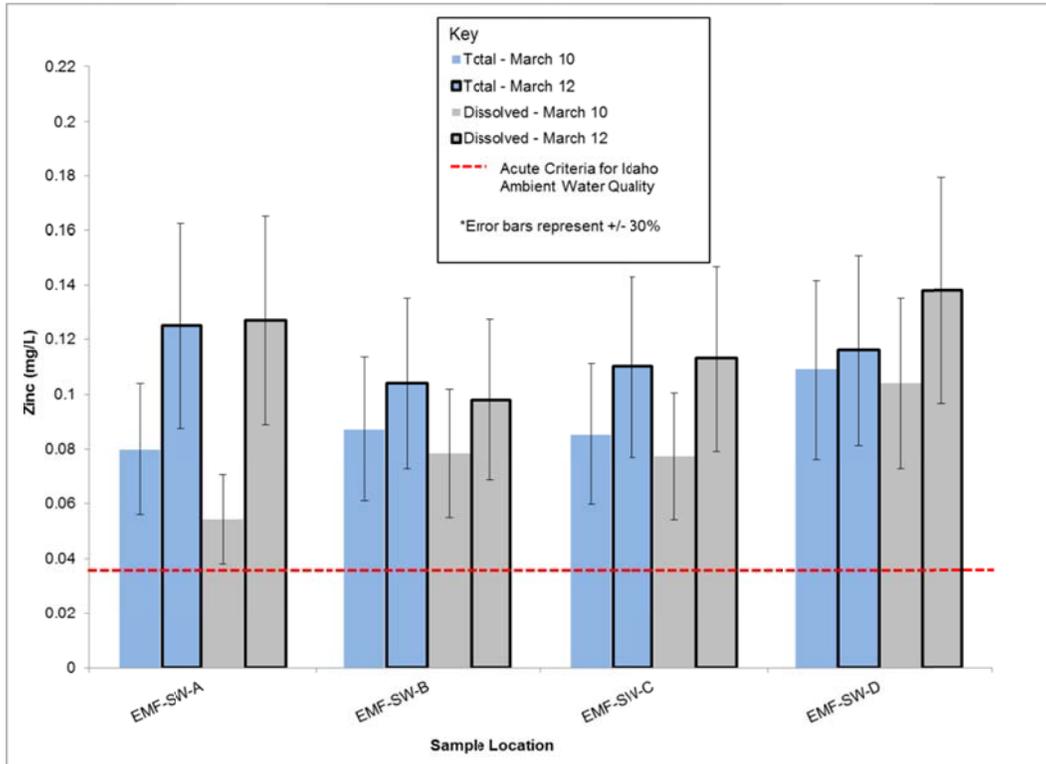


Figure 5: East Mission Flats Repository floodwater zinc concentrations.

4.1 Regulatory Thresholds Exceedances

Dissolved cadmium, lead, and zinc results were compared to the Statewide Criteria Maximum Concentrations (CMC) for aquatic life in surface water according to the Rules of the Department of Environmental Quality, IDAPA 58.01.02.210, “Water Quality Standards”. The regulatory thresholds for dissolved cadmium, lead, and zinc are dependent on water hardness (Table 2). The minimum required hardness for calculating the regulatory threshold for lead and zinc is 25 milligrams per liter (mg/L) as calcium carbonate (CaCO₃). Since all calculated hardness values for all sites were less than 25 mg/L, this value was used to calculate all regulatory thresholds for lead and zinc.

Table 2: East Mission Flats Repository regulatory thresholds for March 2014 floodwater sampling.

Site No.	Sample Date	Calculated Hardness as CaCO ₃ (mg/L)	Cadmium (mg/L)	Lead (mg/L)	Zinc (mg/L)
EMF-SW-A	10-Mar-14	13.9	0.00026	0.014	0.036
	12-Mar-14	16.9	0.00030	0.014	0.036
EMF-SW-B	10-Mar-14	13.8	0.00026	0.014	0.036
	12-Mar-14	16.5	0.00030	0.014	0.036
EMF-SW-C	10-Mar-14	13.0	0.00024	0.014	0.036
	12-Mar-14	16.7	0.00030	0.014	0.036
EMF-SW-D	10-Mar-14	23.7	0.00040	0.014	0.036
	12-Mar-14	20.6	0.00036	0.014	0.036

Notes:

CaCO₃ = calcium carbonate

mg/L = milligrams per liter

Idaho Ambient Water Quality Criteria (AWQC) regulatory thresholds are based on statewide acute criteria for aquatic life.

Cadmium, lead, and zinc AWQC values calculated using IDAPA 58.01.02.210

If the measured hardness was less than 25 mg/L, a minimum hardness of 25 mg/L was used to calculate the AWQC for lead and zinc.

If the measured hardness was less than 10 mg/L, a minimum hardness of 10 mg/L was used to calculate the AWQC for cadmium.

The following regulatory threshold exceedances were observed:

- Dissolved cadmium at all sites for both events, except EMF-SW-A during the March 10 event.
- Dissolved zinc at all sites for both events.
- Dissolved lead at EMF-SW-D during the March 10 event.

5 Discussion

Differentiating between potential increases in floodwater metals concentrations that are associated with the historical floodplain contamination from those associated with the repository soil may not be possible. Lead concentrations greater than 10,000 mg/kg at depths often exceeding two feet are measured in the historically contaminated floodplain soils that exists below and surrounding the repository site (Box et al. 2001). Floodwater sampling conducted in May 2008 shows small increases in dissolved lead and zinc concentrations at some sample locations (TerraGraphics 2008) as floodwater receded from the area. These data suggest that the historical floodplain contamination may contribute to increased dissolved metals concentrations in floodwater that enters the area. Any potential increase in 2008 can only be attributed to

interactions between the floodwater and the existing historical contamination as no repository sediments were located at the site at this time.

Comparisons between March 2014 floodwater metals concentrations measured on the Coeur d'Alene River and the concentrations measured in the area surrounding the EMFR clearly indicate that the historical contamination contributes to floodwater metals concentrations. Floodwater cadmium and zinc concentrations on the Coeur d'Alene River near Harrison, Idaho on March 11, 2014 (USGS, 2014) were more than five times higher than the maximum concentrations measured in the floodwater receding from the area surrounding the repository. Floodwater lead concentrations near Harrison were more than 140 times the maximum concentrations measured in floodwater receding from the area surrounding the repository. The small potential increases in floodwater metals concentrations near the EMFR are insignificant when viewed in a basin wide context and are within the range of expected sample variability for the current sample design.

Several factors suggest that it is unlikely the repository contributed to a potential increase in cadmium and zinc concentrations.

- Contaminated soils placed in the repository are highly compacted which stabilizes the waste and restricts the movement of water and air in and out of the waste.
- The short duration of the flood event did not permit significant infiltration of floodwater into the repository waste as supported by modeling and the dry piezometers monitoring the repository moisture content. The seepage of floodwater out of the repository would be minimal following the receding floodwater and unlikely to have sufficient quantity to influence floodwater metals concentrations.
- The repository is designed to prevent the discharge of contaminated sediments in stormwater runoff.
- Rock rip-rap underlain by a geotextile separation barrier is installed on the exterior slopes of the repository to an elevation equivalent to at least the 10-year flood event. The level of floodwater inundation associated with the 3-year flood event sampled had no impact on the stability of the exterior slopes.
- Exterior repository slopes above the rock rip-rap have a one foot thick clean soil cap. The clean soil cap is hydro-seeded and straw wattles are installed to prevent erosion of the clean cap.
- Weekly visual inspections of the repository did not identify any area of erosion indicating that no contaminated sediment was discharged to floodwater.

6 Conclusions and Recommendations

In 2014, total and dissolved lead concentrations decreased as floodwater receded from the area surrounding the EMFR. This is likely the result of the metals-laden sediment, transported into the area by the floodwater, settling out while the water is on the floodplain. Deposition of sediment on the floodplain during flood events is a natural phenomenon occurring on floodplains around

the world and it is not related to the presence of the EMFR. The data provide no indication that the EMFR is adversely impacting surface water lead concentrations.

In 2014, increases in cadmium and zinc concentrations were measured as floodwater receded from the area surrounding EMFR. The potential increases in concentration were small and not sufficient to conclude that a difference in concentration was present based on the single sample collected. While the results do suggest potential increases in cadmium and zinc concentrations, it is difficult to attribute any potential increase to the repository due to the historical contamination present in the immediate vicinity of the repository and ongoing upstream sources. Floodwater metals concentrations in the area can be attributed to many factors such as the presence of extensive historical floodplain contamination, the influence of nearby contaminated wetlands, upwelling of contaminated groundwater, and geochemical effects on historically contaminated water and soils.

Although additional sample locations and greater sample frequency during flood events could better define floodwater metals concentrations entering and leaving the area surrounding the repository, it would remain difficult or impossible to determine if changes in concentration are related to the repository or the historical contamination in the area. Based on the lack of correlation between floodwater metals concentrations and the migration of dissolved metals away from the repository, continued monitoring of floodwater metals concentrations is not recommended. This recommendation remains consistent with the EMFR Enhanced Monitoring Plan (TerraGraphics, 2009) which did not include monitoring floodwater metals concentrations. The EMFR Enhanced Monitoring Plan was accepted in response to the final recommendation of the 2009 Environmental Protection Agency Office of Inspector General review of the repository design (USEPA, 2009).

Continued visual inspections to identify surface erosion or deficiencies in sediment controls should be continued on a weekly basis. Depending on the severity of flood conditions, visual inspections may be conducted more frequently. Identification of any erosional features or deficiencies in sediment controls during visual inspections can be addressed immediately to prevent contaminants from moving off site. In addition, groundwater and repository pore water monitoring should continue to evaluate the potential migration of dissolved contaminants away from the repository.

7 References

- Box, S.E., A.A. Bookstrom, M. Ikramuddin, and J. Lindsay. 2001. Geochemical Analyses of Soils and Sediments, Coeur D'Alene Drainage Basin, Idaho: Sampling, Analytical Methods, and Results. U.S. Geological Survey Open-File Report 01-139.
- NOAA (National Oceanic Atmospheric Association). 2014. Coeur d'Alene River at Cataldo, data courtesy of the US Geologic Survey, http://waterdata.usgs.gov/id/nwis/uv/?site_no=12413500.
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- TerraGraphics. 2010. Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP) for Groundwater and Surface Water Monitoring at the East Mission Flats Repository Revision No. 1. October.
- TerraGraphics. 2014. Addendum I to the East Mission Flats Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP). March 20, 2014.
- USEPA (United States Environmental Protection Agency). 2009. Office of the Inspector General Hotline Report: Contaminated Soil Waste Repository at East Mission Flats, Idaho. Report No. 03-P-0162. June.
- USGS (U.S. Geological Survey). August 8, 2014. Personal communication with Greg Clark.

Attachment A
Metals Data

Table A-1
EMFR Floodwater Monitoring Results
March 2014 Floodwater Event
Total Recoverable Metals

Site No.	Analyte ^a	Results (mg/L)			RPD ^c
		10-Mar-14	12-Mar-14	Difference ^b	
EMF-SW-A	Antimony	0.00300 U	0.00300 U	0	NA
	Arsenic	0.0030 U	0.0030 U	0	NA
	Cadmium	0.00059	0.00056	-0.00003	5%
	Lead	0.0290	0.00501	-0.0240	141%
	Zinc	0.0798	0.125 J	0.045	44%
EMF-SW-B	Antimony	0.00300 U	0.00300 U	0	NA
	Arsenic	0.0030 U	0.0030 U	0	NA
	Cadmium	0.00050	0.00056	0.00006	11%
	Lead	0.0111	0.00594	-0.00516	61%
	Zinc	0.0873	0.104 J	0.0167	17%
EMF-SW-C	Antimony	0.00300 U	0.00300 U	0	NA
	Arsenic	0.0030 U	0.0030 U	0	NA
	Cadmium	0.00052	0.00061	0.00009	16%
	Lead	0.0117	0.00704	-0.00466	50%
	Zinc	0.0854	0.110 J	0.025	25%
EMF-SW-D	Antimony	0.00300 U	0.00300 U	0	NA
	Arsenic	0.0030 U	0.0030 U	0	NA
	Cadmium	0.00081	0.00086	0.00005	6%
	Lead	0.0308	0.0103	-0.0205	100%
	Zinc	0.109	0.116 J	0.007	6%

Notes:

a. Samples analyzed by EPA Method 200.8

b. Difference = (12 March results) - (10 March results). Negative number indicates decrease in metals concentration over reporting period.

c. Relative Percent Difference (RPD) = $(|X1 - X2| / ((X1 + X2) / 2)) * 100$

X1 = March 10 Concentration

X2 = March 12 Concentration

U = The material was analyzed, but not detected above the level of the associated value. The associated value is the method reporting limit.

J = Reported concentration is an estimate based on the data quality review.

mg/L = milligrams per liter

NA = The RPD could not be calculated because one or both of the results was below the method reporting limit.

Table A-2
EMFR Floodwater Monitoring Results
March 2014 Floodwater Event
Dissolved Metals

Site No.	Analyte ^a	Results (mg/L)			RPD ^c
		10-Mar-14	12-Mar-14	Difference ^b	
EMF-SW-A	Antimony	0.00300 U	0.00300 U	0	NA
	Arsenic	0.0030 U	0.0030 U	0	NA
	Cadmium	0.00025	0.00054	0.00029	73%
	Lead	0.00300 U	0.00300 U	0	NA
	Zinc	0.0542	0.127 J	0.073	80%
EMF-SW-B	Antimony	0.00300 U	0.00300 U	0	NA
	Arsenic	0.0030 U	0.0030 U	0	NA
	Cadmium	0.00038	0.00052	0.00014	31%
	Lead	0.00300 U	0.00300 U	0	NA
	Zinc	0.0784	0.098 J	0.020	22%
EMF-SW-C	Antimony	0.00300 U	0.00300 U	0	NA
	Arsenic	0.0030 U	0.0030 U	0	NA
	Cadmium	0.00042	0.00057	0.00015	30%
	Lead	0.00300 U	0.00300 U	0	NA
	Zinc	0.0773	0.113 J	0.036	38%
EMF-SW-D	Antimony	0.00300 U	0.00300 U	0	NA
	Arsenic	0.0030 U	0.0030 U	0	NA
	Cadmium	0.00053	0.00096	0.00043	58%
	Lead	0.0182	0.00649	-0.0117	95%
	Zinc	0.104	0.138 J	0.034	28%

Notes:

a. Samples analyzed by EPA Method 200.8

b. Difference = (12 March results) - (10 March results). Negative number indicates decrease in metals concentration over reporting period.

c. Relative Percent Difference (RPD) = $(|X1 - X2| / ((X1 + X2) / 2)) * 100$

X1 = March 10 Concentration

X2 = March 12 Concentration

U = The material was analyzed, but not detected above the level of the associated value. The associated value is the method reporting limit.

J = Reported concentration is an estimate based on the data quality review.

mg/L = milligrams per liter

NA = The RPD could not be calculated because one or both of the results was below the method reporting limit.

= Value exceeds regulatory threshold

Regulatory thresholds for zinc, cadmium, and lead are hardness dependent and are based on acute criteria for aquatic life.

Attachment B
Non-Metals Data

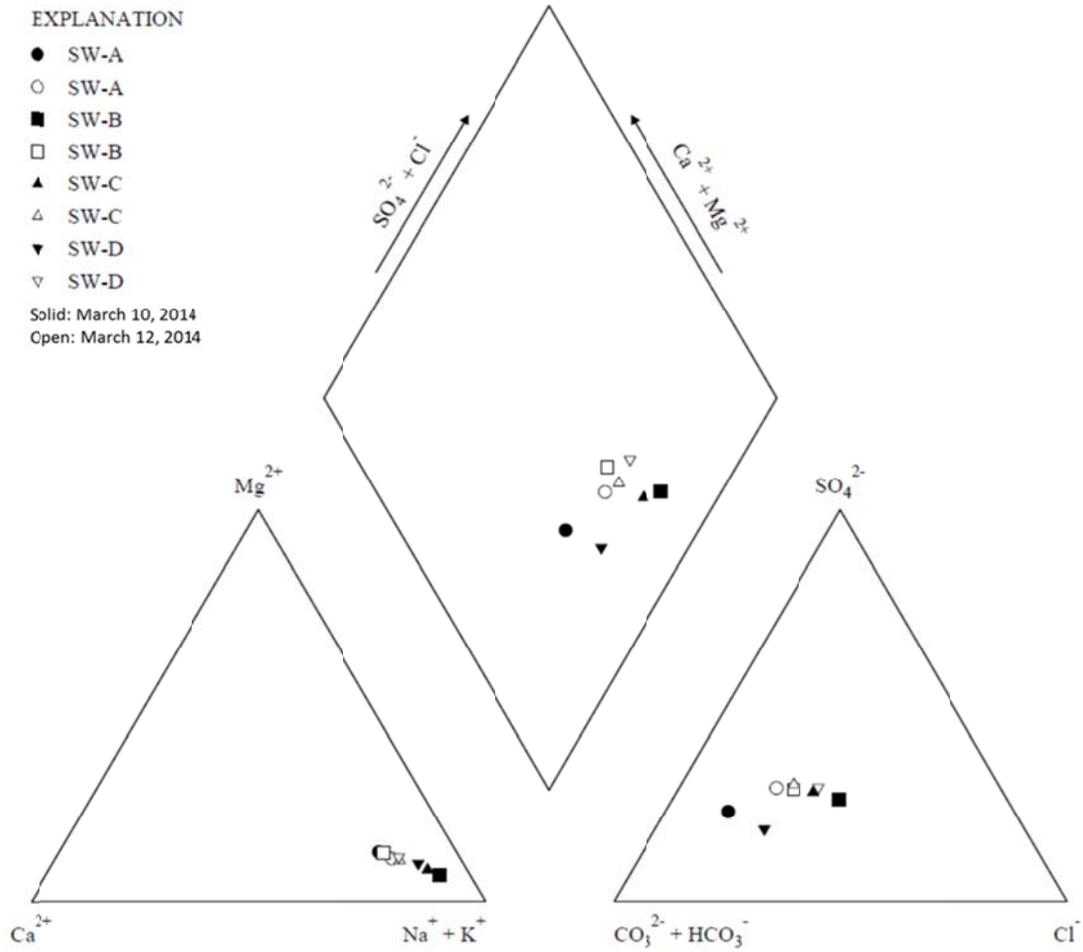


Figure B-1: Piper diagram of predominant cations and anions measured in floodwater samples collected from the area surrounding the East Mission Flats Repository, March 2014.

Table B-1
EMFR Floodwater Monitoring Results
March 2014 Floodwater Event
Water Quality Parameters

Site No.	Analyte	Results (mg/L)	
		10-Mar-14	12-Mar-14
EMF-SW-A	Alkalinity-CO3	1.0 U	1.0 U
	Alkalinity-HCO3	10.3 J*	12.3
	Alkalinity-OH	1.0 U	1.0 U
	Alkalinity-Total	10.3 J*	12.3
	Total Calcium	3.17	3.92
	Total Magnesium	1.44	1.74
	Dissolved Calcium	2.96	4.10
	Dissolved Magnesium	1.10	1.72
	Dissolved Potassium	0.93	1.35
	Dissolved Sodium	1.47	2.17
	Chloride	1.30	3.04
	Nitrate-N	0.076	0.133
	Sulfate	2.95	5.66
	EMF-SW-B	Alkalinity-CO3	1.0 U
Alkalinity-HCO3		9.4 J*	11.2
Alkalinity-OH		1.0 U	1.0 U
Alkalinity-Total		9.4 J*	11.2
Total Calcium		2.79	3.75
Total Magnesium		1.66	1.74
Dissolved Calcium		2.81	2.80
Dissolved Magnesium		1.50	1.21
Dissolved Potassium		1.87	0.86
Dissolved Sodium		4.05	1.86
Chloride		5.41	3.59
Nitrate-N		0.157	0.099
Sulfate		5.24	5.50

Site No.	Analyte	Results (mg/L)	
		10-Mar-14	12-Mar-14
EMF-SW-C	Alkalinity-CO3	1.0 U	1.0 U
	Alkalinity-HCO3	8.9 J*	11.0
	Alkalinity-OH	1.0 U	1.0 U
	Alkalinity-Total	8.9 J*	11.0
	Total Calcium	2.69	3.76
	Total Magnesium	1.53	1.78
	Dissolved Calcium	2.73	3.89
	Dissolved Magnesium	1.36	1.72
	Dissolved Potassium	1.71	1.33
	Dissolved Sodium	2.91	2.37
	Chloride	3.71	3.43
	Nitrate-N	0.137	0.144
	Sulfate	4.68	5.71
	EMF-SW-D	Alkalinity-CO3	1.0 U
Alkalinity-HCO3		22.5	12.6
Alkalinity-OH		1.0 U	1.0 U
Alkalinity-Total		22.5	12.6
Total Calcium		4.78	4.46
Total Magnesium		2.86	2.31
Dissolved Calcium		4.51	4.74
Dissolved Magnesium		2.70	2.35
Dissolved Potassium		2.15	2.42
Dissolved Sodium		4.38	2.78
Chloride		5.39	5.58
Nitrate-N		0.050 U	0.306
Sulfate		5.68	7.23

Notes:

U = The material was analyzed, but not detected above the level of the associated value. The associated value is the method reporting limit.

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

mg/L = milligrams per liter

Table B-2
EMFR Floodwater Monitoring Results
March 2014 Floodwater Event
Field Parameters

Site No.	Date	Parameter				
		pH	Specific Conductance (µS/cm)	Temperature (°C)	DO (mg/L)	ORP (mV)
EMF-SW-A	10-Mar-14	7.23	18	3.46	11.53	194
	12-Mar-14	7.76	52	5.32	10.23	208
EMF-SW-B	10-Mar-14	7.64	52	5.20	10.55	157
	12-Mar-14	7.72	48	6.12	11.20	156
EMF-SW-C	10-Mar-14	7.65	45	2.90	11.76	130
	12-Mar-14	7.82	49	5.73	10.30	151
EMF-SW-D	10-Mar-14	8.03	71	2.04	11.84	109
	12-Mar-14	7.38	64	5.64	10.18	125

Notes:

°C = degrees Celsius

mg/L = milligrams per liter

mV = millivolts

µS/cm = microSiemens per centimeter

DO = Dissolved oxygen

ORP = Oxidation reduction potential

Attachment C
SVL Laboratory Reports



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0126**
Reported: 19-Mar-14 10:44

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received
(EMF-SW-A) 031014	W4C0126-01	Surface Water	10-Mar-14 13:33	GM	11-Mar-2014
(EMF-SW-A) 031014-C	W4C0126-02	Surface Water	10-Mar-14 13:33	GM	11-Mar-2014
(EMF-SW-B) 031014	W4C0126-03	Surface Water	10-Mar-14 13:57	GM	11-Mar-2014
(EMF-SW-C) 031014	W4C0126-04	Surface Water	10-Mar-14 14:20	GM	11-Mar-2014
(EMF-SW-C) 031014-D	W4C0126-05	Rinsate	10-Mar-14 14:09	GM	11-Mar-2014
(EMF-SW-D) 031014	W4C0126-06	Surface Water	10-Mar-14 15:04	GM	11-Mar-2014
(EMF-SW-D) 031014-E	W4C0126-07	Field blank	10-Mar-14 15:11	GM	11-Mar-2014

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0126**
Reported: 19-Mar-14 10:44

Client Sample ID: **(EMF-SW-A) 031014**

SVL Sample ID: **W4C0126-01 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 10-Mar-14 13:33
Received: 11-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	3.17	mg/L	0.040	0.008		W411102	AS	03/17/14 16:51	
EPA 200.7	Magnesium	1.44	mg/L	0.200	0.020		W411102	AS	03/17/14 16:51	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411093	KWH	03/13/14 07:49	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411093	KWH	03/13/14 07:49	
EPA 200.8	Cadmium	0.00050	mg/L	0.00020	0.00004	2.5	W411093	KWH	03/13/14 07:49	
EPA 200.8	Lead	0.0289	mg/L	0.00300	0.000044	2.5	W411093	KWH	03/13/14 07:49	
EPA 200.8	Zinc	0.0798	mg/L	0.0050	0.0005	2.5	W411093	KWH	03/13/14 07:49	
SM 2340B	Hardness (as CaCO3)	13.9	mg/L	0.923	0.099		N/A		03/17/14 16:51	

Metals (Dissolved)

EPA 200.7	Calcium	2.96	mg/L	0.040	0.015		W411116	AS	03/17/14 17:32	
EPA 200.7	Magnesium	1.10	mg/L	0.200	0.039		W411116	AS	03/17/14 17:32	
EPA 200.7	Potassium	0.92	mg/L	0.50	0.13		W411116	AS	03/17/14 17:32	
EPA 200.7	Sodium	1.47	mg/L	0.50	0.08		W411116	AS	03/17/14 17:32	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W411095	KWH	03/12/14 08:08	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W411095	KWH	03/12/14 08:08	
EPA 200.8	Cadmium	0.00025	mg/L	0.00020	0.000031		W411095	KWH	03/12/14 08:08	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000035		W411095	KWH	03/12/14 08:08	
EPA 200.8	Zinc	0.0542	mg/L	0.0050	0.0004		W411095	KWH	03/12/14 08:08	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	10.1	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 09:52	
SM 2320B/2310B	Bicarbonate	10.1	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 09:52	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 09:52	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 09:52	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	1.30	mg/L	0.20	0.04		W411084	AEW	03/11/14 12:21	
EPA 300.0	Nitrate as N	0.076	mg/L	0.050	0.008		W411084	AEW	03/11/14 12:21	
EPA 300.0	Sulfate as SO4	2.95	mg/L	0.30	0.06		W411084	AEW	03/11/14 12:21	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.33 meq/L Anion Sum: 0.31 meq/L C/A Balance: 3.49 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573

Work order Report Page 2 of 11



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0126**
Reported: 19-Mar-14 10:44

Client Sample ID: **(EMF-SW-A) 031014-C**

SVL Sample ID: **W4C0126-02 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 10-Mar-14 13:33
Received: 11-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	3.13	mg/L	0.040	0.008		W411102	AS	03/17/14 16:54	
EPA 200.7	Magnesium	1.39	mg/L	0.200	0.020		W411102	AS	03/17/14 16:54	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411093	KWH	03/13/14 07:51	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411093	KWH	03/13/14 07:51	
EPA 200.8	Cadmium	0.00059	mg/L	0.00020	0.00004	2.5	W411093	KWH	03/13/14 07:51	
EPA 200.8	Lead	0.0290	mg/L	0.00300	0.000044	2.5	W411093	KWH	03/13/14 07:51	
EPA 200.8	Zinc	0.0795	mg/L	0.0050	0.0005	2.5	W411093	KWH	03/13/14 07:51	
SM 2340B	Hardness (as CaCO3)	13.6	mg/L	0.923	0.099		N/A		03/17/14 16:54	

Metals (Dissolved)

EPA 200.7	Calcium	2.59	mg/L	0.040	0.015		W411116	AS	03/17/14 17:35	
EPA 200.7	Magnesium	0.989	mg/L	0.200	0.039		W411116	AS	03/17/14 17:35	
EPA 200.7	Potassium	0.93	mg/L	0.50	0.13		W411116	AS	03/17/14 17:35	
EPA 200.7	Sodium	1.36	mg/L	0.50	0.08		W411116	AS	03/17/14 17:35	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W411095	KWH	03/12/14 08:10	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W411095	KWH	03/12/14 08:10	
EPA 200.8	Cadmium	0.00021	mg/L	0.00020	0.000031		W411095	KWH	03/12/14 08:10	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000035		W411095	KWH	03/12/14 08:10	
EPA 200.8	Zinc	0.0432	mg/L	0.0050	0.0004		W411095	KWH	03/12/14 08:10	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	10.3	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:01	
SM 2320B/2310B	Bicarbonate	10.3	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:01	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:01	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:01	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	1.28	mg/L	0.20	0.04		W411084	AEW	03/11/14 12:31	
EPA 300.0	Nitrate as N	0.074	mg/L	0.050	0.008		W411084	AEW	03/11/14 12:31	
EPA 300.0	Sulfate as SO4	2.94	mg/L	0.30	0.06		W411084	AEW	03/11/14 12:31	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.29 meq/L Anion Sum: 0.31 meq/L C/A Balance: -2.24 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573

Work order Report Page 3 of 11



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0126**
Reported: 19-Mar-14 10:44

Client Sample ID: **(EMF-SW-B) 031014**

SVL Sample ID: **W4C0126-03 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 10-Mar-14 13:57
Received: 11-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	2.79	mg/L	0.040	0.008		W411102	AS	03/17/14 16:56	
EPA 200.7	Magnesium	1.66	mg/L	0.200	0.020		W411102	AS	03/17/14 16:56	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411093	KWH	03/13/14 07:31	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411093	KWH	03/13/14 07:31	
EPA 200.8	Cadmium	0.00050	mg/L	0.00020	0.00004	2.5	W411093	KWH	03/13/14 07:31	
EPA 200.8	Lead	0.0111	mg/L	0.00300	0.000044	2.5	W411093	KWH	03/13/14 07:31	
EPA 200.8	Zinc	0.0873	mg/L	0.0050	0.0005	2.5	W411093	KWH	03/13/14 07:31	
SM 2340B	Hardness (as CaCO3)	13.8	mg/L	0.923	0.099		N/A		03/17/14 16:56	

Metals (Dissolved)

EPA 200.7	Calcium	2.81	mg/L	0.040	0.015		W411116	AS	03/17/14 17:37	
EPA 200.7	Magnesium	1.50	mg/L	0.200	0.039		W411116	AS	03/17/14 17:37	
EPA 200.7	Potassium	1.87	mg/L	0.50	0.13		W411116	AS	03/17/14 17:37	
EPA 200.7	Sodium	4.05	mg/L	0.50	0.08		W411116	AS	03/17/14 17:37	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W411095	KWH	03/12/14 08:04	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W411095	KWH	03/12/14 08:04	
EPA 200.8	Cadmium	0.00038	mg/L	0.00020	0.000031		W411095	KWH	03/12/14 08:04	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000035		W411095	KWH	03/12/14 08:04	
EPA 200.8	Zinc	0.0784	mg/L	0.0050	0.0004		W411095	KWH	03/12/14 08:04	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	9.4	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:12	
SM 2320B/2310B	Bicarbonate	9.4	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:12	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:12	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:12	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	5.41	mg/L	0.20	0.04		W411084	AEW	03/11/14 12:41	
EPA 300.0	Nitrate as N	0.157	mg/L	0.050	0.008		W411084	AEW	03/11/14 12:41	
EPA 300.0	Sulfate as SO4	5.24	mg/L	0.30	0.06		W411084	AEW	03/11/14 12:41	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.49 meq/L Anion Sum: 0.46 meq/L C/A Balance: 2.98 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0126**
Reported: 19-Mar-14 10:44

Client Sample ID: **(EMF-SW-C) 031014**

SVL Sample ID: **W4C0126-04 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 10-Mar-14 14:20
Received: 11-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	2.69	mg/L	0.040	0.008		W411102	AS	03/17/14 17:05	
EPA 200.7	Magnesium	1.53	mg/L	0.200	0.020		W411102	AS	03/17/14 17:05	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411093	KWH	03/13/14 07:52	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411093	KWH	03/13/14 07:52	
EPA 200.8	Cadmium	0.00052	mg/L	0.00020	0.00004	2.5	W411093	KWH	03/13/14 07:52	
EPA 200.8	Lead	0.0117	mg/L	0.00300	0.000044	2.5	W411093	KWH	03/13/14 07:52	
EPA 200.8	Zinc	0.0854	mg/L	0.0050	0.0005	2.5	W411093	KWH	03/13/14 07:52	
SM 2340B	Hardness (as CaCO3)	13.0	mg/L	0.923	0.099		N/A		03/17/14 17:05	

Metals (Dissolved)

EPA 200.7	Calcium	2.73	mg/L	0.040	0.015		W411116	AS	03/17/14 17:46	
EPA 200.7	Magnesium	1.36	mg/L	0.200	0.039		W411116	AS	03/17/14 17:46	
EPA 200.7	Potassium	1.71	mg/L	0.50	0.13		W411116	AS	03/17/14 17:46	
EPA 200.7	Sodium	2.91	mg/L	0.50	0.08		W411116	AS	03/17/14 17:46	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W411095	KWH	03/12/14 08:11	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W411095	KWH	03/12/14 08:11	
EPA 200.8	Cadmium	0.00042	mg/L	0.00020	0.000031		W411095	KWH	03/12/14 08:11	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000035		W411095	KWH	03/12/14 08:11	
EPA 200.8	Zinc	0.0773	mg/L	0.0050	0.0004		W411095	KWH	03/12/14 08:11	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	8.9	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:22	
SM 2320B/2310B	Bicarbonate	8.9	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:22	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:22	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:22	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	3.71	mg/L	0.20	0.04		W411084	AEW	03/11/14 13:11	
EPA 300.0	Nitrate as N	0.137	mg/L	0.050	0.008		W411084	AEW	03/11/14 13:11	
EPA 300.0	Sulfate as SO4	4.68	mg/L	0.30	0.06		W411084	AEW	03/11/14 13:11	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.42 meq/L Anion Sum: 0.39 meq/L C/A Balance: 3.60 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0126**
Reported: 19-Mar-14 10:44

Client Sample ID: **(EMF-SW-C) 031014-D**
SVL Sample ID: **W4C0126-05 (Rinsate)**

Sampled: 10-Mar-14 14:09
Received: 11-Mar-14
Sampled By: GM

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	< 0.040	mg/L	0.040	0.008		W411102	AS	03/17/14 17:07	
EPA 200.7	Magnesium	< 0.200	mg/L	0.200	0.020		W411102	AS	03/17/14 17:07	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411093	KWH	03/13/14 07:54	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411093	KWH	03/13/14 07:54	
EPA 200.8	Cadmium	< 0.00020	mg/L	0.00020	0.00004	2.5	W411093	KWH	03/13/14 07:54	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000044	2.5	W411093	KWH	03/13/14 07:54	
EPA 200.8	Zinc	< 0.0050	mg/L	0.0050	0.0005	2.5	W411093	KWH	03/13/14 07:54	
SM 2340B	Hardness (as CaCO3)	< 0.923	mg/L	0.923	0.099		N/A		03/17/14 17:07	

Metals (Dissolved)

EPA 200.7	Calcium	< 0.040	mg/L	0.040	0.015		W411116	AS	03/17/14 17:48	
EPA 200.7	Magnesium	< 0.200	mg/L	0.200	0.039		W411116	AS	03/17/14 17:48	
EPA 200.7	Potassium	< 0.50	mg/L	0.50	0.13		W411116	AS	03/17/14 17:48	
EPA 200.7	Sodium	< 0.50	mg/L	0.50	0.08		W411116	AS	03/17/14 17:48	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W411095	KWH	03/12/14 08:13	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W411095	KWH	03/12/14 08:13	
EPA 200.8	Cadmium	< 0.00020	mg/L	0.00020	0.000031		W411095	KWH	03/12/14 08:13	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000035		W411095	KWH	03/12/14 08:13	
EPA 200.8	Zinc	< 0.0050	mg/L	0.0050	0.0004		W411095	KWH	03/12/14 08:13	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	1.2	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:33	
SM 2320B/2310B	Bicarbonate	1.2	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:33	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:33	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:33	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	< 0.20	mg/L	0.20	0.04		W411084	AEW	03/11/14 13:21	
EPA 300.0	Nitrate as N	< 0.050	mg/L	0.050	0.008		W411084	AEW	03/11/14 13:21	
EPA 300.0	Sulfate as SO4	< 0.30	mg/L	0.30	0.06		W411084	AEW	03/11/14 13:21	

Cation Sum: 0.01 meq/L Anion Sum: 0.03 meq/L C/A Balance: -50.05 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573

Work order Report Page 6 of 11



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

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Fax (208) 783-0891

Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0126**
Reported: 19-Mar-14 10:44

Client Sample ID: **(EMF-SW-D) 031014**

SVL Sample ID: **W4C0126-06 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 10-Mar-14 15:04
Received: 11-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	4.78	mg/L	0.040	0.008		W411102	AS	03/17/14 17:10	
EPA 200.7	Magnesium	2.86	mg/L	0.200	0.020		W411102	AS	03/17/14 17:10	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411093	KWH	03/13/14 07:59	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411093	KWH	03/13/14 07:59	
EPA 200.8	Cadmium	0.00081	mg/L	0.00020	0.00004	2.5	W411093	KWH	03/13/14 07:59	
EPA 200.8	Lead	0.0308	mg/L	0.00300	0.000044	2.5	W411093	KWH	03/13/14 07:59	
EPA 200.8	Zinc	0.109	mg/L	0.0050	0.0005	2.5	W411093	KWH	03/13/14 07:59	
SM 2340B	Hardness (as CaCO3)	23.7	mg/L	0.923	0.099		N/A		03/17/14 17:10	

Metals (Dissolved)

EPA 200.7	Calcium	4.51	mg/L	0.040	0.015		W411116	AS	03/17/14 17:51	
EPA 200.7	Magnesium	2.70	mg/L	0.200	0.039		W411116	AS	03/17/14 17:51	
EPA 200.7	Potassium	2.15	mg/L	0.50	0.13		W411116	AS	03/17/14 17:51	
EPA 200.7	Sodium	4.38	mg/L	0.50	0.08		W411116	AS	03/17/14 17:51	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W411095	KWH	03/12/14 08:15	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W411095	KWH	03/12/14 08:15	
EPA 200.8	Cadmium	0.00053	mg/L	0.00020	0.000031		W411095	KWH	03/12/14 08:15	
EPA 200.8	Lead	0.0182	mg/L	0.00300	0.000035		W411095	KWH	03/12/14 08:15	
EPA 200.8	Zinc	0.104	mg/L	0.0050	0.0004		W411095	KWH	03/12/14 08:15	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	22.5	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:37	
SM 2320B/2310B	Bicarbonate	22.5	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:37	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:37	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:37	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	5.39	mg/L	0.20	0.04		W411084	AEW	03/11/14 13:51	
EPA 300.0	Nitrate as N	< 0.050	mg/L	0.050	0.008		W411084	AEW	03/11/14 13:51	
EPA 300.0	Sulfate as SO4	5.68	mg/L	0.30	0.06		W411084	AEW	03/11/14 13:51	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.70 meq/L Anion Sum: 0.72 meq/L C/A Balance: -1.71 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0126**
Reported: 19-Mar-14 10:44

Client Sample ID: **(EMF-SW-D) 031014-E**

SVL Sample ID: **W4C0126-07 (Field blank)**

Sample Report Page 1 of 1

Sampled: 10-Mar-14 15:11
Received: 11-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	< 0.040	mg/L	0.040	0.008		W411102	AS	03/17/14 17:18	
EPA 200.7	Magnesium	< 0.200	mg/L	0.200	0.020		W411102	AS	03/17/14 17:18	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411093	KWH	03/13/14 08:01	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411093	KWH	03/13/14 08:01	
EPA 200.8	Cadmium	< 0.00020	mg/L	0.00020	0.00004	2.5	W411093	KWH	03/13/14 08:01	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000044	2.5	W411093	KWH	03/13/14 08:01	
EPA 200.8	Zinc	< 0.0050	mg/L	0.0050	0.0005	2.5	W411093	KWH	03/13/14 08:01	
SM 2340B	Hardness (as CaCO3)	< 0.923	mg/L	0.923	0.099		N/A		03/17/14 17:18	

Metals (Dissolved)

EPA 200.7	Calcium	< 0.040	mg/L	0.040	0.015		W411116	AS	03/17/14 18:01	
EPA 200.7	Magnesium	< 0.200	mg/L	0.200	0.039		W411116	AS	03/17/14 18:01	
EPA 200.7	Potassium	< 0.50	mg/L	0.50	0.13		W411116	AS	03/17/14 18:01	
EPA 200.7	Sodium	< 0.50	mg/L	0.50	0.08		W411116	AS	03/17/14 18:01	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W411095	KWH	03/12/14 08:19	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W411095	KWH	03/12/14 08:19	
EPA 200.8	Cadmium	< 0.00020	mg/L	0.00020	0.000031		W411095	KWH	03/12/14 08:19	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000035		W411095	KWH	03/12/14 08:19	
EPA 200.8	Zinc	< 0.0050	mg/L	0.0050	0.0004		W411095	KWH	03/12/14 08:19	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:55	
SM 2320B/2310B	Bicarbonate	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:55	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:55	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411157	AGF	03/13/14 10:55	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	< 0.20	mg/L	0.20	0.04		W411084	AEW	03/11/14 14:01	
EPA 300.0	Nitrate as N	< 0.050	mg/L	0.050	0.008		W411084	AEW	03/11/14 14:01	
EPA 300.0	Sulfate as SO4	< 0.30	mg/L	0.30	0.06		W411084	AEW	03/11/14 14:01	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.01 meq/L Anion Sum: 0.02 meq/L C/A Balance: -43.76 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573

Work order Report Page 8 of 11



Terragraphics (Moscow) 121 S Jackson Moscow, ID 83843	Project Name: Terragraphics EMF Well Work Order: W4C0126 Reported: 19-Mar-14 10:44
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Quality Control - BLANK Data									
Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes	

Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	mg/L	<0.040	0.008	0.040	W411102	17-Mar-14		
EPA 200.7	Magnesium	mg/L	<0.200	0.020	0.200	W411102	17-Mar-14		
EPA 200.8	Antimony	mg/L	<0.00300	0.00032	0.00300	W411093	13-Mar-14		
EPA 200.8	Arsenic	mg/L	<0.0030	0.0004	0.0030	W411093	13-Mar-14		
EPA 200.8	Cadmium	mg/L	<0.00020	0.00004	0.00020	W411093	13-Mar-14		
EPA 200.8	Lead	mg/L	<0.00300	0.000044	0.00300	W411093	13-Mar-14		
EPA 200.8	Zinc	mg/L	<0.0050	0.0005	0.0050	W411093	13-Mar-14		

Metals (Dissolved)

EPA 200.7	Calcium	mg/L	<0.040	0.015	0.040	W411116	17-Mar-14		
EPA 200.7	Magnesium	mg/L	<0.200	0.039	0.200	W411116	17-Mar-14		
EPA 200.7	Potassium	mg/L	<0.50	0.13	0.50	W411116	17-Mar-14		
EPA 200.7	Sodium	mg/L	<0.50	0.08	0.50	W411116	17-Mar-14		
EPA 200.8	Antimony	mg/L	<0.00300	0.00026	0.00300	W411095	12-Mar-14		
EPA 200.8	Arsenic	mg/L	<0.0030	0.0003	0.0030	W411095	12-Mar-14		
EPA 200.8	Cadmium	mg/L	<0.00020	0.000031	0.00020	W411095	12-Mar-14		
EPA 200.8	Lead	mg/L	<0.00300	0.000035	0.00300	W411095	12-Mar-14		
EPA 200.8	Zinc	mg/L	<0.0050	0.0004	0.0050	W411095	12-Mar-14		

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	mg/L as CaCO3	<1.0		1.0	W411157	13-Mar-14		
SM 2320B/2310B	Bicarbonate	mg/L as CaCO3	<1.0		1.0	W411157	13-Mar-14		
SM 2320B/2310B	Carbonate	mg/L as CaCO3	<1.0		1.0	W411157	13-Mar-14		
SM 2320B/2310B	Hydroxide	mg/L as CaCO3	<1.0		1.0	W411157	13-Mar-14		

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	mg/L	<0.20	0.04	0.20	W411084	11-Mar-14		
EPA 300.0	Nitrate as N	mg/L	<0.050	0.008	0.050	W411084	11-Mar-14		
EPA 300.0	Sulfate as SO4	mg/L	<0.30	0.06	0.30	W411084	11-Mar-14		

Quality Control - LABORATORY CONTROL SAMPLE Data									
Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes

Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	mg/L	19.8	20.0	99.1	85 - 115	W411102	17-Mar-14	
EPA 200.7	Magnesium	mg/L	20.7	20.0	104	85 - 115	W411102	17-Mar-14	
EPA 200.8	Antimony	mg/L	0.0269	0.0250	108	85 - 115	W411093	13-Mar-14	
EPA 200.8	Arsenic	mg/L	0.0239	0.0250	95.7	85 - 115	W411093	13-Mar-14	
EPA 200.8	Cadmium	mg/L	0.0245	0.0250	97.9	85 - 115	W411093	13-Mar-14	
EPA 200.8	Lead	mg/L	0.0250	0.0250	99.8	85 - 115	W411093	13-Mar-14	
EPA 200.8	Zinc	mg/L	0.0249	0.0250	99.7	85 - 115	W411093	13-Mar-14	

Metals (Dissolved)

EPA 200.7	Calcium	mg/L	17.9	20.0	89.5	85 - 115	W411116	17-Mar-14	
EPA 200.7	Magnesium	mg/L	18.0	20.0	90.0	85 - 115	W411116	17-Mar-14	
EPA 200.7	Potassium	mg/L	18.3	20.0	91.6	85 - 115	W411116	17-Mar-14	
EPA 200.7	Sodium	mg/L	16.8	19.0	88.7	85 - 115	W411116	17-Mar-14	
EPA 200.8	Antimony	mg/L	0.0237	0.0250	94.6	85 - 115	W411095	12-Mar-14	
EPA 200.8	Arsenic	mg/L	0.0243	0.0250	97.3	85 - 115	W411095	12-Mar-14	
EPA 200.8	Cadmium	mg/L	0.0247	0.0250	98.7	85 - 115	W411095	12-Mar-14	
EPA 200.8	Lead	mg/L	0.0250	0.0250	100	85 - 115	W411095	12-Mar-14	
EPA 200.8	Zinc	mg/L	0.0238	0.0250	95.1	85 - 115	W411095	12-Mar-14	

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573



Terragraphics (Moscow) 121 S Jackson Moscow, ID 83843	Project Name: Terragraphics EMF Well Work Order: W4C0126 Reported: 19-Mar-14 10:44
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Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Classical Chemistry Parameters									
SM 2320B/2310B	Total Alkalinity	mg/L as CaCO3	99.8	99.3	101	85 - 115	W411157	13-Mar-14	
SM 2320B/2310B	Bicarbonate	mg/L as CaCO3	99.8	99.3	101	85 - 115	W411157	13-Mar-14	
Dissolved Anions by Ion Chromatography									
EPA 300.0	Chloride	mg/L	2.85	3.00	95.1	90 - 110	W411084	11-Mar-14	
EPA 300.0	Nitrate as N	mg/L	2.00	2.00	100	90 - 110	W411084	11-Mar-14	
EPA 300.0	Sulfate as SO4	mg/L	10.0	10.0	100	90 - 110	W411084	11-Mar-14	

Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch ID	Analyzed	Notes
Classical Chemistry Parameters									
SM 2320B/2310B	Total Alkalinity	mg/L as CaCO3	170	169	0.3	20	W411157	13-Mar-14	
SM 2320B/2310B	Total Alkalinity	mg/L as CaCO3	9.49	9.45	0.4	20	W411157	13-Mar-14	
SM 2320B/2310B	Bicarbonate	mg/L as CaCO3	170	169	0.3	20	W411157	13-Mar-14	
SM 2320B/2310B	Bicarbonate	mg/L as CaCO3	9.49	9.45	0.4	20	W411157	13-Mar-14	
SM 2320B/2310B	Carbonate	mg/L as CaCO3	<1.0	<1.0	UDL	20	W411157	13-Mar-14	
SM 2320B/2310B	Carbonate	mg/L as CaCO3	<1.0	<1.0	UDL	20	W411157	13-Mar-14	
SM 2320B/2310B	Hydroxide	mg/L as CaCO3	<1.0	<1.0	UDL	20	W411157	13-Mar-14	
SM 2320B/2310B	Hydroxide	mg/L as CaCO3	<1.0	<1.0	UDL	20	W411157	13-Mar-14	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	Calcium	mg/L	22.6	2.79	20.0	99.3	70 - 130	W411102	17-Mar-14	
EPA 200.7	Magnesium	mg/L	22.4	1.66	20.0	104	70 - 130	W411102	17-Mar-14	
EPA 200.8	Antimony	mg/L	0.0272	<0.00300	0.0250	107	70 - 130	W411093	13-Mar-14	
EPA 200.8	Arsenic	mg/L	0.0252	<0.0030	0.0250	101	70 - 130	W411093	13-Mar-14	
EPA 200.8	Cadmium	mg/L	0.0252	0.00050	0.0250	98.7	70 - 130	W411093	13-Mar-14	
EPA 200.8	Lead	mg/L	0.0361	0.0111	0.0250	99.9	70 - 130	W411093	13-Mar-14	
EPA 200.8	Zinc	mg/L	0.112	0.0873	0.0250	98.7	70 - 130	W411093	13-Mar-14	

Metals (Dissolved)										
EPA 200.7	Calcium	mg/L	22.7	2.81	20.0	99.4	70 - 130	W411116	17-Mar-14	
EPA 200.7	Magnesium	mg/L	21.3	1.50	20.0	99.2	70 - 130	W411116	17-Mar-14	
EPA 200.7	Potassium	mg/L	22.2	1.87	20.0	102	70 - 130	W411116	17-Mar-14	
EPA 200.7	Sodium	mg/L	22.5	4.05	19.0	96.8	70 - 130	W411116	17-Mar-14	
EPA 200.8	Antimony	mg/L	0.0233	<0.00300	0.0250	91.4	70 - 130	W411095	12-Mar-14	
EPA 200.8	Arsenic	mg/L	0.0261	<0.0030	0.0250	104	70 - 130	W411095	12-Mar-14	
EPA 200.8	Cadmium	mg/L	0.0254	0.00038	0.0250	99.9	70 - 130	W411095	12-Mar-14	
EPA 200.8	Lead	mg/L	0.0264	<0.00300	0.0250	99.4	70 - 130	W411095	12-Mar-14	
EPA 200.8	Zinc	mg/L	0.106	0.0784	0.0250	112	70 - 130	W411095	12-Mar-14	

Dissolved Anions by Ion Chromatography										
EPA 300.0	Chloride	mg/L	8.61	5.41	3.00	106	90 - 110	W411084	11-Mar-14	
EPA 300.0	Nitrate as N	mg/L	2.20	0.157	2.00	102	90 - 110	W411084	11-Mar-14	
EPA 300.0	Sulfate as SO4	mg/L	15.8	5.24	10.0	106	90 - 110	W411084	11-Mar-14	

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573



Terragraphics (Moscow) 121 S Jackson Moscow, ID 83843	Project Name: Terragraphics EMF Well Work Order: W4C0126 Reported: 19-Mar-14 10:44
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Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)											
EPA 200.7	Calcium	mg/L	22.6	22.6	20.0	99.2	0.1	20	W411102	17-Mar-14	
EPA 200.7	Magnesium	mg/L	22.7	22.4	20.0	105	1.4	20	W411102	17-Mar-14	
EPA 200.8	Antimony	mg/L	0.0268	0.0272	0.0250	105	1.5	20	W411093	13-Mar-14	
EPA 200.8	Arsenic	mg/L	0.0250	0.0252	0.0250	100	0.7	20	W411093	13-Mar-14	
EPA 200.8	Cadmium	mg/L	0.0254	0.0252	0.0250	99.6	0.9	20	W411093	13-Mar-14	
EPA 200.8	Lead	mg/L	0.0358	0.0361	0.0250	98.6	0.9	20	W411093	13-Mar-14	
EPA 200.8	Zinc	mg/L	0.113	0.112	0.0250	105	1.3	20	W411093	13-Mar-14	
Metals (Dissolved)											
EPA 200.7	Calcium	mg/L	22.7	22.7	20.0	99.4	0.0	20	W411116	17-Mar-14	
EPA 200.7	Magnesium	mg/L	21.6	21.3	20.0	100	1.2	20	W411116	17-Mar-14	
EPA 200.7	Potassium	mg/L	22.3	22.2	20.0	102	0.6	20	W411116	17-Mar-14	
EPA 200.7	Sodium	mg/L	22.8	22.5	19.0	98.5	1.4	20	W411116	17-Mar-14	
EPA 200.8	Antimony	mg/L	0.0237	0.0233	0.0250	93.1	1.9	20	W411095	12-Mar-14	
EPA 200.8	Arsenic	mg/L	0.0253	0.0261	0.0250	101	3.0	20	W411095	12-Mar-14	
EPA 200.8	Cadmium	mg/L	0.0256	0.0254	0.0250	101	1.0	20	W411095	12-Mar-14	
EPA 200.8	Lead	mg/L	0.0262	0.0264	0.0250	98.7	0.7	20	W411095	12-Mar-14	
EPA 200.8	Zinc	mg/L	0.107	0.106	0.0250	114	0.4	20	W411095	12-Mar-14	
Dissolved Anions by Ion Chromatography											
EPA 300.0	Chloride	mg/L	8.62	8.61	3.00	107	0.2	20	W411084	11-Mar-14	
EPA 300.0	Nitrate as N	mg/L	2.20	2.20	2.00	102	0.1	20	W411084	11-Mar-14	
EPA 300.0	Sulfate as SO4	mg/L	15.8	15.8	10.0	106	0.0	20	W411084	11-Mar-14	

Notes and Definitions

LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
R > 4S	% recovery not applicable, sample concentration more than four times greater than spike level
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable



One Government Gulch - PO Box 929

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0199**
Reported: 21-Mar-14 10:47

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received
(EMF-SW-A) 031214	W4C0199-01	Surface Water	12-Mar-14 12:03	GM	13-Mar-2014
(EMF-SW-A) 031214-C	W4C0199-02	Surface Water	12-Mar-14 12:03	GM	13-Mar-2014
(EMF-SW-B) 031214	W4C0199-03	Surface Water	12-Mar-14 12:28	GM	13-Mar-2014
(EMF-SW-C) 031214	W4C0199-04	Surface Water	12-Mar-14 12:47	GM	13-Mar-2014
(EMF-SW-C) 031214-D	W4C0199-05	Surface Water	12-Mar-14 12:53	GM	13-Mar-2014
(EMF-SW-D) 031214	W4C0199-06	Surface Water	12-Mar-14 13:17	GM	13-Mar-2014
(EMF-SW-D) 031214-E	W4C0199-07	Surface Water	12-Mar-14 13:23	GM	13-Mar-2014

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0199**
Reported: 21-Mar-14 10:47

Client Sample ID: **(EMF-SW-A) 031214**

SVL Sample ID: **W4C0199-01 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 12-Mar-14 12:03
Received: 13-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	3.85	mg/L	0.040	0.008		W411247	MCE	03/18/14 14:12	
EPA 200.7	Magnesium	1.74	mg/L	0.200	0.020		W411247	MCE	03/18/14 14:12	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411227	KWH	03/18/14 07:41	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411227	KWH	03/18/14 07:41	
EPA 200.8	Cadmium	0.00053	mg/L	0.00020	0.00004	2.5	W411227	KWH	03/18/14 07:41	
EPA 200.8	Lead	0.00498	mg/L	0.00300	0.000044	2.5	W411227	KWH	03/18/14 07:41	
EPA 200.8	Zinc	0.122	mg/L	0.0050	0.0005	2.5	W411227	KWH	03/18/14 07:41	
SM 2340B	Hardness (as CaCO3)	16.8	mg/L	0.923	0.099		N/A		03/18/14 14:12	

Metals (Dissolved)

EPA 200.7	Calcium	4.00	mg/L	0.040	0.015		W411254	AS	03/19/14 13:10	
EPA 200.7	Magnesium	1.72	mg/L	0.200	0.039		W411254	AS	03/19/14 13:10	
EPA 200.7	Potassium	1.32	mg/L	0.50	0.13		W411254	AS	03/19/14 13:10	
EPA 200.7	Sodium	2.17	mg/L	0.50	0.08		W411254	AS	03/19/14 13:10	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W412036	KWH	03/18/14 07:19	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W412036	KWH	03/18/14 07:19	
EPA 200.8	Cadmium	0.00050	mg/L	0.00020	0.000031		W412036	KWH	03/18/14 07:19	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000035		W412036	KWH	03/18/14 07:19	
EPA 200.8	Zinc	0.126	mg/L	0.0050	0.0004		W412036	KWH	03/18/14 07:19	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	11.8	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 08:56	
SM 2320B/2310B	Bicarbonate	11.8	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 08:56	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 08:56	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 08:56	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	3.04	mg/L	0.20	0.04		W411211	AEW	03/13/14 13:20	
EPA 300.0	Nitrate as N	0.128	mg/L	0.050	0.008		W411211	AEW	03/13/14 13:20	
EPA 300.0	Sulfate as SO4	5.65	mg/L	0.30	0.06		W411211	AEW	03/13/14 13:20	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.47 meq/L Anion Sum: 0.45 meq/L C/A Balance: 1.89 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573

Work order Report Page 2 of 11



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0199**
Reported: 21-Mar-14 10:47

Client Sample ID: **(EMF-SW-A) 031214-C**

SVL Sample ID: **W4C0199-02 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 12-Mar-14 12:03
Received: 13-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	3.92	mg/L	0.040	0.008		W411247	MCE	03/18/14 14:15	
EPA 200.7	Magnesium	1.73	mg/L	0.200	0.020		W411247	MCE	03/18/14 14:15	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411227	KWH	03/18/14 07:42	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411227	KWH	03/18/14 07:42	
EPA 200.8	Cadmium	0.00056	mg/L	0.00020	0.00004	2.5	W411227	KWH	03/18/14 07:42	
EPA 200.8	Lead	0.00501	mg/L	0.00300	0.000044	2.5	W411227	KWH	03/18/14 07:42	
EPA 200.8	Zinc	0.125	mg/L	0.0050	0.0005	2.5	W411227	KWH	03/18/14 07:42	
SM 2340B	Hardness (as CaCO3)	16.9	mg/L	0.923	0.099		N/A		03/18/14 14:15	

Metals (Dissolved)

EPA 200.7	Calcium	4.10	mg/L	0.040	0.015		W411254	AS	03/19/14 13:13	
EPA 200.7	Magnesium	1.71	mg/L	0.200	0.039		W411254	AS	03/19/14 13:13	
EPA 200.7	Potassium	1.35	mg/L	0.50	0.13		W411254	AS	03/19/14 13:13	
EPA 200.7	Sodium	2.15	mg/L	0.50	0.08		W411254	AS	03/19/14 13:13	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W412036	KWH	03/18/14 07:21	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W412036	KWH	03/18/14 07:21	
EPA 200.8	Cadmium	0.00054	mg/L	0.00020	0.000031		W412036	KWH	03/18/14 07:21	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000035		W412036	KWH	03/18/14 07:21	
EPA 200.8	Zinc	0.127	mg/L	0.0050	0.0004		W412036	KWH	03/18/14 07:21	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	12.3	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:08	
SM 2320B/2310B	Bicarbonate	12.3	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:08	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:08	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:08	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	3.04	mg/L	0.20	0.04		W411211	AEW	03/13/14 13:29	
EPA 300.0	Nitrate as N	0.133	mg/L	0.050	0.008		W411211	AEW	03/13/14 13:29	
EPA 300.0	Sulfate as SO4	5.66	mg/L	0.30	0.06		W411211	AEW	03/13/14 13:29	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.47 meq/L Anion Sum: 0.46 meq/L C/A Balance: 1.01 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0199**
Reported: 21-Mar-14 10:47

Client Sample ID: **(EMF-SW-B) 031214**

SVL Sample ID: **W4C0199-03 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 12-Mar-14 12:28
Received: 13-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	3.75	mg/L	0.040	0.008		W411247	MCE	03/18/14 14:18	
EPA 200.7	Magnesium	1.74	mg/L	0.200	0.020		W411247	MCE	03/18/14 14:18	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411227	KWH	03/18/14 07:36	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411227	KWH	03/18/14 07:36	
EPA 200.8	Cadmium	0.00056	mg/L	0.00020	0.00004	2.5	W411227	KWH	03/18/14 07:36	
EPA 200.8	Lead	0.00594	mg/L	0.00300	0.000044	2.5	W411227	KWH	03/18/14 07:36	
EPA 200.8	Zinc	0.104	mg/L	0.0050	0.0005	2.5	W411227	KWH	03/18/14 07:36	
SM 2340B	Hardness (as CaCO3)	16.5	mg/L	0.923	0.099		N/A		03/18/14 14:18	

Metals (Dissolved)

EPA 200.7	Calcium	2.80	mg/L	0.040	0.015		W411254	AS	03/19/14 13:16	
EPA 200.7	Magnesium	1.21	mg/L	0.200	0.039		W411254	AS	03/19/14 13:16	
EPA 200.7	Potassium	0.86	mg/L	0.50	0.13		W411254	AS	03/19/14 13:16	
EPA 200.7	Sodium	1.86	mg/L	0.50	0.08		W411254	AS	03/19/14 13:16	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W412036	KWH	03/18/14 07:15	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W412036	KWH	03/18/14 07:15	
EPA 200.8	Cadmium	0.00052	mg/L	0.00020	0.000031		W412036	KWH	03/18/14 07:15	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000035		W412036	KWH	03/18/14 07:15	
EPA 200.8	Zinc	0.0980	mg/L	0.0050	0.0004		W412036	KWH	03/18/14 07:15	M3

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	11.2	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:15	
SM 2320B/2310B	Bicarbonate	11.2	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:15	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:15	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:15	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	3.59	mg/L	0.20	0.04		W411211	AEW	03/13/14 13:39	
EPA 300.0	Nitrate as N	0.099	mg/L	0.050	0.008		W411211	AEW	03/13/14 13:39	
EPA 300.0	Sulfate as SO4	5.50	mg/L	0.30	0.06		W411211	AEW	03/13/14 13:39	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.35 meq/L Anion Sum: 0.45 meq/L C/A Balance: -12.81 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0199**
Reported: 21-Mar-14 10:47

Client Sample ID: **(EMF-SW-C) 031214**

SVL Sample ID: **W4C0199-04 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 12-Mar-14 12:47
Received: 13-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	3.76	mg/L	0.040	0.008		W411247	MCE	03/18/14 14:26	
EPA 200.7	Magnesium	1.78	mg/L	0.200	0.020		W411247	MCE	03/18/14 14:26	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411227	KWH	03/18/14 07:44	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411227	KWH	03/18/14 07:44	
EPA 200.8	Cadmium	0.00061	mg/L	0.00020	0.00004	2.5	W411227	KWH	03/18/14 07:44	
EPA 200.8	Lead	0.00704	mg/L	0.00300	0.000044	2.5	W411227	KWH	03/18/14 07:44	
EPA 200.8	Zinc	0.110	mg/L	0.0050	0.0005	2.5	W411227	KWH	03/18/14 07:44	
SM 2340B	Hardness (as CaCO3)	16.7	mg/L	0.923	0.099		N/A		03/18/14 14:26	

Metals (Dissolved)

EPA 200.7	Calcium	3.89	mg/L	0.040	0.015		W411254	AS	03/19/14 13:23	
EPA 200.7	Magnesium	1.72	mg/L	0.200	0.039		W411254	AS	03/19/14 13:23	
EPA 200.7	Potassium	1.33	mg/L	0.50	0.13		W411254	AS	03/19/14 13:23	
EPA 200.7	Sodium	2.37	mg/L	0.50	0.08		W411254	AS	03/19/14 13:23	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W412036	KWH	03/18/14 07:23	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W412036	KWH	03/18/14 07:23	
EPA 200.8	Cadmium	0.00057	mg/L	0.00020	0.000031		W412036	KWH	03/18/14 07:23	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000035		W412036	KWH	03/18/14 07:23	
EPA 200.8	Zinc	0.113	mg/L	0.0050	0.0004		W412036	KWH	03/18/14 07:23	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	11.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:22	
SM 2320B/2310B	Bicarbonate	11.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:22	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:22	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:22	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	3.43	mg/L	0.20	0.04		W411211	AEW	03/13/14 14:08	
EPA 300.0	Nitrate as N	0.144	mg/L	0.050	0.008		W411211	AEW	03/13/14 14:08	
EPA 300.0	Sulfate as SO4	5.71	mg/L	0.30	0.06		W411211	AEW	03/13/14 14:08	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.47 meq/L Anion Sum: 0.45 meq/L C/A Balance: 2.62 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0199**
Reported: 21-Mar-14 10:47

Client Sample ID: **(EMF-SW-C) 031214-D**

SVL Sample ID: **W4C0199-05 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 12-Mar-14 12:53
Received: 13-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	< 0.040	mg/L	0.040	0.008		W411247	MCE	03/18/14 14:29	
EPA 200.7	Magnesium	< 0.200	mg/L	0.200	0.020		W411247	MCE	03/18/14 14:29	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411227	KWH	03/18/14 07:45	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411227	KWH	03/18/14 07:45	
EPA 200.8	Cadmium	< 0.00020	mg/L	0.00020	0.00004	2.5	W411227	KWH	03/18/14 07:45	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000044	2.5	W411227	KWH	03/18/14 07:45	
EPA 200.8	Zinc	< 0.0050	mg/L	0.0050	0.0005	2.5	W411227	KWH	03/18/14 07:45	
SM 2340B	Hardness (as CaCO3)	< 0.923	mg/L	0.923	0.099		N/A		03/18/14 14:29	

Metals (Dissolved)

EPA 200.7	Calcium	< 0.040	mg/L	0.040	0.015		W411254	AS	03/19/14 13:26	
EPA 200.7	Magnesium	< 0.200	mg/L	0.200	0.039		W411254	AS	03/19/14 13:26	
EPA 200.7	Potassium	< 0.50	mg/L	0.50	0.13		W411254	AS	03/19/14 13:26	
EPA 200.7	Sodium	< 0.50	mg/L	0.50	0.08		W411254	AS	03/19/14 13:26	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W412036	KWH	03/18/14 07:24	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W412036	KWH	03/18/14 07:24	
EPA 200.8	Cadmium	< 0.00020	mg/L	0.00020	0.000031		W412036	KWH	03/18/14 07:24	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000035		W412036	KWH	03/18/14 07:24	
EPA 200.8	Zinc	< 0.0050	mg/L	0.0050	0.0004		W412036	KWH	03/18/14 07:24	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:32	
SM 2320B/2310B	Bicarbonate	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:32	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:32	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:32	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	< 0.20	mg/L	0.20	0.04		W411211	AEW	03/13/14 14:18	
EPA 300.0	Nitrate as N	< 0.050	mg/L	0.050	0.008		W411211	AEW	03/13/14 14:18	
EPA 300.0	Sulfate as SO4	< 0.30	mg/L	0.30	0.06		W411211	AEW	03/13/14 14:18	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.01 meq/L Anion Sum: 0.02 meq/L C/A Balance: -43.76 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573

Work order Report Page 6 of 11



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

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Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0199**
Reported: 21-Mar-14 10:47

Client Sample ID: **(EMF-SW-D) 031214**

SVL Sample ID: **W4C0199-06 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 12-Mar-14 13:17
Received: 13-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	4.46	mg/L	0.040	0.008		W411247	MCE	03/18/14 14:37	
EPA 200.7	Magnesium	2.31	mg/L	0.200	0.020		W411247	MCE	03/18/14 14:37	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411227	KWH	03/18/14 07:50	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411227	KWH	03/18/14 07:50	
EPA 200.8	Cadmium	0.00086	mg/L	0.00020	0.00004	2.5	W411227	KWH	03/18/14 07:50	
EPA 200.8	Lead	0.0103	mg/L	0.00300	0.000044	2.5	W411227	KWH	03/18/14 07:50	
EPA 200.8	Zinc	0.116	mg/L	0.0050	0.0005	2.5	W411227	KWH	03/18/14 07:50	
SM 2340B	Hardness (as CaCO3)	20.6	mg/L	0.923	0.099		N/A		03/18/14 14:37	

Metals (Dissolved)

EPA 200.7	Calcium	4.74	mg/L	0.040	0.015		W411254	AS	03/19/14 13:29	
EPA 200.7	Magnesium	2.35	mg/L	0.200	0.039		W411254	AS	03/19/14 13:29	
EPA 200.7	Potassium	2.42	mg/L	0.50	0.13		W411254	AS	03/19/14 13:29	
EPA 200.7	Sodium	2.78	mg/L	0.50	0.08		W411254	AS	03/19/14 13:29	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W412036	KWH	03/18/14 07:26	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W412036	KWH	03/18/14 07:26	
EPA 200.8	Cadmium	0.00096	mg/L	0.00020	0.000031		W412036	KWH	03/18/14 07:26	
EPA 200.8	Lead	0.00649	mg/L	0.00300	0.000035		W412036	KWH	03/18/14 07:26	
EPA 200.8	Zinc	0.138	mg/L	0.0050	0.0004		W412036	KWH	03/18/14 07:26	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	12.6	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:35	
SM 2320B/2310B	Bicarbonate	12.6	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:35	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:35	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:35	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	5.58	mg/L	0.20	0.04		W411211	AEW	03/13/14 14:27	
EPA 300.0	Nitrate as N	0.306	mg/L	0.050	0.008		W411211	AEW	03/13/14 14:27	
EPA 300.0	Sulfate as SO4	7.23	mg/L	0.30	0.06		W411211	AEW	03/13/14 14:27	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.60 meq/L Anion Sum: 0.58 meq/L C/A Balance: 1.49 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573

Work order Report Page 7 of 11



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

Terragraphics (Moscow)
121 S Jackson
Moscow, ID 83843

Project Name: Terragraphics EMF Well
Work Order: **W4C0199**
Reported: 21-Mar-14 10:47

Client Sample ID: **(EMF-SW-D) 031214-E**

SVL Sample ID: **W4C0199-07 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 12-Mar-14 13:23
Received: 13-Mar-14
Sampled By: GM

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	< 0.040	mg/L	0.040	0.008		W411247	MCE	03/18/14 14:40	
EPA 200.7	Magnesium	< 0.200	mg/L	0.200	0.020		W411247	MCE	03/18/14 14:40	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00032	2.5	W411227	KWH	03/18/14 07:52	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0004	2.5	W411227	KWH	03/18/14 07:52	
EPA 200.8	Cadmium	< 0.00020	mg/L	0.00020	0.00004	2.5	W411227	KWH	03/18/14 07:52	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000044	2.5	W411227	KWH	03/18/14 07:52	
EPA 200.8	Zinc	< 0.0050	mg/L	0.0050	0.0005	2.5	W411227	KWH	03/18/14 07:52	
SM 2340B	Hardness (as CaCO3)	< 0.923	mg/L	0.923	0.099		N/A		03/18/14 14:40	

Metals (Dissolved)

EPA 200.7	Calcium	< 0.040	mg/L	0.040	0.015		W411254	AS	03/19/14 13:38	
EPA 200.7	Magnesium	< 0.200	mg/L	0.200	0.039		W411254	AS	03/19/14 13:38	
EPA 200.7	Potassium	< 0.50	mg/L	0.50	0.13		W411254	AS	03/19/14 13:38	
EPA 200.7	Sodium	< 0.50	mg/L	0.50	0.08		W411254	AS	03/19/14 13:38	
EPA 200.8	Antimony	< 0.00300	mg/L	0.00300	0.00026		W412036	KWH	03/18/14 07:31	
EPA 200.8	Arsenic	< 0.0030	mg/L	0.0030	0.0003		W412036	KWH	03/18/14 07:31	
EPA 200.8	Cadmium	< 0.00020	mg/L	0.00020	0.000031		W412036	KWH	03/18/14 07:31	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000035		W412036	KWH	03/18/14 07:31	
EPA 200.8	Zinc	< 0.0050	mg/L	0.0050	0.0004		W412036	KWH	03/18/14 07:31	

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:42	
SM 2320B/2310B	Bicarbonate	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:42	
SM 2320B/2310B	Carbonate	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:42	
SM 2320B/2310B	Hydroxide	< 1.0	mg/L as CaCO3	1.0			W411216	AGF	03/14/14 09:42	

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	< 0.20	mg/L	0.20	0.04		W411211	AEW	03/13/14 14:56	
EPA 300.0	Nitrate as N	< 0.050	mg/L	0.050	0.008		W411211	AEW	03/13/14 14:56	
EPA 300.0	Sulfate as SO4	< 0.30	mg/L	0.30	0.06		W411211	AEW	03/13/14 14:56	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.01 meq/L Anion Sum: 0.02 meq/L C/A Balance: -43.76 %

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573

Work order Report Page 8 of 11



Terragraphics (Moscow) 121 S Jackson Moscow, ID 83843	Project Name: Terragraphics EMF Well Work Order: W4C0199 Reported: 21-Mar-14 10:47
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Quality Control - BLANK Data									
Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes	

Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	mg/L	<0.040	0.008	0.040	W411247	18-Mar-14		
EPA 200.7	Magnesium	mg/L	<0.200	0.020	0.200	W411247	18-Mar-14		
EPA 200.8	Antimony	mg/L	<0.00300	0.00032	0.00300	W411227	18-Mar-14		
EPA 200.8	Arsenic	mg/L	<0.0030	0.0004	0.0030	W411227	18-Mar-14		
EPA 200.8	Cadmium	mg/L	<0.00020	0.00004	0.00020	W411227	18-Mar-14		
EPA 200.8	Lead	mg/L	<0.00300	0.000044	0.00300	W411227	18-Mar-14		
EPA 200.8	Zinc	mg/L	<0.0050	0.0005	0.0050	W411227	18-Mar-14		

Metals (Dissolved)

EPA 200.7	Calcium	mg/L	<0.040	0.015	0.040	W411254	19-Mar-14		
EPA 200.7	Magnesium	mg/L	<0.200	0.039	0.200	W411254	19-Mar-14		
EPA 200.7	Potassium	mg/L	<0.50	0.13	0.50	W411254	19-Mar-14		
EPA 200.7	Sodium	mg/L	<0.50	0.08	0.50	W411254	19-Mar-14		
EPA 200.8	Antimony	mg/L	<0.00300	0.00026	0.00300	W412036	18-Mar-14		
EPA 200.8	Arsenic	mg/L	<0.0030	0.0003	0.0030	W412036	18-Mar-14		
EPA 200.8	Cadmium	mg/L	<0.00020	0.000031	0.00020	W412036	18-Mar-14		
EPA 200.8	Lead	mg/L	<0.00300	0.000035	0.00300	W412036	18-Mar-14		
EPA 200.8	Zinc	mg/L	<0.0050	0.0004	0.0050	W412036	18-Mar-14		

Classical Chemistry Parameters

SM 2320B/2310B	Total Alkalinity	mg/L as CaCO3	<1.0		1.0	W411216	14-Mar-14		
SM 2320B/2310B	Bicarbonate	mg/L as CaCO3	<1.0		1.0	W411216	14-Mar-14		
SM 2320B/2310B	Carbonate	mg/L as CaCO3	<1.0		1.0	W411216	14-Mar-14		
SM 2320B/2310B	Hydroxide	mg/L as CaCO3	<1.0		1.0	W411216	14-Mar-14		

Dissolved Anions by Ion Chromatography

EPA 300.0	Chloride	mg/L	<0.20	0.04	0.20	W411211	13-Mar-14		
EPA 300.0	Nitrate as N	mg/L	<0.050	0.008	0.050	W411211	13-Mar-14		
EPA 300.0	Sulfate as SO4	mg/L	<0.30	0.06	0.30	W411211	13-Mar-14		

Quality Control - LABORATORY CONTROL SAMPLE Data									
Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes

Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Calcium	mg/L	20.0	20.0	99.8	85 - 115	W411247	18-Mar-14	
EPA 200.7	Magnesium	mg/L	20.8	20.0	104	85 - 115	W411247	18-Mar-14	
EPA 200.8	Antimony	mg/L	0.0267	0.0250	107	85 - 115	W411227	18-Mar-14	
EPA 200.8	Arsenic	mg/L	0.0250	0.0250	100	85 - 115	W411227	18-Mar-14	
EPA 200.8	Cadmium	mg/L	0.0248	0.0250	99.2	85 - 115	W411227	18-Mar-14	
EPA 200.8	Lead	mg/L	0.0251	0.0250	100	85 - 115	W411227	18-Mar-14	
EPA 200.8	Zinc	mg/L	0.0262	0.0250	105	85 - 115	W411227	18-Mar-14	

Metals (Dissolved)

EPA 200.7	Calcium	mg/L	19.8	20.0	98.8	85 - 115	W411254	19-Mar-14	
EPA 200.7	Magnesium	mg/L	19.3	20.0	96.3	85 - 115	W411254	19-Mar-14	
EPA 200.7	Potassium	mg/L	20.1	20.0	100	85 - 115	W411254	19-Mar-14	
EPA 200.7	Sodium	mg/L	18.2	19.0	95.6	85 - 115	W411254	19-Mar-14	
EPA 200.8	Antimony	mg/L	0.0237	0.0250	94.8	85 - 115	W412036	18-Mar-14	
EPA 200.8	Arsenic	mg/L	0.0260	0.0250	104	85 - 115	W412036	18-Mar-14	
EPA 200.8	Cadmium	mg/L	0.0258	0.0250	103	85 - 115	W412036	18-Mar-14	
EPA 200.8	Lead	mg/L	0.0258	0.0250	103	85 - 115	W412036	18-Mar-14	
EPA 200.8	Zinc	mg/L	0.0256	0.0250	102	85 - 115	W412036	18-Mar-14	

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573



Terragraphics (Moscow) 121 S Jackson Moscow, ID 83843	Project Name: Terragraphics EMF Well Work Order: W4C0199 Reported: 21-Mar-14 10:47
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Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Classical Chemistry Parameters									
SM 2320B/2310B	Total Alkalinity	mg/L as CaCO3	98.6	99.3	99.3	85 - 115	W411216	14-Mar-14	
SM 2320B/2310B	Bicarbonate	mg/L as CaCO3	98.6	99.3	99.3	85 - 115	W411216	14-Mar-14	
Dissolved Anions by Ion Chromatography									
EPA 300.0	Chloride	mg/L	2.87	3.00	95.8	90 - 110	W411211	13-Mar-14	
EPA 300.0	Nitrate as N	mg/L	2.01	2.00	100	90 - 110	W411211	13-Mar-14	
EPA 300.0	Sulfate as SO4	mg/L	10.0	10.0	100	90 - 110	W411211	13-Mar-14	

Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch ID	Analyzed	Notes
Classical Chemistry Parameters									
SM 2320B/2310B	Total Alkalinity	mg/L as CaCO3	11.2	11.2	0.4	20	W411216	14-Mar-14	
SM 2320B/2310B	Total Alkalinity	mg/L as CaCO3	96.0	96.2	0.2	20	W411216	14-Mar-14	
SM 2320B/2310B	Bicarbonate	mg/L as CaCO3	11.2	11.2	0.4	20	W411216	14-Mar-14	
SM 2320B/2310B	Bicarbonate	mg/L as CaCO3	96.0	96.2	0.2	20	W411216	14-Mar-14	
SM 2320B/2310B	Carbonate	mg/L as CaCO3	<1.0	<1.0	UDL	20	W411216	14-Mar-14	
SM 2320B/2310B	Carbonate	mg/L as CaCO3	<1.0	<1.0	UDL	20	W411216	14-Mar-14	
SM 2320B/2310B	Hydroxide	mg/L as CaCO3	<1.0	<1.0	UDL	20	W411216	14-Mar-14	
SM 2320B/2310B	Hydroxide	mg/L as CaCO3	<1.0	<1.0	UDL	20	W411216	14-Mar-14	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	Calcium	mg/L	23.5	3.75	20.0	98.8	70 - 130	W411247	18-Mar-14	
EPA 200.7	Magnesium	mg/L	22.6	1.74	20.0	104	70 - 130	W411247	18-Mar-14	
EPA 200.8	Antimony	mg/L	0.0254	<0.00300	0.0250	100	70 - 130	W411227	18-Mar-14	
EPA 200.8	Arsenic	mg/L	0.0249	<0.0030	0.0250	99.7	70 - 130	W411227	18-Mar-14	
EPA 200.8	Cadmium	mg/L	0.0244	0.00056	0.0250	95.3	70 - 130	W411227	18-Mar-14	
EPA 200.8	Lead	mg/L	0.0293	0.00594	0.0250	93.4	70 - 130	W411227	18-Mar-14	
EPA 200.8	Zinc	mg/L	0.122	0.104	0.0250	75.4	70 - 130	W411227	18-Mar-14	
Metals (Dissolved)										
EPA 200.7	Calcium	mg/L	21.4	2.80	20.0	92.9	70 - 130	W411254	19-Mar-14	
EPA 200.7	Magnesium	mg/L	19.5	1.21	20.0	91.5	70 - 130	W411254	19-Mar-14	
EPA 200.7	Potassium	mg/L	19.9	0.86	20.0	95.4	70 - 130	W411254	19-Mar-14	
EPA 200.7	Sodium	mg/L	18.9	1.86	19.0	89.7	70 - 130	W411254	19-Mar-14	
EPA 200.8	Antimony	mg/L	0.0238	<0.00300	0.0250	93.5	70 - 130	W412036	18-Mar-14	
EPA 200.8	Arsenic	mg/L	0.0271	<0.0030	0.0250	109	70 - 130	W412036	18-Mar-14	
EPA 200.8	Cadmium	mg/L	0.0268	0.00052	0.0250	105	70 - 130	W412036	18-Mar-14	
EPA 200.8	Lead	mg/L	0.0265	<0.00300	0.0250	101	70 - 130	W412036	18-Mar-14	
EPA 200.8	Zinc	mg/L	0.0978	0.0980	0.0250	-0.564	70 - 130	W412036	18-Mar-14	M3

Dissolved Anions by Ion Chromatography										
EPA 300.0	Chloride	mg/L	6.78	3.59	3.00	106	90 - 110	W411211	13-Mar-14	
EPA 300.0	Nitrate as N	mg/L	2.18	0.099	2.00	104	90 - 110	W411211	13-Mar-14	
EPA 300.0	Sulfate as SO4	mg/L	16.3	5.50	10.0	108	90 - 110	W411211	13-Mar-14	

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573



Terragraphics (Moscow) 121 S Jackson Moscow, ID 83843	Project Name: Terragraphics EMF Well Work Order: W4C0199 Reported: 21-Mar-14 10:47
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Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)											
EPA 200.7	Calcium	mg/L	24.0	23.5	20.0	101	2.2	20	W411247	18-Mar-14	
EPA 200.7	Magnesium	mg/L	22.8	22.6	20.0	106	1.1	20	W411247	18-Mar-14	
EPA 200.8	Antimony	mg/L	0.0266	0.0254	0.0250	105	4.7	20	W411227	18-Mar-14	
EPA 200.8	Arsenic	mg/L	0.0259	0.0249	0.0250	104	4.0	20	W411227	18-Mar-14	
EPA 200.8	Cadmium	mg/L	0.0254	0.0244	0.0250	99.3	4.0	20	W411227	18-Mar-14	
EPA 200.8	Lead	mg/L	0.0314	0.0293	0.0250	102	7.1	20	W411227	18-Mar-14	
EPA 200.8	Zinc	mg/L	0.129	0.122	0.0250	102	5.3	20	W411227	18-Mar-14	
Metals (Dissolved)											
EPA 200.7	Calcium	mg/L	22.8	21.4	20.0	100	6.4	20	W411254	19-Mar-14	
EPA 200.7	Magnesium	mg/L	20.7	19.5	20.0	97.3	5.8	20	W411254	19-Mar-14	
EPA 200.7	Potassium	mg/L	21.2	19.9	20.0	102	6.3	20	W411254	19-Mar-14	
EPA 200.7	Sodium	mg/L	20.1	18.9	19.0	95.8	6.0	20	W411254	19-Mar-14	
EPA 200.8	Antimony	mg/L	0.0235	0.0238	0.0250	92.2	1.4	20	W412036	18-Mar-14	
EPA 200.8	Arsenic	mg/L	0.0274	0.0271	0.0250	110	1.0	20	W412036	18-Mar-14	
EPA 200.8	Cadmium	mg/L	0.0262	0.0268	0.0250	103	2.0	20	W412036	18-Mar-14	M3
EPA 200.8	Lead	mg/L	0.0261	0.0265	0.0250	99.6	1.5	20	W412036	18-Mar-14	
EPA 200.8	Zinc	mg/L	0.0985	0.0978	0.0250	2.31	0.7	20	W412036	18-Mar-14	M3
Dissolved Anions by Ion Chromatography											
EPA 300.0	Chloride	mg/L	6.80	6.78	3.00	107	0.3	20	W411211	13-Mar-14	
EPA 300.0	Nitrate as N	mg/L	2.21	2.18	2.00	106	1.4	20	W411211	13-Mar-14	
EPA 300.0	Sulfate as SO4	mg/L	16.4	16.3	10.0	109	0.9	20	W411211	13-Mar-14	

Notes and Definitions

- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
- LCS Laboratory Control Sample (Blank Spike)
- RPD Relative Percent Difference
- UDL A result is less than the detection limit
- R > 4S % recovery not applicable, sample concentration more than four times greater than spike level
- <RL A result is less than the reporting limit
- MRL Method Reporting Limit
- MDL Method Detection Limit
- N/A Not Applicable

Attachment D
Photographs



Photo 1: Photo taken from PZ-A, looking SE



Photo 2: MW-C DEEP taken from PZ-A



Photo 3: SW-C taken from NW edge of repository



Photo 4: Flow of floodwater along NW repository edge looking N



Photo 5: SW-D



Photo 6: SW-C

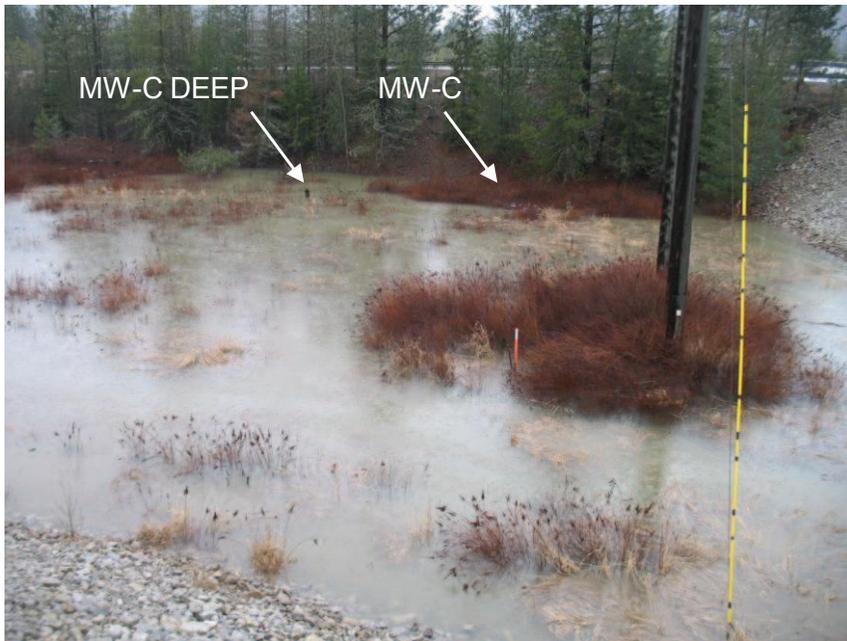


Photo 7: MW-C DEEP and MW-C



Photo 8: Road to gun club taken from Mission Rd.



Photo 9: Looking SW from SE end of repository



Photo 10: Looking S



Photo 11: SW-A



Photo 12: SW-A



Photo 13: Water gushing from casing cap on MW-C DEEP



Photo 14: SW-B



Photo 15: SW-C looking NE from Dredge Rd.



Photo 1: SW-A



Photo 2: SW-A



Photo 3: Looking N from bank on N side of off ramp

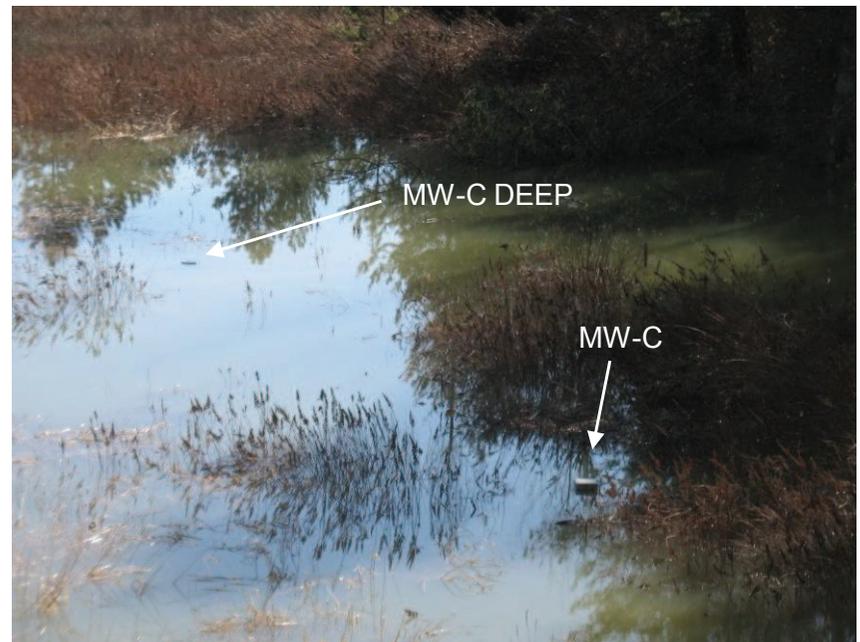


Photo 4: MW-C & MW-C DEEP



Photo 5: SW-C looking NE from Dredge Rd.



Photo 6: Looking N from SW-C



Photo 7: SW-D looking E



Photo 8: NE end of repository looking SE



Photo 9: Road to gun club looking SE



Photo 10: SW water flow at road to gun club looking ESE