GROUNDWATER AND SURFACE WATER MONITORING DATA RELEASE 2013 SAMPLING EVENT SHALLOW LAND DISPOSAL AREA FUSRAP SITE

U.S. Army Corps of Engineers
Pittsburgh District

Building Strong®

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Formerly Utilized Sites Remedial Action Program (FUSRAP)

FUSRAP was initiated in 1974 to identify, investigate, and if necessary, cleanup or control sites throughout the United States that were part of the Nation's early atomic weapons and energy programs during the 1940s, 1950s, and 1960s. When implementing FUSRAP, the United States Army Corps of Engineers (USACE) follows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The USACE is the lead federal agency under FUSRAP remediating the Shallow Land Disposal Area (SLDA) Site.

Site Description

The SLDA is located in Parks Township, Armstrong County, Pennsylvania, about 23 miles (37 kilometers) east-northeast of Pittsburgh, Pennsylvania (Figure 1). The 44-acre (18-hectare) site is predominantly an open field partially bordered by woodland. Ten (10) disposal trenches were excavated in the overburden soils and together encompass approximately 1.2 acres (0.49 hectares); the trenches are separated geographically into the Trench 1 through 9 area (or the upper trench area) and Trench 10 (the lower trench area). Site topography declines approximately 115 feet (35 meters) from the southeast to northwest, or from Trenches 1 through 9 toward Trench 10 (Figure 2). The depths of the upper trenches vary between 10 and 15 feet, whereas Trench 10 varies up to 20 feet in depth.

The upper trench area is underlain by up to 20 feet of native silty soils that blanket four groundwater bearing bedrock zones:

- First Shallow Bedrock - averages 13 feet in thickness between elevation 881 and 894 feet,
- Second Shallow Bedrock - averages 14-feet in thickness between elevation 856 and 870 feet,

- Upper Freeport Coal – averages 4 feet in thickness between elevations 832 and 836 feet and was subjected to room and pillar mining (now exhibits open-channel flow), and
- Deep Bedrock Zone - averages about 36 feet in thickness between elevations 757 and 793 feet.

In the Trench 10 area, the Freeport coal seam was strip mined and the general area backfilled with approximately 22 feet of shale rock spoils. Figure 3 presents a generalized northwest to southeast geologic cross section through the site to depict these site entities and groundwater zones.

Groundwater surrounding the upper trench area flows dominantly to the north in the soil layer (Figure 4), to the north-northeast in both the first and second shallow bedrock zones (Figures 5 and 6), to the south in the Freeport Coal (Figure 7), and to the west in the deep bedrock zone (Figure 8). Groundwater surrounding Trench 10 appears to enter the Upper Freeport Coal seam, which drains in a westerly to southerly direction (Figure 7).

The site is drained by a small, ephemeral stream identified as Dry Run (Figure 2). A portion of the flow in Dry Run infiltrates through the coal mine spoils in the vicinity of Trench 10 and into the abandoned coal mines that underlie most of the site (see Figure 2-14 in USACE 2005). The balance of Dry Run flow continues northwest into the Kiskiminetas River.

Land use surrounding the SLDA Site consists of medium-sized residential communities and individual rural residences, small farms with croplands and pastures, idle farmland, forestlands, and light industrial areas. The closest community is Kiskimere, which is adjacent to and to the south of the SLDA; some residences are located within several hundred feet of the SLDA.

Previous Groundwater Monitoring Results

Historical (non-USACE) groundwater monitoring at the site included a site investigation in 1981, a site characterization from 1990-1994, another investigation in 1995, and the site owner's quarterly monitoring from 1991-2000. These data are summarized in the Remedial Investigation (RI) performed by the USACE (USACE 2005).

Based upon these historic data, groundwater sampling conducted during the USACE RI included a subset of the groundwater well inventory shown on Figure 9; these wells were sampled for the following analytes:

- Radium-228
- Uranium-234, -235, -238
- Thorium-228, -232
- Plutonium-239,-241
- Americium-241

In addition, 10% of the RI samples were analyzed for cesium-137, cobalt-60, thorium-230, radium-226, plutonium-238, -240, -242, and gross alpha and beta. The RI sampling of groundwater indicated that FUSRAP-related constituents were not a threat to human health and the environment (USACE 2005).

During the remedial action (or trench excavation), groundwater is sampled monthly at 14 locations to determine if the site excavation activities were affecting groundwater (Figure 10). This targeted program analyzes for isotopic uranium (U-234, -235, -238), isotopic thorium (Th-228, -232), radium-228, plutonium-239 and -241, americium-241, total uranium, target analyte list (TAL) metals plus molybdenum, anions, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total organic carbon, and total dissolved solids. The radiological and metals analyses include both unfiltered and filtered samples. This program was conducted from April 2011 through December 2011 and produced results consistent with the RI sampling (i.e., FUSRAP-related radiologic constituents are not a groundwater risk factor at the SLDA) (see Appendix A). This monitoring effort was suspended in 2012 due to a remediation hiatus and will re-initiate once remediation recommences.

Purpose

A SLDA groundwater monitoring plan to annually sample site groundwater was developed in 2013 to guide sampling activities through the completion of the remedial action (Appendix B). The overarching objective of the sampling effort is to ensure the protection of human health and the environment from FUSRAP-related constituents of concern at the SLDA site. The USACE plan delineated an optimal monitoring program to detect the potential for off-site migration, specifically towards the Kiskimere community.

The goals of the groundwater monitoring program include:

- Identify the locations to be sampled (Figure 11)
- Identify the frequency of sampling (i.e., annual sampling)
- Specify analytical parameters for collected samples (Table 1)

This sampling program has been developed in consultation with the U.S. Environmental Protection Agency (USEPA).

Scope

The 2013 annual groundwater monitoring at the SLDA was conducted from May 20-24, 2013. Eighteen (18) wells were sampled and are located generally between the 10 trenches and the neighboring residences (Figure 12). Nine (9) fewer wells were sampled than planned in 2013 due to either minimal groundwater (i.e., extremely poor yield) or dry-well conditions. Alternatively, three wells and two surface-water locations were substituted to best ensure the protection of human health and the environment. Table 1 lists the constituents analyzed, Table 2 lists the planned locations (and noted changes), and Figure 12 shows the wells actually sampled. The constituents listed in Table 1 are a subset of the analytes sampled during the RI and remedial action; this annual sampling program is focused on site contaminants specifically listed in the record of decision (ROD) (USACE 2007).

Static water levels from all site wells were recorded synchronously to the nearest 0.01 foot to determine whether adequate volumes were available for sampling and to confirm groundwater flow directions.

These data are listed in Table 3; wells omitted from this list were either decommissioned under remedial actions or damaged and thus deemed unreliable. Figures 4 through 8 graphically present these groundwater elevation data and inferred flow directions for four water bearing zones.

Low-flow sampling techniques consistent with USEPA guidance (Puls and Barcelona, 1996) and the Department of Defense (DoD) (DoD, 2013) were utilized for the groundwater sampling. Prior to sampling, wells were purged until the following field parameters stabilized according to the sampling plan: temperature, pH, specific conductance, oxidation-reduction potential, turbidity, and dissolved oxygen. These data are listed in Table 4.

Both unfiltered (total fraction) and field filtered (dissolved fraction) groundwater samples were obtained where well yield allowed. Filtered samples were collected in the field by utilizing a disposable 0.45 micron in-line filter. Field duplicates provided quality control samples, which were collected at a rate of approximately one duplicate for every ten regular samples. Well MW-20 was sampled over a two-day period using a disposable bailer to collect the needed volume of water for full analysis due to poor production; this unfiltered sample represents a time-composited sample.

Samples were packaged according to standard practices, and shipped to DoD Environmental Laboratory Accreditation Program (ELAP) accredited laboratories. Laboratory data were reviewed and qualified per laboratory performance quality indicators, the applicable laboratory and method criteria, and the DoD Quality Systems Manual.

The sampling task produced investigation derived waste (IDW) that consisted of solids and liquids. The solid IDW was assessed for radioactivity and either disposed of as general trash or retained on site for disposition. The liquid IDW consisted of purge water that was containerized on site for future disposition.

Sampling Results

Table 5 lists the unfiltered (total) and filtered (dissolved phase) analytical results for the 2013 monitoring event. Filtered data have a “-F” after the location name in the table. Table 6 presents a summary of the results, comparative drinking water standards, and up-gradient (or background) values for radionuclides derived for the site during the USACE RI. Analytical results are consistent with past sampling and indicate that only 11 locations exhibit unique values relative to the overall dataset, as outlined below:

Metals Data:

- Aluminum, beryllium, iron, and manganese exceed a primary or secondary drinking water standard.
- MW-39 is screened in the coal-mine near Trench 10 and exhibits distinct aluminum, beryllium, cobalt, iron, manganese, and zinc results, along with a sulfuric odor.
- MW-22 is screened in the deep groundwater zone and exhibits high arsenic, manganese, and iron due to geochemically reductive conditions at this location.
- MW-40 is screened in the deep groundwater zone and exhibits high sodium.

Figure 13 shows the locations of these wells.

Radionuclides:

- Plutonium-241 (Pu-241), thorium-228 (Th-228), uranium-234 (U-234), uranium-238 (U-238), and total elemental uranium (Total U) were detected at levels above background ranges in eight wells.
- No radionuclides exceed the USEPA drinking water standards of 30 µg/L for uranium, 15 picoCuries per liter (pCi/L) for total alpha emitters, and 4 millirem per year (mrem/yr) dose limit for beta emitters (e.g., Pu-241 limit of 300 pCi/L). The radionuclide-specific standards for the beta-emitter dose threshold are explained in Appendix C (USEPA 2001).
- The radiologic detections uncharacteristic of background are summarized below:
    - Pu-241: Estimated (or "J" qualified) detections up to 8.18 pCi/L were seen in MW-01, MW-09A, MW-40, and MW-15; the maximum detection was observed at MW-01 (near Trench 10) and is approximately 3% of the drinking water standard of 300 pCi/L for Pu-241 (Table 6). These results show inconsistencies between filtered and unfiltered samples. Unfiltered samples from the same location normally exhibit higher concentrations due to influences from suspended soil particles or colloids in the sample, while filtered samples omit these artifacts. The Pu-241 data show a mix of estimated detections and non-detections from these locations, irrespective of filtering. This disparity was evident during the RI, which prompted confirmatory sampling that did not authenticate the plutonium detections; similar inconsistent results were evident during the 2011 sampling events. Future annual sampling will include Pu-241 for verification purposes.
    - Th-228: Low detections (up to 2.42 pCi/L) were estimated in unfiltered samples from MW-03 and MW-20. These wells yielded little water and required the use of manual bailers to obtain the proper quantity for analysis; this process increased the turbidity of the samples. Since only unfiltered samples were collected at these locations, the Th-228 appears to be an artifact of soil particles (turbidity) present in the groundwater sample. All other estimated Th-228 values were below 0.9 pCi/L.
    - Total U: Concentrations between 1.0 µg/L and 3.81 µg/L were detected in MW-03, MW-20, and at surface-water point SP-DR-01 near Trenches 4 and 5; all other results were below 1.0 µg/L.
    - U-234: Concentrations between 1.22 pCi/L and 5.18 pCi/L were detected in MW-03, MW-20, 10L31, MW-81 near the north end of Trench 1, and at surface-water point SP-DR-01 near Trenches 4 and 5; all other results were below 1.0 pCi/L.
    - U-238: A maximum concentration of 2.12 pCi/L was detected in MW-03. All other U-238 detections were below 1.0 pCi/L.

The wells that exhibit detected radionuclides penetrate the coal seam near Trench 10 or the bedrock immediately north of Trench 1; the groundwater seep sampled near Trenches 4 and 5 (SP-DR-01) also showed low radiologic concentrations (Figure 14). These results are consistent with past USACE findings that show no FUSRAP-related radionuclides exceed the USEPA MCLs or dose-based levels for drinking water (Table 6).

References:

Department of Defense (DoD), 2013. DoD Environmental Field Sampling Handbook, Revision 1.0, DoD Environmental Data Quality Workgroup, April 2013.

Puls, R. and M. Barcelona, 1996. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, EPA Issue Paper (EPA/540/S-95/04), April 1996.

U.S. Army Corps of Engineers (USACE), 2005. Shallow Land Disposal Area Remedial Investigation Report, U.S. Army Corps of Engineers, October 2005.

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U.S. Environmental Protection Agency, 2001. Directive number 9283.1-14, Memorandum: Use of Uranium Drinking Water Standards under 40 CFR 141 and 40 CFR 192 as Remediation Goals for Groundwater at CERCLA sites.

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Table 1. Annual Groundwater Monitoring Program Analytes and Analytical Methods

Analyte	Fraction	Method
TAL Metals	Filtered and Unfiltered	EPA 6020, Inductively Coupled Plasma Mass-Spectrometry
Total Uranium	Filtered and Unfiltered	ASTM D5174, Trace Uranium by Pulsed-Laser Phosphorimetry
Americium-241	Filtered and Unfiltered	Alpha Spectrometry
Isotopic Plutonium (238, 239/240)	Filtered and Unfiltered	Alpha Spectrometry
Plutonium-241	Filtered and Unfiltered	Liquid Scintillation
Isotopic Thorium (228, 230, 232)	Filtered and Unfiltered	Alpha Spectrometry
Isotopic Uranium (234, 235, 238)	Filtered and Unfiltered	Alpha Spectrometry

Table 2. Shallow Land Disposal Area FUSRAP Site Groundwater Monitoring Well Summary

Well/Location	Top of Casing Elevation (ft AMSL)	Zone	Up (U) or Down (D) Gradient from Disposal Areas	Monitoring Activity			Rationale
				Water Level	Unfiltered GW	Filtered GW	
02U11	925.99	OB	D	X			Water Levels
02U13	923.45	OB	D	X			Water Levels
03U05	924.10	OB	D	X			Water Levels
05U07	935.10	OB	U	X			Water Levels
06U05	941.26	OB	D	X			Water Levels
08U04	938.94	OB	D	X			Water Levels
08U05	940.93	OB	D	X			Water Levels
09U07	927.69	OB	D	X			Water Levels
10L31	859.84	UF	U	X	X	X	Trench Containment Verification
10L32	848.69	UF	U	X			Water Levels
MW-01	845.79	UF	U	X	◇	◇	Substituted Well Sampled
MW-02	884.22	DB	U	X			Water Levels
MW-02A	885.43	UF	D	X	X	X	Trench Containment Verification
MW-03	890.50	UF	D	X	X	X	Trench Containment Verification
MW-04	NA	UF	D	X			Water Levels
MW-05	865.49	UF	U	X	X	X	Trench Containment Verification
MW-07	921.52	1S	U/cross gradient	X	X	X	Trench Containment Verification
MW-08	931.77	1S	U	X	X	X	Trench Containment Verification
MW-09A	945.45	1S	U	X	X	X	Trench Containment Verification
MW-11D	909.80	2S	D	X			Water Levels
MW-11S	909.27	OB	D	X			Water Levels
MW-12D	919.31	1S	D	X			Water Levels
MW-13	948.68	1S	U	X	X	X	Trench Containment Verification
MW-14	947.33	1S	U	X	X	X	Trench Containment Verification
MW-15	940.31	1S	U	X	X	X	Trench Containment Verification
MW-17	913.71	2S	D	X			Water Levels
MW-19	861.45	DB	U	X			Water Levels
MW-20	889.87	UF	D	X	X	X	Trench Containment Verification
MW-21	888.32	UF	D	X	X	X	Trench Containment Verification
MW-22	893.41	DB	D	X	X	X	Trench Containment Verification
MW-25	910.07	1S	D	X			Water Levels
MW-26	919.56	1S	D	X			Water Levels
MW-27	929.99	1S	D	X			Water Levels
MW-29	912.53	1S	D	X			Water Levels
MW-32	925.89	1S	U	X	X	X	Trench Containment Verification
MW-33	940.76	2S	U	X	X	X	Trench Containment Verification
MW-34A	926.84	DB	D	X	X	X	Trench Containment Verification
MW-35	913.68	DB	U	X			Water Levels
MW-37	926.58	2S	D	X			Water Levels
MW-39	891.99	UF	D	X	X	X	Trench Containment Verification
MW-40	939.63	DB	D	X	X	X	Trench Containment Verification
MW-41	912.86	1S	D	X			Water Levels
MW-42	916.50	1S	D	X			Water Levels
MW-43	916.32	2S	D	X			Water Levels
MW-44	930.98	1S	D	X			Water Levels
MW-45	929.90	2S	U	X	X	X	Trench Containment Verification
MW-46	924.18	UF	D	X	X	X	Trench Containment Verification
MW-47	925.18	OB	U	X	X	X	Trench Containment Verification
MW-50	902.02	1S	D	X			Water Levels
MW-51	925.43	1S	D	X			Water Levels
MW-52	924.73	2S	U	X	X	X	Trench Containment Verification
MW-53	925.34	2S	D	X			Water Levels
MW-58	838.93	DB	U	X			Water Levels
MW-59	932.45	OB	U	X			Water Levels
MW-61	932.49	2S	U	X	X	X	Trench Containment Verification
MW-62	926.22	UF	D	X			Water Levels
MW-64	946.50	OB	U	X			Water Levels
MW-69	947.43	OB	U	X			Water Levels
MW-74	925.30	OB	U	X			Water Levels
MW-80	916.07	1S	D	X			Water Levels
MW-81	898.22	1S	D	X	◇	◇	Substituted Well Sampled
MW-82	921.22	1S	D	X			Water Levels
MW-83	916.03	OB	D	X			Water Levels
MW-84	923.36	1S	D	X			Water Levels
MW-86	928.02	1S	D	X			Water Levels
NWS-01A	931.57	Varies	Varies	X			FLUTe Well – Not Measured
NWS-02	946.35	Varies	Varies	X			FLUTe Well – Not Measured
NWS-03	946.87	Varies	Varies	X			FLUTe Well – Not Measured
NWS-04	925.25	Varies	Varies	X			FLUTe Well – Not Measured
NWS-05	914.28	Varies	Varies	X			FLUTe Well – Not Measured
PZ-01	907.53	OB	D	X			Water Levels
PZ-02	913.49	OB	D	X			Water Levels
PZ-03A	920.72	OB	D	X			Water Levels
PZ-04	920.85	OB	D	X			Water Levels
PZ-05	929.78	OB	D	X			Water Levels
PZ-06A	943.23	OB	D	X			Water Levels
PZ-07	942.67	OB	U	X			Water Levels
PZ-08	933.31	OB	U	X			Water Levels
PZ-09	938.49	OB	U	X	X	X	Trench Containment Verification
TPZ-01	924.30	1S	U	X			Water Levels
TPZ-02	926.38	1S	U	X			Water Levels
TPZ-03	895.50	1S	D	X			Water Levels
TPZ-04	914.09	1S	D	X			Water Levels
TPZ-05	916.51	1S	D	X			Water Levels
TPZ-06	907.77	OB	D	X			Water Levels
TPZ-07	917.35	OB	D	X			Water Levels
TPZ-08	924.45	OB	D	X			Water Levels

Notes:

ft AMSL	feet above mean sea level	UF	Upper Freeport Coal
GW	Groundwater	DB	Deep Bedrock Zone
OB	Overburden	NA	Data Not Available
1S	First shallow bedrock zone		
2S	Second shallow bedrock zone		
◇	Substituted Well – Normally Water Levels		

Table 3. 2013 SLDA Groundwater Level Record Sheet

Sample Location ID	Date	Time	Depth to Water from TOC (feet)	Remarks
10L31	21-May	14:30	22.81	
10L32	20-May	16:03	10.65	
MW-01	23-May	14:20	7.84	
MW-02	20-May	15:36	78.26	
MW-02A	20-May	16:26	47.02	
MW-03	20-May	15:34	53.20	
MW-05	20-May	15:24	Dry	27.32 deep
MW-07	20-May	17:09	32.32	
MW-08	20-May	16:54	13.12	
MW-09A	20-May	14:00-17:30	20.73	
MW-11D	20-May	14:00-17:30	41.45	
MW-11S	20-May	14:00-17:30	11.47	Sump at 12' so dry
MW-13	20-May	14:00-17:30	23.25	
MW-14	20-May	14:00-17:30	14.45	
MW-15	20-May	14:00-17:30	12.97	
MW-17	20-May	14:00-17:30	44.00	
MW-19	20-May	15:50	57.90	
MW-20	20-May	16:24	51.93	
MW-21	20-May	16:19	Dry	50.51 deep
MW-22	20-May	16:15	89.55	
MW-25	20-May	14:00-17:30	17.26	
MW-26	20-May	14:00-17:30	29.85	
MW-27	20-May	14:00-17:30	36.00	
MW-29	20-May	14:00-17:30	18.61	
MW-32	20-May	16:57	Dry	26.25 deep
MW-33	20-May	14:00-17:30	56.3	
MW-34A	20-May	14:00-17:30	Dry	
MW-35	20-May	14:00-17:30	> 100	
MW-37	20-May	14:00-17:30	Dry	69.05 deep
MW-38	20-May	16:15	42.27	
MW-39	20-May	16:13	55.28	
MW-40	22-May	15:20	120.32	
MW-41	20-May	14:00-17:30	19.61	
MW-42	20-May	14:00-17:30	28.22	
MW-43	20-May	14:00-17:30	36.63	
MW-44	20-May	14:00-17:30	41.56	
MW-45	20-May	16:47	65.36	
MW-46	20-May	16:51	Dry	39.28 deep
MW-47	20-May	17:05	19.43	
MW-50	23-May	14:00-17:30	36.46	
MW-51	20-May	14:00-17:30	32.44	
MW-52	20-May	17:06	35.82	
MW-53	20-May	14:00-17:30	51.45	
MW-58	20-May	16:00	6.41	
MW-59	20-May	14:00-17:30	6.95	
MW-61	20-May	14:00-17:30	67.68	
MW-62	23-May	14:00-17:30	89.25	
MW-74	20-May	14:00-17:30	Dry	15.20 deep
MW-80	20-May	14:00-17:30	27.67	
MW-81	20-May	14:00-17:30	9.71	
MW-82	20-May	14:00-17:30	29.7	
MW-83	20-May	14:00-17:30	48.95	
MW-84	20-May	14:00-17:30	34.48	
MW-86	20-May	14:00-17:30	37.93	
PZ-01	20-May	14:00-17:30	13.71	
PZ-02	20-May	14:00-17:30	18.06	
PZ-04	23-May	14:00-17:30	10.86	
PZ-05	20-May	14:00-17:30	19.9	20' deep - Dry
PZ-06A	20-May	14:00-17:30	6.41	
PZ-07	20-May	14:00-17:30	7.09	
PZ-08	20-May	16:45	8.95	
PZ-09	20-May	14:00-17:30	9.35	
TPZ-03	20-May	14:00-17:30	9.85	
TPZ-04	20-May	14:00-17:30	20.33	
TPZ-05	23-May	14:00-17:30	22.61	
TPZ-07				Bent - no level
TPZ-08				Lost to clearing

Table 4. Groundwater Sampling Field Data

Well ID	Collect Date	Temperature (F)	Specific Conductance (mS/cm)	pH (standard unit)	ORP (mV)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Purge Rate (mL/min)	Comments
10L31	21-May-13	22.73	0.56	6.41	106	1.80	2.1	150	Neglible drawdown
MW-01	23-May-13	31.10	0.40	6.19	182	1.79	0.0	210	Neglible drawdown
MW-02A	23-May-13	56.80	0.39	6.03	186	2.43	0.0	225	2.8 feet of drawdown
MW-07	21-May-13	58.60	0.39	6.84	49	7.65	0.4	220	Neglible drawdown
MW-08	22-May-13	57.80	0.26	7.25	16	0.50	4.0	150	1.3 feet of drawdown
MW-09A	22-May-13	59.00	0.21	6.91	96	2.83	0.0	260	1.4 feet of drawdown
MW-13	21-May-13	61.50	0.22	7.01	84	0.80	0.0	210	0.4 feet of drawdown
MW-14	21-May-13	65.00	0.21	6.67	-18	1.03	0.0	220	0.7 feet of drawdown
MW-15	22-May-13	60.80	0.11	5.87	134	0.61	158.0	235	1.3 feet of drawdown
MW-20	23-May-13	58.70	3.37	2.82	429	9.68	745.0	--	Pumped dry, multi-day composite
MW-22	22-May-13	59.30	1.16	6.30	-72	0.54	0.0	340	Neglible drawdown
MW-33	22-May-13	71.10	0.50	7.49	-87	1.28	165.0	250	3.1 feet of drawdown
MW-39	21-May-13	57.60	0.60	4.14	299	3.46	0.0	750	Neglible drawdown - sulfur odor
MW-40	22-May-13	58.30	0.81	9.06	-224	0.92	0.0	460	7.3 feet of drawdown
MW-52	21-May-13	58.40	0.51	6.81	-58	0.62	0.0	280	Neglible drawdown
MW-59	23-May-13	55.50	0.16	4.70	216	2.32	18.3	200	3.4 feet of drawdown
MW-81	23-May-13	58.70	0.18	5.96	171	1.21	48.4	170	1.2 feet of drawdown
PZ-09	22-May-13	60.90	0.16	4.82	304	1.91	39.7	200	0.5 feet of drawdown
SP-DR-01	23-May-13	70.60	0.15	6.14	41	4.21	302.0	300	Groundwater seep near Trench 4-5
SP-DR-05	23-May-13	65.80	0.35	6.35	107	6.75	5.1	300	Dry Run flow exiting at fenceline

Maximum	71.1	3.370	9.06	429	9.68	745	750
Minimum	22.7	0.112	2.82	-224	0.50	0	150
Average	57.4	0.535	6.19	98	2.62	74	270
Geometric Mean	55.9	0.357	6.03	--	1.76	--	249

NOTES:
Temperature (F) - Degrees Faherheit
Specific Conductance (mS/cm) - millisiemens per centimeter
ORP (mV) - Oxygen Reduction Potential in miliivolts
Turbidity (NTU) - Nephelometric Turbidity Units
Purge Rate (mL/min) - milliliters per minute

Table 5. 2013 Groundwater Monitoring Results for Annual SLDA Sampling

Metals Table Definitions:
J - Estimated value below minimum Level of Detectability (LOD)
U - Undetectable below Achieved Detection Limit
LOD - Limit of Detection
LOQ - Limit of Quantitation
µg/L - micrograms per liter

Radiologic Table Definitions:
J - Estimated value below minimum Level of Detectability (LOD)
U - Undetectable below Critical Level
MDA - Minimal Detectable Activity
RL - Reporting Limit
pCi/L - picoCuries per liter

Metals Data

Sample Location	Parameter	Result	Units	Qualifier	Detection Limit	LOD	LOQ	Reporting Limit
10L31	Aluminum	10	µg/L	J	1.4	2.5	50	50
10L31	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
10L31	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5
10L31	Barium	39	µg/L		0.18	0.50	25	25
10L31	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
10L31	Calcium	79,000	µg/L		90	120	1000	1,000
10L31	Chromium	1.3	µg/L	J	0.30	0.50	10	10
10L31	Cobalt	0.36	µg/L	J	0.12	0.50	5.0	5.0
10L31	Copper	0.80	µg/L	J	0.24	0.50	5.0	5.0
10L31	Iron	290	µg/L		48	120	200	200
10L31	Lead	ND	µg/L	U	0.24	0.50	1.0	1.0
10L31	Magnesium	42,000	µg/L		41	120	500	500
10L31	Manganese	46	µg/L		0.26	0.50	5.0	5.0
10L31	Mercury	0.086	µg/L	J	0.024	0.10	0.20	0.20
10L31	Nickel	4.2	µg/L	J	0.20	0.50	10	10
10L31	Potassium	3,100	µg/L		110	120	500	500
10L31	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
10L31	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
10L31	Sodium	9,000	µg/L		58	120	500	500
10L31	Thallium	ND	µg/L	U	0.16	0.50	2.0	2.0
10L31	Vanadium	0.54	µg/L	J	0.49	0.50	4.0	4.0
10L31	Zinc	16	µg/L	J	1.8	2.5	50	50
10L31-F	Aluminum, dissolved	9.9	µg/L	J	1.4	2.5	50	50
10L31-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
10L31-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
10L31-F	Barium, dissolved	30	µg/L		0.18	0.50	25	25
10L31-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
10L31-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
10L31-F	Calcium, dissolved	65,000	µg/L		90	120	1000	1,000
10L31-F	Chromium, dissolved	1.6	µg/L	J	0.30	0.50	10	10
10L31-F	Cobalt, dissolved	0.18	µg/L	J	0.12	0.50	2.0	2.0
10L31-F	Copper, dissolved	0.88	µg/L	J	0.24	0.50	5.0	5.0
10L31-F	Iron, dissolved	98	µg/L	J	48	120	200	200
10L31-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
10L31-F	Magnesium, dissolved	32,000	µg/L		41	120	500	500
10L31-F	Manganese, dissolved	37	µg/L		0.26	0.50	5.0	5.0
10L31-F	Mercury	0.12	µg/L	J	0.052	0.10	0.20	0.20
10L31-F	Nickel, dissolved	3.7	µg/L	J	0.20	0.50	10	10
10L31-F	Potassium, dissolved	2,500	µg/L		110	120	500	500
10L31-F	Selenium, dissolved	1.7	µg/L	J	1.5	2.5	5.0	5.0
10L31-F	Silver, dissolved	0.28	µg/L	J	0.18	0.50	1.5	1.5
10L31-F	Sodium, dissolved	7,000	µg/L		58	250	500	500
10L31-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
10L31-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
10L31-F	Zinc, dissolved	13	µg/L	J	1.8	2.5	50	50
MW-01	Aluminum	12	µg/L	J	1.4	2.5	50	50
MW-01	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-01	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-01	Barium	48	µg/L		0.18	0.50	25	25
MW-01	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-01	Calcium	46,000	µg/L		90	120	1000	1,000
MW-01	Chromium	0.92	µg/L	J	0.30	0.50	10	10
MW-01	Cobalt	0.22	µg/L	J	0.12	0.50	5.0	5.0
MW-01	Copper	0.80	µg/L	J	0.24	0.50	5.0	5.0
MW-01	Iron	190	µg/L	J	48	120	200	200
MW-01	Lead	0.30	µg/L	J	0.24	0.50	1.0	1.0
MW-01	Magnesium	23,000	µg/L		41	120	500	500
MW-01	Manganese	14	µg/L		0.26	0.50	5.0	5.0
MW-01	Mercury	0.091	µg/L	J	0.024	0.10	0.20	0.20
MW-01	Nickel	3.4	µg/L	J	0.20	0.50	10	10
MW-01	Potassium	1,800	µg/L		110	120	500	500
MW-01	Selenium	2.2	µg/L	J	1.5	2.5	5.0	5.0
MW-01	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-01	Sodium	4,800	µg/L		58	120	500	500
MW-01	Thallium	0.20	µg/L	J	0.16	0.50	2.0	2.0
MW-01	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-01	Zinc	6.7	µg/L	J	1.8	2.5	50	50
MW-01-F	Aluminum, dissolved	1.7	µg/L	J	1.4	2.5	50	50
MW-01-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-01-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-01-F	Barium, dissolved	43	µg/L		0.18	0.50	25	25
MW-01-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-01-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-01-F	Calcium, dissolved	44,000	µg/L		90	120	1000	1,000
MW-01-F	Chromium, dissolved	0.31	µg/L	J	0.30	0.50	10	10
MW-01-F	Cobalt, dissolved	ND	µg/L	U	0.12	0.50	2.0	2.0
MW-01-F	Copper, dissolved	0.40	µg/L	J	0.24	0.50	5.0	5.0
MW-01-F	Iron, dissolved	ND	µg/L	U	48	120	200	200
MW-01-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-01-F	Magnesium, dissolved	21,000	µg/L		41	120	500	500
MW-01-F	Manganese, dissolved	0.86	µg/L	J	0.26	0.50	5.0	5.0
MW-01-F	Mercury	0.085	µg/L	J	0.052	0.10	0.20	0.20
MW-01-F	Nickel, dissolved	3.2	µg/L	J	0.20	0.50	10	10
MW-01-F	Potassium, dissolved	1,700	µg/L		110	120	500	500
MW-01-F	Selenium, dissolved	1.8	µg/L	J	1.5	2.5	5.0	5.0
MW-01-F	Silver, dissolved	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-01-F	Sodium, dissolved	4,500	µg/L		58	250	500	500
MW-01-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-01-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-01-F	Zinc, dissolved	2.7	µg/L	J	1.8	2.5	50	50
MW-02A	Aluminum	41	µg/L	J	1.4	2.5	50	50
MW-02A	Antimony	1.1	µg/L	J	0.52	0.50	2.5	2.5
MW-02A	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-02A	Barium	35	µg/L		0.18	0.50	25	25
MW-02A	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-02A	Calcium	58,000	µg/L		90	120	1000	1,000
MW-02A	Chromium	1.7	µg/L	J	0.30	0.50	10	10
MW-02A	Cobalt	3.3	µg/L	J	0.12	0.50	5.0	5.0
MW-02A	Copper	2.7	µg/L	J	0.24	0.50	5.0	5.0
MW-02A	Iron	380	µg/L		48	120	200	200
MW-02A	Lead	0.46	µg/L	J	0.24	0.50	1.0	1.0
MW-02A	Magnesium	15,000	µg/L		41	120	500	500
MW-02A	Manganese	210	µg/L		0.26	0.50	5.0	5.0
MW-02A	Mercury	0.087	µg/L	J	0.024	0.10	0.20	0.20
MW-02A	Nickel	21	µg/L		0.20	0.50	10	10
MW-02A	Potassium	3,600	µg/L		110	120	500	500
MW-02A	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-02A	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-02A	Sodium	4,900	µg/L		58	120	500	500
MW-02A	Thallium	0.36	µg/L	J	0.16	0.50	2.0	2.0
MW-02A	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-02A	Zinc	23	µg/L	J	1.8	2.5	50	50
MW-02A-F	Aluminum, dissolved	9.4	µg/L	J	1.4	2.5	50	50
MW-02A-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-02A-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-02A-F	Barium, dissolved	30	µg/L		0.18	0.50	25	25
MW-02A-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-02A-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-02A-F	Calcium, dissolved	59,000	µg/L		90	120	1000	1,000
MW-02A-F	Chromium, dissolved	0.75	µg/L	J	0.30	0.50	10	10
MW-02A-F	Cobalt, dissolved	3.0	µg/L		0.12	0.50	2.0	2.0
MW-02A-F	Copper, dissolved	2.8	µg/L	J	0.24	0.50	5.0	5.0
MW-02A-F	Iron, dissolved	460	µg/L		48	120	200	200
MW-02A-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-02A-F	Magnesium, dissolved	14,000	µg/L		41	120	500	500
MW-02A-F	Manganese, dissolved	250	µg/L		0.26	0.50	5.0	5.0
MW-02A-F	Mercury	0.064	µg/L	U	0.052	0.10	0.20	0.20
MW-02A-F	Nickel, dissolved	33	µg/L		0.20	0.50	10	10
MW-02A-F	Potassium, dissolved	3,400	µg/L		110	120	500	500
MW-02A-F	Selenium, dissolved	2.3	µg/L	J	1.5	2.5	5.0	5.0
MW-02A-F	Silver, dissolved	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-02A-F	Sodium, dissolved	4,600	µg/L		58	250	500	500
MW-02A-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-02A-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-02A-F	Zinc, dissolved	25	µg/L	J	1.8	2.5	50	50
MW-07	Aluminum	15	µg/L	J	1.4	2.5	50	50
MW-07	Antimony	1.4	µg/L	J	0.52	0.50	2.5	2.5
MW-07	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5

Radiologic Data

Sample Location	Isotope	Result	Units	Qualifier	Uncertainty	Critical Level	MDA	RL
10L31	Americium-241	0.109	pCi/L	J	0.105	0.0566	0.171	0.171
10L31	Plutonium-238	0.168	pCi/L		0.115	0.0534	0.159	0.159
10L31	Pu-239/240	0.066	pCi/L	U	0.067	0.0267	0.097	0.097
10L31	Plutonium-241	-1.23	pCi/L	U	4.59	3.9	7.98	7.98
10L31	Thorium-228	0.524	pCi/L	U	0.315	0.0943	0.352	0.352
10L31	Thorium-230	-0.059	pCi/L	U	0.137	0.0859	0.329	0.329
10L31	Thorium-232	-0.007	pCi/L	U	0.137	0.0297	0.183	0.183
10L31	Total Uranium	0.431	ug/L		0.008	0.051	0.197	0.197
10L31	Uranium-234	1.39	pCi/L		0.455	0.106	0.342	0.342
10L31	Uranium-235	0.035	pCi/L	U	0.127	0	0.096	0.096
10L31	Uranium-238	0.185	pCi/L		0.144	0.0199	0.124	0.124
10L31-F	Americium-241	0.099	pCi/L	J	0.102	0.0602	0.174	0.174
10L31-F	Plutonium-238	0.159	pCi/L	J	0.112	0.0546	0.160	0.160
10L31-F	Pu-239/240	0.006	pCi/L	U	0.051	0.0407	0.128	0.128
10L31-F	Plutonium-241	-1.74	pCi/L	U	4.67	3.97	8.13	8.13
10L31-F	Thorium-228	0.576	pCi/L	U	0.326	0.125	0.417	0.417
10L31-F	Thorium-230	-0.065	pCi/L	U	0.118	0.0839	0.309	0.309
10L31-F	Thorium-232	-0.03	pCi/L	U	0.118	0.0572	0.240	0.240
10L31-F	Total Uranium	0.402	ug/L		0.008	0.051	0.197	0.197
10L31-F	Uranium-234	1.22	pCi/L		0.379	0.0891	0.283	0.283
10L31-F	Uranium-235	0.134	pCi/L	J	0.123	0.0189	0.123	0.123
10L31-F	Uranium-238	0.003	pCi/L	U	0.080	0.0658	0.224	0.224
MW-01	Americium-241	0.027	pCi/L	U	0.080	0.0595	0.175	0.175
MW-01	Plutonium-238	0.204	pCi/L	J	0.133	0.0688	0.193	0.193
MW-01	Pu-239/240	0.019	pCi/L	U	0.051	0.0318	0.108	0.108
MW-01	Plutonium-241	3.62	pCi/L	U	4.63	3.74	8.25	8.25
MW-01	Thorium-228	0.442	pCi/L	U	0.325	0.102	0.401	0.401
MW-01	Thorium-230	-0.04	pCi/L	U	0.175	0.12	0.446	0.446
MW-01	Thorium-232	-0.216	pCi/L	U	0.178	0.186	0.617	0.617
MW-01	Total Uranium	0.162	ug/L	J	0.005	0.051	0.197	0.197
MW-01	Uranium-234	-0.044	pCi/L	U	0.114	0.0899	0.313	0.313
MW-01	Uranium-235	-0.059	pCi/L	U	0.148	0.0909	0.342	0.342
MW-01	Uranium-238	-0.082	pCi/L	U	0.114	0.11	0.364	0.364
MW-01-F	Americium-241	0.066	pCi/L	U	0.109	0.0754	0.213	0.213
MW-01-F	Plutonium-238	0.186	pCi/L	J	0.144	0.0817	0.228	0.228
MW-01-F	Pu-239/240	0.022	pCi/L	U	0.066	0.0472	0.148	0.148
MW-01-F	Plutonium-241	8.18	pCi/L	J	5.87	4.57	10.1	10.1
MW-01-F	Thorium-228	0.422	pCi/L	U	0.329	0.0471	0.290	0.290
MW-01-F	Thorium-230	-0.005	pCi/L	U	0.214	0.114	0.460	0.460
MW-01-F	Thorium-232	-0.022	pCi/L	U	0.214	0.0657	0.336	0.336
MW-01-F	Total Uranium	0.163	ug/L	J	0.005	0.051	0.197	0.197
MW-01-F	Uranium-234	0.075	pCi/L	U	0.150	0.0919	0.330	0.330
MW-01-F	Uranium-235	0.013	pCi/L	U	0.169	0.0735	0.314	0.314
MW-01-F	Uranium-238	0.029	pCi/L	U	0.130	0.0727	0.282	0.282
MW-02A	Americium-241	0.047	pCi/L	U	0.082	0.0576	0.163	0.163
MW-02A	Plutonium-238	0.221	pCi/L	J	0.124	0.0534	0.156	0.156
MW-02A	Pu-239/240	0.091	pCi/L	J	0.076	0.0305	0.104	0.104
MW-02A	Plutonium-241	1.04	pCi/L	U	4.68	3.9	8.59	8.59
MW-02A	Thorium-228	0.571	pCi/L	J	0.432	0.189	0.648	0.648
MW-02A	Thorium-230	-0.125	pCi/L	U	0.203	0.152	0.551	0.551
MW-02A	Thorium-232	-0.021	pCi/L	U	0.202	0.0621	0.317	0.317
MW-02A	Total Uranium	0.102	ug/L	J	0.003	0.051	0.197	0.197
MW-02A	Uranium-234	0.019	pCi/L	U	0.120	0.0921	0.321	0.321
MW-02A	Uranium-235	-0.02	pCi/L	U	0.152	0.0537	0.250	0.250
MW-02A	Uranium-238	0.018	pCi/L	U	0.116	0.0713	0.268	0.268
MW-02A-F	Americium-241	-0.048	pCi/L	U	0.054	0.0599	0.171	0.171
MW-02A-F	Plutonium-238	0.049	pCi/L	U	0.101	0.0747	0.205	0.205
MW-02A-F	Pu-239/240	0.038	pCi/L	J	0.060	0.0352	0.114	0.114
MW-02A-F	Plutonium-241	-0.092	pCi/L	U	4.49	3.78	8.34	8.34
MW-02A-F	Thorium-228	0.41	pCi/L	U	0.365	0.191	0.629	0.629
MW-02A-F	Thorium-230	-0.153	pCi/L	U	0.172	0.177	0.591	0.591
MW-02A-F	Thorium-232	-0.048	pCi/L	U	0.171	0.123	0.450	0.450
MW-02A-F	Total Uranium	0.093	ug/L	J	0.003	0.051	0.197	0.197
MW-02A-F	Uranium-234	-0.148	pCi/L	U	0.172	0.187	0.570	0.570
MW-02A-F	Uranium-235	0.026	pCi/L	U	0.167	0.103	0.385	0.385
MW-02A-F	Uranium-238	-0.103	pCi/L	U	0.129	0.111	0.378	0.378
MW-03	Americium-241	0.042	pCi/L	U	0.084	0.0591	0.170	0.170
MW-03	Plutonium-238	0.164	pCi/L	J	0.152	0.0936	0.260	0.260
MW-03	Pu-239/240	0.01	pCi/L	U	0.065	0.0468	0.152	0.152
MW-03	Plutonium-241	-0.122	pCi/L	U	5.99	5.05	11.1	11.1
MW-03	Thorium-228	2.42	pCi/L	J	0.882	0.209	0.707	0.707
MW-03	Thorium-230	0.056	pCi/L	U	0.212	0.113	0.456	0.456
MW-03	Thorium-232	0.369	pCi/L	J	0.323	0.103	0.431	0.431
MW-03	Total Uranium	3.81	ug/L		0.122	0.051	0.197	0.197
MW-03	Uranium-234	2.91	pCi/L		0.829	0.144	0.470	0.470
MW-03	Uranium-235	0.089	pCi/L	J	0.183	0.0456	0.253	0.253
MW-03	Uranium-238	2.12	pCi/L		0.668	0.0856	0.322	0.322
MW-07	Americium-241	0.103	pCi/L	J	0.110	0.0619	0.187	0.187
MW-07	Plutonium-238	0.094	pCi/L	J	0.101	0.0616	0.177	0.177
MW-07	Pu-239/240	0.017	pCi/L	U	0.058	0.0422	0.132	0.132
MW-07	Plutonium-241	-4.6	pCi/L	U	4.58	3.95	8.09	8.09
MW-07	Thorium-228	0.374	pCi/L	U	0.287	0.102	0.385	0.385
MW-07	Thorium-230	-0.008	pCi/L	U	0.154	0.0334	0.206	0.206
MW-07	Thorium-232	0	pCi/L	U	0.154	0	0.119	0.119
MW-07	Total Uranium	0.241	ug/L	J	0.004	0.051	0.197	0.197
MW-07	Uranium-234	0.416	pCi/L		0.203	0.0393	0.159	0.159
MW-07	Uranium-235	-0.001	pCi/L	U	0.103	0.0108	0.105	0.105
MW-07	Uranium-238	0.099	pCi/L	J	0.098	0.0278	0.130	0.130
MW-07-F	Americium-241	0.102	pCi/L	J	0.116	0.0714	0.207	0.207
MW-07-F	Plutonium-238	0.151	pCi/L	J	0.107	0.0527	0.154	0.154
MW-07-F	Pu-239/240	0.018	pCi/L	U	0.048	0.0302	0.102	0.102
MW-07-F	Plutonium-241	-2.3	pCi/L	U	4.62	3.94	8.07	8.07
MW-07-F	Thorium-228	0.819	pCi/L	J	0.387	0.11	0.385	0.385
MW-07-F	Thorium-230	-0.039	pCi/L	U	0.127	0.0675	0.274	0.274
MW-07-F	Thorium-232	0	pCi/L	U	0.127	0	0.098	0.098
MW-07-F	Total Uranium	0.239	ug/L	J	0.005	0.051	0.197	0.197
MW-07-F	Uranium-234	0.202	pCi/L	J	0.151	0.0567	0.204	0.204
MW-07-F	Uranium-235	0.029	pCi/L	U	0.104	0	0.079	0.079
MW-07-F	Uranium-238	0.095	pCi/L	J	0.100	0.0347	0.148	0.148
MW-08	Americium-241	-0.028	pCi/L	U	0.081	0.0772	0.232	0.232
MW-08	Plutonium-238	0.184	pCi/L	J	0.126	0.0434	0.147	0.147
MW-08	Pu-239/240	-0.009	pCi/L	U	0.075	0.0663	0.200	0.200
MW-08	Plutonium-241	1.28	pCi/L	U	4.90	4.08	8.98	8.98
MW-08	Thorium-228	0.67	pCi/L	J	0.352	0.0911	0.342	0.342
MW-08	Thorium-230	0.011	pCi/L	U	0.135	0.0586	0.256	0.256
MW-08	Thorium-232	-0.007	pCi/L	U	0.135	0.0293	0.180	0.180
MW-08	Total Uranium	0.103	ug/L	J	0.003	0.051	0.197	0.197
MW-08	Uranium-234	-0.159	pCi/L	U	0.175	0.192	0.584	0.584
MW-08	Uranium-235	-0.021	pCi/L	U	0.169	0.104	0.390	0.390
MW-08	Uranium-238	-0.068	pCi/L	U	0.130	0.112	0.382	0.382
MW-08-F	Americium-241	-0.003	pCi/L	U	0.063	0.0472	0.159	0.159
MW-08-F	Plutonium-238	0.043	pCi/L	U	0.073	0.0421	0.143	0.143
MW-08-F	Pu-239/240	0.026	pCi/L	U	0.067	0.0421	0.143	0.143
MW-08-F	Plutonium-241	-1.74	pCi/L	U	4.44	3.8	8.36	8.36
MW-08-F	Thorium-228	0.15	pCi/L	U	0.214	0.121	0.431	0.431
MW-08-F	Thorium-230	-0.015	pCi/L	U	0.148	0.0454	0.232	0.232
MW-08-F	Thorium-232	-0.008	pCi/L	U	0.148	0.0321	0.198	0.198
MW-08-F	Total Uranium	0.107	ug/L	J	0.003	0.051	0.197	0.197
MW-08-F	Uranium-234	-0.003	pCi/L	U	0.153	0.13	0.422	0.422
MW-08-F	Uranium-235	-0.011	pCi/L	U	0.164	0.041	0.227	0.227
MW-08-F	Uranium-238	0.054	pCi/L	U	0.126	0.0769	0.289	0.289
MW-09A	Americium-241	0.109	pCi/L	U	0.113	0.0586	0.190	0.190
MW-09A	Plutonium-238	0.051	pCi/L	U	0.131	0.0965	0.277	0.277
MW-09A	Pu-239/240	-0.041	pCi/L	U	0.081	0.0713	0.219	0.219
MW-09A	Plutonium-241	5.58	pCi/L	J	5.76	4.61	10.2	10.2
MW-09A	Thorium-228	0.283	pCi/L	U	0.236	0.0962	0.351	0.351
MW-09A	Thorium-230	-0.027	pCi/L	U	0.129	0.0562	0.246	0.246
MW-09A	Thorium-232	0.037	pCi/L	J	0.130	0	0.100	0.100
MW-09A	Total Uranium	0.154	ug/L	J	0.004	0.051	0.197	0.197
MW-09A	Uranium-234	0.023	pCi/L	U	0.140	0.107	0.373	0.373
MW-09A	Uranium-235	-0.022	pCi/L	U	0.177	0.108	0.408	0.408
MW-09A	Uranium-238	-0.06	pCi/L	U	0.136	0.131	0.434	0.434
MW-09A-F	Americium-241	0.141	pCi/L	J	0.116	0.0519	0.171	0.171
MW-09A-F	Plutonium-238	0.205	pCi/L	J	0.153	0.0752	0.223	0.223
MW-09A-F	Pu-239/240	-0.028	pCi/L	U	0.105	0.0958	0.271	0.271
MW-09A-F	Plutonium-241	2.99	pCi/L	U	5.21	4.26	9.39	9.39
MW-09A-F	Thorium-228	0.505	pCi/L	U	0.305	0.102	0.365	0.365
MW-09A-F	Thorium-230	-0.02	pCi/L	U	0.128	0.0479	0.223	0.223

Sample Location	Parameter	Result	Units	Qualifier	Detection Limit	LOD	LOQ	Reporting Limit
MW-07	Barium	200	µg/L		0.18	0.50	25	25
MW-07	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-07	Calcium	70,000	µg/L		90	120	1000	1,000
MW-07	Chromium	2.0	µg/L	J	0.30	0.50	10	10
MW-07	Cobalt	0.49	µg/L	J	0.12	0.50	5.0	5.0
MW-07	Copper	3.1	µg/L	J	0.24	0.50	5.0	5.0
MW-07	Iron	160	µg/L	J	48	120	200	200
MW-07	Lead	0.38	µg/L	J	0.24	0.50	1.0	1.0
MW-07	Magnesium	13,000	µg/L		41	120	500	500
MW-07	Manganese	460	µg/L	J	0.26	0.50	5.0	5.0
MW-07	Mercury	0.047	µg/L	J	0.024	0.10	0.20	0.20
MW-07	Nickel	6.2	µg/L	J	0.20	0.50	10	10
MW-07	Potassium	2,500	µg/L		110	120	500	500
MW-07	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-07	Silver	0.86	µg/L	J	0.18	0.50	1.5	1.5
MW-07	Sodium	5,200	µg/L	J	58	120	500	500
MW-07	Thallium	0.25	µg/L	J	0.16	0.50	2.0	2.0
MW-07	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-07	Zinc	23	µg/L	J	1.8	2.5	50	50
MW-07-F	Aluminum, dissolved	9.5	µg/L	J	1.4	2.5	50	50
MW-07-F	Antimony, dissolved	1.2	µg/L	J	0.52	1.0	2.5	2.5
MW-07-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-07-F	Barium, dissolved	160	µg/L		0.18	0.50	25	25
MW-07-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-07-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-07-F	Calcium, dissolved	58,000	µg/L		90	120	1000	1,000
MW-07-F	Chromium, dissolved	1.5	µg/L	J	0.30	0.50	10	10
MW-07-F	Cobalt, dissolved	0.27	µg/L	J	0.12	0.50	2.0	2.0
MW-07-F	Copper, dissolved	2.0	µg/L	J	0.24	0.50	5.0	5.0
MW-07-F	Iron, dissolved	ND	µg/L	U	48	120	200	200
MW-07-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-07-F	Magnesium, dissolved	9,900	µg/L		41	120	500	500
MW-07-F	Manganese, dissolved	390	µg/L		0.26	0.50	5.0	5.0
MW-07-F	Mercury	0.12	µg/L	J	0.052	0.10	0.20	0.20
MW-07-F	Nickel, dissolved	4.9	µg/L	J	0.20	0.50	10	10
MW-07-F	Potassium, dissolved	2,100	µg/L		110	120	500	500
MW-07-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-07-F	Silver, dissolved	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-07-F	Sodium, dissolved	4,000	µg/L		58	250	500	500
MW-07-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-07-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-07-F	Zinc, dissolved	15	µg/L	J	1.8	2.5	50	50
MW-08	Aluminum	5.0	µg/L	J	1.4	2.5	50	50
MW-08	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-08	Arsenic	1.4	µg/L	J	0.61	1.0	1.5	1.5
MW-08	Barium	350	µg/L	J	0.18	0.50	25	25
MW-08	Cadmium	1.2	µg/L		0.27	0.50	1.0	1.0
MW-08	Calcium	43,000	µg/L		90	120	1000	1,000
MW-08	Chromium	2.5	µg/L	J	0.30	0.50	10	10
MW-08	Cobalt	1.5	µg/L	J	0.12	0.50	5.0	5.0
MW-08	Copper	1.9	µg/L	J	0.24	0.50	5.0	5.0
MW-08	Iron	470	µg/L		48	120	200	200
MW-08	Lead	1.4	µg/L		0.24	0.50	1.0	1.0
MW-08	Magnesium	8,500	µg/L		41	120	500	500
MW-08	Manganese	100	µg/L		0.26	0.50	5.0	5.0
MW-08	Mercury	0.095	µg/L	J	0.024	0.10	0.20	0.20
MW-08	Nickel	2.7	µg/L	J	0.20	0.50	10	10
MW-08	Potassium	1,700	µg/L		110	120	500	500
MW-08	Selenium	2.0	µg/L	J	1.5	2.5	5.0	5.0
MW-08	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-08	Sodium	3,800	µg/L	J	58	120	500	500
MW-08	Thallium	0.90	µg/L	J	0.16	0.50	2.0	2.0
MW-08	Vanadium	1.8	µg/L	J	0.49	0.50	4.0	4.0
MW-08	Zinc	14	µg/L	J	1.8	2.5	50	50
MW-08-F	Aluminum, dissolved	1.6	µg/L	J	1.4	2.5	50	50
MW-08-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-08-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-08-F	Barium, dissolved	330	µg/L		0.18	0.50	25	25
MW-08-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-08-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-08-F	Calcium, dissolved	44,000	µg/L		90	120	1000	1,000
MW-08-F	Chromium, dissolved	ND	µg/L	U	0.30	0.50	10	10
MW-08-F	Cobalt, dissolved	ND	µg/L	U	0.12	0.50	2.0	2.0
MW-08-F	Copper, dissolved	0.32	µg/L	J	0.24	0.50	5.0	5.0
MW-08-F	Iron, dissolved	280	µg/L		48	120	200	200
MW-08-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-08-F	Magnesium, dissolved	8,300	µg/L		41	120	500	500
MW-08-F	Manganese, dissolved	52	µg/L		0.26	0.50	5.0	5.0
MW-08-F	Mercury	0.062	µg/L	U	0.052	0.10	0.20	0.20
MW-08-F	Nickel, dissolved	1.3	µg/L	J	0.20	0.50	10	10
MW-08-F	Potassium, dissolved	1,700	µg/L		110	120	500	500
MW-08-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-08-F	Silver, dissolved	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-08-F	Sodium, dissolved	3,300	µg/L		58	250	500	500
MW-08-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-08-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-08-F	Zinc, dissolved	13	µg/L	J	1.8	2.5	50	50
MW-09A	Aluminum	44	µg/L	J	1.4	2.5	50	50
MW-09A	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-09A	Arsenic	4.3	µg/L		0.61	1.0	1.5	1.5
MW-09A	Barium	460	µg/L		0.18	0.50	25	25
MW-09A	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-09A	Calcium	30,000	µg/L		90	120	1000	1,000
MW-09A	Chromium	5.0	µg/L	J	0.30	0.50	10	10
MW-09A	Cobalt	0.44	µg/L	J	0.12	0.50	5.0	5.0
MW-09A	Copper	13	µg/L		0.24	0.50	5.0	5.0
MW-09A	Iron	510	µg/L		48	120	200	200
MW-09A	Lead	0.31	µg/L	J	0.24	0.50	1.0	1.0
MW-09A	Magnesium	6,000	µg/L		41	120	500	500
MW-09A	Manganese	32	µg/L		0.26	0.50	5.0	5.0
MW-09A	Mercury	0.083	µg/L	J	0.024	0.10	0.20	0.20
MW-09A	Nickel	3.3	µg/L	J	0.20	0.50	10	10
MW-09A	Potassium	6,500	µg/L		110	120	500	500
MW-09A	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-09A	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-09A	Sodium	8,500	µg/L		58	120	500	500
MW-09A	Thallium	ND	µg/L	U	0.16	0.50	2.0	2.0
MW-09A	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-09A	Zinc	26	µg/L	J	1.8	2.5	50	50
MW-09A-F	Aluminum, dissolved	59	µg/L		1.4	2.5	50	50
MW-09A-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-09A-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-09A-F	Barium, dissolved	410	µg/L		0.18	0.50	25	25
MW-09A-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-09A-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-09A-F	Calcium, dissolved	27,000	µg/L		90	120	1000	1,000
MW-09A-F	Chromium, dissolved	3.6	µg/L	J	0.30	0.50	10	10
MW-09A-F	Cobalt, dissolved	0.29	µg/L	J	0.12	0.50	2.0	2.0
MW-09A-F	Copper, dissolved	1.0	µg/L	J	0.24	0.50	5.0	5.0
MW-09A-F	Iron, dissolved	180	µg/L	J	48	120	200	200
MW-09A-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-09A-F	Magnesium, dissolved	5,400	µg/L		41	120	500	500
MW-09A-F	Manganese, dissolved	3.9	µg/L	J	0.26	0.50	5.0	5.0
MW-09A-F	Mercury	0.11	µg/L	J	0.052	0.10	0.20	0.20
MW-09A-F	Nickel, dissolved	2.5	µg/L	J	0.20	0.50	10	10
MW-09A-F	Potassium, dissolved	6,000	µg/L		110	120	500	500
MW-09A-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-09A-F	Silver, dissolved	0.79	µg/L	J	0.18	0.50	1.5	1.5
MW-09A-F	Sodium, dissolved	7,700	µg/L		58	250	500	500
MW-09A-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-09A-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-09A-F	Zinc, dissolved	16	µg/L	J	1.8	2.5	50	50
MW-13	Aluminum	10	µg/L	J	1.4	2.5	50	50
MW-13	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-13	Arsenic	0.62	µg/L	J	0.61	1.0	1.5	1.5
MW-13	Barium	490	µg/L		0.18	0.50	25	25
MW-13	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-13	Calcium	40,000	µg/L		90	120	1000	1,000
MW-13	Chromium	2.4	µg/L	J	0.30	0.50	10	10
MW-13	Cobalt	0.32	µg/L	J	0.12	0.50	5.0	5.0
MW-13	Copper	1.2	µg/L	J	0.24	0.50	5.0	5.0
MW-13	Iron	1,100	µg/L		48	120	200	200
MW-13	Lead	0.51	µg/L	J	0.24	0.50	1.0	1.0
MW-13	Magnesium	8,000	µg/L		41	120	500	500
MW-13	Manganese	66	µg/L		0.26	0.50	5.0	5.0
MW-13	Mercury	0.076	µg/L	J	0.024	0.10	0.20	0.20
MW-13	Nickel	1.9	µg/L	J	0.20	0.50	10	10
MW-13	Potassium	1,500	µg/L		110	120	500	500
MW-13	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-13	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-13	Sodium	3,300	µg/L		58	120	500	500
MW-13	Thallium	0.24	µg/L	J	0.16	0.50	2.0	2.0
MW-13	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0

Sample Location	Isotope	Result	Units	Qualifier	Uncertainty	Critical Level	MDA	RL
MW-09A-F	Thorium-232	0	pCi/L	U	0.127	0	0.099	0.099
MW-09A-F	Total Uranium	0.174	ug/L	J	0.004	0.051	0.197	0.197
MW-09A-F	Uranium-234	0.143	pCi/L	J	0.177	0.0895	0.322	0.322
MW-09A-F	Uranium-235	0.013	pCi/L	U	0.165	0.0716	0.306	0.306
MW-09A-F	Uranium-238	-0.007	pCi/L	U	0.126	0.0708	0.274	0.274
MW-13	Americium-241	0.068	pCi/L	J	0.083	0.051	0.150	0.150
MW-13	Plutonium-238	0.033	pCi/L	U	0.086	0.0631	0.181	0.181
MW-13	Pu-239/240	0.027	pCi/L	U	0.067	0.0466	0.143	0.143
MW-13	Plutonium-241	-0.274	pCi/L	U	4.46	3.76	7.70	7.70
MW-13	Thorium-228	0.252	pCi/L	U	0.230	0.106	0.374	0.374
MW-13	Thorium-230	-0.037	pCi/L	U	0.125	0.0656	0.267	0.267
MW-13	Thorium-232	-0.019	pCi/L	U	0.125	0.0471	0.219	0.219
MW-13	Total Uranium	0.137	ug/L	J	0.004	0.051	0.197	0.197
MW-13	Uranium-234	0.002	pCi/L	U	0.079	0.0559	0.201	0.201
MW-13	Uranium-235	-0.014	pCi/L	U	0.103	0.0365	0.170	0.170
MW-13	Uranium-238	0.001	pCi/L	U	0.079	0.0395	0.159	0.159
MW-13-F	Americium-241	0.02	pCi/L	U	0.087	0.0684	0.193	0.193
MW-13-F	Plutonium-238	0.156	pCi/L	J	0.120	0.0642	0.184	0.184
MW-13-F	Pu-239/240	0.053	pCi/L	U	0.077	0.0474	0.146	0.146
MW-13-F	Plutonium-241	-4.75	pCi/L	U	4.44	3.84	7.85	7.85
MW-13-F	Thorium-228	0.457	pCi/L	U	0.296	0.109	0.385	0.385
MW-13-F	Thorium-230	0.06	pCi/L	J	0.129	0.0394	0.201	0.201
MW-13-F	Thorium-232	-0.005	pCi/L	U	0.128	0.0243	0.162	0.162
MW-13-F	Total Uranium	0.156	ug/L	J	0.004	0.051	0.197	0.197
MW-13-F	Uranium-234	0.119	pCi/L	J	0.130	0.0574	0.216	0.216
MW-13-F	Uranium-235	-0.024	pCi/L	U	0.122	0.053	0.226	0.226
MW-13-F	Uranium-238	0.085	pCi/L	J	0.105	0.0406	0.173	0.173
MW-14	Americium-241	0.057	pCi/L	U	0.089	0.0571	0.172	0.172
MW-14	Plutonium-238	0.1	pCi/L	J	0.114	0.0738	0.206	0.206
MW-14	Pu-239/240	0.1	pCi/L	U	0.089	0.0426	0.134	0.134
MW-14	Plutonium-241	-0.698	pCi/L	U	4.86	4.11	8.41	8.41
MW-14	Thorium-228	0.828	pCi/L	J	0.393	0.0996	0.363	0.363
MW-14	Thorium-230	-0.027	pCi/L	U	0.134	0.0581	0.254	0.254
MW-14	Thorium-232	0	pCi/L	U	0.134	0	0.103	0.103
MW-14	Total Uranium	0.098	ug/L	J	0.003	0.051	0.197	0.197
MW-14	Uranium-234	0.02	pCi/L	U	0.087	0.0638	0.225	0.225
MW-14	Uranium-235	0	pCi/L	U	0.111	0	0.084	0.084
MW-14	Uranium-238	0.018	pCi/L	U	0.085	0.0213	0.118	0.118
MW-14-DUP	Americium-241	0.191	pCi/L		0.125	0.062	0.177	0.177
MW-14-DUP	Plutonium-238	0.205	pCi/L		0.123	0.0537	0.159	0.159
MW-14-DUP	Pu-239/240	0.074	pCi/L	U	0.076	0.037	0.120	0.120
MW-14-DUP	Plutonium-241	-1.65	pCi/L	U	4.45	3.79	7.75	7.75
MW-14-DUP	Thorium-228	0.242	pCi/L	U	0.239	0.117	0.409	0.409
MW-14-DUP	Thorium-230	-0.018	pCi/L	U	0.135	0.0471	0.226	0.226
MW-14-DUP	Thorium-232	-0.007	pCi/L	U	0.135	0.0292	0.180	0.180
MW-14-DUP	Total Uranium	0.106	ug/L	J	0.003	0.051	0.197	0.197
MW-14-DUP	Uranium-234	-0.016	pCi/L	U	0.089	0.0736	0.253	0.253
MW-14-DUP	Uranium-235	0	pCi/L	U	0.116	0	0.087	0.087
MW-14-DUP	Uranium-238	0.003	pCi/L	U	0.089	0.0423	0.174	0.174
MW-14-F	Americium-241	0.108	pCi/L	J	0.108	0.0656	0.185	0.185
MW-14-F	Plutonium-238	0.035	pCi/L	U	0.101	0.0765	0.213	0.213
MW-14-F	Pu-239/240	0.124	pCi/L	J	0.083	0	0.037	0.037
MW-14-F	Plutonium-241	-3.51	pCi/L	U	4.55	3.91	8.01	8.01
MW-14-F	Thorium-228	0.886	pCi/L	J	0.423	0.115	0.410	0.410
MW-14-F	Thorium-230	-0.022	pCi/L	U	0.143	0.0537	0.250	0.250
MW-14-F	Thorium-232	0	pCi/L	U	0.143	0	0.111	0.111
MW-14-F	Total Uranium	0.099	ug/L	J	0.003	0.051	0.197	0.197
MW-14-F	Uranium-234	0.094	pCi/L	J	0.106	0.0426	0.171	0.171
MW-14-F	Uranium-235	-0.007	pCi/L	U	0.110	0.0275	0.152	0.152
MW-14-F	Uranium-238	0.041	pCi/L	J	0.084	0.0211	0.117	0.117
MW-14-F-DUP	Americium-241	0.033	pCi/L	U	0.079	0.057	0.164	0.164
MW-14-F-DUP	Plutonium-238	0.359	pCi/L		0.159	0.0703	0.192	0.192
MW-14-F-DUP	Pu-239/240	-0.006	pCi/L	U	0.055	0.0484	0.142	0.142
MW-14-F-DUP	Plutonium-241	-4.86	pCi/L	U	4.54	3.93	8.04	8.04
MW-14-F-DUP	Thorium-228	0.699	pCi/L	J	0.379	0.115	0.412	0.412
MW-14-F-DUP	Thorium-230	0.041	pCi/L	J	0.145	0	0.112	0.112
MW-14-F-DUP	Thorium-232	0.083	pCi/L	J	0.145	0	0.112	0.112
MW-14-F-DUP	Total Uranium	0.114	ug/L	J	0.004	0.051	0.197	0.197
MW-14-F-DUP	Uranium-234	0.058	pCi/L	J	0.083	0.0293	0.136	0.136
MW-14-F-DUP	Uranium-235	0.023	pCi/L	U	0.108	0.027	0.150	0.150
MW-14-F-DUP	Uranium-238	0.046	pCi/L	J	0.083	0	0.062	0.062
MW-15	Americium-241	0.061	pCi/L	U	0.092	0.0595	0.177	0.177
MW-15	Plutonium-238	0.008	pCi/L	U	0.118	0.0976	0.269	0.269
MW-15	Pu-239/240	-0.017	pCi/L	U	0.065	0.058	0.178	0.178
MW-15	Plutonium-241	4.42	pCi/L	J	4.74	3.8	8.38	8.38
MW-15	Thorium-228	0.283	pCi/L	U	0.264	0.0994	0.392	0.392
MW-15	Thorium-230	0.08	pCi/L	J	0.171	0.0523	0.268	0.268
MW-15	Thorium-232	-0.035	pCi/L	U	0.171	0.074	0.324	0.324
MW-15	Total Uranium	0.263	ug/L	J	0.008	0.051	0.197	0.197
MW-15	Uranium-234	0.078	pCi/L	J	0.125	0.0669	0.252	0.252
MW-15	Uranium-235	-0.01	pCi/L	U	0.142	0.0357	0.198	0.198
MW-15	Uranium-238	0.009	pCi/L	U	0.109	0.0473	0.202	0.202
MW-15-F	Americium-241	0.05	pCi/L	U	0.074	0.0498	0.142	0.142
MW-15-F	Plutonium-238	0.023	pCi/L	U	0.078	0.058	0.175	0.175
MW-15-F	Pu-239/240	0	pCi/L	U	0.074	0.062	0.184	0.184
MW-15-F	Plutonium-241	0.708	pCi/L	U	5.00	4.18	9.21	9.21
MW-15-F	Thorium-228	0.557	pCi/L	J	0.391	0.16	0.553	0.553
MW-15-F	Thorium-230	0.032	pCi/L	U	0.176	0.054	0.276	0.276
MW-15-F	Thorium-232	0.023	pCi/L	U	0.176	0.0661	0.308	0.308
MW-15-F	Total Uranium	0.061	ug/L	U	0.002	0.051	0.197	0.197
MW-15-F	Uranium-234	-0.03	pCi/L	U	0.113	0.0564	0.228	0.228
MW-15-F	Uranium-235	0.031	pCi/L	U	0.147	0.0368	0.204	0.204
MW-15-F	Uranium-238	0.15	pCi/L	J	0.156	0.063	0.244	0.244
MW-20	Americium-241	0.026	pCi/L	U	0.058	0.0398	0.122	0.122
MW-20	Plutonium-238	0.16	pCi/L	J	0.120	0.07	0.192	0.192
MW-20	Pu-239/240	0.006	pCi/L	U	0.059	0.0482	0.141	0.141
MW-20	Plutonium-241	3.32	pCi/L	U	4.82	3.92	8.64	8.64
MW-20	Thorium-228	2.41	pCi/L	J	0.767	0.105	0.397	0.397
MW-20	Thorium-230	0.413	pCi/L		0.291	0.0772	0.323	0.323
MW-20	Thorium-232	0.492	pCi/L		0.335	0.12	0.433	0.433
MW-20	Total Uranium	2.47	ug/L		0.105	0.051	0.197	0.197
MW-20	Uranium-234	2.09	pCi/L		0.629	0.0693	0.269	0.269
MW-20	Uranium-235	-0.011	pCi/L	U	0.162	0.0405	0.224	0.224
MW-20	Uranium-238	0.838	pCi/L		0.372	0.082	0.301	0.301
MW-22	Americium-241	0.106	pCi/L	J	0.114	0.0631	0.199	0.199
MW-22	Plutonium-238	0.152	pCi/L	J	0.121	0.0705	0.196	0.196
MW-22	Pu-239/240	0.093	pCi/L		0.068	0	0.033	0.033
MW-22	Plutonium-241	-0.47	pCi/L	U	5.16	4.36	8.98	8.98
MW-22	Thorium-228	0.489	pCi/L	J	0.277	0.106	0.354	0.354
MW-22	Thorium-230	-0.055	pCi/L	U	0.101	0.0713	0.262	0.262
MW-22	Thorium-232	0.003	pCi/L	U	0.100	0.0487	0.204	0.204
MW-22	Total Uranium	0.282	ug/L	J	0.008	0.051	0.197	0.197
MW-22	Uranium-234	0.075	pCi/L	J	0.129	0.0722	0.273	0.273
MW-22	Uranium-235	0	pCi/L	U	0.145	0	0.112	0.112
MW-22	Uranium-238	0.023	pCi/L	U	0.111	0.0304	0.165	0.165
MW-22-Dup	Americium-241	0.034	pCi/L	U	0.079	0.0517	0.174	0.174
MW-22-Dup	Plutonium-238	0.123	pCi/L	U	0.102	0.0532	0.157	0.157
MW-22-Dup	Pu-239/240	0.089	pCi/L		0.067	0	0.034	0.034
MW-22-Dup	Plutonium-241	-3.92	pCi/L	U	5.41	4.67	9.60	9.60
MW-22-Dup	Thorium-228	0.442	pCi/L	U	0.344	0.163	0.545	0.545
MW-22-Dup	Thorium-230	0.02	pCi/L	U	0.155	0.0581	0.270	0.270
MW-22-Dup	Thorium-232	0.056	pCi/L	U	0.155	0.0671	0.294	0.294
MW-22-Dup	Total Uranium	0.03	ug/L	U	0.001	0.051	0.197	0.197
MW-22-Dup	Uranium-234	-0.013	pCi/L	U	0.104	0.0639	0.246	0.246
MW-22-Dup	Uranium-235	0	pCi/L	U	0.136	0	0.105	0.105
MW-22-Dup	Uranium-238	0.073	pCi/L	U	0.105	0.0391	0.182	0.182
MW-22-F	Americium-241	0.026	pCi/L	U	0.111	0.0858	0.258	0.258
MW-22-F	Plutonium-238	0.075	pCi/L	U	0.105	0.0725	0.200	0.200
MW-22-F	Pu-239/240	0.031	pCi/L	U	0.067	0.0461	0.139	0.139
MW-22-F	Plutonium-241	0.184	pCi/L	U	5.07	4.26	8.76	8.76
MW-22-F	Thorium-228	0.643	pCi/L	J	0.338	0.0999	0.358	0.358
MW-22-F	Thorium-230	-0.039	pCi/L	U	0.126	0.0673	0.272	0.272
MW-22-F	Thorium-232	0	pCi/L	U	0.126	0	0.097	0.097
MW-22-F	Total Uranium	0.157	ug/L	J	0.005	0.051	0.197	0.197
MW-22-F	Uranium-234	0.107	pCi/L	J	0.131	0.0497	0.218	0.218
MW-22-F	Uranium-235	0.084	pCi/L	J	0.150	0.0136	0.151	0.151
MW-22-F	Uranium-238	0.054	pCi/L	U	0.115	0.0352	0.180	0.180
MW-22-F-Dup	Americium-241	0.089	pCi/L	J	0.092	0.0477	0.155	0.155
MW-22-F-Dup	Plutonium-238	0.129	pCi/L	U	0.113	0.0642	0.184	0.184
MW-22-F-Dup	Pu-239/240	0.085	pCi/L	J	0.085	0.0439	0.137	0.137
MW-22-F-Dup	Plutonium-241	-5.99	pCi/L	U	5.41	4.71	9.69	9.69
MW-22-F-Dup	Thorium-228	0.514	pCi/L	J	0.310	0.103	0.370	0.370
MW-22-F-Dup	Thorium-230	-0.053	pCi/L	U	0.130	0.0798	0.307	0.307
MW-22-F-Dup	Thorium-232	0.004	pCi/L	U	0.130	0.0631	0.264	0.264
MW-22-F-Dup	Total Uranium	0.021	ug/L	U	0.001	0.051	0.197	0.197
MW-22-F-Dup	Uranium-234	0.024	pCi/L	U	0.111	0.0636	0.251	0.251
MW-22-F-Dup	Uranium-235	0	pCi/L	U	0.145	0	0.112	0.112
MW-22-F-Dup	Uranium-238	0.063	pCi/L	U	0.111	0	0.086	0.086
MW-33	Americium-241	-0.012	pCi/L	U	0.047	0.0416	0.128	0.128
MW-33	Plutonium-238	-0.055	pCi/L	U	0.120	0.111	0.298	0.298
MW-33	Pu-239/240	-0.016	pCi/L	U	0.108	0.0944	0.260	0.260
MW-33	Plutonium-241	1.79	pCi/L	U	4.72	3.9	8.60	8.60
MW-33	Thorium-228	0.817	pCi/L	J	0.393	0.0916	0.346	0.346

Sample Location	Parameter	Result	Units	Qualifier	Detection Limit	LOD	LOQ	Reporting Limit
MW-13	Zinc	12	µg/L	J	1.8	2.5	50	50
MW-13-F	Aluminum, dissolved	9.2	µg/L	J	1.4	2.5	50	50
MW-13-F	Antimony, dissolved	1.5	µg/L	J	0.52	1.0	2.5	2.5
MW-13-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-13-F	Barium, dissolved	430	µg/L		0.18	0.50	25	25
MW-13-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-13-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-13-F	Calcium, dissolved	35,000	µg/L		90	120	1000	1,000
MW-13-F	Chromium, dissolved	0.72	µg/L	J	0.30	0.50	10	10
MW-13-F	Cobalt, dissolved	0.12	µg/L	J	0.12	0.50	2.0	2.0
MW-13-F	Copper, dissolved	0.86	µg/L	J	0.24	0.50	5.0	5.0
MW-13-F	Iron, dissolved	680	µg/L		48	120	200	200
MW-13-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-13-F	Magnesium, dissolved	6,600	µg/L		41	120	500	500
MW-13-F	Manganese, dissolved	52	µg/L		0.26	0.50	5.0	5.0
MW-13-F	Mercury	0.085	µg/L	J	0.052	0.10	0.20	0.20
MW-13-F	Nickel, dissolved	1.6	µg/L	J	0.20	0.50	10	10
MW-13-F	Potassium, dissolved	1,200	µg/L		110	120	500	500
MW-13-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-13-F	Silver, dissolved	1.2	µg/L	J	0.18	0.50	1.5	1.5
MW-13-F	Sodium, dissolved	2,500	µg/L		58	250	500	500
MW-13-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-13-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-13-F	Zinc, dissolved	14	µg/L	J	1.8	2.5	50	50
MW-14	Aluminum	6.0	µg/L	J	1.4	2.5	50	50
MW-14	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-14	Arsenic	1.9	µg/L		0.61	1.0	1.5	1.5
MW-14	Barium	360	µg/L		0.18	0.50	25	25
MW-14	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-14	Calcium	34,000	µg/L		90	120	1000	1,000
MW-14	Chromium	0.61	µg/L	J	0.30	0.50	10	10
MW-14	Cobalt	3.8	µg/L	J	0.12	0.50	5.0	5.0
MW-14	Copper	2.7	µg/L	J	0.24	0.50	5.0	5.0
MW-14	Iron	10,000	µg/L		48	120	200	200
MW-14	Lead	0.38	µg/L	J	0.24	0.50	1.0	1.0
MW-14	Magnesium	6,000	µg/L		41	120	500	500
MW-14	Manganese	410	µg/L		0.26	0.50	5.0	5.0
MW-14	Mercury	0.086	µg/L	J	0.024	0.10	0.20	0.20
MW-14	Nickel	5.0	µg/L	J	0.20	0.50	10	10
MW-14	Potassium	960	µg/L		110	120	500	500
MW-14	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-14	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-14	Sodium	3,700	µg/L		58	120	500	500
MW-14	Thallium	0.17	µg/L	J	0.16	0.50	2.0	2.0
MW-14	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-14	Zinc	18	µg/L	J	1.8	2.5	50	50
MW-14-Dup	Aluminum	4.6	µg/L	J	1.4	2.5	50	50
MW-14-Dup	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-14-Dup	Arsenic	1.6	µg/L		0.61	1.0	1.5	1.5
MW-14-Dup	Barium	360	µg/L		0.18	0.50	25	25
MW-14-Dup	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-14-Dup	Calcium	34,000	µg/L		90	120	1000	1,000
MW-14-Dup	Chromium	0.34	µg/L	J	0.30	0.50	10	10
MW-14-Dup	Cobalt	3.8	µg/L	J	0.12	0.50	5.0	5.0
MW-14-Dup	Copper	0.80	µg/L	J	0.24	0.50	5.0	5.0
MW-14-Dup	Iron	10,000	µg/L		48	120	200	200
MW-14-Dup	Lead	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-14-Dup	Magnesium	5,800	µg/L		41	120	500	500
MW-14-Dup	Manganese	420	µg/L		0.26	0.50	5.0	5.0
MW-14-Dup	Mercury	0.093	µg/L	J	0.024	0.10	0.20	0.20
MW-14-Dup	Nickel	5.1	µg/L	J	0.20	0.50	10	10
MW-14-Dup	Potassium	920	µg/L		110	120	500	500
MW-14-Dup	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-14-Dup	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-14-Dup	Sodium	3,600	µg/L		58	120	500	500
MW-14-Dup	Thallium	0.16	µg/L	J	0.16	0.50	2.0	2.0
MW-14-Dup	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-14-Dup	Zinc	16	µg/L	J	1.8	2.5	50	50
MW-14-F	Aluminum, dissolved	9.2	µg/L	J	1.4	2.5	50	50
MW-14-F	Antimony, dissolved	0.81	µg/L	J	0.52	1.0	2.5	2.5
MW-14-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-14-F	Barium, dissolved	300	µg/L		0.18	0.50	25	25
MW-14-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-14-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-14-F	Calcium, dissolved	28,000	µg/L		90	120	1000	1,000
MW-14-F	Chromium, dissolved	0.76	µg/L	J	0.30	0.50	10	10
MW-14-F	Cobalt, dissolved	3.0	µg/L		0.12	0.50	2.0	2.0
MW-14-F	Copper, dissolved	0.76	µg/L	J	0.24	0.50	5.0	5.0
MW-14-F	Iron, dissolved	7,500	µg/L		48	120	200	200
MW-14-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-14-F	Magnesium, dissolved	4,900	µg/L		41	120	500	500
MW-14-F	Manganese, dissolved	330	µg/L		0.26	0.50	5.0	5.0
MW-14-F	Mercury	0.11	µg/L	J	0.052	0.10	0.20	0.20
MW-14-F	Nickel, dissolved	4.3	µg/L	J	0.20	0.50	10	10
MW-14-F	Potassium, dissolved	770	µg/L		110	120	500	500
MW-14-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-14-F	Silver, dissolved	0.82	µg/L	J	0.18	0.50	1.5	1.5
MW-14-F	Sodium, dissolved	3,000	µg/L		58	250	500	500
MW-14-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-14-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-14-F	Zinc, dissolved	17	µg/L	J	1.8	2.5	50	50
MW-14-F-Dup	Aluminum, dissolved	8.7	µg/L	J	1.4	2.5	50	50
MW-14-F-Dup	Antimony, dissolved	0.52	µg/L	J	0.52	1.0	2.5	2.5
MW-14-F-Dup	Arsenic, dissolved	0.84	µg/L	J	0.61	1.0	1.5	1.5
MW-14-F-Dup	Barium, dissolved	300	µg/L		0.18	0.50	25	25
MW-14-F-Dup	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-14-F-Dup	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-14-F-Dup	Calcium, dissolved	27,000	µg/L		90	120	1000	1,000
MW-14-F-Dup	Chromium, dissolved	0.70	µg/L	J	0.30	0.50	10	10
MW-14-F-Dup	Cobalt, dissolved	3.0	µg/L		0.12	0.50	2.0	2.0
MW-14-F-Dup	Copper, dissolved	0.80	µg/L	J	0.24	0.50	5.0	5.0
MW-14-F-Dup	Iron, dissolved	7,400	µg/L		48	120	200	200
MW-14-F-Dup	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-14-F-Dup	Magnesium, dissolved	4,700	µg/L		41	120	500	500
MW-14-F-Dup	Manganese, dissolved	330	µg/L		0.26	0.50	5.0	5.0
MW-14-F-Dup	Mercury	0.11	µg/L	J	0.052	0.10	0.20	0.20
MW-14-F-Dup	Nickel, dissolved	4.3	µg/L	J	0.20	0.50	10	10
MW-14-F-Dup	Potassium, dissolved	750	µg/L		110	120	500	500
MW-14-F-Dup	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-14-F-Dup	Silver, dissolved	0.70	µg/L	J	0.18	0.50	1.5	1.5
MW-14-F-Dup	Sodium, dissolved	3,000	µg/L		58	250	500	500
MW-14-F-Dup	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-14-F-Dup	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-14-F-Dup	Zinc, dissolved	14	µg/L	J	1.8	2.5	50	50
MW-15	Aluminum	33	µg/L	J	1.4	2.5	50	50
MW-15	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-15	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-15	Barium	210	µg/L		0.18	0.50	25	25
MW-15	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-15	Calcium	17,000	µg/L		90	120	1000	1,000
MW-15	Chromium	0.59	µg/L	J	0.30	0.50	10	10
MW-15	Cobalt	0.70	µg/L	J	0.12	0.50	5.0	5.0
MW-15	Copper	0.64	µg/L	J	0.24	0.50	5.0	5.0
MW-15	Iron	17,000	µg/L		48	120	200	200
MW-15	Lead	0.27	µg/L	J	0.24	0.50	1.0	1.0
MW-15	Magnesium	4,500	µg/L		41	120	500	500
MW-15	Manganese	230	µg/L		0.26	0.50	5.0	5.0
MW-15	Mercury	0.091	µg/L	J	0.024	0.10	0.20	0.20
MW-15	Nickel	0.97	µg/L	J	0.20	0.50	10	10
MW-15	Potassium	1,000	µg/L		110	120	500	500
MW-15	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-15	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-15	Sodium	4,000	µg/L		58	120	500	500
MW-15	Thallium	ND	µg/L	U	0.16	0.50	2.0	2.0
MW-15	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-15	Zinc	16	µg/L	J	1.8	2.5	50	50
MW-15-F	Aluminum, dissolved	11	µg/L	J	1.4	2.5	50	50
MW-15-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-15-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-15-F	Barium, dissolved	190	µg/L		0.18	0.50	25	25
MW-15-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-15-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-15-F	Calcium, dissolved	18,000	µg/L		90	120	1000	1,000
MW-15-F	Chromium, dissolved	0.78	µg/L	J	0.30	0.50	10	10
MW-15-F	Cobalt, dissolved	0.26	µg/L	J	0.12	0.50	2.0	2.0
MW-15-F	Copper, dissolved	0.86	µg/L	J	0.24	0.50	5.0	5.0
MW-15-F	Iron, dissolved	140	µg/L	J	48	120	200	200
MW-15-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-15-F	Magnesium, dissolved	4,400	µg/L		41	120	500	500
MW-15-F	Manganese, dissolved	140	µg/L		0.26	0.50	5.0	5.0
MW-15-F	Mercury	0.093	µg/L	J	0.052	0.10	0.20	0.20
MW-15-F	Nickel, dissolved	1.7	µg/L	J	0.20	0.50	10	10
MW-15-F	Potassium, dissolved	1,100	µg/L		110	120	500	500

Sample Location	Isotope	Result	Units	Qualifier	Uncertainty	Critical Level	MDA	RL
MW-33	Thorium-230	-0.028	pCi/L	U	0.139	0.0601	0.263	0.263
MW-33	Thorium-232	0.024	pCi/L	U	0.139	0.0443	0.222	0.222
MW-33	Total Uranium	0.448	ug/L		0.009	0.051	0.197	0.197
MW-33	Uranium-234	0.122	pCi/L	U	0.216	0.137	0.462	0.462
MW-33	Uranium-235	0	pCi/L	U	0.198	0	0.149	0.149
MW-33	Uranium-238	0.024	pCi/L	U	0.152	0.0932	0.350	0.350
MW-33-F	Americium-241	0.038	pCi/L	U	0.088	0.0592	0.192	0.192
MW-33-F	Plutonium-238	0.124	pCi/L	U	0.130	0.0784	0.225	0.225
MW-33-F	Pu-239/240	0.083	pCi/L	J	0.092	0.0472	0.153	0.153
MW-33-F	Plutonium-241	0.087	pCi/L	U	4.30	3.62	7.97	7.97
MW-33-F	Thorium-228	0.478	pCi/L	U	0.296	0.0879	0.333	0.333
MW-33-F	Thorium-230	0.031	pCi/L	J	0.133	0.0289	0.178	0.178
MW-33-F	Thorium-232	0	pCi/L	U	0.133	0	0.103	0.103
MW-33-F	Total Uranium	0.295	ug/L	J	0.006	0.051	0.197	0.197
MW-33-F	Uranium-234	0.186	pCi/L	J	0.196	0.103	0.346	0.346
MW-33-F	Uranium-235	-0.03	pCi/L	U	0.148	0.0644	0.275	0.275
MW-33-F	Uranium-238	0.056	pCi/L	J	0.114	0.0285	0.158	0.158
MW-39	Americium-241	0.003	pCi/L	U	0.107	0.0893	0.248	0.248
MW-39	Plutonium-238	0.074	pCi/L	U	0.108	0.0751	0.206	0.206
MW-39	Pu-239/240	0.012	pCi/L	U	0.049	0.0354	0.115	0.115
MW-39	Plutonium-241	-3.83	pCi/L	U	4.47	3.85	7.88	7.88
MW-39	Thorium-228	0.366	pCi/L	U	0.272	0.122	0.412	0.412
MW-39	Thorium-230	0.004	pCi/L	U	0.122	0.059	0.247	0.247
MW-39	Thorium-232	0	pCi/L	U	0.122	0	0.094	0.094
MW-39	Total Uranium	0.408	ug/L		0.008	0.051	0.197	0.197
MW-39	Uranium-234	0.2	pCi/L		0.145	0.051	0.187	0.187
MW-39	Uranium-235	0.056	pCi/L	U	0.101	0	0.076	0.076
MW-39	Uranium-238	0.214	pCi/L		0.137	0	0.058	0.058
MW-39-F	Americium-241	-0.02	pCi/L	U	0.074	0.0671	0.186	0.186
MW-39-F	Plutonium-238	0.235	pCi/L		0.141	0.0723	0.201	0.201
MW-39-F	Pu-239/240	0.051	pCi/L	U	0.051	0	0.034	0.034
MW-39-F	Plutonium-241	-2.47	pCi/L	U	4.57	3.91	8.01	8.01
MW-39-F	Thorium-228	0.309	pCi/L	U	0.250	0.104	0.372	0.372
MW-39-F	Thorium-230	-0.041	pCi/L	U	0.131	0.07	0.283	0.283
MW-39-F	Thorium-232	0	pCi/L	U	0.131	0	0.101	0.101
MW-39-F	Total Uranium	0.46	ug/L		0.009	0.051	0.197	0.197
MW-39-F	Uranium-234	0.189	pCi/L	J	0.196	0.112	0.358	0.358
MW-39-F	Uranium-235	0.133	pCi/L	J	0.142	0.0319	0.177	0.177
MW-39-F	Uranium-238	0.103	pCi/L	J	0.123	0.0547	0.212	0.212
MW-40	Americium-241	0.101	pCi/L	U	0.109	0.0563	0.186	0.186
MW-40	Plutonium-238	-0.016	pCi/L	U	0.099	0.0878	0.247	0.247
MW-40	Pu-239/240	0.107	pCi/L	J	0.125	0.0778	0.224	0.224
MW-40	Plutonium-241	1.18	pCi/L	U	4.52	3.76	8.29	8.29
MW-40	Thorium-228	0.791	pCi/L	J	0.378	0.109	0.381	0.381
MW-40	Thorium-230	-0.003	pCi/L	U	0.126	0.067	0.271	0.271
MW-40	Thorium-232	0.036	pCi/L	J	0.126	0	0.097	0.097
MW-40	Total Uranium	0.11	ug/L	J	0.003	0.051	0.197	0.197
MW-40	Uranium-234	-0.1	pCi/L	U	0.155	0.164	0.532	0.532
MW-40	Uranium-235	-0.132	pCi/L	U	0.203	0.189	0.630	0.630
MW-40	Uranium-238	0.005	pCi/L	U	0.162	0.134	0.456	0.456
MW-40-F	Americium-241	0.066	pCi/L	U	0.114	0.0739	0.233	0.233
MW-40-F	Plutonium-238	0.074	pCi/L	U	0.115	0.0743	0.221	0.221
MW-40-F	Pu-239/240	0.046	pCi/L	U	0.090	0.0587	0.185	0.185
MW-40-F	Plutonium-241	4.84	pCi/L	J	5.30	4.26	9.38	9.38
MW-40-F	Thorium-228	0.502	pCi/L	U	0.308	0.121	0.410	0.410
MW-40-F	Thorium-230	0.004	pCi/L	U	0.121	0.0588	0.246	0.246
MW-40-F	Thorium-232	0	pCi/L	U	0.121	0	0.094	0.094
MW-40-F	Total Uranium	0.099	ug/L	J	0.003	0.051	0.197	0.197
MW-40-F	Uranium-234	0.069	pCi/L	U	0.180	0.122	0.426	0.426
MW-40-F	Uranium-235	-0.027	pCi/L	U	0.201	0.0713	0.332	0.332
MW-40-F	Uranium-238	-0.019	pCi/L	U	0.154	0.0946	0.356	0.356
MW-52	Americium-241	0.041	pCi/L	U	0.073	0.0476	0.146	0.146
MW-52	Plutonium-238	0.155	pCi/L	J	0.126	0.0737	0.204	0.204
MW-52	Pu-239/240	0.026	pCi/L	U	0.057	0.0368	0.120	0.120
MW-52	Plutonium-241	-0.098	pCi/L	U	4.79	4.03	8.26	8.26
MW-52	Thorium-228	0.437	pCi/L	U	0.285	0.09	0.338	0.338
MW-52	Thorium-230	-0.027	pCi/L	U	0.133	0.0579	0.253	0.253
MW-52	Thorium-232	-0.007	pCi/L	U	0.133	0.0289	0.178	0.178
MW-52	Total Uranium	0.233	ug/L	J	0.006	0.051	0.197	0.197
MW-52	Uranium-234	0.191	pCi/L		0.140	0.0437	0.170	0.170
MW-52	Uranium-235	-0.004	pCi/L	U	0.102	0.0361	0.168	0.168
MW-52	Uranium-238	0.124	pCi/L	J	0.113	0.0391	0.158	0.158
MW-52-F	Americium-241	0.088	pCi/L	J	0.090	0.0506	0.150	0.150
MW-52-F	Plutonium-238	0.136	pCi/L	J	0.121	0.0715	0.201	0.201
MW-52-F	Pu-239/240	0.035	pCi/L	U	0.058	0.0331	0.112	0.112
MW-52-F	Plutonium-241	-2.56	pCi/L	U	4.56	3.9	7.99	7.99
MW-52-F	Thorium-228	0.314	pCi/L	U	0.270	0.118	0.421	0.421
MW-52-F	Thorium-230	-0.015	pCi/L	U	0.144	0.0443	0.226	0.226
MW-52-F	Thorium-232	-0.007	pCi/L	U	0.144	0.0313	0.193	0.193
MW-52-F	Total Uranium	0.258	ug/L	J	0.005	0.051	0.197	0.197
MW-52-F	Uranium-234	0.205	pCi/L		0.142	0.0345	0.147	0.147
MW-52-F	Uranium-235	0.058	pCi/L	U	0.104	0	0.078	0.078
MW-52-F	Uranium-238	0.039	pCi/L	J	0.080	0.0199	0.110	0.110
MW-59	Americium-241	0.097	pCi/L	U	0.127	0.0782	0.232	0.232
MW-59	Plutonium-238	0.26	pCi/L	J	0.153	0.0766	0.214	0.214
MW-59	Pu-239/240	0.097	pCi/L		0.073	0	0.038	0.038
MW-59	Plutonium-241	4.07	pCi/L	U	5.07	4.1	9.04	9.04
MW-59	Thorium-228	0.714	pCi/L	J	0.454	0.173	0.598	0.598
MW-59	Thorium-230	-0.004	pCi/L	U	0.191	0.101	0.410	0.410
MW-59	Thorium-232	-0.02	pCi/L	U	0.191	0.0585	0.299	0.299
MW-59	Total Uranium	0.199	ug/L	J	0.006	0.051	0.197	0.197
MW-59	Uranium-234	0.133	pCi/L	J	0.145	0.0642	0.241	0.241
MW-59	Uranium-235	-0.018	pCi/L	U	0.137	0.0484	0.226	0.226
MW-59	Uranium-238	0.023	pCi/L	U	0.105	0.0586	0.227	0.227
MW-59-F	Americium-241	0.037	pCi/L	U	0.084	0.0614	0.175	0.175
MW-59-F	Plutonium-238	0.17	pCi/L	J	0.119	0.0568	0.168	0.168
MW-59-F	Pu-239/240	0.069	pCi/L	J	0.077	0.0392	0.127	0.127
MW-59-F	Plutonium-241	2.63	pCi/L	U	4.92	4.03	8.89	8.89
MW-59-F	Thorium-228	0.46	pCi/L	U	0.325	0.116	0.425	0.425
MW-59-F	Thorium-230	0.067	pCi/L	U	0.188	0.129	0.457	0.457
MW-59-F	Thorium-232	-0.028	pCi/L	U	0.159	0.103	0.391	0.391
MW-59-F	Total Uranium	0.191	ug/L	J	0.006	0.051	0.197	0.197
MW-59-F	Uranium-234	0.138	pCi/L	U	0.216	0.143	0.450	0.450
MW-59-F	Uranium-235	-0.019	pCi/L	U	0.152	0.0934	0.351	0.351
MW-59-F	Uranium-238	0.068	pCi/L	U	0.135	0.0826	0.297	0.297
MW-81	Americium-241	0.182	pCi/L	J	0.142	0.0615	0.202	0.202
MW-81	Plutonium-238	0.13	pCi/L	U	0.114	0.0624	0.183	0.183
MW-81	Pu-239/240	0.036	pCi/L	J	0.062	0.0357	0.121	0.121
MW-81	Plutonium-241	-4.34	pCi/L	U	5.84	5.04	10.4	10.4
MW-81	Thorium-228	0.053	pCi/L	U	0.266	0.209	0.657	0.657
MW-81	Thorium-230	-0.043	pCi/L	U	0.180	0.167	0.545	0.545
MW-81	Thorium-232	-0.115	pCi/L	U	0.146	0.144	0.487	0.487
MW-81	Total Uranium	0.645	ug/L		0.010	0.051	0.197	0.197
MW-81	Uranium-234	3.41	pCi/L		0.840	0.0536	0.225	0.225
MW-81	Uranium-235	0.191	pCi/L	J	0.184	0.0443	0.226	0.226
MW-81	Uranium-238	0.23	pCi/L	J	0.180	0.048	0.210	0.210
MW-81-D	Americium-241	0.003	pCi/L	U	0.097	0.0804	0.249	0.249
MW-81-D	Plutonium-238	0.104	pCi/L	U	0.115	0.0743	0.206	0.206
MW-81-D	Pu-239/240	0.026	pCi/L	U	0.057	0.0371	0.121	0.121
MW-81-D	Plutonium-241	-3.53	pCi/L	U	5.29	4.55	9.37	9.37
MW-81-D	Thorium-228	0.429	pCi/L	U	0.382	0.2	0.658	0.658
MW-81-D	Thorium-230	-0.16	pCi/L	U	0.180	0.185	0.619	0.619
MW-81-D	Thorium-232	-0.05	pCi/L	U	0.178	0.128	0.470	0.470
MW-81-D	Total Uranium	0.649	ug/L		0.010	0.051	0.197	0.197
MW-81-D	Uranium-234	5.18	pCi/L		1.32	0.109	0.412	0.412
MW-81-D	Uranium-235	0.301	pCi/L		0.273	0	0.169	0.169
MW-81-D	Uranium-238	0.517	pCi/L	J	0.323	0.0363	0.224	0.224
MW-81-F	Americium-241	0.072	pCi/L	J	0.102	0.0648	0.199	0.199
MW-81-F	Plutonium-238	0.014	pCi/L	U	0.105	0.0852	0.234	0.234
MW-81-F	Pu-239/240	0.041	pCi/L	J	0.067	0.0402	0.131	0.131
MW-81-F	Plutonium-241	-2.73	pCi/L	U	5.70	4.88	10.0	10.0
MW-81-F	Thorium-228	0.554	pCi/L	J	0.375	0.152	0.522	0.522
MW-81-F	Thorium-230	-0.054	pCi/L	U	0.163	0.122	0.444	0.444
MW-81-F	Thorium-232	-0.017	pCi/L	U	0.163	0.05	0.256	0.256
MW-81-F	Total Uranium	0.67	ug/L		0.011	0.051	0.197	0.197
MW-81-F	Uranium-234	2.6	pCi/L		0.689	0.0401	0.187	0.187
MW-81-F	Uranium-235	0.199	pCi/L		0.177	0	0.108	0.108
MW-81-F	Uranium-238	0.269	pCi/L	J	0.184	0.0232	0.143	0.143
MW-81-F-D	Americium-241	0.037	pCi/L	U	0.091	0.0644	0.202	0.202
MW-81-F-D	Plutonium-238	0.127	pCi/L	U	0.115	0.0689	0.193	0.193
MW-81-F-D	Pu-239/240	0.042	pCi/L	J	0.060	0.0319	0.108	0.108
MW-81-F-D	Plutonium-241	-2.99	pCi/L	U	5.05	4.34	8.93	8.93
MW-81-F-D	Thorium-228	0.555	pCi/L	J	0.388	0.166	0.562	0.562
MW-81-F-D	Thorium-230	-0.052	pCi/L	U	0.169	0.0895	0.362	0.362
MW-81-F-D	Thorium-232	-0.043	pCi/L	U	0.169	0.0817	0.342	0.342
MW-81-F-D	Total Uranium	0.627	ug/L		0.009	0.051	0.197	0.197
MW-81-F-D	Uranium-234	2.79	pCi/L		0.774	0.0562	0.245	0.245
MW-81-F-D	Uranium-235	0.135	pCi/L	J	0.169	0.0363	0.224	0.224
MW-81-F-D	Uranium-238	0.103	pCi/L	J	0.129	0.0278	0.171	0.171
PZ-09	Americium-241	0.104	pCi/L	U	0.116	0.0682	0.209	0.209
PZ-09	Plutonium-238	0.123	pCi/L	U	0.110	0.0502	0.163	0.163
PZ-09	Pu-239/240	0.088	pCi/L	J	0.098	0.0501	0.163	0.163
PZ-09	Plutonium-241	2.9	pCi/L	U	4.88	3.99	8.79	8.79

Sample Location	Parameter	Result	Units	Qualifier	Detection Limit	LOD	LOQ	Reporting Limit
MW-15-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-15-F	Silver, dissolved	0.50	µg/L	J	0.18	0.50	1.5	1.5
MW-15-F	Sodium, dissolved	3,800	µg/L		58	250	500	500
MW-15-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-15-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-15-F	Zinc, dissolved	12	µg/L	J	1.8	2.5	50	50
MW-22	Aluminum	44	µg/L	J	1.4	2.5	50	50
MW-22	Antimony	1.4	µg/L	J	0.52	0.50	2.5	2.5
MW-22	Arsenic	20	µg/L		0.61	1.0	1.5	1.5
MW-22	Barium	22	µg/L	J	0.18	0.50	25	25
MW-22	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-22	Calcium	210,000	µg/L		900	1200	10000	10,000
MW-22	Chromium	1.1	µg/L	J	0.30	0.50	10	10
MW-22	Cobalt	0.72	µg/L	J	0.12	0.50	5.0	5.0
MW-22	Copper	0.80	µg/L	J	0.24	0.50	5.0	5.0
MW-22	Iron	37,000	µg/L		48	120	200	200
MW-22	Lead	0.36	µg/L	J	0.24	0.50	1.0	1.0
MW-22	Magnesium	44,000	µg/L		41	120	500	500
MW-22	Manganese	590	µg/L		0.26	0.50	5.0	5.0
MW-22	Mercury	0.089	µg/L	J	0.024	0.10	0.20	0.20
MW-22	Nickel	7.5	µg/L	J	0.20	0.50	10	10
MW-22	Potassium	5,100	µg/L		110	120	500	500
MW-22	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-22	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-22	Sodium	12,000	µg/L		58	120	500	500
MW-22	Thallium	0.18	µg/L	J	0.16	0.50	2.0	2.0
MW-22	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-22	Zinc	12	µg/L	J	1.8	2.5	50	50
MW-22-Dup	Aluminum	50	µg/L		1.4	2.5	50	50
MW-22-Dup	Antimony	1.1	µg/L	J	0.52	0.50	2.5	2.5
MW-22-Dup	Arsenic	20	µg/L		0.61	1.0	1.5	1.5
MW-22-Dup	Barium	22	µg/L	J	0.18	0.50	25	25
MW-22-Dup	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-22-Dup	Calcium	220,000	µg/L		900	1200	10000	10,000
MW-22-Dup	Chromium	0.84	µg/L	J	0.30	0.50	10	10
MW-22-Dup	Cobalt	0.74	µg/L	J	0.12	0.50	5.0	5.0
MW-22-Dup	Copper	1.2	µg/L	J	0.24	0.50	5.0	5.0
MW-22-Dup	Iron	35,000	µg/L		48	120	200	200
MW-22-Dup	Lead	0.32	µg/L	J	0.24	0.50	1.0	1.0
MW-22-Dup	Magnesium	41,000	µg/L		41	120	500	500
MW-22-Dup	Manganese	630	µg/L		0.26	0.50	5.0	5.0
MW-22-Dup	Mercury	0.096	µg/L	J	0.024	0.10	0.20	0.20
MW-22-Dup	Nickel	7.9	µg/L	J	0.20	0.50	10	10
MW-22-Dup	Potassium	4,700	µg/L		110	120	500	500
MW-22-Dup	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-22-Dup	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-22-Dup	Sodium	11,000	µg/L		58	120	500	500
MW-22-Dup	Thallium	0.16	µg/L	J	0.16	0.50	2.0	2.0
MW-22-Dup	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-22-Dup	Zinc	3.4	µg/L	J	1.8	2.5	50	50
MW-22-F	Aluminum, dissolved	2.7	µg/L	J	1.4	2.5	50	50
MW-22-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-22-F	Arsenic, dissolved	18	µg/L		0.61	1.0	1.5	1.5
MW-22-F	Barium, dissolved	18	µg/L	J	0.18	0.50	25	25
MW-22-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-22-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-22-F	Calcium, dissolved	190,000	µg/L		900	1200	10000	10,000
MW-22-F	Chromium, dissolved	ND	µg/L	U	0.30	0.50	10	10
MW-22-F	Cobalt, dissolved	0.34	µg/L	J	0.12	0.50	2.0	2.0
MW-22-F	Copper, dissolved	0.40	µg/L	J	0.24	0.50	5.0	5.0
MW-22-F	Iron, dissolved	35,000	µg/L		48	120	200	200
MW-22-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-22-F	Magnesium, dissolved	38,000	µg/L		41	120	500	500
MW-22-F	Manganese, dissolved	550	µg/L		0.26	0.50	5.0	5.0
MW-22-F	Mercury	0.073	µg/L	J	0.052	0.10	0.20	0.20
MW-22-F	Nickel, dissolved	6.5	µg/L	J	0.20	0.50	10	10
MW-22-F	Potassium, dissolved	4,500	µg/L		110	120	500	500
MW-22-F	Selenium, dissolved	2.0	µg/L	J	1.5	2.5	5.0	5.0
MW-22-F	Silver, dissolved	0.30	µg/L	J	0.18	0.50	1.5	1.5
MW-22-F	Sodium, dissolved	10,000	µg/L		58	250	500	500
MW-22-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-22-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-22-F	Zinc, dissolved	13	µg/L	J	1.8	2.5	50	50
MW-22-F-Dup	Aluminum, dissolved	10	µg/L	J	1.4	2.5	50	50
MW-22-F-Dup	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-22-F-Dup	Arsenic, dissolved	18	µg/L		0.61	1.0	1.5	1.5
MW-22-F-Dup	Barium, dissolved	18	µg/L	J	0.18	0.50	25	25
MW-22-F-Dup	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-22-F-Dup	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-22-F-Dup	Calcium, dissolved	200,000	µg/L		900	1200	10000	10,000
MW-22-F-Dup	Chromium, dissolved	ND	µg/L	U	0.30	0.50	10	10
MW-22-F-Dup	Cobalt, dissolved	0.40	µg/L	J	0.12	0.50	2.0	2.0
MW-22-F-Dup	Copper, dissolved	0.36	µg/L	J	0.24	0.50	5.0	5.0
MW-22-F-Dup	Iron, dissolved	35,000	µg/L		48	120	200	200
MW-22-F-Dup	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-22-F-Dup	Magnesium, dissolved	38,000	µg/L		41	120	500	500
MW-22-F-Dup	Manganese, dissolved	550	µg/L		0.26	0.50	5.0	5.0
MW-22-F-Dup	Mercury	0.059	µg/L	U	0.052	0.10	0.20	0.20
MW-22-F-Dup	Nickel, dissolved	6.6	µg/L	J	0.20	0.50	10	10
MW-22-F-Dup	Potassium, dissolved	4,600	µg/L		110	120	500	500
MW-22-F-Dup	Selenium, dissolved	1.5	µg/L	J	1.5	2.5	5.0	5.0
MW-22-F-Dup	Silver, dissolved	0.32	µg/L	J	0.18	0.50	1.5	1.5
MW-22-F-Dup	Sodium, dissolved	10,000	µg/L		58	250	500	500
MW-22-F-Dup	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-22-F-Dup	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-22-F-Dup	Zinc, dissolved	ND	µg/L	U	1.8	2.5	50	50
MW-33	Aluminum	150	µg/L		1.4	2.5	50	50
MW-33	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-33	Arsenic	1.8	µg/L		0.61	1.0	1.5	1.5
MW-33	Barium	810	µg/L		0.18	0.50	25	25
MW-33	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-33	Calcium	36,000	µg/L		90	120	1000	1,000
MW-33	Chromium	1.8	µg/L	J	0.30	0.50	10	10
MW-33	Cobalt	0.57	µg/L	J	0.12	0.50	5.0	5.0
MW-33	Copper	2.2	µg/L	J	0.24	0.50	5.0	5.0
MW-33	Iron	1,000	µg/L		48	120	200	200
MW-33	Lead	0.98	µg/L	J	0.24	0.50	1.0	1.0
MW-33	Magnesium	6,800	µg/L		41	120	500	500
MW-33	Manganese	80	µg/L		0.26	0.50	5.0	5.0
MW-33	Mercury	0.10	µg/L	J	0.024	0.10	0.20	0.20
MW-33	Nickel	3.0	µg/L	J	0.20	0.50	10	10
MW-33	Potassium	2,400	µg/L		110	120	500	500
MW-33	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-33	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-33	Sodium	72,000	µg/L		58	120	500	500
MW-33	Thallium	0.25	µg/L	J	0.16	0.50	2.0	2.0
MW-33	Vanadium	0.60	µg/L	J	0.49	0.50	4.0	4.0
MW-33	Zinc	19	µg/L	J	1.8	2.5	50	50
MW-33-F	Aluminum, dissolved	3.1	µg/L	J	1.4	2.5	50	50
MW-33-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-33-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-33-F	Barium, dissolved	670	µg/L		0.18	0.50	25	25
MW-33-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-33-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-33-F	Calcium, dissolved	45,000	µg/L		90	120	1000	1,000
MW-33-F	Chromium, dissolved	0.48	µg/L	J	0.30	0.50	10	10
MW-33-F	Cobalt, dissolved	0.13	µg/L	J	0.12	0.50	2.0	2.0
MW-33-F	Copper, dissolved	0.78	µg/L	J	0.24	0.50	5.0	5.0
MW-33-F	Iron, dissolved	320	µg/L		48	120	200	200
MW-33-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-33-F	Magnesium, dissolved	8,100	µg/L		41	120	500	500
MW-33-F	Manganese, dissolved	67	µg/L		0.26	0.50	5.0	5.0
MW-33-F	Mercury	0.081	µg/L	J	0.052	0.10	0.20	0.20
MW-33-F	Nickel, dissolved	2.2	µg/L	J	0.20	0.50	10	10
MW-33-F	Potassium, dissolved	2,400	µg/L		110	120	500	500
MW-33-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-33-F	Silver, dissolved	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-33-F	Sodium, dissolved	44,000	µg/L		58	250	500	500
MW-33-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-33-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-33-F	Zinc, dissolved	11	µg/L	J	1.8	2.5	50	50
MW-39	Aluminum	5,400	µg/L		1.4	2.5	50	50
MW-39	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-39	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-39	Barium	30	µg/L		0.18	0.50	25	25
MW-39	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-39	Calcium	50,000	µg/L		90	120	1000	1,000
MW-39	Chromium	2.0	µg/L	J	0.30	0.50	10	10
MW-39	Cobalt	36	µg/L		0.12	0.50	5.0	5.0
MW-39	Copper	14	µg/L		0.24	0.50	5.0	5.0
MW-39	Iron	22,000	µg/L		48	120	200	200
MW-39	Lead	1.1	µg/L		0.24	0.50	1.0	1.0
MW-39	Magnesium	20,000	µg/L		41	120	500	500

Sample Location	Isotope	Result	Units	Qualifier	Uncertainty	Critical Level	MDA	RL
PZ-09	Thorium-228	0.54	pCi/L	J	0.301	0.0997	0.349	0.349
PZ-09	Thorium-230	-0.015	pCi/L	U	0.115	0.0402	0.193	0.193
PZ-09	Thorium-232	-0.006	pCi/L	U	0.115	0.0249	0.154	0.154
PZ-09	Total Uranium	0.126	ug/L	J	0.004	0.051	0.197	0.197
PZ-09	Uranium-234	0.05	pCi/L	U	0.116	0.0708	0.266	0.266
PZ-09	Uranium-235	0.064	pCi/L	J	0.151	0.0534	0.249	0.249
PZ-09	Uranium-238	-0.006	pCi/L	U	0.115	0.0646	0.251	0.251
PZ-09-F	Americium-241	0.017	pCi/L	U	0.116	0.0917	0.284	0.284
PZ-09-F	Plutonium-238	0.135	pCi/L	U	0.104	0.0392	0.133	0.133
PZ-09-F	Pu-239/240	0.063	pCi/L	J	0.073	0.032	0.117	0.117
PZ-09-F	Plutonium-241	0.974	pCi/L	U	4.39	3.66	8.07	8.07
PZ-09-F	Thorium-228	0.515	pCi/L	U	0.324	0.112	0.400	0.400
PZ-09-F	Thorium-230	0	pCi/L	U	0.141	0	0.109	0.109
PZ-09-F	Thorium-232	0	pCi/L	U	0.141	0	0.109	0.109
PZ-09-F	Total Uranium	0.127	ug/L	J	0.005	0.051	0.197	0.197
PZ-09-F	Uranium-234	-0.023	pCi/L	U	0.152	0.135	0.426	0.426
PZ-09-F	Uranium-235	0.053	pCi/L	U	0.145	0.0954	0.350	0.350
PZ-09-F	Uranium-238	0.002	pCi/L	U	0.110	0.0781	0.281	0.281
SP-DR-01	Americium-241	0.128	pCi/L	J	0.146	0.0794	0.258	0.258
SP-DR-01	Plutonium-238	-0.003	pCi/L	U	0.069	0.0592	0.175	0.175
SP-DR-01	Pu-239/240	0.114	pCi/L	J	0.094	0.0408	0.133	0.133
SP-DR-01	Plutonium-241	-4.1	pCi/L	U	5.66	4.88	10.0	10.0
SP-DR-01	Thorium-228	0.502	pCi/L	J	0.398	0.176	0.609	0.609
SP-DR-01	Thorium-230	-0.06	pCi/L	U	0.194	0.103	0.418	0.418
SP-DR-01	Thorium-232	0.091	pCi/L	J	0.195	0.0596	0.305	0.305
SP-DR-01	Total Uranium	1.63	ug/L		0.030	0.051	0.197	0.197
SP-DR-01	Uranium-234	2.11	pCi/L		0.669	0.0847	0.327	0.327
SP-DR-01	Uranium-235	0.136	pCi/L	J	0.182	0.0553	0.283	0.283
SP-DR-01	Uranium-238	0.523	pCi/L	J	0.303	0.0599	0.262	0.262
SP-DR-01-D	Americium-241	0.262	pCi/L	J	0.201	0.0983	0.304	0.304
SP-DR-01-D	Plutonium-238	0.086	pCi/L	U	0.153	0.111	0.303	0.303
SP-DR-01-D	Pu-239/240	-0.027	pCi/L	U	0.080	0.0763	0.224	0.224
SP-DR-01-D	Plutonium-241	-6.66	pCi/L	U	8.13	7.03	14.5	14.5
SP-DR-01-D	Thorium-228	0.348	pCi/L	U	0.295	0.331	0.461	0.461
SP-DR-01-D	Thorium-230	0.216	pCi/L	J	0.215	0.368	0.335	0.335
SP-DR-01-D	Thorium-232	-0.003	pCi/L	U	0.143	0.295	0.272	0.272
SP-DR-01-D	Total Uranium	1.24	ug/L		0.027	0.051	0.197	0.197
SP-DR-01-D	Uranium-234	1.34	pCi/L		0.647	0.122	0.495	0.495
SP-DR-01-D	Uranium-235	0.211	pCi/L	J	0.303	0.113	0.525	0.525
SP-DR-01-D	Uranium-238	0.161	pCi/L	J	0.232	0.0864	0.402	0.402
SP-DR-05	Americium-241	0.074	pCi/L	J	0.112	0.0685	0.219	0.219
SP-DR-05	Plutonium-238	0.195	pCi/L	J	0.133	0.0714	0.199	0.199
SP-DR-05	Pu-239/240	0.018	pCi/L	U	0.057	0.0412	0.130	0.130
SP-DR-05	Plutonium-241	-0.298	pCi/L	U	5.46	4.61	9.48	9.48
SP-DR-05	Thorium-228	0.682	pCi/L	J	0.449	0.128	0.504	0.504
SP-DR-05	Thorium-230	-0.05	pCi/L	U	0.220	0.151	0.561	0.561
SP-DR-05	Thorium-232	-0.208	pCi/L	U	0.222	0.233	0.775	0.775
SP-DR-05	Total Uranium	0.149	ug/L	J	0.004	0.051	0.197	0.197
SP-DR-05	Uranium-234	0.325	pCi/L	J	0.261	0.102	0.375	0.375
SP-DR-05	Uranium-235	0	pCi/L	U	0.186	0	0.143	0.143
SP-DR-05	Uranium-238	0.095	pCi/L	U	0.143	0.0587	0.262	0.262
SP-DR-05-F	Americium-241	-0.054	pCi/L	U	0.076	0.0833	0.256	0.256
SP-DR-05-F	Plutonium-238	0.187	pCi/L	J	0.140	0.078	0.218	0.218
SP-DR-05-F	Pu-239/240	0.028	pCi/L	J	0.056	0	0.038	0.038
SP-DR-05-F	Plutonium-241	-0.503	pCi/L	U	5.52	4.67	9.60	9.60
SP-DR-05-F	Thorium-228	0.406	pCi/L	U	0.316	0.0453	0.279	0.279
SP-DR-05-F	Thorium-230	-0.063	pCi/L	U	0.206	0.109	0.443	0.443
SP-DR-05-F	Thorium-232	-0.021	pCi/L	U	0.206	0.0632	0.323	0.323
SP-DR-05-F	Total Uranium	0.13	ug/L	J	0.003	0.051	0.197	0.197
SP-DR-05-F	Uranium-234	0.064	pCi/L	J	0.138	0.0422	0.216	0.216
SP-DR-05-F	Uranium-235	-0.009	pCi/L	U	0.180	0.039	0.240	0.240
SP-DR-05-F	Uranium-238	0.042	pCi/L	U	0.138	0	0.106	0.106

Sample Location	Parameter	Result	Units	Qualifier	Detection Limit	LOD	LOQ	Reporting Limit
MW-39	Manganese	230	µg/L		0.26	0.50	5.0	5.0
MW-39	Mercury	0.088	µg/L	J	0.024	0.10	0.20	0.20
MW-39	Nickel	100	µg/L		0.20	0.50	10	10
MW-39	Potassium	4,100	µg/L		110	120	500	500
MW-39	Selenium	2.2	µg/L	J	1.5	2.5	5.0	5.0
MW-39	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-39	Sodium	13,000	µg/L		58	120	500	500
MW-39	Thallium	0.24	µg/L	J	0.16	0.50	2.0	2.0
MW-39	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-39	Zinc	160	µg/L		1.8	2.5	50	50
MW-39-F	Aluminum, dissolved	5,400	µg/L		14	25	500	500
MW-39-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-39-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-39-F	Barium, dissolved	26	µg/L		0.18	0.50	25	25
MW-39-F	Beryllium, dissolved	4.4	µg/L		0.25	0.50	1.0	1.0
MW-39-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-39-F	Calcium, dissolved	43,000	µg/L		90	120	1000	1,000
MW-39-F	Chromium, dissolved	1.2	µg/L	J	0.30	0.50	10	10
MW-39-F	Cobalt, dissolved	31	µg/L		0.12	0.50	2.0	2.0
MW-39-F	Copper, dissolved	14	µg/L		0.24	0.50	5.0	5.0
MW-39-F	Iron, dissolved	14,000	µg/L		48	120	200	200
MW-39-F	Lead, dissolved	0.74	µg/L	J	0.24	0.50	1.0	1.0
MW-39-F	Magnesium, dissolved	17,000	µg/L		41	120	500	500
MW-39-F	Manganese, dissolved	200	µg/L		0.26	0.50	5.0	5.0
MW-39-F	Mercury	0.12	µg/L	J	0.052	0.10	0.20	0.20
MW-39-F	Nickel, dissolved	86	µg/L		0.20	0.50	10	10
MW-39-F	Potassium, dissolved	3,500	µg/L		110	120	500	500
MW-39-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-39-F	Silver, dissolved	0.22	µg/L	J	0.18	0.50	1.5	1.5
MW-39-F	Sodium, dissolved	12,000	µg/L		58	250	500	500
MW-39-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-39-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-39-F	Zinc, dissolved	170	µg/L		1.8	2.5	50	50
MW-40	Aluminum	17	µg/L	J	1.4	2.5	50	50
MW-40	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-40	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-40	Barium	400	µg/L		0.18	0.50	25	25
MW-40	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-40	Calcium	5,600	µg/L		90	120	1000	1,000
MW-40	Chromium	1.1	µg/L	J	0.30	0.50	10	10
MW-40	Cobalt	ND	µg/L	U	0.12	0.50	5.0	5.0
MW-40	Copper	3.4	µg/L	J	0.24	0.50	5.0	5.0
MW-40	Iron	350	µg/L		48	120	200	200
MW-40	Lead	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-40	Magnesium	1,100	µg/L		41	120	500	500
MW-40	Manganese	9.8	µg/L		0.26	0.50	5.0	5.0
MW-40	Mercury	0.069	µg/L	J	0.024	0.10	0.20	0.20
MW-40	Nickel	0.22	µg/L	J	0.20	0.50	10	10
MW-40	Potassium	1,800	µg/L		110	120	500	500
MW-40	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-40	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-40	Sodium	240,000	µg/L		580	1200	5000	5,000
MW-40	Thallium	ND	µg/L	U	0.16	0.50	2.0	2.0
MW-40	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-40	Zinc	ND	µg/L	U	1.8	2.5	50	50
MW-40-F	Aluminum, dissolved	14	µg/L	J	1.4	2.5	50	50
MW-40-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-40-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-40-F	Barium, dissolved	340	µg/L		0.18	0.50	25	25
MW-40-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-40-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-40-F	Calcium, dissolved	4,800	µg/L		90	120	1000	1,000
MW-40-F	Chromium, dissolved	0.40	µg/L	J	0.30	0.50	10	10
MW-40-F	Cobalt, dissolved	ND	µg/L	U	0.12	0.50	2.0	2.0
MW-40-F	Copper, dissolved	2.9	µg/L	J	0.24	0.50	5.0	5.0
MW-40-F	Iron, dissolved	52	µg/L	J	48	120	200	200
MW-40-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-40-F	Magnesium, dissolved	880	µg/L		41	120	500	500
MW-40-F	Manganese, dissolved	8.2	µg/L		0.26	0.50	5.0	5.0
MW-40-F	Mercury	0.084	µg/L	J	0.052	0.10	0.20	0.20
MW-40-F	Nickel, dissolved	0.58	µg/L	J	0.20	0.50	10	10
MW-40-F	Potassium, dissolved	1,500	µg/L		110	120	500	500
MW-40-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-40-F	Silver, dissolved	0.37	µg/L	J	0.18	0.50	1.5	1.5
MW-40-F	Sodium, dissolved	230,000	µg/L		580	2500	5000	5,000
MW-40-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-40-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-40-F	Zinc, dissolved	2.1	µg/L	J	1.8	2.5	50	50
MW-52	Aluminum	28	µg/L	J	1.4	2.5	50	50
MW-52	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-52	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-52	Barium	300	µg/L		0.18	0.50	25	25
MW-52	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-52	Calcium	94,000	µg/L		90	120	1000	1,000
MW-52	Chromium	3.9	µg/L	J	0.30	0.50	10	10
MW-52	Cobalt	0.52	µg/L	J	0.12	0.50	5.0	5.0
MW-52	Copper	3.0	µg/L	J	0.24	0.50	5.0	5.0
MW-52	Iron	1,400	µg/L		48	120	200	200
MW-52	Lead	0.36	µg/L	J	0.24	0.50	1.0	1.0
MW-52	Magnesium	15,000	µg/L		41	120	500	500
MW-52	Manganese	250	µg/L		0.26	0.50	5.0	5.0
MW-52	Mercury	0.077	µg/L	J	0.024	0.10	0.20	0.20
MW-52	Nickel	6.7	µg/L	J	0.20	0.50	10	10
MW-52	Potassium	2,200	µg/L		110	120	500	500
MW-52	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-52	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-52	Sodium	3,900	µg/L		58	120	500	500
MW-52	Thallium	ND	µg/L	U	0.16	0.50	2.0	2.0
MW-52	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-52	Zinc	3.5	µg/L	J	1.8	2.5	50	50
MW-52-F	Aluminum, dissolved	11	µg/L	J	1.4	2.5	50	50
MW-52-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-52-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-52-F	Barium, dissolved	240	µg/L		0.18	0.50	25	25
MW-52-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-52-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-52-F	Calcium, dissolved	84,000	µg/L		90	120	1000	1,000
MW-52-F	Chromium, dissolved	2.3	µg/L	J	0.30	0.50	10	10
MW-52-F	Cobalt, dissolved	1.1	µg/L	J	0.12	0.50	2.0	2.0
MW-52-F	Copper, dissolved	1.5	µg/L	J	0.24	0.50	5.0	5.0
MW-52-F	Iron, dissolved	950	µg/L		48	120	200	200
MW-52-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-52-F	Magnesium, dissolved	13,000	µg/L		41	120	500	500
MW-52-F	Manganese, dissolved	180	µg/L		0.26	0.50	5.0	5.0
MW-52-F	Mercury	0.12	µg/L	J	0.052	0.10	0.20	0.20
MW-52-F	Nickel, dissolved	5.3	µg/L	J	0.20	0.50	10	10
MW-52-F	Potassium, dissolved	2,100	µg/L		110	120	500	500
MW-52-F	Selenium, dissolved	1.7	µg/L	J	1.5	2.5	5.0	5.0
MW-52-F	Silver, dissolved	0.56	µg/L	J	0.18	0.50	1.5	1.5
MW-52-F	Sodium, dissolved	3,300	µg/L		58	250	500	500
MW-52-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-52-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-52-F	Zinc, dissolved	4.0	µg/L	J	1.8	2.5	50	50
MW-59	Aluminum	200	µg/L		1.4	2.5	50	50
MW-59	Antimony	0.58	µg/L	J	0.52	0.50	2.5	2.5
MW-59	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-59	Barium	56	µg/L		0.18	0.50	25	25
MW-59	Cadmium	0.38	µg/L	J	0.27	0.50	1.0	1.0
MW-59	Calcium	9,000	µg/L		90	120	1000	1,000
MW-59	Chromium	0.98	µg/L	J	0.30	0.50	10	10
MW-59	Cobalt	18	µg/L		0.12	0.50	5.0	5.0
MW-59	Copper	1.9	µg/L	J	0.24	0.50	5.0	5.0
MW-59	Iron	1,200	µg/L		48	120	200	200
MW-59	Lead	0.52	µg/L	J	0.24	0.50	1.0	1.0
MW-59	Magnesium	8,000	µg/L		41	120	500	500
MW-59	Manganese	730	µg/L		0.26	0.50	5.0	5.0
MW-59	Mercury	0.10	µg/L	J	0.024	0.10	0.20	0.20
MW-59	Nickel	32	µg/L		0.20	0.50	10	10
MW-59	Potassium	1,200	µg/L		110	120	500	500
MW-59	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-59	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-59	Sodium	7,100	µg/L		58	120	500	500
MW-59	Thallium	0.20	µg/L	J	0.16	0.50	2.0	2.0
MW-59	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-59	Zinc	44	µg/L	J	1.8	2.5	50	50
MW-59-F	Aluminum, dissolved	66	µg/L		1.4	2.5	50	50
MW-59-F	Antimony, dissolved	0.64	µg/L	J	0.52	1.0	2.5	2.5
MW-59-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-59-F	Barium, dissolved	53	µg/L		0.18	0.50	25	25
MW-59-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-59-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-59-F	Calcium, dissolved	9,300	µg/L		90	120	1000	1,000
MW-59-F	Chromium, dissolved	ND	µg/L	U	0.30	0.50	10	10

Sample Location	Isotope	Result	Units	Qualifier	Uncertainty	Critical Level	MDA	RL

Sample Location	Parameter	Result	Units	Qualifier	Detection Limit	LOD	LOQ	Reporting Limit
MW-59-F	Cobalt, dissolved	16	µg/L		0.12	0.50	2.0	2.0
MW-59-F	Copper, dissolved	1.3	µg/L	J	0.24	0.50	5.0	5.0
MW-59-F	Iron, dissolved	840	µg/L		48	120	200	200
MW-59-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-59-F	Magnesium, dissolved	7,200	µg/L		41	120	500	500
MW-59-F	Manganese, dissolved	610	µg/L		0.26	0.50	5.0	5.0
MW-59-F	Mercury	0.15	µg/L	J	0.052	0.10	0.20	0.20
MW-59-F	Nickel, dissolved	28	µg/L		0.20	0.50	10	10
MW-59-F	Potassium, dissolved	1,100	µg/L		110	120	500	500
MW-59-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-59-F	Silver, dissolved	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-59-F	Sodium, dissolved	5,900	µg/L		58	250	500	500
MW-59-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-59-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-59-F	Zinc, dissolved	49	µg/L	J	1.8	2.5	50	50
MW-81	Aluminum	9.7	µg/L	J	1.4	2.5	50	50
MW-81	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-81	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-81	Barium	98	µg/L		0.18	0.50	25	25
MW-81	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-81	Calcium	30,000	µg/L		90	120	1000	1,000
MW-81	Chromium	0.76	µg/L	J	0.30	0.50	10	10
MW-81	Cobalt	0.25	µg/L	J	0.12	0.50	5.0	5.0
MW-81	Copper	0.69	µg/L	J	0.24	0.50	5.0	5.0
MW-81	Iron	170	µg/L	J	48	120	200	200
MW-81	Lead	0.30	µg/L	J	0.24	0.50	1.0	1.0
MW-81	Magnesium	6,000	µg/L		41	120	500	500
MW-81	Manganese	14	µg/L		0.26	0.50	5.0	5.0
MW-81	Mercury	0.10	µg/L	J	0.024	0.10	0.20	0.20
MW-81	Nickel	1.7	µg/L	J	0.20	0.50	10	10
MW-81	Potassium	1,100	µg/L		110	120	500	500
MW-81	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-81	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-81	Sodium	4,800	µg/L		58	120	500	500
MW-81	Thallium	0.22	µg/L	J	0.16	0.50	2.0	2.0
MW-81	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-81	Zinc	11	µg/L	J	1.8	2.5	50	50
MW-81-D	Aluminum	9.1	µg/L	J	1.4	2.5	50	50
MW-81-D	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
MW-81-D	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-81-D	Barium	95	µg/L		0.18	0.50	25	25
MW-81-D	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-81-D	Calcium	32,000	µg/L		90	120	1000	1,000
MW-81-D	Chromium	0.82	µg/L	J	0.30	0.50	10	10
MW-81-D	Cobalt	0.24	µg/L	J	0.12	0.50	5.0	5.0
MW-81-D	Copper	0.86	µg/L	J	0.24	0.50	5.0	5.0
MW-81-D	Iron	170	µg/L	J	48	120	200	200
MW-81-D	Lead	0.32	µg/L	J	0.24	0.50	1.0	1.0
MW-81-D	Magnesium	6,200	µg/L		41	120	500	500
MW-81-D	Manganese	15	µg/L		0.26	0.50	5.0	5.0
MW-81-D	Mercury	0.080	µg/L	J	0.024	0.10	0.20	0.20
MW-81-D	Nickel	1.9	µg/L	J	0.20	0.50	10	10
MW-81-D	Potassium	1,200	µg/L		110	120	500	500
MW-81-D	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-81-D	Silver	0.18	µg/L	J	0.18	0.50	1.5	1.5
MW-81-D	Sodium	5,200	µg/L		58	120	500	500
MW-81-D	Thallium	0.22	µg/L	J	0.16	0.50	2.0	2.0
MW-81-D	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-81-D	Zinc	5.4	µg/L	J	1.8	2.5	50	50
MW-81-F	Aluminum, dissolved	2.9	µg/L	J	1.4	2.5	50	50
MW-81-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-81-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-81-F	Barium, dissolved	85	µg/L		0.18	0.50	25	25
MW-81-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-81-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-81-F	Calcium, dissolved	28,000	µg/L		90	120	1000	1,000
MW-81-F	Chromium, dissolved	0.32	µg/L	J	0.30	0.50	10	10
MW-81-F	Cobalt, dissolved	ND	µg/L	U	0.12	0.50	2.0	2.0
MW-81-F	Copper, dissolved	0.54	µg/L	J	0.24	0.50	5.0	5.0
MW-81-F	Iron, dissolved	ND	µg/L	U	48	120	200	200
MW-81-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-81-F	Magnesium, dissolved	5,300	µg/L		41	120	500	500
MW-81-F	Manganese, dissolved	11	µg/L		0.26	0.50	5.0	5.0
MW-81-F	Mercury	0.090	µg/L	J	0.052	0.10	0.20	0.20
MW-81-F	Nickel, dissolved	1.6	µg/L	J	0.20	0.50	10	10
MW-81-F	Potassium, dissolved	990	µg/L		110	120	500	500
MW-81-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-81-F	Silver, dissolved	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-81-F	Sodium, dissolved	4,000	µg/L		58	250	500	500
MW-81-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-81-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-81-F	Zinc, dissolved	19	µg/L	J	1.8	2.5	50	50
MW-81-F-D	Aluminum, dissolved	2.9	µg/L	J	1.4	2.5	50	50
MW-81-F-D	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
MW-81-F-D	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
MW-81-F-D	Barium, dissolved	87	µg/L		0.18	0.50	25	25
MW-81-F-D	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
MW-81-F-D	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
MW-81-F-D	Calcium, dissolved	28,000	µg/L		90	120	1000	1,000
MW-81-F-D	Chromium, dissolved	0.32	µg/L	J	0.30	0.50	10	10
MW-81-F-D	Cobalt, dissolved	ND	µg/L	U	0.12	0.50	2.0	2.0
MW-81-F-D	Copper, dissolved	0.39	µg/L	J	0.24	0.50	5.0	5.0
MW-81-F-D	Iron, dissolved	ND	µg/L	U	48	120	200	200
MW-81-F-D	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
MW-81-F-D	Magnesium, dissolved	5,400	µg/L		41	120	500	500
MW-81-F-D	Manganese, dissolved	10	µg/L		0.26	0.50	5.0	5.0
MW-81-F-D	Mercury	0.093	µg/L	J	0.052	0.10	0.20	0.20
MW-81-F-D	Nickel, dissolved	1.8	µg/L	J	0.20	0.50	10	10
MW-81-F-D	Potassium, dissolved	1,000	µg/L		110	120	500	500
MW-81-F-D	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
MW-81-F-D	Silver, dissolved	ND	µg/L	U	0.18	0.50	1.5	1.5
MW-81-F-D	Sodium, dissolved	3,900	µg/L		58	250	500	500
MW-81-F-D	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
MW-81-F-D	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
MW-81-F-D	Zinc, dissolved	ND	µg/L	U	1.8	2.5	50	50
PZ-09	Aluminum	38	µg/L	J	1.4	2.5	50	50
PZ-09	Antimony	ND	µg/L	U	0.52	0.50	2.5	2.5
PZ-09	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5
PZ-09	Barium	190	µg/L		0.18	0.50	25	25
PZ-09	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
PZ-09	Calcium	13,000	µg/L		90	120	1000	1,000
PZ-09	Chromium	1.3	µg/L	J	0.30	0.50	10	10
PZ-09	Cobalt	0.50	µg/L	J	0.12	0.50	5.0	5.0
PZ-09	Copper	0.97	µg/L	J	0.24	0.50	5.0	5.0
PZ-09	Iron	100	µg/L	J	48	120	200	200
PZ-09	Lead	0.40	µg/L	J	0.24	0.50	1.0	1.0
PZ-09	Magnesium	7,200	µg/L		41	120	500	500
PZ-09	Manganese	17	µg/L		0.26	0.50	5.0	5.0
PZ-09	Mercury	0.080	µg/L	J	0.024	0.10	0.20	0.20
PZ-09	Nickel	21	µg/L		0.20	0.50	10	10
PZ-09	Potassium	1,300	µg/L		110	120	500	500
PZ-09	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
PZ-09	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
PZ-09	Sodium	4,500	µg/L		58	120	500	500
PZ-09	Thallium	0.32	µg/L	J	0.16	0.50	2.0	2.0
PZ-09	Vanadium	ND	µg/L	U	0.49	0.50	4.0	4.0
PZ-09	Zinc	10	µg/L	J	1.8	2.5	50	50
PZ-09-F	Aluminum, dissolved	28	µg/L	J	1.4	2.5	50	50
PZ-09-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
PZ-09-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
PZ-09-F	Barium, dissolved	170	µg/L		0.18	0.50	25	25
PZ-09-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
PZ-09-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
PZ-09-F	Calcium, dissolved	12,000	µg/L		90	120	1000	1,000
PZ-09-F	Chromium, dissolved	0.88	µg/L	J	0.30	0.50	10	10
PZ-09-F	Cobalt, dissolved	0.28	µg/L	J	0.12	0.50	2.0	2.0
PZ-09-F	Copper, dissolved	0.54	µg/L	J	0.24	0.50	5.0	5.0
PZ-09-F	Iron, dissolved	ND	µg/L	U	48	120	200	200
PZ-09-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
PZ-09-F	Magnesium, dissolved	6,400	µg/L		41	120	500	500
PZ-09-F	Manganese, dissolved	14	µg/L		0.26	0.50	5.0	5.0
PZ-09-F	Mercury	0.066	µg/L	U	0.052	0.10	0.20	0.20
PZ-09-F	Nickel, dissolved	19	µg/L		0.20	0.50	10	10
PZ-09-F	Potassium, dissolved	1,200	µg/L		110	120	500	500
PZ-09-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
PZ-09-F	Silver, dissolved	ND	µg/L	U	0.18	0.50	1.5	1.5
PZ-09-F	Sodium, dissolved	3,900	µg/L		58	250	500	500
PZ-09-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
PZ-09-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
PZ-09-F	Zinc, dissolved	9.0	µg/L	J	1.8	2.5	50	50
SP-DR-01	Aluminum	1,000	µg/L		1.4	2.5	50	50
SP-DR-01	Antimony	1.0	µg/L	J	0.52	0.50	2.5	2.5
SP-DR-01	Arsenic	4.4	µg/L		0.61	1.0	1.5	1.5

Sample Location	Isotope	Result	Units	Qualifier	Uncertainty	Critical Level	MDA	RL

Sample Location	Parameter	Result	Units	Qualifier	Detection Limit	LOD	LOQ	Reporting Limit
SP-DR-01	Barium	130	µg/L		0.18	0.50	25	25
SP-DR-01	Cadmium	0.64	µg/L	J	0.27	0.50	1.0	1.0
SP-DR-01	Calcium	17,000	µg/L		90	120	1000	1,000
SP-DR-01	Chromium	2.8	µg/L	J	0.30	0.50	10	10
SP-DR-01	Cobalt	6.2	µg/L		0.12	0.50	5.0	5.0
SP-DR-01	Copper	10	µg/L		0.24	0.50	5.0	5.0
SP-DR-01	Iron	5,300	µg/L		48	120	200	200
SP-DR-01	Lead	10	µg/L		0.24	0.50	1.0	1.0
SP-DR-01	Magnesium	5,400	µg/L		41	120	500	500
SP-DR-01	Manganese	1,500	µg/L		0.26	0.50	5.0	5.0
SP-DR-01	Mercury	0.11	µg/L	J	0.024	0.10	0.20	0.20
SP-DR-01	Nickel	11	µg/L		0.20	0.50	10	10
SP-DR-01	Potassium	6,200	µg/L		110	120	500	500
SP-DR-01	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
SP-DR-01	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
SP-DR-01	Sodium	3,200	µg/L		58	120	500	500
SP-DR-01	Thallium	0.30	µg/L	J	0.16	0.50	2.0	2.0
SP-DR-01	Vanadium	4.0	µg/L		0.49	0.50	4.0	4.0
SP-DR-01	Zinc	29	µg/L	J	1.8	2.5	50	50
SP-DR-01-D	Aluminum	1,200	µg/L		6.9	12	250	250
SP-DR-01-D	Antimony	0.84	µg/L	J	0.52	0.50	2.5	2.5
SP-DR-01-D	Arsenic	4.9	µg/L		0.61	1.0	1.5	1.5
SP-DR-01-D	Barium	130	µg/L		0.18	0.50	25	25
SP-DR-01-D	Cadmium	0.76	µg/L	J	0.27	0.50	1.0	1.0
SP-DR-01-D	Calcium	18,000	µg/L		90	120	1000	1,000
SP-DR-01-D	Chromium	3.9	µg/L	J	0.30	0.50	10	10
SP-DR-01-D	Cobalt	7.1	µg/L		0.12	0.50	5.0	5.0
SP-DR-01-D	Copper	10	µg/L		0.24	0.50	5.0	5.0
SP-DR-01-D	Iron	6,700	µg/L		48	120	200	200
SP-DR-01-D	Lead	11	µg/L		0.24	0.50	1.0	1.0
SP-DR-01-D	Magnesium	6,000	µg/L		41	120	500	500
SP-DR-01-D	Manganese	1,900	µg/L		1.3	2.5	25	25
SP-DR-01-D	Mercury	0.11	µg/L	J	0.024	0.10	0.20	0.20
SP-DR-01-D	Nickel	11	µg/L		0.20	0.50	10	10
SP-DR-01-D	Potassium	6,200	µg/L		110	120	500	500
SP-DR-01-D	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
SP-DR-01-D	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
SP-DR-01-D	Sodium	3,500	µg/L		58	120	500	500
SP-DR-01-D	Thallium	0.32	µg/L	J	0.16	0.50	2.0	2.0
SP-DR-01-D	Vanadium	4.3	µg/L		0.49	0.50	4.0	4.0
SP-DR-01-D	Zinc	29	µg/L	J	1.8	2.5	50	50
SP-DR-05	Aluminum	140	µg/L		1.4	2.5	50	50
SP-DR-05	Antimony	0.72	µg/L	J	0.52	0.50	2.5	2.5
SP-DR-05	Arsenic	ND	µg/L	U	0.61	1.0	1.5	1.5
SP-DR-05	Barium	55	µg/L		0.18	0.50	25	25
SP-DR-05	Cadmium	ND	µg/L	U	0.27	0.50	1.0	1.0
SP-DR-05	Calcium	52,000	µg/L		90	120	1000	1,000
SP-DR-05	Chromium	1.4	µg/L	J	0.30	0.50	10	10
SP-DR-05	Cobalt	1.8	µg/L	J	0.12	0.50	5.0	5.0
SP-DR-05	Copper	3.5	µg/L	J	0.24	0.50	5.0	5.0
SP-DR-05	Iron	2,600	µg/L		48	120	200	200
SP-DR-05	Lead	1.2	µg/L		0.24	0.50	1.0	1.0
SP-DR-05	Magnesium	24,000	µg/L		41	120	500	500
SP-DR-05	Manganese	570	µg/L		0.26	0.50	5.0	5.0
SP-DR-05	Mercury	0.076	µg/L	J	0.024	0.10	0.20	0.20
SP-DR-05	Nickel	4.1	µg/L	J	0.20	0.50	10	10
SP-DR-05	Potassium	2,600	µg/L		110	120	500	500
SP-DR-05	Selenium	ND	µg/L	U	1.5	2.5	5.0	5.0
SP-DR-05	Silver	ND	µg/L	U	0.18	0.50	1.5	1.5
SP-DR-05	Sodium	5,500	µg/L		58	120	500	500
SP-DR-05	Thallium	0.27	µg/L	J	0.16	0.50	2.0	2.0
SP-DR-05	Vanadium	0.80	µg/L	J	0.49	0.50	4.0	4.0
SP-DR-05	Zinc	21	µg/L	J	1.8	2.5	50	50
SP-DR-05-F	Aluminum, dissolved	3.3	µg/L	J	1.4	2.5	50	50
SP-DR-05-F	Antimony, dissolved	ND	µg/L	U	0.52	1.0	2.5	2.5
SP-DR-05-F	Arsenic, dissolved	ND	µg/L	U	0.61	1.0	1.5	1.5
SP-DR-05-F	Barium, dissolved	41	µg/L		0.18	0.50	25	25
SP-DR-05-F	Beryllium, dissolved	ND	µg/L	U	0.25	0.50	1.0	1.0
SP-DR-05-F	Cadmium, dissolved	ND	µg/L	U	0.27	0.50	1.0	1.0
SP-DR-05-F	Calcium, dissolved	45,000	µg/L		90	120	1000	1,000
SP-DR-05-F	Chromium, dissolved	0.76	µg/L	J	0.30	0.50	10	10
SP-DR-05-F	Cobalt, dissolved	0.57	µg/L	J	0.12	0.50	2.0	2.0
SP-DR-05-F	Copper, dissolved	1.1	µg/L	J	0.24	0.50	5.0	5.0
SP-DR-05-F	Iron, dissolved	110	µg/L	J	48	120	200	200
SP-DR-05-F	Lead, dissolved	ND	µg/L	U	0.24	0.50	1.0	1.0
SP-DR-05-F	Magnesium, dissolved	19,000	µg/L	J	41	120	500	500
SP-DR-05-F	Manganese, dissolved	270	µg/L		0.26	0.50	5.0	5.0
SP-DR-05-F	Mercury	0.073	µg/L	J	0.052	0.10	0.20	0.20
SP-DR-05-F	Nickel, dissolved	2.8	µg/L	J	0.20	0.50	10	10
SP-DR-05-F	Potassium, dissolved	2,100	µg/L		110	120	500	500
SP-DR-05-F	Selenium, dissolved	ND	µg/L	U	1.5	2.5	5.0	5.0
SP-DR-05-F	Silver, dissolved	ND	µg/L	U	0.18	0.50	1.5	1.5
SP-DR-05-F	Sodium, dissolved	4,300	µg/L		58	250	500	500
SP-DR-05-F	Thallium, dissolved	ND	µg/L	U	0.16	0.50	5.0	5.0
SP-DR-05-F	Vanadium, dissolved	ND	µg/L	U	0.49	0.50	4.0	4.0
SP-DR-05-F	Zinc, dissolved	6.6	µg/L	J	1.8	2.5	50	50

Sample Location	Isotope	Result	Units	Qualifier	Uncertainty	Critical Level	MDA	RL

Table 6. Groundwater Sampling Summary of Detections

Metal	Average	Minimum	Maximum	Detection Count	USEPA or PADEP Primary or Secondary Drinking Water Standard (1)	SLDA-specific Upgradient Average
	ug/L	ug/L	ug/L	n	ug/L	ug/L
Aluminum	319.13	1.6	5400.0	44	200.0	NC
Antimony	0.98	0.5	1.5	13	6.0	NC
Arsenic	9.19	0.6	20.0	13	10.0	NC
Barium	200.85	18.0	810.0	44	2000.0	NC
Beryllium	4.40	4.4	4.40	1	4.0	NC
Cadmium	0.75	0.4	1.20	4	5.0	NC
Calcium	52954.35	4800.0	220000.0	44	NA	NC
Chromium	1.38	0.3	5.0	40	100.0	NC
Cobalt	3.86	0.1	36.0	38	NA	NC
Copper	2.56	0.3	14.0	44	1000.0	NC
Iron	6547.11	52.0	37000.0	39	300.0	NC
Lead	1.14	0.3	11.0	21	15.0	NC
Magnesium	13427.06	880.0	44000.0	44	NA	NC
Manganese	281.87	0.9	1900.0	44	50.0	NC
Mercury	0.09	0.1	0.20	40	2.0	NC
Nickel	10.95	0.2	100.0	44	100.0	NC
Potassium	2484.59	750.0	6500.0	44	NA	NC
Selenium	1.98	1.5	2.3	9	50.0	NC
Silver	0.54	0.2	1.2	13	100.0	NC
Sodium	18410.56	2500.0	240000.0	44	NA	NC
Thallium	0.28	0.2	0.90	18	2.0	NC
Vanadium	2.01	0.5	4.30	6	NA	NC
Zinc	22.97	2.1	170.0	41	5000.0	NC
Total Uranium	0.44	0.09	3.81	43	30	0.9
Radionuclide	pCi/L	pCi/L	pCi/L	n	pCi/L	pCi/L
Americium-241	0.12	0.07	0.26	16	15	ND
Plutonium-238	0.18	0.09	0.36	23	15	ND
Plutonium-241	5.76	4.42	8.18	4	300 (2)	ND
Plutonium-239/240	0.08	0.03	0.12	17	15	ND
Thorium-228	0.83	0.49	2.42	20	15	ND
Thorium-230	0.14	0.03	0.41	6	15	0.74
Thorium-232	0.18	0.04	0.49	6	15	0.39
Uranium-234	1.03	0.06	5.18	27	16.4 (3)	0.6
Uranium-235	0.15	0.06	0.30	11	0.2 (3)	ND
Uranium-238	0.31	0.04	2.12	19	10 (3)	0.3

NOTES:
(1) - USEPA Maximum Coontaminant Levels (MCLs), Secondary MCLs, or Pennsylvania DEP MCLs
(2) - Based upon beta dose articulated in Appendix C.
(3) - Based on 40 CFR 9, 141, 142, Federal Register, 7 Dec. 2000, Assumes a U234:U238 ratio of 1.6:1.
NA - No Standard Available
Average exceeds water quality standard.
NC - Not Calculated for non-FUSRAP consituents of concern
ND - Not Detected in up-gradient wells

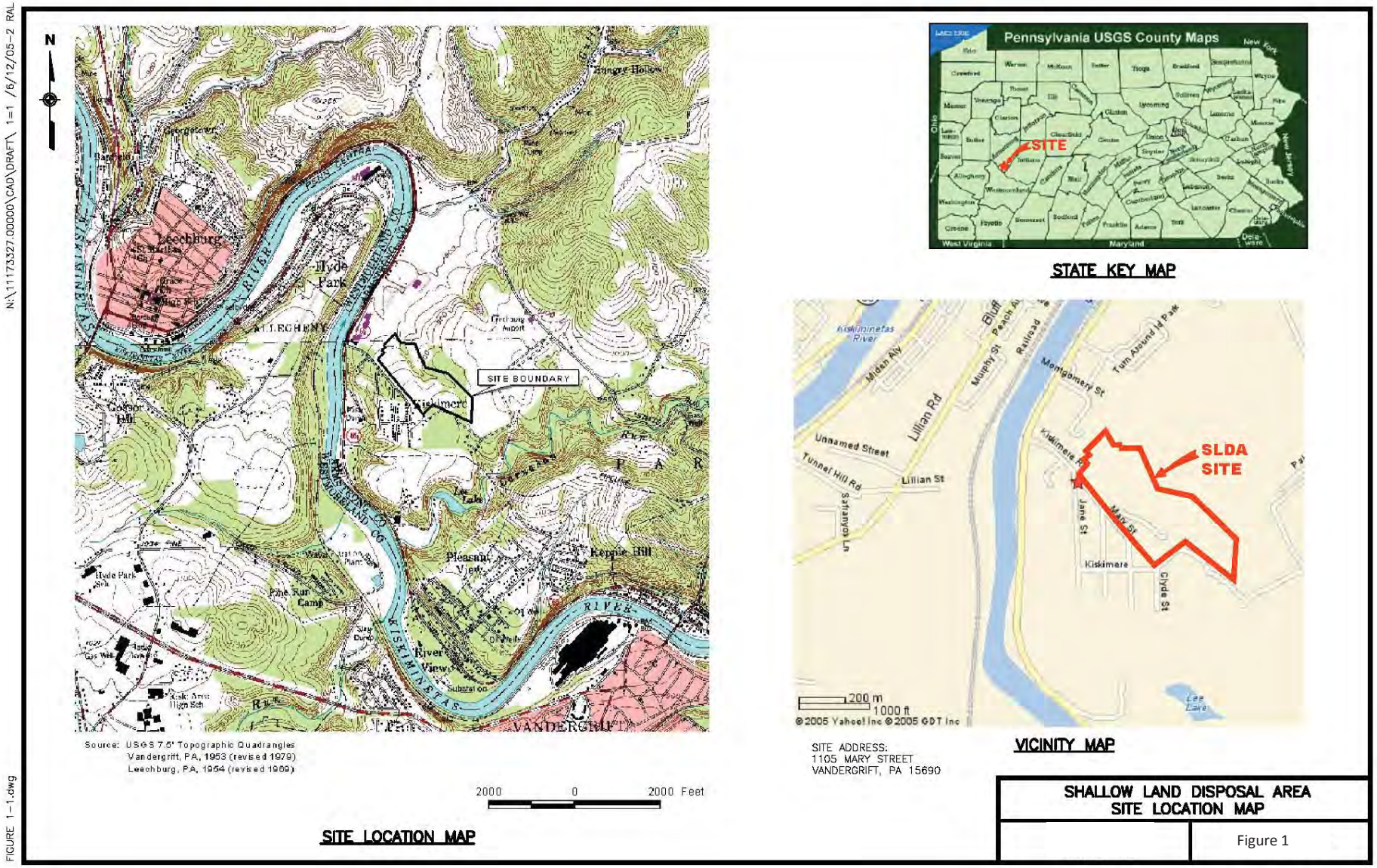

Figure 1. Shallow Land Disposal Area (SLDA) Site Location

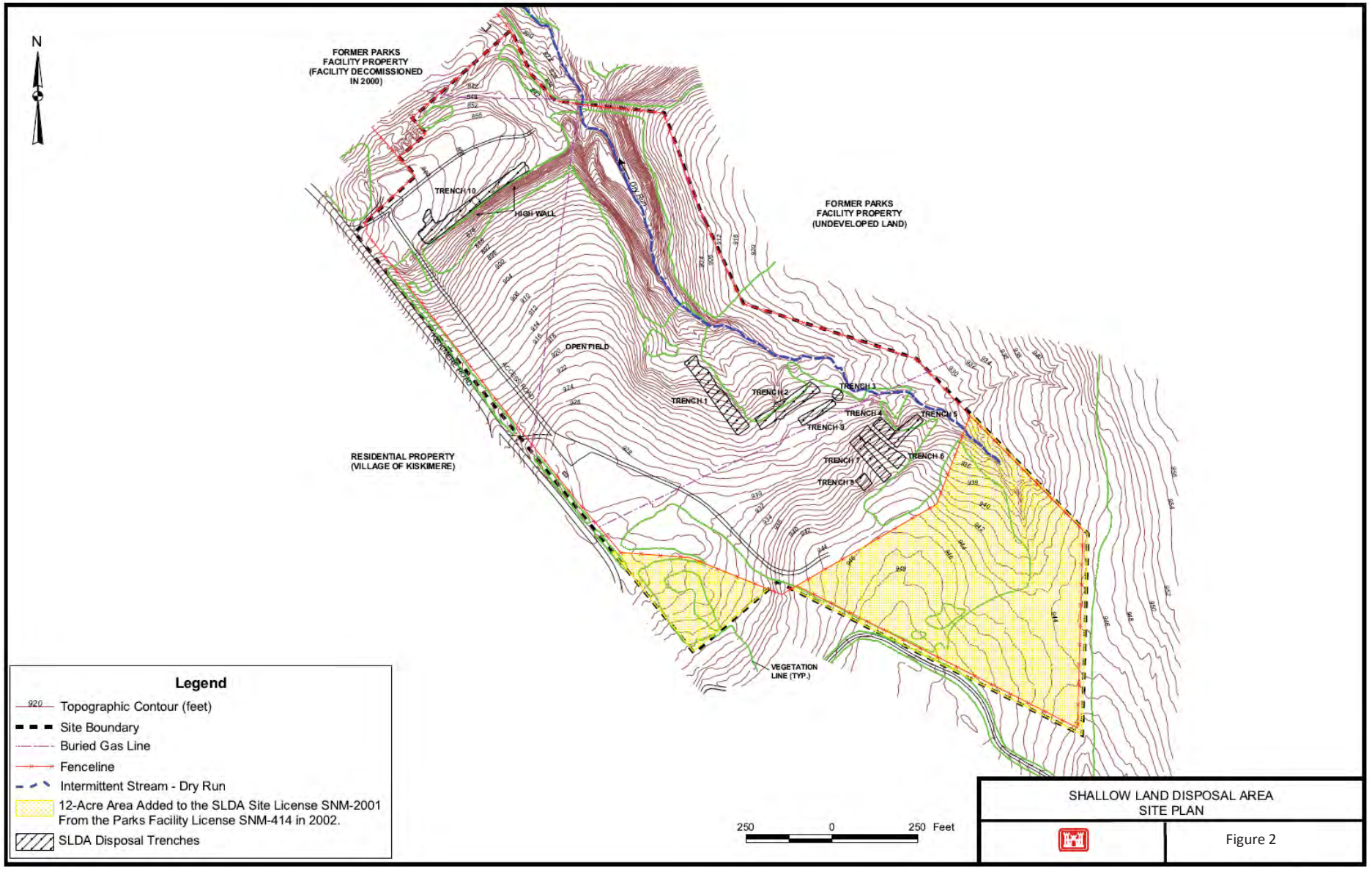

Figure 2. Shallow Land Disposal Area Site Plan

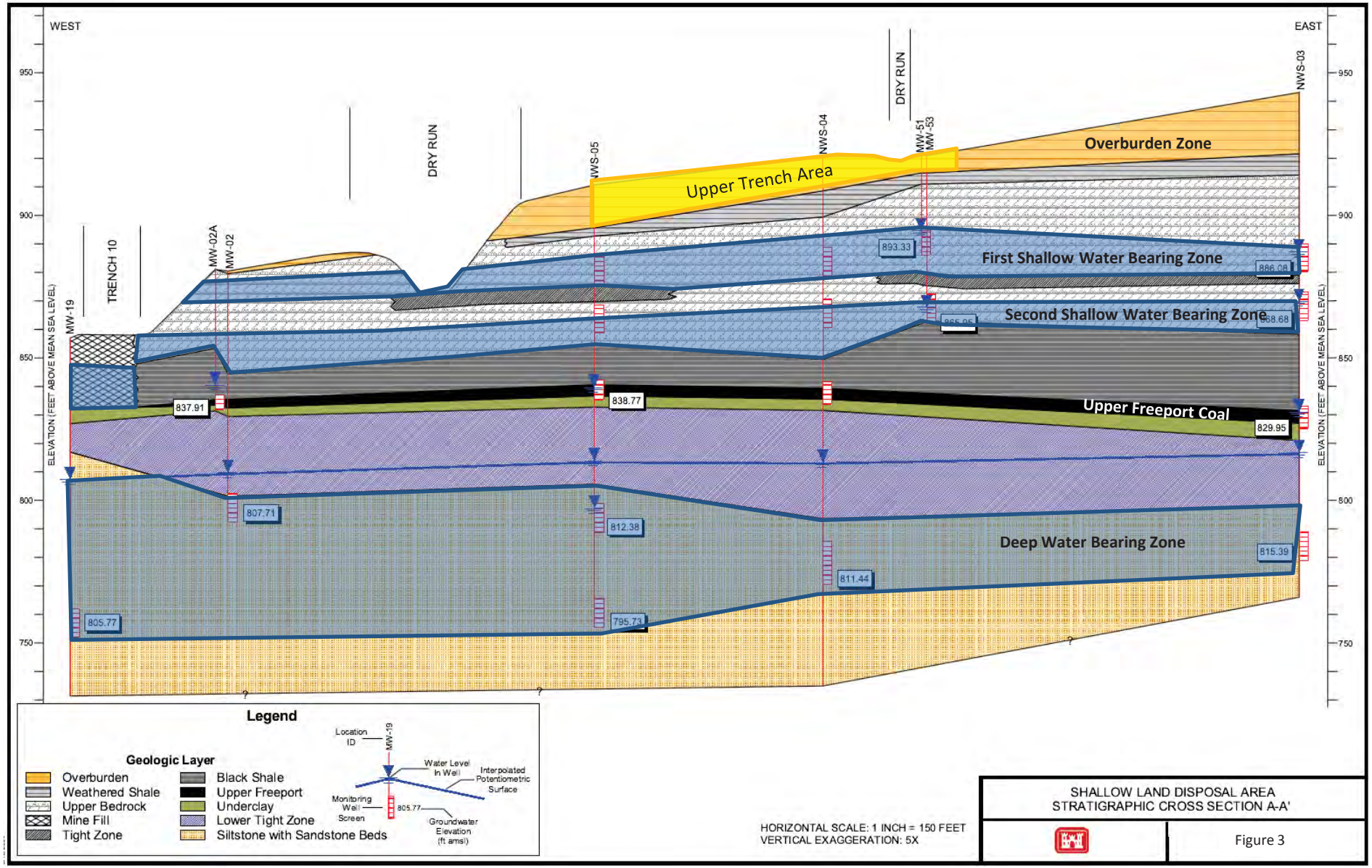

Figure 3. Northwest to Southeast Geologic Cross Section Through SLDA

Legend

- Monitoring Well
- Piezometer
- Temporary Piezometer
- Groundwater Elevation Contour (ft amsl)
- Groundwater Flow Direction
- Trench
- Fenceline
- Site Boundary

0 110 220 440 Feet

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GROUNDWATER ELEVATION CONTOUR MAP
OVERBURDEN - MAY 2013

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SHALLOW LAND DISPOSAL AREA
PARKS TOWNSHIP, PENNSYLVANIA

Figure 4

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Legend

- Monitoring Well
- Piezometer
- Temporary Piezometer
- Groundwater Elevation Contour (ft amsl)
- Groundwater Flow Direction
- Trench
- Fenceline
- Site Boundary

0 110 220 440 Feet

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GROUNDWATER ELEVATION CONTOUR MAP
FIRST SHALLOW BEDROCK ZONE - MAY 2013

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SHALLOW LAND DISPOSAL AREA
PARKS TOWNSHIP, PENNSYLVANIA

Figure 5

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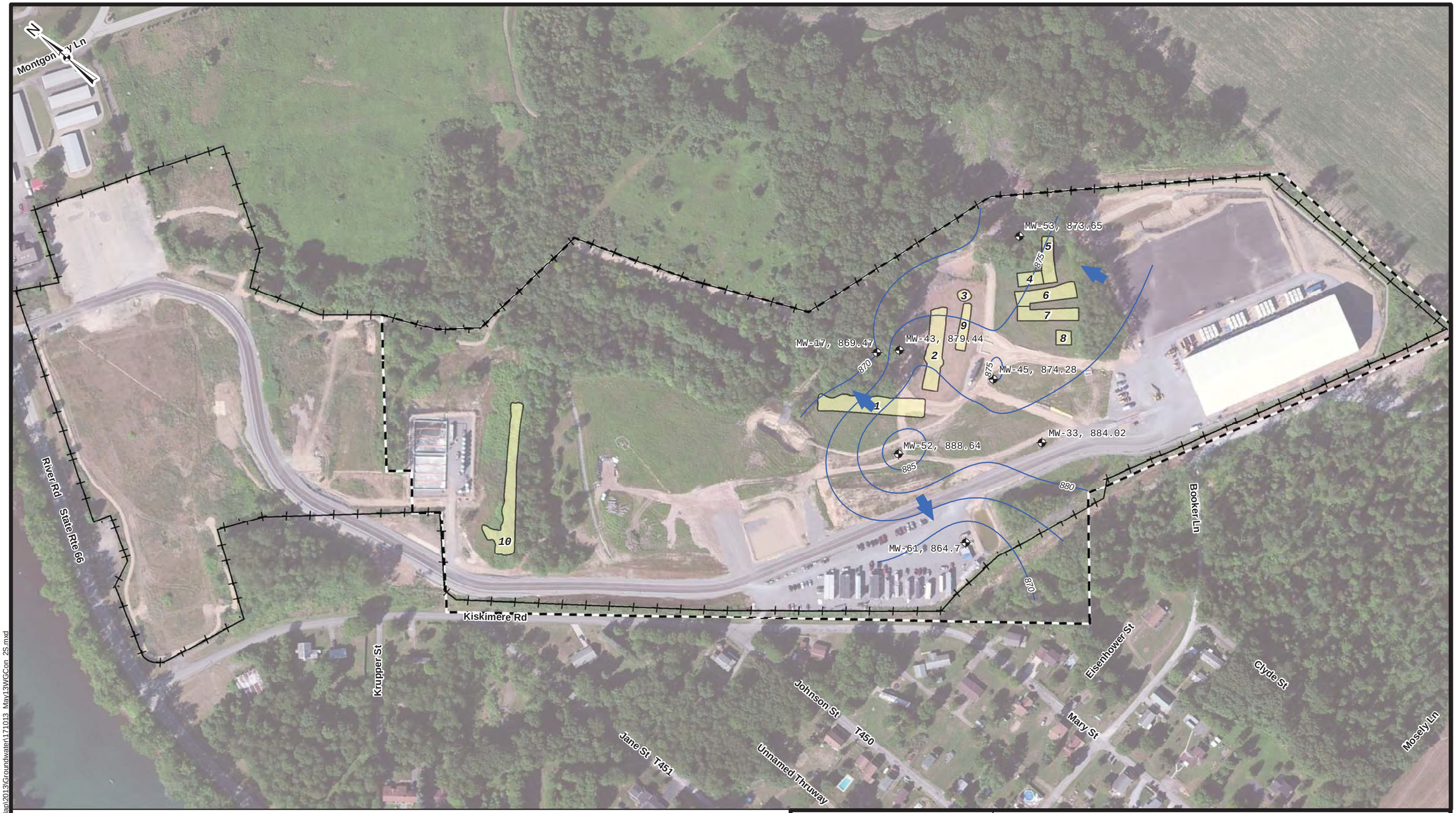

Legend

- Monitoring Well
- Piezometer
- Temporary Piezometer
- Groundwater Elevation Contour (ft amsl)
- Groundwater Flow Direction
- Trench
- Fenceline
- Site Boundary

0 110 220 440 Feet

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GROUNDWATER ELEVATION CONTOUR MAP
SECOND SHALLOW BEDROCK ZONE - MAY 2013

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SHALLOW LAND DISPOSAL AREA
PARKS TOWNSHIP, PENNSYLVANIA

Figure 6

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Legend

- Monitoring Well
- Piezometer
- Temporary Piezometer
- Groundwater Elevation Contour (ft amsl)
- Groundwater Flow Direction
- Trench
- Fenceline
- Site Boundary

0 110 220 440 Feet

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GROUNDWATER ELEVATION CONTOUR MAP
UPPER FREEPORT COAL ZONE - MAY 2013

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SHALLOW LAND DISPOSAL AREA
PARKS TOWNSHIP, PENNSYLVANIA

Figure 7

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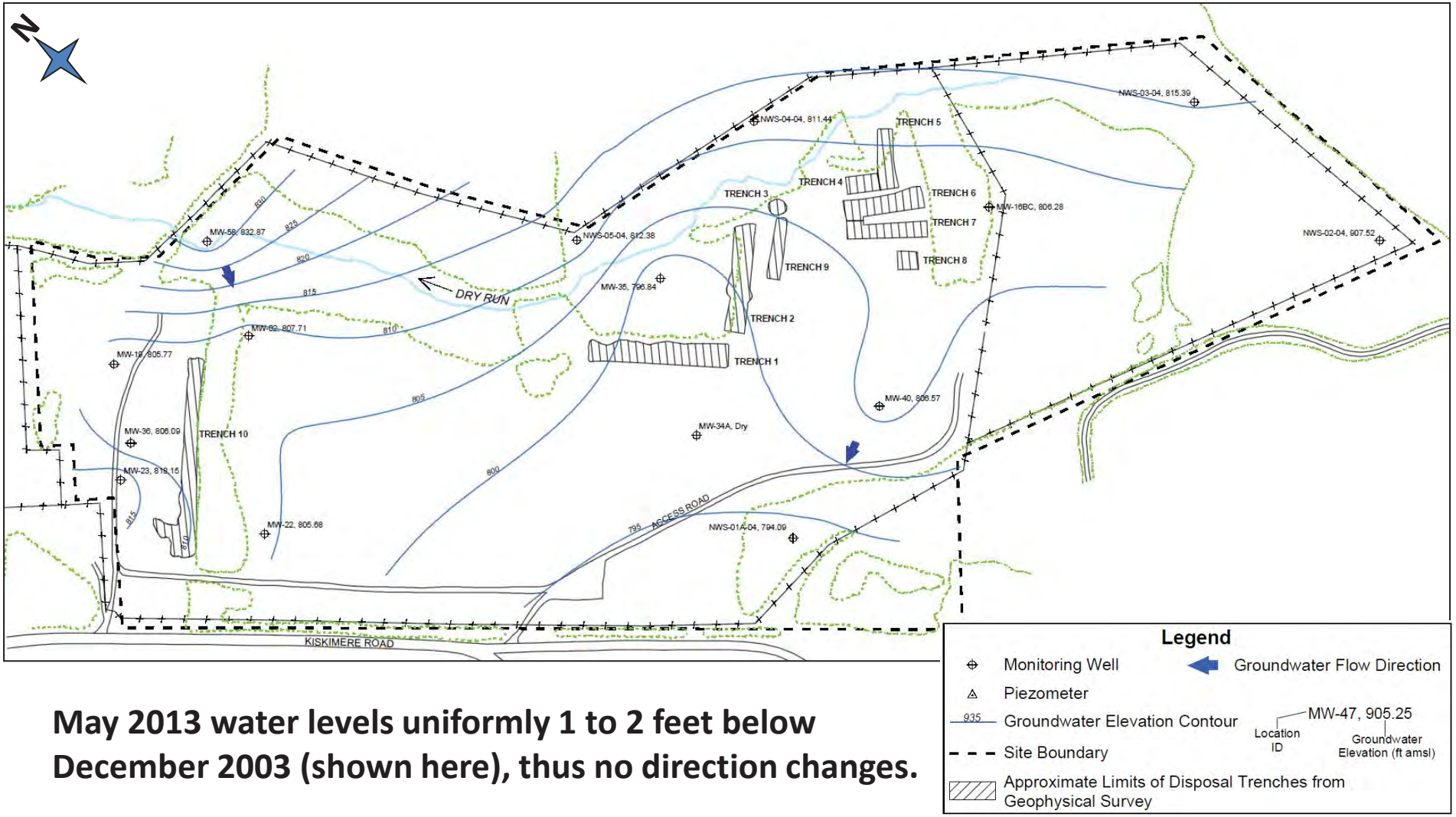


May 2013 water levels uniformly 1 to 2 feet below December 2003 (shown here), thus no direction changes.

Figure 8. Groundwater Contours for the Deep Bedrock Zone

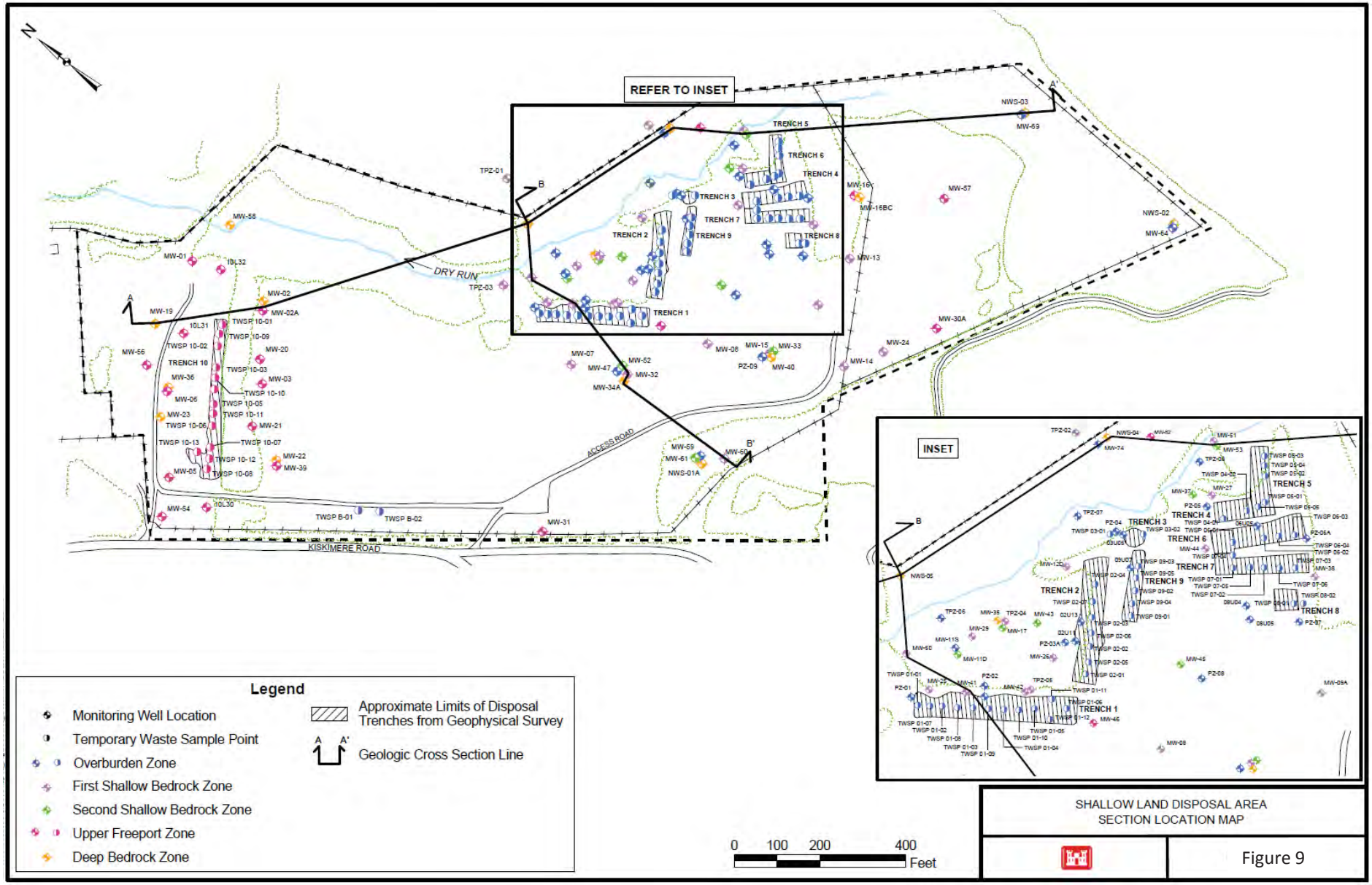


Figure 9. Pre-existing and Remedial Investigation Wells

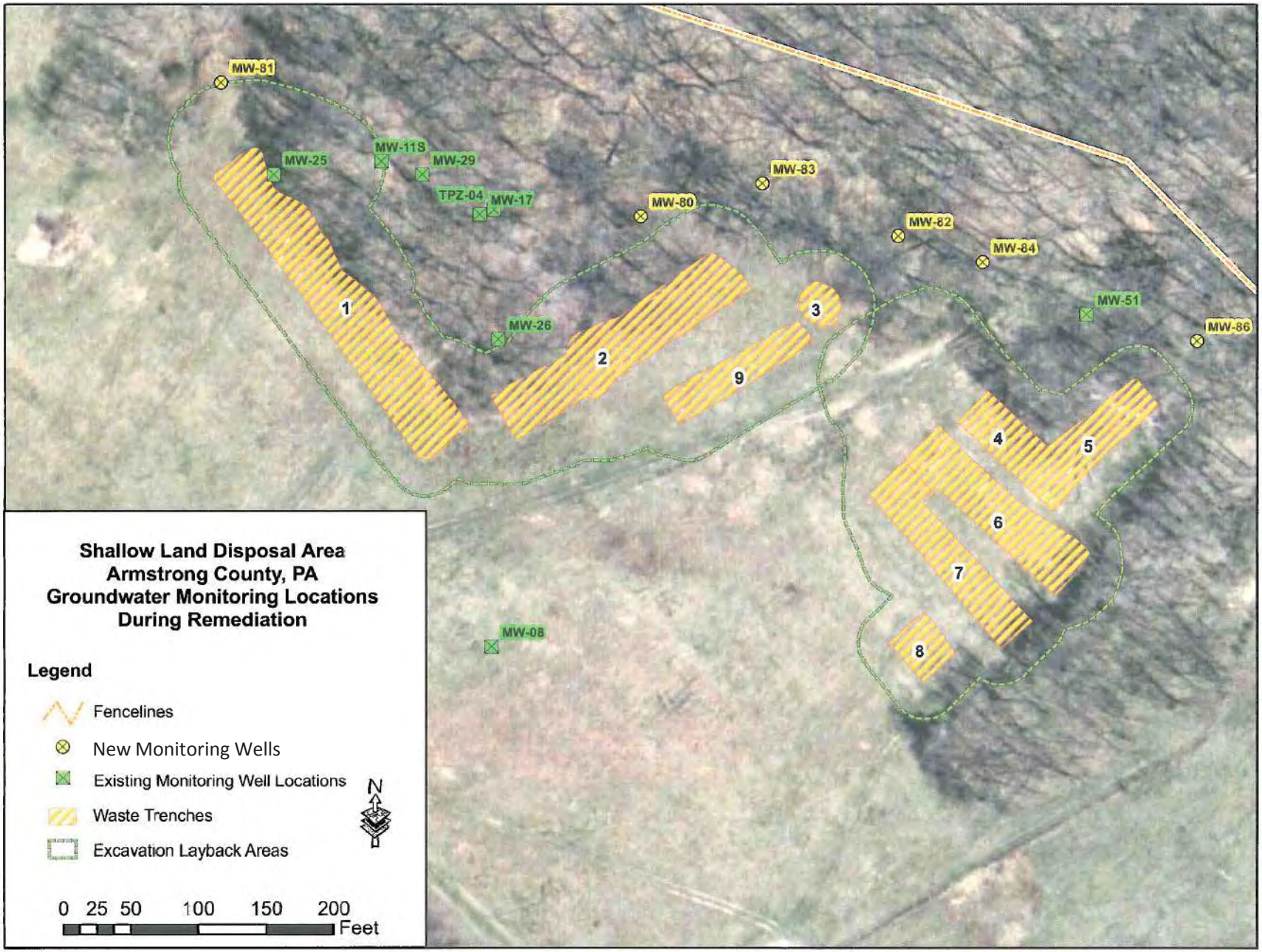


Figure 10. Remedial Action Groundwater Monitoring Locations (Monthly Program)

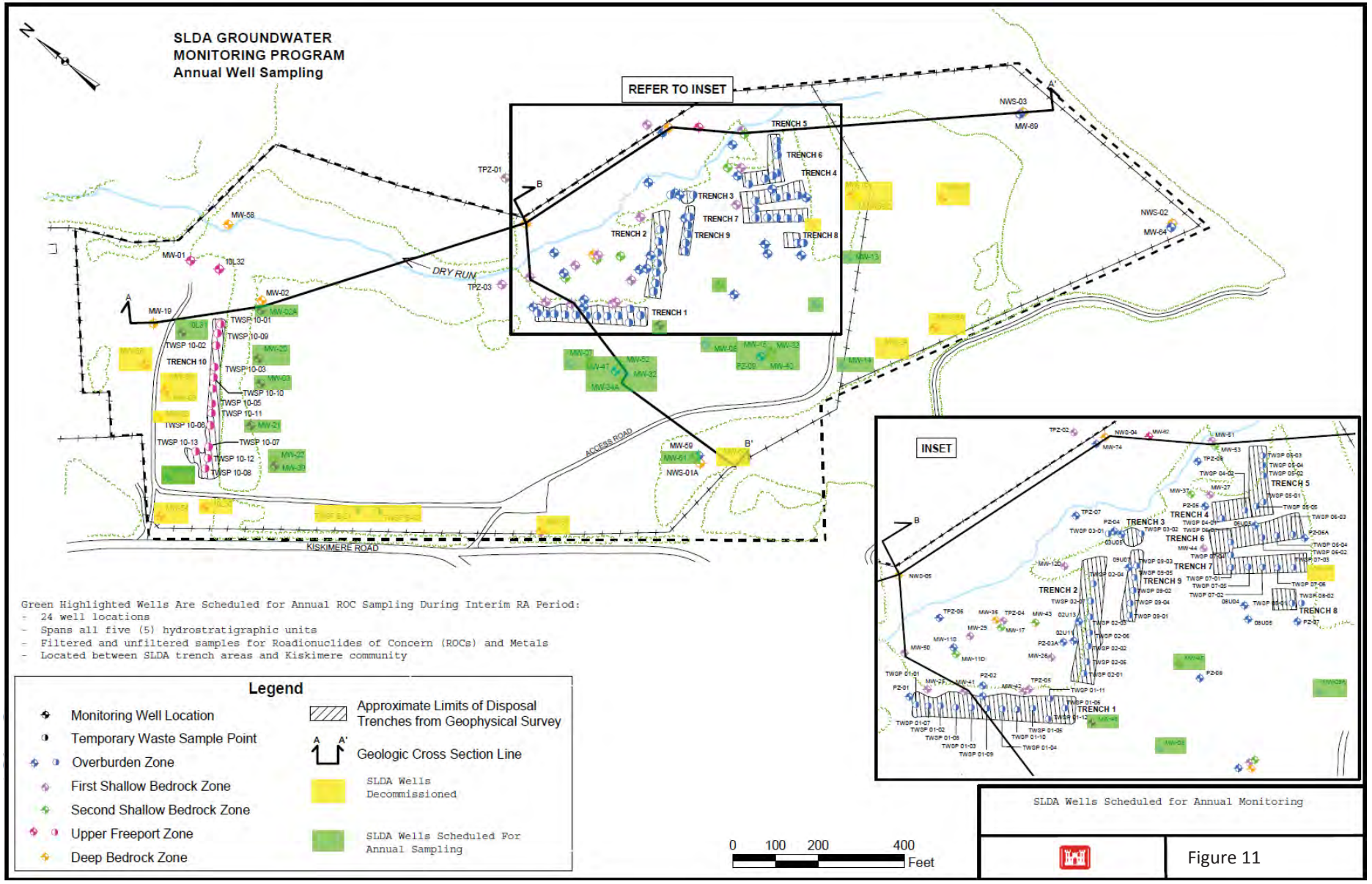
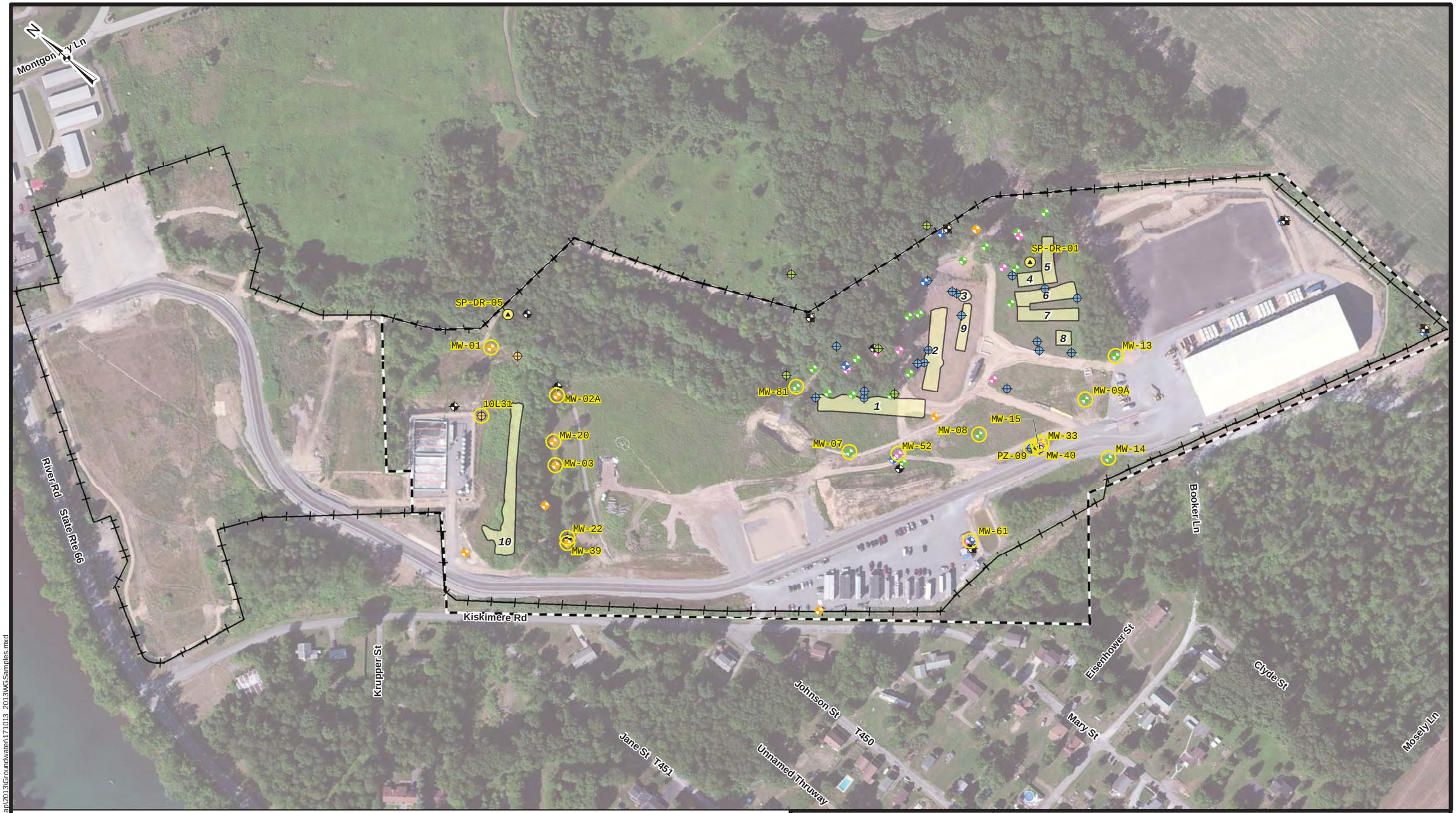


Figure 11. Annual Groundwater Sampling Locations



Legend

- Monitoring Well/Piezometer (Sampled 2013)
- Surface Water Location (Sampled 2013)
- Monitoring Well (Overburden)
- Monitoring Well (First Shallow Bedrock)
- Monitoring Well (Second Shallow Bedrock)
- Monitoring Well (Upper Freeport Zone)
- Monitoring Well (Deep Bedrock)
- Nested Monitoring Well
- Piezometer (Overburden)
- Piezometer (First Shallow Bedrock)
- Piezometer (Upper Freeport Zone)
- Trench
- Fenceline
- Boundary

0 110 220 440 Feet

US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

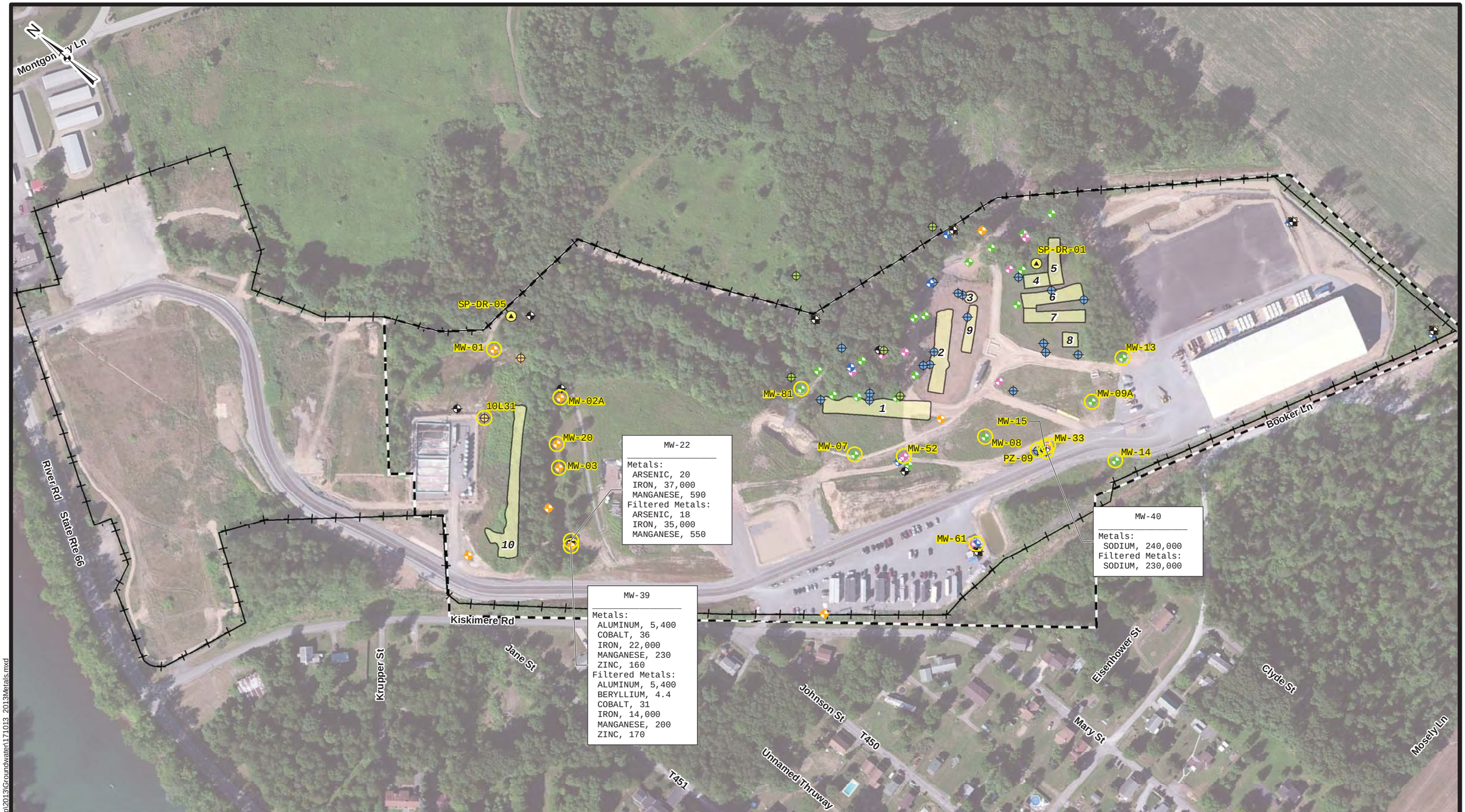
GROUNDWATER SAMPLING LOCATIONS (MAY 2013)

Document Name: 171013_2013WGSamples.mxd
Drawn By: H5TDESPM
Date Saved: 25 Oct 2013
Time Saved: 8:26:57 AM

SHALLOW LAND DISPOSAL AREA
PARKS TOWNSHIP, PENNSYLVANIA

Figure 12

Document Path: K:\SLDA\GIS\ArcMap\2013\Groundwater\171013_2013WGSamples.mxd



Legend

- Monitoring Well/Piezometer (Sampled 2013)
- Surface Water Location (Sampled 2013)
- Monitoring Well (Overburden)
- Monitoring Well (First Shallow Bedrock)
- Monitoring Well (Second Shallow Bedrock)
- Monitoring Well (Upper Freeport Zone)
- Monitoring Well (Deep Bedrock)
- Nested Monitoring Well
- Piezometer (Overburden)
- Piezometer (First Shallow Bedrock)
- Piezometer (Upper Freeport Zone)
- Trench
- Fenceline
- Site Boundary

0 110 220 440 Feet

US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

GROUNDWATER SAMPLING LOCATIONS EXHIBITING METALS ANOMALIES (MAY 2013)

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SHALLOW LAND DISPOSAL AREA
PARKS TOWNSHIP, PENNSYLVANIA

Figure 13

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N

Montgomery Ln

MW-01

Radionuclides:
PLUTONIUM-241, ND
Filtered Radionuclides:
PLUTONIUM-241, 8.18

SP-DR-05

MW-81

Radionuclides:
URANIUM-234, 3.41
Filtered Radionuclides:
URANIUM-234, 2.6

SP-DR-01

Radionuclides:
URANIUM-234, 2.11
TOTAL URANIUM, 1.63

MW-09A

Radionuclides:
PLUTONIUM-241, 5.58
Filtered Radionuclides:
PLUTONIUM-241, ND

MW-02A

MW-20

Radionuclides:
THORIUM-228, 2.41
URANIUM-234, 2.09
TOTAL URANIUM, 2.47

10L31

Radionuclides:
URANIUM-234, 1.39
Filtered Radionuclides:
URANIUM-234, 1.22

MW-03

Radionuclides:
THORIUM-228, 2.42
URANIUM-234, 2.91
URANIUM-238, 2.12
TOTAL URANIUM, 3.81

MW-15

Radionuclides:
PLUTONIUM-241, 4.42
Filtered Radionuclides:
PLUTONIUM-241, ND

MW-40

Radionuclides:
PLUTONIUM-241, ND
Filtered Radionuclides:
PLUTONIUM-241, 4.84

MW-13
MW-14
MW-07
MW-52
MW-08
PZ-09
MW-33
MW-22
MW-39
MW-61
1
2
3
4
5
6
7
8
9
10
River Rd
State Rte 66
Kiskimere Rd
Krupper St
Booker Ln
Johnson St
Jane St
T451
T450
Unnamed Thruway
Eisenhower St
Mary St
Clyde St
Mosely Ln

Legend

- Monitoring Well/Piezometer (Sampled 2013)
- Surface Water Location (Sampled 2013)
- Monitoring Well (Overburden)
- Monitoring Well (First Shallow Bedrock)
- Monitoring Well (Second Shallow Bedrock)
- Monitoring Well (Upper Freeport Zone)
- Monitoring Well (Deep Bedrock)
- Nested Monitoring Well
- Piezometer (Overburden)
- Piezometer (First Shallow Bedrock)
- Piezometer (Upper Freeport Zone)
- Trench
- Fenceline
- Site Boundary

0 110 220 440 Feet

US Army Corps of Engineers Buffalo District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
BUFFALO, NY

GROUNDWATER SAMPLING LOCATIONS EXHIBITING RADIOLOGICAL ANOMALIES (MAY 2013)

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Date Saved: 25 Oct 2013
Time Saved: 8:55:41 AM

SHALLOW LAND DISPOSAL AREA
PARKS TOWNSHIP, PENNSYLVANIA

Figure 14

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APPENDIX A

GROUNDWATER SAMPLING EVENT
DECEMBER 2011 REPORT

GROUNDWATER SAMPLING EVENT DECEMBER 2011

SHALLOW LAND DISPOSAL AREA (SLDA) FUSRAP SITE REMEDIATION
ARMSTRONG COUNTY, PENNSYLVANIA

Revision 0 – March 2012

Prepared for:
U.S. Army Corps of Engineers – Buffalo District
Buffalo, New York
Formerly Utilized Sites Remedial Action Program

Contract No. W912P4-07-D-0009, Delivery Order 0001

Prepared by:
ARSEC
2609 N. River Road
Port Allen, LA 70767

GROUNDWATER SAMPLING EVENT
DECEMBER 2011

SHALLOW LAND DISPOSAL AREA (SLDA)
FUSRAP SITE REMEDIATION
ARMSTRONG COUNTY, PENNSYLVANIA

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GROUNDWATER MONITORING DATA SHEETS AND FIELD NOTES

ATTACHMENT 2
MULTI-WELL TREND GRAPHS

ATTACHMENT 3
IN-SITU DATA TREND GRAPHS

EXECUTIVE SUMMARY

From December 14 through December 16, 2011, CEC collected groundwater samples from 11 of 14 installed wells. Wells MW-11S, MW-17 and MW-86 did not produce enough groundwater (GW) to sample. All other wells produced enough water to collect the full suite of analytes. During the December 2011 event: (1) the in-situ sonde from MW-81 that had malfunctioned in November was reinstalled during the December 2011 GW sampling event and (2) RB038 radioactive sample leaked during transport and there was insufficient sample for analysis.

Radiological results (full discussion in section 3.2 and data presented in Table 1) are as follows:

- Ra-228. Not present in unfiltered portion the 11 wells sampled. Ra-228 is present in 4 of 11 filtered well samples, with the highest activity in MW-25 at 3.251 pCi/L.
- Uranium. Uranium is present in unfiltered samples from 9 of the 11 wells. The maximum detection of U-234 is in MW-81 at 3.985 pCi/L. Two wells contained U-235 in the unfiltered portion: MW-81 (0.130 pCi/L) and MW-83 (0.049 pCi/L). Seven of 11 wells contained activity of U-238. The highest activity was in MW-83 at 0.986 pCi/L. The presence of U-234 was detected in amounts greater than 1 pCi/L in two filtered samples: MW-81 (3.263 pCi/L) and MW-83 (2.144 pCi/L). U-235 was present in the filtered MW-81 (0.115 pCi/L) and MW-83 (0.043 pCi/L). U-238 was detected in 6 filtered well samples. MW-83 had the only U-238 activity greater than 1 pCi/L (1.220 pCi/L). MW-81 duplicate unfiltered, the regular filtered, and duplicate filtered all contained enriched Uranium at 8.3%, 6.6%, and 8.6% respectively.
- Total Uranium unfiltered was detected in MW-83 at 3.480 µg/L. For the 11 filtered GW samples, three wells had detections of Total-U (MW-51, MW-81, and MW-83).
- Am-241. Present in the unfiltered MW-29 at 0.029 pCi/L and in MW-83 at 0.021pCi/L. Am-241 was detected in filtered samples from two wells (MW-08 and TPZ-04).
- Plutonium-239 is present in 1 unfiltered well sample at an activity of less than 1 pCi/L. Pu-239 was detected in two filtered samples at activities of less than 1pCi/L.
- Pu-241 was present in two unfiltered samples: MW-51 (1.616 pCi/L) and MW-80 (2.441 pCi/L). Pu-241 was not present in filtered samples.
- Thorium-232 was detected in two unfiltered samples at activities less than 1 pCi/L. No Th-232 was present in the filtered samples.

Chemical data are discussed in Section 3.2. The three chemicals graphed are 1,1-Dichloroethane (1,1-DCA), cis-1,2-Dichloroethene, and Trichloroethene (TCE). Wells that originally had detections for these chemicals generally continue to have comparable detections (See Attachment 2). However, the amount detected in some wells has decreased. (See Attachment 2- Graphs). 1,1,1-Trichloroethane was detected in MW-51 at 369 µg/L in the December GW sampling event. Vinyl chloride was detected in two wells: MW-51 at 4.2 µg/L and MW-81 at 2.33 µg/L. Field blanks and the rinsate blank in the QC samples detected bromodichloromethane and chloroform indicating that the distilled water used probably had those impurities. These chemicals were not detected in the well samples. Acetone was detected in RB-037 and in MW-82 which was sampled using a disposable bailer. Therefore, cross contamination is unlikely.

1.0 INTRODUCTION

In order to assess potential impacts to groundwater quality associated with remediation of the SLDA Site (Site), ARSEC subcontracted the services of CEC to perform the groundwater monitoring activities required in the SOW. These activities require the sampling and laboratory analysis of groundwater samples collected from 14 monitoring wells at the site, including four new wells and two replacement wells that were installed by CEC in March and April 2011.

Monitoring well locations are presented on the attached site figure. This report documents the results of the December 2011 sampling event conducted by CEC. This report also presents the data from the in-situ groundwater meters that have been installed in the 14 wells at the Site.

The Statement of Work (SOW) for the Site identifies the requirements for environmental services to be conducted in support of the remedial action to remove radiologically contaminated materials at the Site. The environmental services that will be required to monitor the effects of remediation include groundwater monitoring activities before, during, and after remedial activities.

2.0 BACKGROUND

In 1957, the Apollo Nuclear Fabrication Facility began operations in Apollo, Pennsylvania. Between 1961 and 1970, Nuclear Materials and Equipment Corporation (NUMEC), who owned both the Apollo Facility and the SLDA, buried process and other wastes from the Apollo plant at the SLDA site. The use of the SLDA for radioactive waste disposal was discontinued after 1970. In 1971 the Babcock & Wilcox Company (B&W) acquired the Site and in 1997 BWX Technologies, Inc. (BWXT) assumed ownership of the SLDA. Based on historic reports and discussions with individuals familiar with disposal operations at the SLDA, the waste materials were placed into a series of pits that were constructed adjacent to one another.

Under license SNM-2001, BWXT is required to properly maintain the site in order to ensure protection of workers and the public, and to eventually decommission the site in compliance with Nuclear Regulatory Commission (NRC) regulations as part of its license termination activities.

3.0 SCOPE OF SERVICES

3.1 GROUNDWATER SAMPLING

From December 14 through December 16, 2011, CEC collected groundwater samples from the newly installed wells, replacement wells and existing wells chosen by the USACE for monitoring in accordance with the SOW and FSP for the Site.

The current list of wells being monitored and sampled includes:

- MW-08
- MW-11S
- MW-17
- MW-25
- MW-26
- MW-29
- MW-51
- MW-80
- MW-81
- MW-82
- MW-83
- MW-84
- MW-86
- TPZ-04

Prior to groundwater sampling, the depth to water was recorded in each well. Wells MW-11S, MW-17, and MW-86 did not contain sufficient water to allow sampling. Low flow data sheets, groundwater monitoring data sheets and field logbook pages are presented in Attachment 1 "Groundwater Monitoring Data Sheets and Field Notes." Purge water from the wells was discharged to the onsite water treatment plant.

Following purging, groundwater samples were collected from each well for laboratory analysis of the following parameters as specified in the SOW:

- Isotopic uranium
- Isotopic thorium
- Radium-228
- Plutonium-239
- Plutonium-241
- Americium-241
- Total uranium (by kinetic phosphorescence)
- TAL metals plus molybdenum
- Anions
- VOCs
- SVOCs
- Total organic carbon
- Total dissolved solids

The radiological and metals analyses were collected as separate unfiltered and field-filtered samples.

No priority sampling was required because all 11 wells with sufficient groundwater to sample produced sufficient volumes for all analytes.

Groundwater samples were submitted for laboratory analysis following industry-accepted chain-of-custody procedures using a standard (approximately 28 calendar days) turn-around time. Chemical samples were submitted to Davis & Floyd Laboratory of Greenwood, South Carolina; radiological samples were submitted to ARS International of Port Allen, Louisiana; samples collected for total uranium analysis were submitted to PACE Analytical, Inc. of Greensburg, Pa.

During the groundwater sampling event, two duplicate samples, two field blanks, two rinsate blanks and three trip blanks were collected and submitted for QC purposes.

3.2 GROUNDWATER RESULTS

Radiological and chemical laboratory analytical data for groundwater samples collected during the December 2011 monitoring event are summarized on Tables 1 and 2, respectively. QC analytical data are presented on Tables 1 through 3. Table 1 also presents the contract-required Minimum Detectable Concentrations (MDC) for the radiological analyses. Rinsate sample – SLDA-RB038U-121611 – sent for radiological analysis leaked during transport and there was insufficient sample to analyze.

As specified in the SOW for the Site, multi-well data trend graphs for both filtered and unfiltered uranium isotopes and total uranium, iron, manganese, chromium, selenium, sulfate, nitrate, and total dissolved solids. Data trend graphs were produced for the three highest detections of VOCs although the SOW originally required only the two highest VOCs. The data presented on the graphs only includes parameter concentrations that were detected above the MDC (i.e. non-detects are not graphed). See Attachment 2 for the data trend graphs.

Radiological results indicate that Ra-228 is not present in the unfiltered portion of the 11 wells. Ra-228 was detected in the filtered portion of 4 of 10 wells with the highest detection at 3.251 pCi/L in MW-25. Uranium is present in the unfiltered samples from 9 of the 11 wells. The highest detection of U-234 is in MW-81 at

3.985 pCi/L. Two wells contain U-235 in the unfiltered portion: MW-81 (0.130 pCi/L) and MW-83 (0.049 pCi/L). U-238 was detected in 8 of unfiltered samples with a maximum activity of 0.986 pCi/L in Mw-83. MW-81 was noted initially in the July 2011 GW report as having uranium enrichment. Neither well cited contain enriched U-235. However, MW-81 duplicate unfiltered, the regular filtered, and duplicate filtered all contained enriched Uranium at 8.3%, 6.6%, and 8.6% respectively.

Four wells had detections of Total Uranium in the unfiltered portion. The well with the highest Total Uranium unfiltered is MW-83 at 3.480 µg/L. For the 11 filtered GW samples, only three wells had detections of Total Uranium (MW-51 at 0.208 µg/L, MW-81at 0.600 µg/L and MW-83 at 3.390 µg/L). Am-241 is present in the unfiltered portions of MW-29 at 0.029 pCi/L and MW-83at 0.021pCi/L. Am-241 was detected in filtered samples from two wells (MW-08 at 0.020 pCi/L and TPZ04 at 0.028 pCi/L). Plutonium-239 unfiltered is present in MW-80 at 0.022 pCi/L. Pu-239 was detected in two filtered samples – MW-25 at 0.015 pCi/L and MW-81 at 0.035 pCi/L. Pu-241 unfiltered was present in MW-51 at 1.616 pCi/L and MW-80 at 2.441 pCi/L. There were no detections of Pu-241 in filtered samples. Thorium-228 was present in 4 unfiltered well samples with the highest activity at 0.065 pCi/L in TPZ04. Th-228 filtered was not present in any wells. Th-230 was present in two unfiltered well samples: MW-82 (0.042 pCi/L) and MW-83 (0.038 pCi/L). Th-230 in filtered samples was detected in 6 wells with the highest activity in MW-08 at 0.055 pCi/L. Thorium-232 was detected in two unfiltered samples: MW-25 at 0.016 pCi/L and MW81duplicate at 0.012 pCi/L. No Th-232 was detected in filtered samples. See Table 1 for radiological results.

Chemical data are presented in Table 2 and QC results are in Table 3. The chemicals graphed (as discussed above) are 1,1-Dichloroethane (1,1-DCA), cis-1,2-Dichloroethene, and Trichloroethene (TCE). Wells that originally had detections for these chemicals generally continue to have comparable detections. However, the amount detected decreased in some wells. See Attachment 2 – Graphs. One chemical, 1,1,1-Trichloroethane (1,1,1-TCA) was detected in MW-51 at 369 µg/L. The EPA Primary Drinking Water Standard for 1,1,1-TCA is 200 µg/L (0.2mg/L). Vinyl chloride was detected in two wells: MW-51 ranging at 4.2 µg/L and MW-81 at 2.33 µg/L. The EPA Primary Drinking Water Standard for vinyl chloride is 2 µg/L (0.002mg/L). Acetone was noted in RB-037 and in MW-82 which was sampled using a disposable bailer. Therefore, cross contamination is unlikely.

3.3 IN-SITU MONITORING

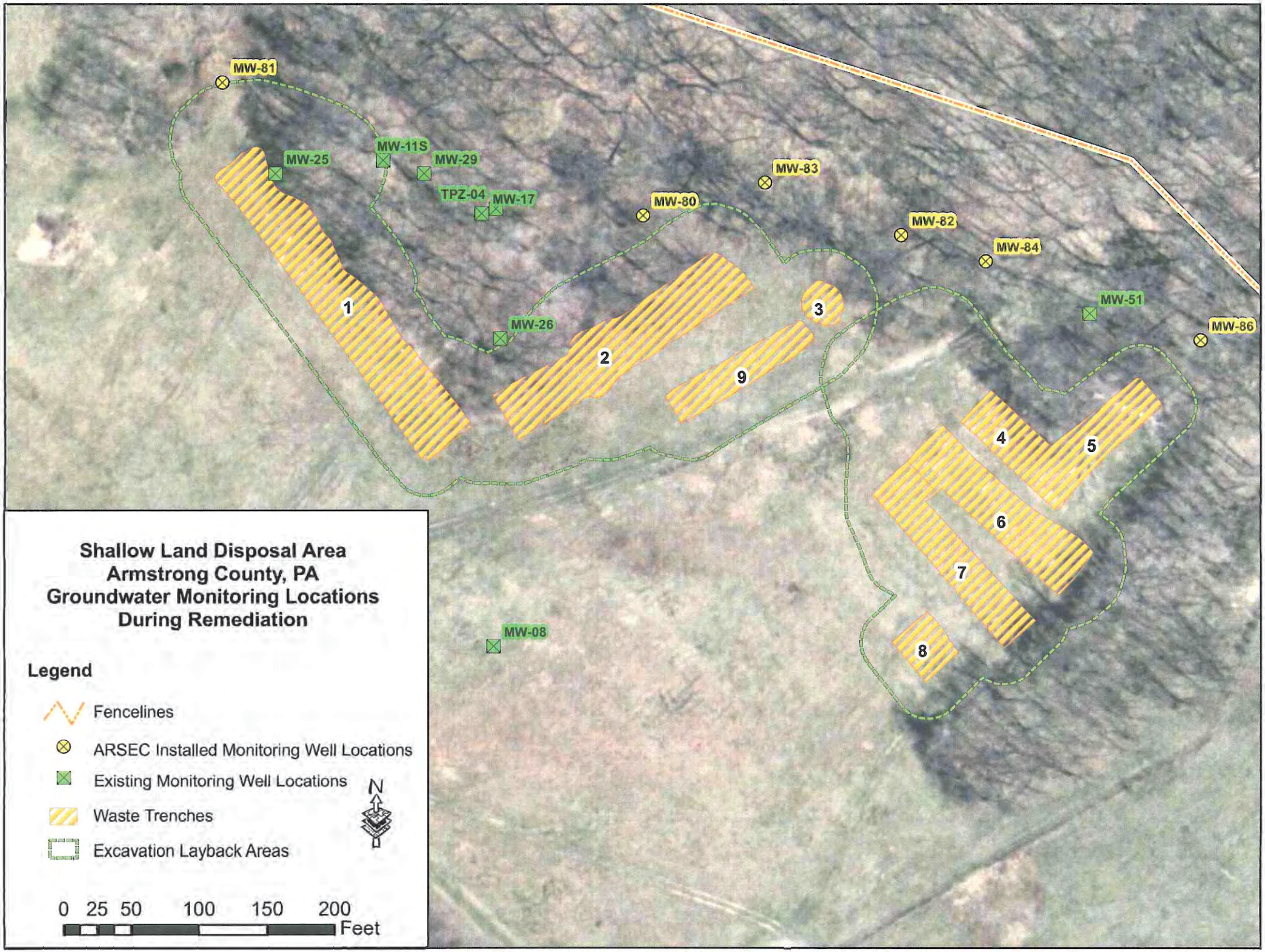
As specified in the SOW for the Site, in-situ groundwater quality meters were deployed in the 14 wells chosen for monitoring and were configured for readings of specific conductance, temperature, pH, dissolved oxygen, and oxidation-reduction potential. Data were logged every 4 hours (6 times per day). During the December 2011 sampling event, data logged by the meters was downloaded, and each meter was cleaned and calibrated. It was noted during the November 2011 event that the sonde in MW-81 had malfunctioned. This sonde was repaired and reinstalled in December 2011.

In-situ data trend graphs for all parameters recorded by the in-situ meters from the time of installation through the December 2011 sampling event are presented in Attachment 3. No notable variations from the August 2011 sampling event through the December 2011 sampling event are apparent.

4.0 CLOSING

A summary of radiological and chemical results is discussed in Section 3.2. Supporting data for the samples are found in Tables – GW Data Tables and in Attachment 2 – Multi-trend Well Graphs following this report.

FIGURE


MW-81
MW-11S
MW-25
MW-29
TPZ-04
MW-17
MW-80
MW-83
MW-82
MW-84
MW-51
MW-86
MW-26
MW-08
1
2
3
9
4
5
6
7
8
Shallow Land Disposal Area
Armstrong County, PA
Groundwater Monitoring Locations
During Remediation
Legend
Fencelines
ARSEC Installed Monitoring Well Locations
Existing Monitoring Well Locations
Waste Trenches
Excavation Layback Areas
N
0 25 50 100 150 200
Feet

TABLES

TABLE 1
RADIOLOGICAL DATA SUMMARY
SLDA FUSRAP SITE - VANDERGRIFT, PA
PAGE 1

Sample Type:		Groundwater Samples														
Sample Location:		MW-08			MW-11S[1]			MW-17[1]			MW-25			MW-26		
Sample Date:		12/14/2011			NS			NS			12/15/2011			12/15/2011		
	Contract Required Minimum Detection Concentrations	Analysis Results	Analysis Error +/ 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual
Radiological Parameters, Unfiltered (pCi/L)																
Radium-228	1.5	0.188	0.412	U	NS			NS			0.431	0.378	U	0.401	0.376	U
Uranium-234	1	0.024	0.039	U	NS			NS			0.238	0.052		0.024	0.016	
Uranium-235	1	-0.005	0.009	U	NS			NS			0.002	0.011	U	0.005	0.009	U
Uranium-238	1	0.000	0.027	U	NS			NS			0.077	0.027		0.024	0.015	
Total Uranium (µg/L)	1	0.028	0.001	U	NS			NS			0.148	0.003	U	0.024	0.001	U
Americium-241	1	0.004	0.013	U	NS			NS			0.017	0.017	U	0.009	0.022	U
Plutonium-239	1	0.000	0.008	U	NS			NS			-0.005	0.013	U	0.014	0.021	U
Plutonium-241	3	1.069	0.875	U	NS			NS			0.582	0.972	U	0.550	0.865	U
Thorium-228	1	0.060	0.035		NS			NS			0.014	0.024	U	0.000	0.022	U
Thorium-230	1	0.028	0.026	U	NS			NS			0.024	0.020	U	0.023	0.028	U
Thorium-232	1	-0.003	0.012	U	NS			NS			0.010	0.012		0.000	0.021	U
Radiological Parameters, Filtered (pCi/L)																
Radium-228	1.5	0.118	0.321	U	NS			NS			3.251	0.761		0.108	0.309	U
Uranium-234	1	0.029	0.042	U	NS			NS			0.115	0.038		0.016	0.017	U
Uranium-235	1	0.004	0.019	U	NS			NS			0.000	0.006	U	-0.002	0.005	U
Uranium-238	1	0.026	0.043	U	NS			NS			0.041	0.021		0.008	0.016	U
Total Uranium (µg/L)	1	0.021	0.001	U	NS			NS			0.077	0.002	U	0.025	0.001	U
Americium-241	1	0.020	0.018		NS			NS			0.007	0.014	U	0.022	0.027	U
Plutonium-239	1	0.003	0.017	U	NS			NS			0.015	0.014		0.015	0.017	U
Plutonium-241	3	0.973	0.821	U	NS			NS			0.816	0.820	U	0.281	0.843	U
Thorium-228	1	0.019	0.017	U	NS			NS			0.023	0.035	U	0.021	0.022	U
Thorium-230	1	0.055	0.026		NS			NS			0.004	0.029	U	0.032	0.023	
Thorium-232	1	-0.003	0.013	U	NS			NS			-0.004	0.015	U	0.008	0.011	U

Notes:
1. Well contained insufficient water volume and could not be sampled.

2. Rinsate Blank SLDA-RB038 was collected but sample leaked in shipping container.

NA- Not Analyzed

NS - not sampled

U- Result is lower than Minimum Detectable Concentration (MDC)

TABLE 1
RADIOLOGICAL DATA SUMMARY
SLDA FUSRAP SITE - VANDERGRIFT, PA
PAGE 2

	Groundwater Samples cont.																	
	MW-29			MW-51			MW-80			MW-80 Dup (GW910)			MW-81			MW-81 Dup (GW909)		
	12/15/2011			12/16/2011			12/16/2011			12/16/2011			12/14/2011			12/14/2011		
	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual
Radiological Parameters, Unfiltered (pCi/L)																		
Radium-228	0.556	0.384	U	0.421	0.307	U	0.135	0.305	U	0.071	0.288	U	0.020	0.306	U	0.003	0.325	U
Uranium-234	0.403	0.069		0.211	0.068		-0.390	0.606	U	0.010	0.028	U	3.985	0.604		3.413	0.515	
Uranium-235	0.013	0.011	U	-0.003	0.005	U	-0.113	0.586	U	-0.003	0.006	U	0.130	0.076		0.112	0.063	
Uranium-238	0.047	0.019		0.076	0.045		-0.973	1.118	U	0.015	0.024	U	0.309	0.110		0.196	0.078	
Total Uranium (µg/L)	0.128	0.002	U	0.261	0.005		0.005	0	U	0.002	0	U	0.775	0.013		0.767	0.013	
Americium-241	0.029	0.022		0.002	0.010	U	-0.007	0.007	U	0.016	0.016	U	0.004	0.008	U	0.009	0.013	U
Plutonium-239	0.007	0.010	U	0.013	0.015	U	0.022	0.018		0.009	0.012	U	0.002	0.010	U	0.012	0.019	U
Plutonium-241	0.800	0.788	U	1.616	1.039		2.441	1.168		0.690	0.841	U	0.714	0.748	U	0.603	0.753	U
Thorium-228	0.044	0.032		0.036	0.026		0.000	0.008	U	-0.005	0.007	U	0.020	0.039	U	-0.008	0.034	U
Thorium-230	0.004	0.020	U	0.019	0.019	U	0.008	0.017	U	0.019	0.027	U	0.008	0.019	U	0.004	0.023	U
Thorium-232	0.000	0.015	U	0.025	0.022	U	-0.004	0.005	U	-0.009	0.015	U	-0.023	0.030	U	0.012	0.013	
Radiological Parameters, Filtered (pCi/L)																		
Radium-228	0.049	0.304	U	0.770	0.362		0.264	0.327	U	0.555	0.356		1.427	0.548		0.209	0.339	U
Uranium-234	0.454	0.082		0.154	0.052		0.002	0.020	U	-0.004	0.016	U	3.263	0.505		2.665	0.372	
Uranium-235	0.010	0.012	U	0.006	0.012	U	0.000	0.012	U	-0.002	0.005	U	0.115	0.071		0.102	0.041	
Uranium-238	0.039	0.019		0.086	0.040		0.009	0.016	U	0.000	0.025	U	0.261	0.098		0.173	0.054	
Total Uranium (µg/L)	0.122	0.003	U	0.208	0.004		0.008	0	U	0.007	0	U	0.600	0.010		0.618	0.010	
Americium-241	0.034	0.034	U	0.002	0.008	U	0.010	0.013	U	0.010	0.016	U	0.008	0.018	U	0.000	0.014	U
Plutonium-239	0.002	0.017	U	0.005	0.014	U	0.018	0.018	U	0.013	0.015	U	0.035	0.021		0.003	0.007	U
Plutonium-241	0.428	0.895	U	0.924	0.872	U	1.148	0.912	U	1.037	0.957	U	0.986	0.788	U	0.620	0.802	U
Thorium-228	0.014	0.017	U	0.005	0.009	U	0.006	0.011	U	0.002	0.009	U	0.007	0.037	U	0.023	0.024	U
Thorium-230	0.020	0.016		0.022	0.019		0.013	0.022	U	0.000	0.022	U	0.025	0.019		0.016	0.021	U
Thorium-232	0.005	0.018	U	0.004	0.008	U	-0.007	0.007	U	-0.006	0.015	U	-0.018	0.021	U	0.000	0.018	U

Notes:
1. Well contained insufficient water volume and could not be sampled.

2. Rinsate Blank SLDA-RB038 was collected but sample leaked in shipping container.

NA- Not Analyzed

NS - not sampled

U- Result is lower than Minimum Detectable Concentration (MDC)

TABLE 1
RADIOLOGICAL DATA SUMMARY
SLDA FUSRAP SITE - VANDERGRIFT, PA
PAGE 3

	Groundwater Samples cont.														Rinsate Blanks		
	MW-82			MW-83			MW-84			MW-86[1]			TPZ-04			RB037 [2]		
	12/15/2011			12/16/2011			12/15/2011			NS			12/15/2011			12/15/2011		
	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual	Analysis Results	Analysis Error +/- 2 s	Qual
Radiological Parameters, Unfiltered (pCi/L)																		
Radium-228	0.313	0.390	U	0.371	0.302	U	0.193	0.325	U	NS			0.422	0.384	U	0.026	0.367	U
Uranium-234	0.361	0.071		1.829	0.276		0.042	0.022		NS			0.025	0.018		0.006	0.006	
Uranium-235	0.015	0.013	U	0.049	0.029		0.001	0.010	U	NS			0.000	0.006	U	0.002	0.004	U
Uranium-238	0.316	0.065		0.986	0.170		0.012	0.021	U	NS			0.023	0.017	U	0.000	0.006	U
Total Uranium (µg/L)	0.885	0.017		3.480	0.055		0.036	0.001	U	NS			0.029	0.001	U	-0.002	0	U
Americium-241	-0.002	0.016	U	0.021	0.017		0.020	0.018	U	NS			0.020	0.024	U	0.018	0.016	U
Plutonium-239	0.006	0.016	U	0.000	0.012	U	0.000	0.011	U	NS			0.007	0.014	U	0.013	0.015	
Plutonium-241	0.781	0.857	U	0.810	0.814	U	1.296	1.275	U	NS			0.243	0.741	U	0.728	0.915	U
Thorium-228	0.010	0.025	U	0.016	0.021	U	0.013	0.015	U	NS			0.065	0.042		0.008	0.025	U
Thorium-230	0.042	0.027		0.038	0.028		0.022	0.022	U	NS			0.041	0.030	U	0.031	0.022	
Thorium-232	-0.013	0.016	U	0.000	0.013	U	-0.006	0.021	U	NS			0.007	0.009	U	0.000	0.015	U
Radiological Parameters, Filtered (pCi/L)																		
Radium-228	0.236	0.385	U	0.389	0.310	U	0.121	0.335	U	NS			0.138	0.331	U	NS		
Uranium-234	0.041	0.025		2.144	0.316		0.015	0.018	U	NS			0.041	0.023		NS		
Uranium-235	-0.005	0.014	U	0.043	0.033		0.001	0.008	U	NS			0.000	0.006	U	NS		
Uranium-238	0.021	0.022	U	1.220	0.201		0.030	0.020		NS			-0.003	0.019	U	NS		
Total Uranium (µg/L)	0.128	0.003	U	3.390	0.053		0.009	0	U	NS			0.025	0.001	U	NS		
Americium-241	0.030	0.027	U	0.003	0.013	U	0.021	0.022	U	NS			0.028	0.020		NS		
Plutonium-239	0.010	0.014	U	0.007	0.014	U	0.004	0.008	U	NS			0.000	0.010	U	NS		
Plutonium-241	0.621	0.880	U	0.910	0.924	U	1.070	0.926	U	NS			0.963	1.057	U	NS		
Thorium-228	0.000	0.034	U	0.000	0.010	U	0.010	0.037	U	NS			0.031	0.033	U	NS		
Thorium-230	0.017	0.015		-0.004	0.011	U	0.037	0.034	U	NS			0.051	0.040	U	NS		
Thorium-232	-0.021	0.021	U	-0.012	0.010	U	0.019	0.022	U	NS			-0.004	0.022	U	NS		

Notes:
1. Well contained insufficient water volume and could not be sampled.

2. Rinsate Blank SLDA-RB038 was collected but sample leaked in shipping container.

NA- Not Analyzed

NS - not sampled

U- Result is lower than Minimum Detectable Concentration (MDC)

TABLE 2
CHEMICAL DATA SUMMARY
SLDA FUSRAP SITE- VANDERGRIFT, PA

Sample Type:	Groundwater Samples													
Sample Location:	MW-08		MW-11S		MW-17		MW-25		MW-26		MW-29		MW-51	
Sample Date:	12/14/2011		NS [1]		NS [1]		12/15/2011		12/15/2011		12/15/2011		12/16/2011	
Dissolved Metals, ICP/MS (mg/L)														
Aluminum, dissolved	0.1	U	NS		NS		0.1	U	0.1	U	0.1	U	0.1	U
Antimony, dissolved	0.005	U	NS		NS		0.005	U	0.005	U	0.005	U	0.0034	J
Arsenic, dissolved	0.005	U	NS		NS		0.005	U	0.005	U	0.005	U	0.005	U
Barium, dissolved	0.313		NS		NS		0.267		0.0713		0.116		0.226	
Beryllium, dissolved	0.004	U	NS		NS		0.004	U	0.004	U	0.004	U	0.004	U
Cadmium, dissolved	0.005	U	NS		NS		0.005	U	0.005	U	0.005	U	0.005	U
Calcium, dissolved	36.2		NS		NS		40.3		42.4		35		44.2	
Chromium, dissolved	0.01	U	NS		NS		0.01	U	0.01	U	0.01	U	0.01	U
Cobalt, dissolved	0.02	U	NS		NS		0.02	U	0.02	U	0.02	U	0.02	U
Copper, dissolved	0.01	U	NS		NS		0.01	U	0.01	U	0.01	U	0.01	U
Iron, dissolved	0.468		NS		NS		0.05	U	0.159		0.05	U	0.119	
Lead, dissolved	0.005	U	NS		NS		0.005	U	0.005	U	0.005	U	0.005	U
Magnesium, dissolved	7.22		NS		NS		7.18		8.33		6.91		9.16	
Manganese, dissolved	0.066		NS		NS		0.01	U	0.145		0.01	U	0.072	
Molybdenum, dissolved	0.005	U	NS		NS		0.005	U	0.005	U	0.005	U	0.005	U
Nickel, dissolved	0.02	U	NS		NS		0.02	U	0.02	U	0.02	U	0.02	U
Potassium, dissolved	1.31		NS		NS		1.77		1.39		1.2		2.44	
Selenium, dissolved	0.005	U	NS		NS		0.005	U	0.005	U	0.005	U	0.0032	J
Silver, dissolved	0.01	U	NS		NS		0.01	U	0.01	U	0.01	U	0.01	U
Sodium, dissolved	2.29		NS		NS		4.88		3.58		4.21		6.02	
Thallium, dissolved	0.0029	J	NS		NS		0.004	U	0.004	U	0.004	U	0.0017	J
Titanium, dissolved	NS		NS		NS		NS		NS		NS		NS	
Vanadium, dissolved	0.02	U	NS		NS		0.02	U	0.02	U	0.02	U	0.02	U
Zinc, dissolved	0.02	U	NS		NS		0.02	U	0.02	U	0.02	U	0.02	
Dissolved Mercury (mg/L)														
Mercury	0.0002	U	NS		NS		0.0002	U	0.0002	U	0.0001	J	0.0001	J
Inorganic Anions (mg/L)														
Bromide	0.1	U	NS		NS		0.1	U	0.066	J	0.1	U	0.1	U
Chloride	1.38		NS		NS		3.26		4.29		3.04		4.61	
Fluoride	0.157		NS		NS		0.127		0.099	J	0.108		0.558	
Nitrate	0.086	J	NS		NS		0.129		0.072	J	0.592		0.079	J
Nitrite	0.1	U	NS		NS		0.1	U	0.1	U	0.1	U	0.1	U
ortho-Phosphate-P	0.1	U	NS		NS		0.1	U	0.1	U	0.1	U	0.1	U
Sulfate	10.2		NS		NS		19.7		28.2		22.9		8.14	
Metals, ICP/MS (mg/L)														
Aluminum	0.1	U	NS		NS		0.638		0.042	J	0.071	J	1.8	
Arsenic	0.005	U	NS		NS		0.005	U	0.005	U	0.005	U	0.005	U
Barium	0.321		NS		NS		0.276		0.0787		0.111		0.273	
Beryllium	0.004	U	NS		NS		0.004	U	0.004	U	0.004	U	0.004	U
Cadmium	0.005	U	NS		NS		0.005	U	0.005	U	0.005	U	0.005	U
Calcium	37		NS		NS		39.4		44.2		32.8		46.3	
Chromium	0.01	U	NS		NS		0.002	J	0.01	U	0.01	U	0.0029	J
Cobalt	0.02	U	NS		NS		0.02	U	0.02	U	0.02	U	0.02	U
Copper	0.01	U	NS		NS		0.01		0.01	U	0.01	U	0.005	J
Iron	0.486		NS		NS		1.1		0.221		0.034	J	2.61	
Lead	0.005	U	NS		NS		0.005	U	0.005	U	0.005	U	0.0021	J
Magnesium	7.38		NS		NS		7.04		8.73		6.53		9.97	
Manganese	0.069		NS		NS		0.116		0.151		0.01	U	0.106	
Molybdenum	0.005	U	NS		NS		0.005	U	0.005	U	0.005	U	0.005	U
Nickel	0.02	U	NS		NS		0.02	U	0.02	U	0.02	U	0.007	J
Potassium	1.34		NS		NS		1.79		1.46		1.24		3.01	
Selenium	0.005	U	NS		NS		0.005	U	0.005	U	0.005	U	0.005	U
Sodium	2.23		NS		NS		4.9		3.74		5.89		6.39	
Thallium	0.004	U	NS		NS		0.0019	J	0.004	U	0.004	U	0.003	J
Titanium	NS		NS		NS		NS		NS		NS		NS	
Vanadium	0.02	U	NS		NS		0.02	U	0.02	U	0.02	U	0.02	U
Zinc	0.02	U	NS		NS		0.006	J	0.004	J	0.007	J	0.025	
Silver and Antimony, ICP/MS (mg/L)														
Antimony	0.005	U	NS		NS		0.005	U	0.005	U	0.005	U	0.005	U
Silver	0.01	U	NS		NS		0.01	U	0.01	U	0.01	U	0.01	U

TABLE 2
CHEMICAL DATA SUMMARY
SLDA FUSRAP SITE- VANDERGRIFT, PA

Sample Type:	Groundwater Samples													
Sample Location:	MW-08		MW-11S		MW-17		MW-25		MW-26		MW-29		MW-51	
Sample Date:	12/14/2011		NS [1]		NS [1]		12/15/2011		12/15/2011		12/15/2011		12/16/2011	
Mercury (mg/L)														
Mercury	0.0002	U	NS		NS		0.0002	U	0.00006	J	0.00006	J	0.00006	J
Semi-Volatile Organic Compounds (µg/L) [2,3]														
Bis(2-ethylhexyl) phthalate	10	U	NS		NS		10	U	10	U	10	U	10	U
Volatile Organic Compounds (µg/L) [2,3]														
1,1,1-Trichloroethane	2	U	NS		NS		2	U	2	U	2	U	369	
1,1-Dichloroethane	2	U	NS		NS		2	U	2.86		2	U	173	
1,1-Dichloroethene	2	U	NS		NS		2	U	2	U	2	U	23.2	
1,2-Dichloroethane	2	U	NS		NS		2	U	2	U	2	U	1.84	J
Acetone	5	U	NS		NS		5	U	5	U	5	U	5	U
Chloroethane	2	U	NS		NS		2	U	2	U	2	U	7.47	
cis-1,2-Dichloroethene	2	U	NS		NS		6.44		2.37		2.48		1.45	J
Dichlorodifluoromethane	2	U	NS		NS		2	U	2	U	2	U	1.79	J
Trichloroethene	2	U	NS		NS		3.29		4.23		8.03		2	U
Vinyl chloride	2	U	NS		NS		2	U	2	U	2	U	4.2	
Total Dissolved Solids (mg/L)														
Residue, Dissolved	143		NS		NS		152		164		145		176	
Carbon (mg/L)														
Organic Carbon, Total - Avg	1	U	NS		NS		0.761	J	0.711	J	0.577	J	0.697	J
Organic Carbon, Total - High	1	U	NS		NS		0.786	J	0.726	J	0.616	J	0.728	J
Organic Carbon, Total -Low	1	U	NS		NS		0.747	J	0.692	J	0.543	J	0.676	J

Notes:

1. NS - Not Sampled due to insufficient water volume

2. Six SVOCs and 3 VOCs were found in the laboratory's MB and in all samples and QC samples in amounts equal to the MB. These have been removed from further consideration.

3. Only those VOCs and SVOCs detected at concentrations above the MDL are shown.

J- estimated value below Minimum Detection Limit (MDL)

TABLE 2
CHEMICAL DATA SUMMARY
SLDA FUSRAP SITE- VANDERGRIFT, PA

Sample Type:	**Groundwater Samples cont.**																	
Sample Location:	MW-80		MW-80Dup (GW-910)		MW-81		MW-81 Dup (GW-909)		MW-82		MW-83		MW-84		MW-86		TPZ-04	
Sample Date:	12/16/2011		12/16/2011		12/14/2011		12/14/2011		12/15/2011		12/16/2011		12/15/2011		NS [1]		12/15/2011	
Dissolved Metals, ICP/MS (mg/L)																		
Aluminum, dissolved	0.1	U	0.1	U	0.1	U	NS		0.088	J	0.201		0.1	U	NS		0.1	U
Antimony, dissolved	0.005	U	0.005	U	0.005	U	NS		0.005	U	0.005	U	0.005	U	NS		0.005	U
Arsenic, dissolved	0.005	U	0.005	U	0.005	U	NS		0.005	U	0.005	U	0.005	U	NS		0.005	U
Barium, dissolved	0.0606		0.0583		0.0864		NS		0.0317		0.326		0.0626		NS		0.0517	
Beryllium, dissolved	0.004	U	0.004	U	0.004	U	NS		0.004	U	0.004	U	0.004	U	NS		0.004	U
Cadmium, dissolved	0.005	U	0.005	U	0.005	U	NS		0.005	U	0.005	U	0.005	U	NS		0.005	U
Calcium, dissolved	29.4		27.5		27.8		NS		10.9		141		13.5		NS		34.5	
Chromium, dissolved	0.01	U	0.01	U	0.01	U	NS		0.01	U	0.01	U	0.01	U	NS		0.01	U
Cobalt, dissolved	0.02	U	0.02	U	0.02	U	NS		0.02	U	0.02	U	0.02	U	NS		0.02	U
Copper, dissolved	0.01	U	0.01	U	0.01	U	NS		0.01	U	0.009	J	0.003	J	NS		0.01	U
Iron, dissolved	0.013	J	0.018	J	0.05	U	NS		0.091		0.462		0.014	J	NS		0.022	J
Lead, dissolved	0.005	U	0.005	U	0.005	U	NS		0.005	U	0.005	U	0.005	U	NS		0.005	U
Magnesium, dissolved	6.82		6.18		5.32		NS		3.5		26.6		4.62		NS		8.13	
Manganese, dissolved	0.11		0.106		0.012		NS		0.027		0.208		0.01		NS		0.01	U
Molybdenum, dissolved	0.005	U	0.005	U	0.005	U	NS		0.005	U	0.0031	J	0.005	U	NS		0.005	U
Nickel, dissolved	0.02	U	0.02	U	0.02	U	NS		0.02	U	0.02	U	0.004	J	NS		0.02	U
Potassium, dissolved	1.88		1.67		0.95	J	NS		4.54		3.17		1.16		NS		1.35	
Selenium, dissolved	0.005	U	0.0032	J	0.005	U	NS		0.005	U	0.0047	J	0.005	U	NS		0.005	U
Silver, dissolved	0.01	U	0.01	U	0.01	U	NS		0.01	U	0.01	U	0.01	U	NS		0.01	U
Sodium, dissolved	3.1		2.88		3.47		NS		3.98		11.8		2.19		NS		3.15	
Thallium, dissolved	0.004	U	0.004	U	0.004	U	NS		0.004	U	0.004	U	0.004	U	NS		0.004	U
Titanium, dissolved	NS		NS		NS		NS		NS		NS		NS		NS		NS	
Vanadium, dissolved	0.02	U	0.02	U	0.02	U	NS		0.02	U	0.02	U	0.02	U	NS		0.02	U
Zinc, dissolved	0.007	J	0.007	J	0.02	U	NS		0.011	J	0.005	J	0.02	U	NS		0.012	J
Dissolved Mercury (mg/L)																		
Mercury	0.0002	U	0.0002	U	0.0002	U	NS		0.0002	U	0.0001	J	0.0002	U	NS		0.0001	J
Inorganic Anions (mg/L)																		
Bromide	0.066	J	0.065	J	0.1	U	0.1	U	0.056	J	0.1	U	0.06	J	NS		0.081	J
Chloride	3.93		4.01		3		3.01		3.59		4.76		3.7		NS		4.57	
Fluoride	0.107		0.107		0.132		0.134		0.113		0.129		0.074	J	NS		0.102	
Nitrate	0.1	U	0.309		0.152		0.14		1.12		1.16		1.77		NS		0.185	
Nitrite	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	NS		0.1	U
ortho-Phosphate-P	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.4	U	0.1	U	NS		0.1	U
Sulfate	25.1		25		21.4		21.3		22		150		19.5		NS		38.5	
Metals, ICP/MS (mg/L)																		
Aluminum	0.1	U	0.1	U	3.73		3.32		0.447		0.857		0.359		NS		0.32	
Arsenic	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	NS		0.005	U
Barium	0.0607		0.0597		0.124		0.122		0.039		0.356		0.0661		NS		0.0624	
Beryllium	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	NS		0.004	U
Cadmium	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	NS		0.005	U
Calcium	28.2		27.7		27.2		27.1		9.94		145		12.9		NS		35.1	
Chromium	0.01	U	0.01	U	0.0043	J	0.0039	J	0.01	U	0.01	U	0.01	U	NS		0.01	U
Cobalt	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	NS		0.02	U
Copper	0.01	U	0.01	U	0.003	J	0.003	J	0.01	U	0.009	J	0.004	J	NS		0.01	U
Iron	0.068		0.061		2.37		2.29		0.331		1.06		0.351		NS		0.829	
Lead	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	NS		0.005	U
Magnesium	6.36		6.26		5.63		5.67		3.91		27.3		4.35		NS		8.37	
Manganese	0.145		0.142		0.087		0.083		0.032		0.204		0.011		NS		0.062	
Molybdenum	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.0034	J	0.005	U	NS		0.005	U
Nickel	0.02	U	0.02	U	0.02	U	0.02	U	0.009	J	0.004	J	0.02	U	NS		0.02	U
Potassium	2.67		2.65		1.86		1.76		3.02		3.44		1.11		NS		1.45	
Selenium	0.005	U	0.0031	J	0.005	U	0.005	U	0.005	U	0.0033	J	0.005	U	NS		0.005	U
Sodium	3.29		3.23		3.5		3.53		3.49		12		1.86		NS		3.06	
Thallium	0.0017	J	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	NS		0.004	U
Titanium	NS		NS		NS		NS		NS		NS		NS		NS		NS	
Vanadium	0.02	U	0.02	U	0.006	J	0.005	J	0.02	U	0.02	U	0.02	U	NS		0.02	U
Zinc	0.013	J	0.013	J	0.014	J	0.012	J	0.02		0.065		0.039		NS		0.004	J
Silver and Antimony, ICP/MS (mg/L)																		
Antimony	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	NS		0.005	U
Silver	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	NS		0.01	U

TABLE 2
CHEMICAL DATA SUMMARY
SLDA FUSRAP SITE- VANDERGRIFT, PA

Sample Type:	Groundwater Samples cont.																	
Sample Location:	MW-80		MW-80Dup (GW-910)		MW-81		MW-81 Dup (GW-909)		MW-82		MW-83		MW-84		MW-86		TPZ-04	
Sample Date:	12/16/2011		12/16/2011		12/14/2011		12/14/2011		12/15/2011		12/16/2011		12/15/2011		NS [1]		12/15/2011	
Mercury (mg/L)																		
Mercury	0.0002	U	0.0002	U	0.00006	J	0.0002	U	0.0002	U	0.00007	J	0.0002	U	NS		0.00007	J
Semi-Volatile Organic Compounds (µg/L) [2,3]																		
Bis(2-ethylhexyl) phthalate	10	U	10	U	10	U	10	U	2.35	J	10	U	10	U	NS		10	U
Volatile Organic Compounds (µg/L) [2,3]															NS			
1,1,1-Trichloroethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	NS		2	U
1,1-Dichloroethane	2	U	2	U	1.79	J	1.79	J	2	U	2	U	13.1		NS		2	U
1,1-Dichloroethene	2	U	2	U	2	U	2	U	2	U	2	U	4.57		NS		2	U
1,2-Dichloroethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	NS		2	U
Acetone	5	U	5	U	5	U	5	U	3.33	J	5	U	5	U	NS		5	U
Chloroethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	NS		2	U
cis-1,2-Dichloroethene	2	U	2	U	11.7		11.6		2	U	2	U	2	U	NS		2	U
Dichlorodifluoromethane	2	U	2	U	2	U	2	U	2	U	2	U	2	U	NS		2	U
Trichloroethene	2	U	2	U	11.5		10.9		2	U	2	U	2	U	NS		1.48	J
Vinyl chloride	2	U	2	U	2.33		2.26		2	U	2	U	2	U	NS		2	U
Total Dissolved Solids (mg/L)																		
Residue, Dissolved	121		111		136		134		84		562		74		NS		157	
Carbon (mg/L)																		
Organic Carbon, Total - Avg	0.867	J	0.915	J	0.725	J	0.631	J	0.917	J	0.991	J	0.764	J	NS		0.67	J
Organic Carbon, Total - High	0.892	J	0.94	J	0.731	J	0.664	J	0.972	J	1.01		0.768	J	NS		0.724	J
Organic Carbon, Total -Low	0.847	J	0.898	J	0.719	J	0.619	J	0.86	J	0.978	J	0.759	J	NS		0.629	J

Notes:

1. NS - Not Sampled due to insufficient water volume

2. Six SVOCs and 3 VOCs were found in the laboratory's MB and in all samples and QC samples in amounts equal to the MB. These have been removed from further consideration.

3. Only those VOCs and SVOCs detected at concentrations above the MDL are shown.

J- estimated value below Minimum Detection Limit (MDL)

TABLE 3
QUALITY CONTROL CHEMICAL DATA SUMMARY
SLDA FUSRAP SITE, VANDERGRIFT, PA
Page 1

Sample Type:	Field Blanks		Rinsate Blanks		Trip Blanks		
Sample Name:	FB-042	FB-043	RB-037	RB-038	TB-048	TB-049	TB-050
Sample Date:	12/15/2011	12/16/2011	12/15/2011	12/16/2011	12/14/2011	12/15/2011	12/16/2011
Dissolved Metals, ICP/MS (mg/L)	NOT SAMPLED						
Dissolved Mercury (mg/L)	NOT SAMPLED						
Inorganic Anions (mg/L)							
Bromide	NS	NS	0.1 U	0.1 U	NS	NS	NS
Chloride	NS	NS	0.6 J	1 U	NS	NS	NS
Fluoride	NS	NS	0.1 U	0.1 U	NS	NS	NS
Nitrate	NS	NS	0.091 J	0.077 J	NS	NS	NS
Nitrite	NS	NS	0.1 U	0.1 U	NS	NS	NS
ortho-Phosphate-P	NS	NS	0.1 U	0.1 U	NS	NS	NS
Sulfate	NS	NS	0.591 J	1 U	NS	NS	NS
Metals, ICP/MS (mg/L)							
Aluminum	NS	NS	0.1 U	0.07 J	NS	NS	NS
Arsenic	NS	NS	0.005 U	0.005 U	NS	NS	NS
Barium	NS	NS	0.02 U	0.02 U	NS	NS	NS
Beryllium	NS	NS	0.004 U	0.004 U	NS	NS	NS
Cadmium	NS	NS	0.005 U	0.005 U	NS	NS	NS
Calcium	NS	NS	1 U	1 U	NS	NS	NS
Chromium	NS	NS	0.01 U	0.01 U	NS	NS	NS
Cobalt	NS	NS	0.02 U	0.02 U	NS	NS	NS
Copper	NS	NS	0.01 U	0.01 U	NS	NS	NS
Iron	NS	NS	0.05 U	0.05 U	NS	NS	NS
Lead	NS	NS	0.005 U	0.0039 J	NS	NS	NS
Magnesium	NS	NS	1 U	1 U	NS	NS	NS
Manganese	NS	NS	0.01 U	0.01 U	NS	NS	NS
Molybdenum	NS	NS	0.005 U	0.005 U	NS	NS	NS
Nickel	NS	NS	0.02 U	0.02 U	NS	NS	NS
Potassium	NS	NS	1 U	1 U	NS	NS	NS
Selenium	NS	NS	0.005 U	0.005 U	NS	NS	NS
Sodium	NS	NS	0.680 J	1 U	NS	NS	NS
Thallium	NS	NS	0.004 U	0.004 U	NS	NS	NS
Titanium	NS	NS	NA	NA	NS	NS	NS
Vanadium	NS	NS	0.02 U	0.02 U	NS	NS	NS
Zinc	NS	NS	0.02 U	0.014 J	NS	NS	NS
Silver and Antimony, ICP/MS (mg/L)							
Antimony	NS	NS	0.005 U	0.005 U	NS	NS	NS
Silver	NS	NS	0.01 U	0.01 U	NS	NS	NS
Mercury (mg/L)							
Mercury	NS	NS	0.00006 J	0.00007 J	NS	NS	NS
Semi-Volatile Organic Compounds (µg/L) [1]	No Detections Noted						
Volatile Organic Compounds (µg/L) [1]							
Acetone	5 U	5 U	3.65 J	5 U	5 U	5 U	5 U
Bromodichloromethane	1.8 J	2 U	1.97 J	2 U	2 U	2 U	2 U
Chloroform	9.48	2 U	9.59	2 U	2 U	2 U	2 U
Total Dissolved Solids (mg/L)							
Residue, Dissolved	NS	NS	12.5 U	12.5 U	NS	NS	NS
Carbon (mg/L)							
Organic Carbon, Total - Avg	NS	NS	1 U	1 U	NS	NS	NS
Organic Carbon, Total - High	NS	NS	1 U	1 U	NS	NS	NS
Organic Carbon, Total -Low	NS	NS	1 U	1 U	NS	NS	NS

Notes:
Only those VOCs and SVOCs detected at concentrations above the MDL are shown
NA- Not Analyzed
NS - Not Sampled
J- estimated value below Minimum Detection Limit (MDL)

1. Six SVOCs and 3 VOCs were found in the laboratory's MB and in all samples and QC samples in amounts equal to the MB. These have been removed from further consideration.

ATTACHMENT 1

GROUNDWATER MONITORING DATA SHEETS AND FIELD NOTES

11/17/11 BLB

1030 MW-83 SAMPLE COLLECTED & LABELED SLDA-GWMW83U-111711 1 "F"

- MS & MSD ALSO COLLECTED
MS = SLDA-GWMW83UMS-111711 "E"
MSD = SLDA-GWMW83UMSD-111711 "E"

1115 MW-29 START OF LOW FLOW. W/ PERISTALTIC @ 200 mL/min & removed 3.5 gallons

1157 MW-29 SAMPLE COLLECED & LABELED SLDA-GWMW29U-111711 1 F

900 MW-51 SAMPLE COLLECTED & LABELED SLDA-GWMW51U-111711 1 "F"

1430 TRIP BLANK LABELED SLDA-TB0480-111711

1440 FIELD BLANK LABELED & COLLECTED SLDA-FB041U-111711

1 cooler to D&E; 1 cooler to PACE & to AKS

1700 Offsite

BLB SLDA 4th EVENT BLB 11/17/11 12/14/11

WEATHER: 38°F-50°F RAIN/CLOUDS

ONSITE @ 715 w/ TIM DOUTT (ARS) & GRAHM (CORE) [redacted]

- SAFETY MTG W/ TIM (LIFTING COOLERS)

December 2011

- NEED TO REPLACE SONDE 81 BACK INTO WELL BUT DID NOT HAVE A PIECE. FONDRIEST WILL DELIVER THE MISSING PIECE SO IT CAN BE REPLACED BACK INTO WELL MW-81

YSI CAL 1.409 = 1.409
~~100~~ 7.00 = 7.01 pH

TURBIDITY METER 2020WE
1.00 NTU = 0.96 10 NTU = 11.25

800 MW-08 WL=12.46 removed 4 gal @ 150 mL/min

	pH 4	7	10	cond	DO
before	3.96	7.19	9.89	1.454	99.3
after	4.00	7.00	9.95	1.409	98.6

MW-08
1 START OF LOW FLOW W/ PERISTALTIC
1005 collected sample SLDA-GWMW08U-121411

12/14/11 BLB

1137 MW-81 WL 9.02' TOC
removed 7.5 gallon

1155 collected MW-81 SAMPLE LABELED
SLDA-GW-MW81U-121411

DUP COLLECTED @ MW-81
SLDA-GW-909BUD-121411

field readings [81] BLB
13.78°C 3911 µS/cm 9.68 DO 7.43 PH 31.8 ORP

1326 MW-17 WL = 52.44
removed 0.25 gallons to Dry

1320 TPZ-04 WL = 19.96
removed 1.5 gal to Dry

1530 MW-82 WL = 27.31
removed 13 gal to Dry

1610 MW-84 WL = 33.30
removed 12 gal

BLB 12/14/11

- TIM HELPED CLEAN, CALIBRATE & DOWNLOAD SONDE DATA

- ALL WATER WAS CONTAINED AND DUMPED IN THE WATER CONTAINMENT BASIN at the treatment area WAS OKED BY MARC GRAHL (CORPS) @ 1330

1630 TRIP BLANK
SLDA-TB04BU-121411

WELL	WL TOC	TIME REMOVED	REPLACED
MW-86	37.37	855	1257
MW-51	31.16	903	1255
MW-84	33.30	910	1251
MW-~~82~~ 82	~~49.50~~ BLB 27.3	915	1244
MW-~~80~~ 83	~~27.22~~ ~~49.50~~	920	1248
MW-80	27.22	1309	1505
MW-26	29.4	1314	1510
TPZ-04	19.96	1320	1515
MW-29	18.85	1332	1518
MW-17	52.44	1326	1522
MW-115	DRY	1336	1525
MW-25	16.51	1340	1528
MW-08	12.46	800	1030
MW-81	9.02	out	12/7/11

12/14/11 — 9th — BLR

SONDE CAL DATA (REPLACED ALL BATTERIES)

Battery life = 140 DAYS (ABOUT)

	pH 4	pH 7	pH 10	sp cond 1.40745 ms/cm	DO %
MW-08	see page 57				
MW-86 upload					
before	4.02	6.94	10.14	1.615	97.4
after	3.99	7	10.03	1.409	98.0
MW-51					
before	4.33	7.02 (6.99)	10.27	1.647	100.5
after	4.04	7.02	10.2	1.410	98.1
MW-84					
before	4.27	6.80	10.35	1.499	101.8
after	4.00	7.01	9.93	1.409	98.0
MW-82					
before	3.99	6.97	9.86	1.467	103
after	4.00	7.03	10.01	1.409	98
MW-83					
before cal	3.87	7.09	9.55	1.657	103.7
after cal	4.04	6.99	9.90	1.409	98

BCB — 9th — 12/14/11

	pH 4	pH 7	pH 10	sp cond ms/cm	DO %
MW-80					
before	4.12	7.03	9.68	1.377	103.0
after	3.97	6.98	9.87	1.408	97.9
MW-26					
before	4.24	7.13	10.24	1.264	100.1
after	3.9	6.99	10.01	1.409	97.9
~~AA~~ TPZ-04					
before	4.22	7.04	10.12	1.290	100.6
after	3.99	7.01	9.92	1.409	97.9
MW-29					
before	4.42	6.87	9.38	1.358	103.3
after	4.01	7.01	9.97	1.409	97.4
MW-17					
before	3.93	7.15	9.73	1.325	104.5
after	3.99	7.01	9.99	1.410	97.8
MW-11S					
before	4.23	7.10	10.22	1.329	105.6
after	3.95	7.00	9.97	1.409	97.9

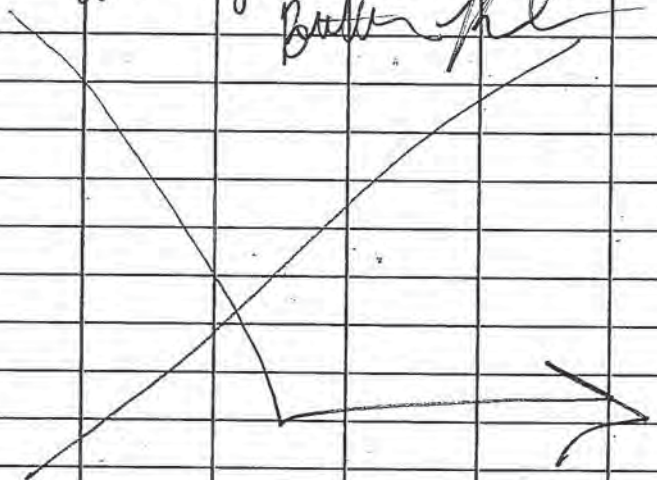
12/14/11 BLB

	pH 4	pH 7	pH 10	SP COND	DO%
Cal					
MW-[illegible] BLD 25					
~~before~~	~~4.23~~	~~7.10~~	~~10.22~~	~~1.529~~	~~105.4~~
~~after~~	~~3.95~~	~~7.00~~	~~9.97~~	~~1.406~~	~~97.9~~
~~after~~					
after*	3.49	7.01	9.88	1.466	103
after	4.23	7.02	9.96	1.409	97.5

BLB BLB

*MW-81 was calibrated before sending back to SLDA., see call sheet in trip report

1745 offsite signed out



62

BLB SLDA 9th event Cont 12/15/11

WEATHER: 56°F-58°F RAIN

ONSITE @ 720 w/ TIM ARSEC DOUTT & MARC CORPS GRAHN

730 SAFETY MTG w/ TIM (ESCORTS)

745 YSI CAL

1.401 ms/cm = 1.401 ms/cm

7 = 7.10

4 = 4.08

10 = 9.98

TURBIDITY METER 2020we

1 = 1.00 NTU

10 = 10.95 NTU

820 START LOW FLOW MW-29 w/ PERISTALTIC @ 200 mL/min & removed 2.5 gal

910 SAMPLE COLLECTED @ MW-29

SLDA-GWMW29U-121511 V & F

SAMPLED TPZ-04 & LABELED

SLDA-GWTPZ-04U-121511 field para

Temp °C	uS/cm	DO	pH	ORP	TURB
15.64	642	9.12	6.65	119.3	68

63

12/15/11 BLB

1100 MARTY FROM ARSEC ARRIVED & HELPED ME

1110 MW-24 SAMPLED & LABELED (BY MARTY)
SLDA-GWMW24U-121511
field parameters

TEMP	SP COND MW-24	DO	pH	ORP	TURB.
15.45	348 us/cm	4.37	5.93	128.9	88

955 MW-82 sampled & labeled (BY MARTY)
SLDA-GWMW82U-121511
field parameters

1540	381	2.83	6.06	132.2	>100

START LOW FLOW MW-26 W/ MONSOON
removed 5 gallon @ 300 mL/min

SAMPLED MW-26

1440 MW-25 SAMPLED & LABELED
SLDA-GWMW25U-121511

15.69	514 us/cm	8.19 DO	7.20 SU	64.5 mV	46 NTU

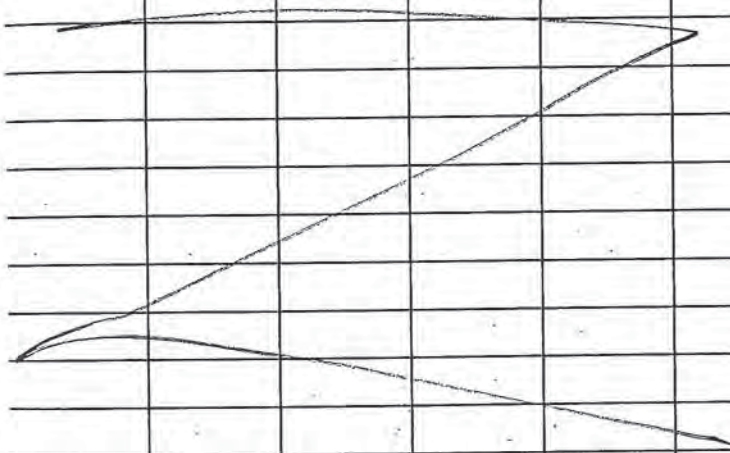
BLB 12/15/11

1545 SLDA-RB037U-121511
Field Blank collected

1715 SLDA-FB042U-121511

1730 Trip Blank labeled
SLDA-TB049U-121511

1815 Offsite signed out
Brett



12/16/11 9th BLB

WEATHER: 36°F CLOUDY

onsite @ 715 w/ TIM & MARTY (SEC) & LACE

[redacted]

730 Calibration YSI

1.409 ms/cm = 1.603 ms/cm

7 = 7.10

4 = 3.95

10 = 9.92

TURBIDITIMETER 2020WE

1 = 1.33

10 = 11.09

- Safety Mtg w/ Tim

809 START OF LOW FLOW MW-80 w/ MONSOON @ 250 mL/min & removed 6 gal

918 collected MW-80 SAMPLE LABELED SLOA-GWMWB0U-121611

* DUPLICATE COLLECTED & LABELED SLOA-GWDUP10-121611

BCA Cont... 12/16/11

815 MW-83 SAMPLE COLLECTED & LABELED (MARTY) SLOA-GW-MW83U-121611

- MS & MSD collected at MW-83

MS = SLOA-GW MW83UMS-121611

MSD = SLOA-GW MW83UMSD-121611

* field parameters

8.96°C 825 uS/cm 9.00 DO 6.79 SU 51.6 ORP 94 NTU

1020 MW-51 SAMPLE COLLECTED & LABELED SLOA-GWMW51U-121611

field parameters

12.03°C 488 uS/cm 6.82 DO 6.60 SU 77.0 ORP 83 NTU

Placed MW-81 sonde back into well logging every 4 hrs & 149 days of battery life

- removed sonde from MW-11S (no WL & used a part from 11S sonde for MW-81 sonde)

12/16/11 BVB

1100 Rinsate blank
SLDA-RB0388U-121611

1130 Field BLANK collected
SLDA-FB0438U-121611

1145 TRIP BLANK
SLDA TB0500-12/6/11

1510 Offsite & signed out
Britt Hall

MICROPURGE DATA SHEET

Site: SLDA

Page 1 of 1

Personnel: B. BARABAS

Well #: MW-08

Project #: 101-986

Date: 12/14/11

Static Water Level (ft): 12.46 Maximum Allowable Drawdown:

Pump Type: PERISTALTIC

Date/Time of Pump Installation: 12/14/11 ☐ permanent

Water Level after Pump Installation: 12.5

Time of Purge Initiation: 0940

TIME	Q mL/min (gpm)	TURBIDITY NTU	S.U. pH	mV Eh	Diss. Oxygen mg/L (ppm)	SP. COND. us/cm (umho/cm)	TEMP. ☐ °F ☒ °C	WATER LEVEL (ft)	DRAW-DOWN (ft)
843								12.00	
846								12.0	
850	150		8.23	-56.0	2.46	332	14.27	12.90	
855							14.47		
900									
905			7.69		1.70	375			
			7.6	-132.3	1.00	305	14.37	13.42	
	200		7.43	-131.0		390	14.55	13.49	
920			7.51	-129.9	1.43	407	14.51	13.49	
925		0.16	7.5	-129.3		407	14.50	13.51	
930		0.20	7.55	-125.2	1.29	413	14.58	13.61	
935		0.10	7.51	-127.1	1.21	419	14.81	13.65	
		0.06	7.54	-128.1	1.20	423	14.84	13.68	
945	150	0.07	7.51	-128.9	1.19	425	14.89	13.70	
950	150	0.09	7.51	-143.1	1.24	429	14.78	13.71	
955		0.10	7.51	-142.1	1.26	431	14.81	13.71	
1000		0.13	7.55	-143.3	1.27	435	14.82	13.70	

Sample Collected Date: 12/14/11 Time: 1005

Color/Appearance: clear

Other Field Measurements:

Comments: SLDA-GW-MW08U-121411 SIF11

MICROPURGE DATA SHEET

Site: SLDA

Page 1 of 1

Personnel: B. BARABAS

Well #: MW-20

Project #: 101-986

Date: 12/15/11

Static Water Level (ft): 29.42 Maximum Allowable Drawdown:

Pump Type: MONSOON PUMP

Date/Time of Pump Installation: 12/15/11 1140 ☐ permanent

Water Level after Pump Installation: 29.42

Time of Purge Initiation: 1148

TIME	Q (ml/min) (gpm)	TURBIDITY NTU	S.U. pH	mV Eh	Diss. Oxygen mg/L (ppm)	SP. COND. us/cm (umho/cm)	TEMP. ☐ °F ☒ °C	WATER LEVEL (ft)	DRAW-DOWN (ft)
1150	400								
1155	300								
1200									
1205			6.80	0.6	0.23	612	14.97	29.45	
1210		7.57	6.76	0.8	0.20	602	14.91	29.45	
1215		6.34	6.73	12.0	0.19	586	15.07		
1220		5.12	6.72	14.2	0.19	579	15.06		
1225		2.18	6.72	14.4	0.18	573	15.11		
1230		1.87	6.72	13.3	0.17	570	15.07		
1235		1.03	6.72	10.0	0.17	569	15.06		
1240		1.58	6.70	9.7	0.18	554	14.92		

TIME	Q (gpm)	TURBIDITY	pH	Eh	Diss. Oxygen (ppm)	SP. COND. (umho/cm)	TEMP. ☐ °F ☐ °C	WATER LEVEL (ft)	DRAW-DOWN (ft)

Sample Collected Date: 12/15/11 Time: 1245

Color/Appearance: CLEAR

Other Field Measurements:

Comments: SLDA SAMPLED 12/15/11
MS - MSD COLLECTED
SLDA-GW-MW-20-121511-MS-1245
SLDA-GW-MW-20-121511-MSD-1245

MICROPURGE DATA SHEET

Site: SLDA

Page 1 of 1

Personnel: B. BARABAS

Well #: MW-29

Project #: 101-986

Date: 12/15/11

Static Water Level (ft): 18.11 Maximum Allowable Drawdown:

Pump Type: PERISTALTIC PUMP

Date/Time of Pump Installation: 12/15/11 815 ☐ permanent

Water Level after Pump Installation: 18.11

Time of Purge Initiation: 820

TIME	Q ml/min (gpm)	TURBIDITY NTU	S.U. pH	mV Eh	Diss. Oxygen mg/L (ppm)	SP. COND. us/cm (umho/cm)	TEMP. ☐ °F ☒ °C	WATER LEVEL (ft)	DRAW-DOWN (ft)
822								18.86	
825	250		6.46	30.9	1.85	509	14.82	18.90	
830	|		6.48	32.0	0.48	492	14.72	19.29	
833	↓		6.51	35.2	0.33	491	14.64	19.52	
835	200		6.53	33.8	0.24	491	14.61	19.65	
840	|	2.50	6.55	37.6	0.21	502	14.63	19.77	
845	|	1.21	6.54	37.7	0.19	509	14.70	19.80	
850	|	1.10	6.53	38.4	0.15	510	14.66	19.91	
855	|	1.03	6.53	39.3	0.12	510	14.66	19.95	
900	|	0.98	6.52	41.4	0.19	507	14.64	19.91	
905	↓	0.81	6.53	39.9	0.19	512	14.69	19.91	

TIME	Q (gpm)	TURBIDITY	pH	Eh	Diss. Oxygen (ppm)	SP. COND. (umho/cm)	TEMP. ☐ °F ☐ °C	WATER LEVEL (ft)	DRAW-DOWN (ft)

Sample Collected Date: 12/15/11 Time: 910

Color/Appearance:

Other Field Measurements:

Comments: SLDA-GW MW 29-121511 @ 910

MICROPURGE DATA SHEET

Site: SLDA

Page 1 of 1

Personnel: B. BARABAS

Well #: MW-80

Project #: 101-986

Date: 12/16/11

Static Water Level (ft): 27.24 Maximum Allowable Drawdown:

Pump Type: MONSOON

Date/Time of Pump Installation: 12/16/11 800 ☐ permanent

Water Level after Pump Installation: 27.24

Time of Purge Initiation: 809

TIME	Q mL/min ~~(gpm)~~	TURBIDITY NTU	S.U. pH	mV Eh	Diss. Oxygen ~~mg/L~~ (ppm)	SP. COND. ~~us/cm~~ (umho/cm)	TEMP. ☐ °F ☒ °C	WATER LEVEL (ft)	DRAW-DOWN (ft)
~~811~~	250		9.58	+10.2	0.77	432	12.22	27.31	
815			6.77	-21.5	0.53	422	12.14	27.33	
820			6.61	-18.0	0.47	421	12.12	27.32	
825	300		6.36	-2.6	0.40	408	12.12	27.32	
830	250	5.03	6.31	5.6	0.40	405	12.12	27.32	
835		4.36	6.22	13.6	0.55	406	12.15	27.32	
840		3.78	6.25	15.3	0.42	406	11.91		
845		5.32	6.24	19.9	0.43	405	11.76		
850		5.14	6.23	22.4	0.58	400	11.28		
855		3.69	6.22	32.7	0.52	392	10.76		
900		2.38	6.22	36.0	0.44	395	11.34		
905		3.04	6.23	36.1	0.41	398	12.62		
910	↓	3.51	6.24	37.1	0.40	396	12.90	↓	
915	250	3.45	6.24	37.5	0.39	395	13.10	27.30	

TIME	Q (gpm)	TURBIDITY	pH	Eh	Diss. Oxygen (ppm)	SP. COND. (umho/cm)	TEMP. ☐ °F ☐ °C	WATER LEVEL (ft)	DRAW-DOWN (ft)

Sample Collected Date: 12/16/11 Time: 918

Color/Appearance: C

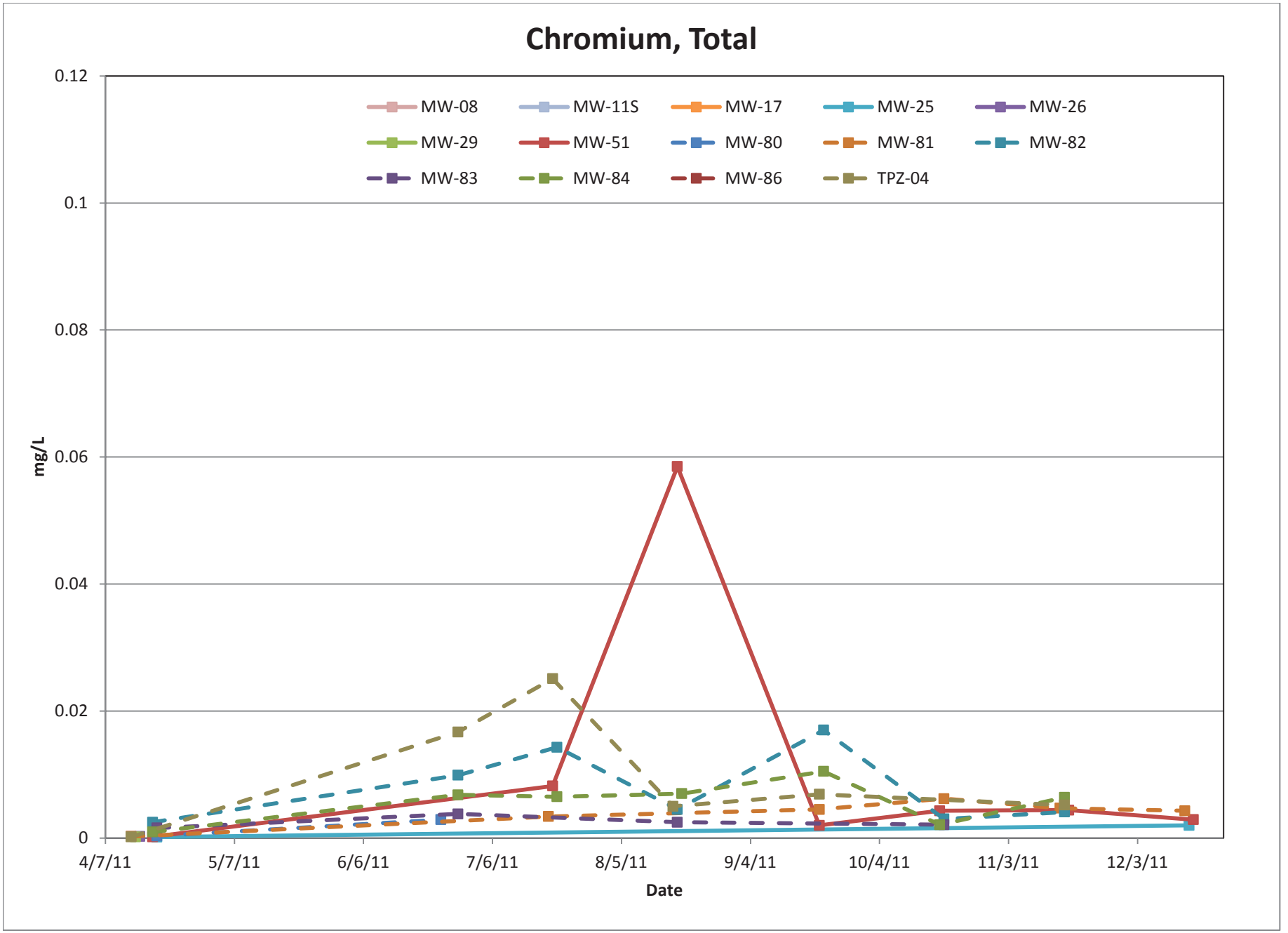
Other Field Measurements:

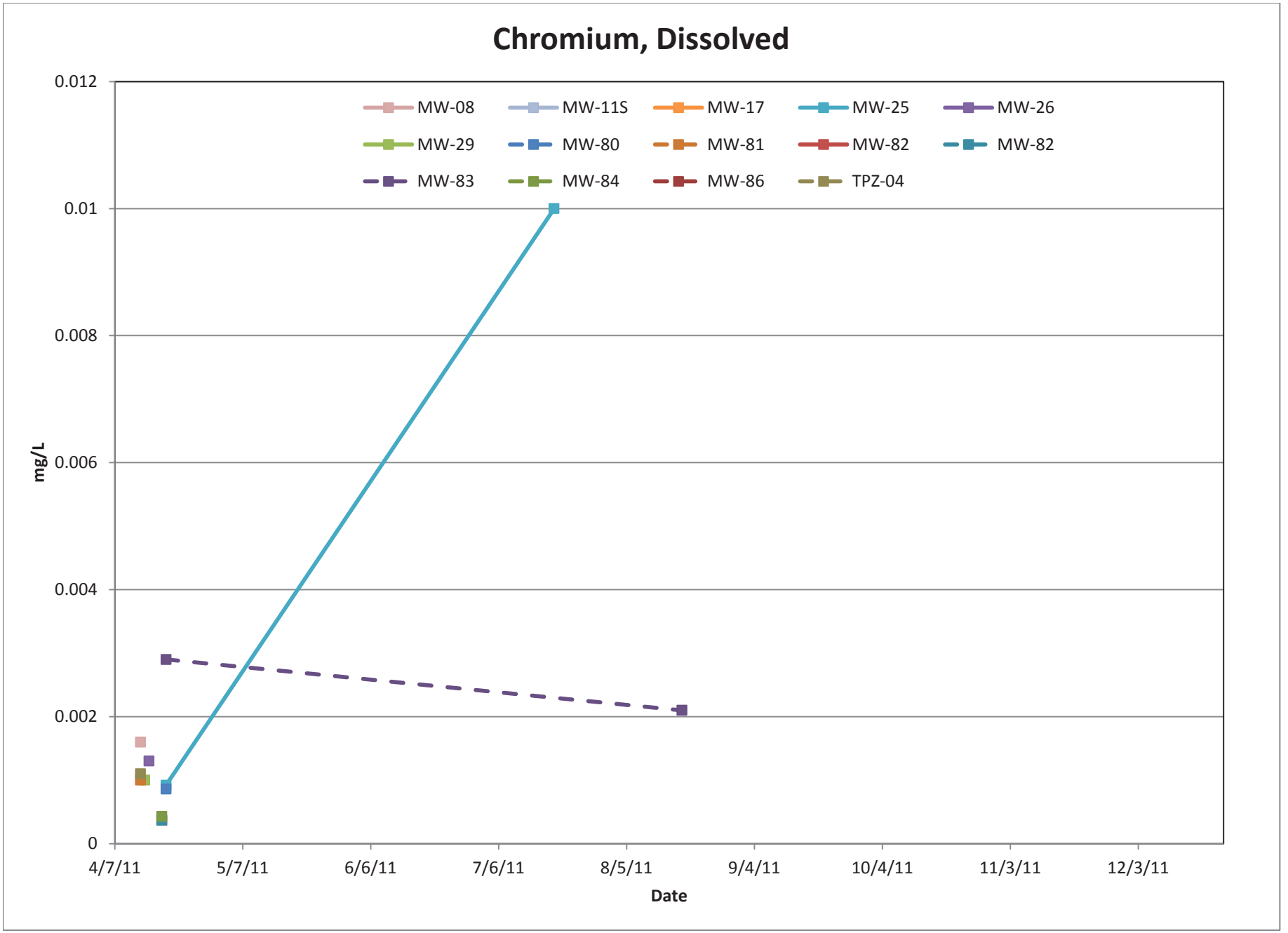
Comments: SLDA-GWMW80U-121611

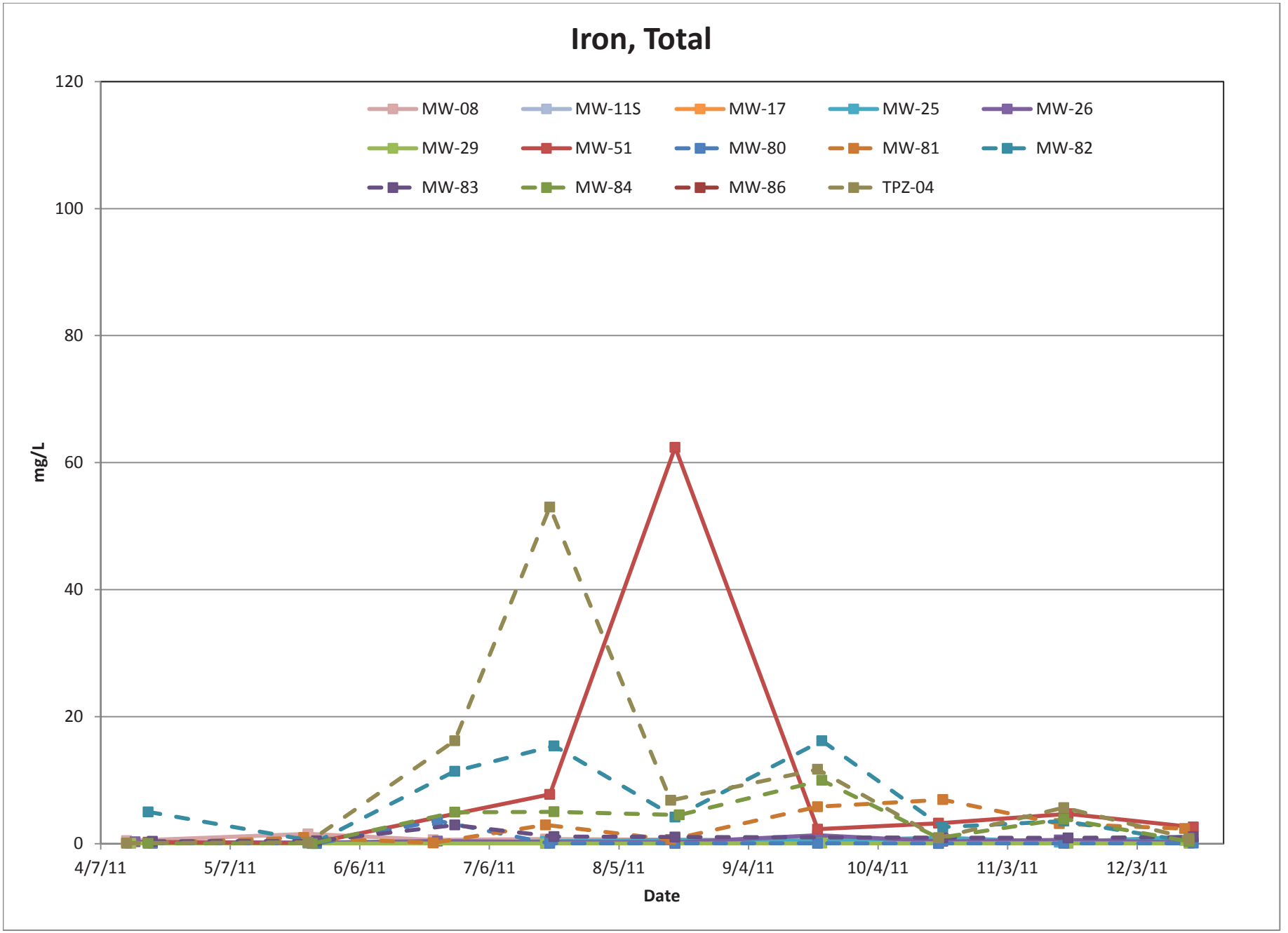
DUPLICATE COLLECTED
SLDA-GWMW910UD-121611

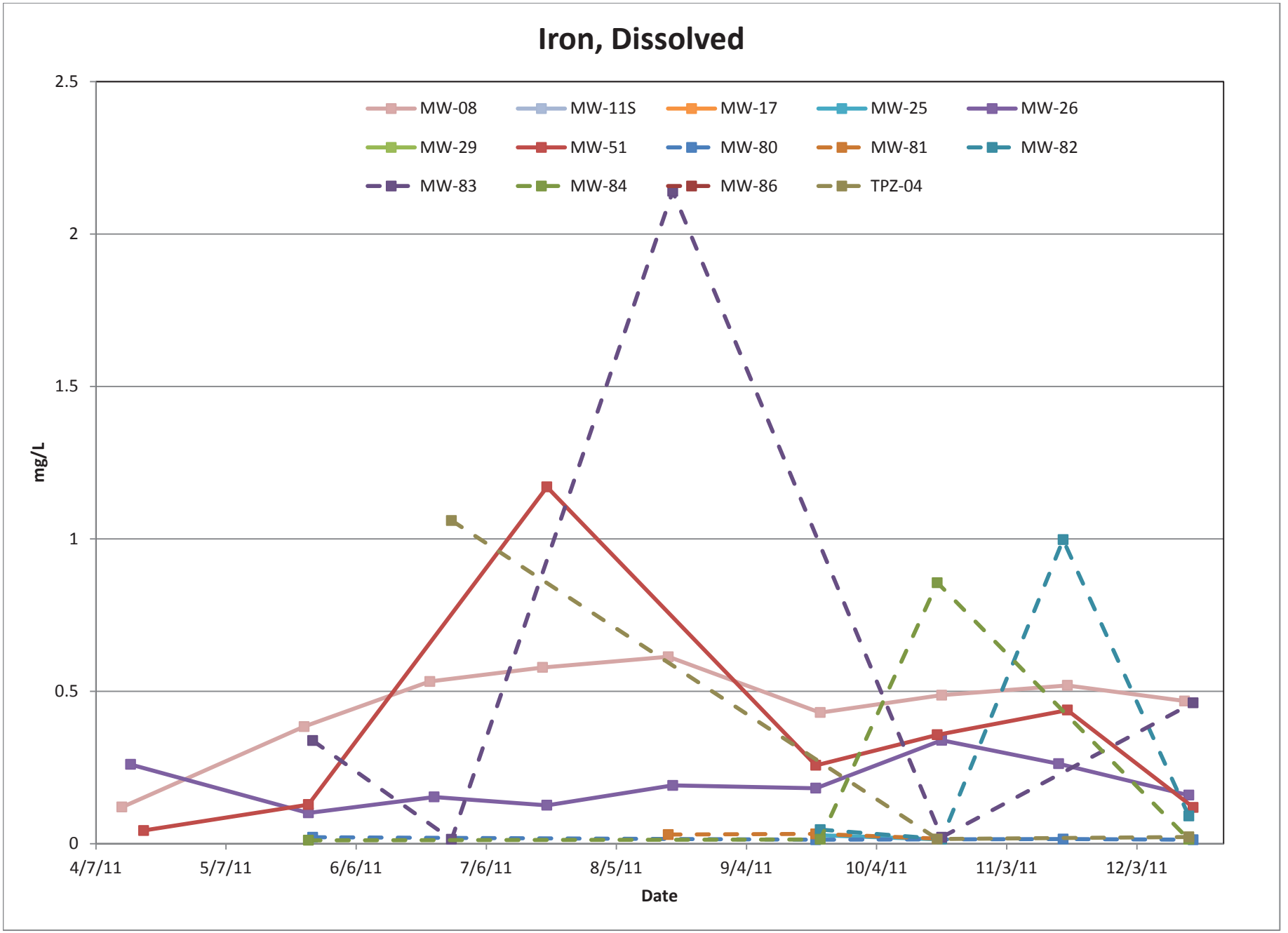
ATTACHMENT 2

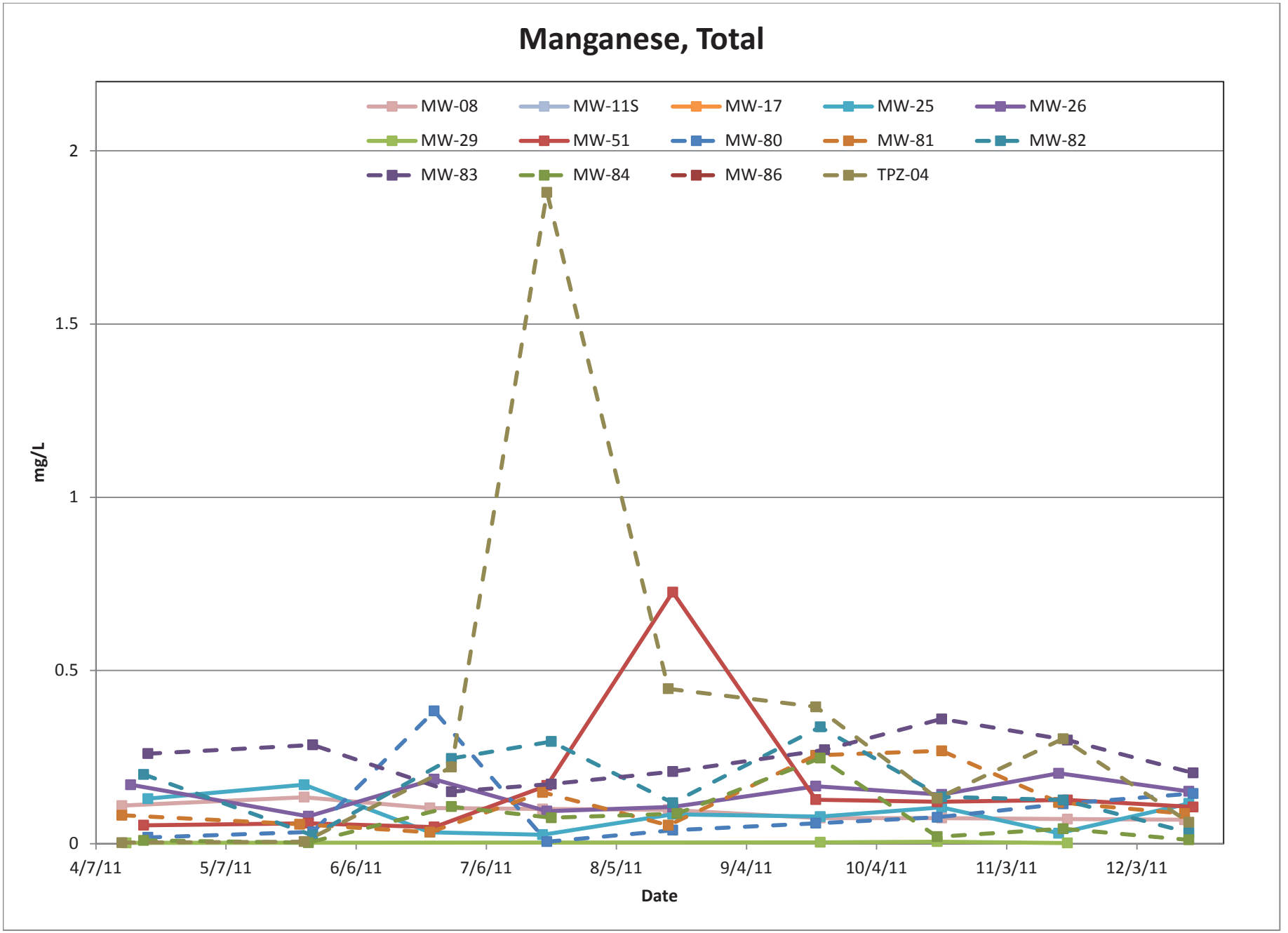
MULTI-WELL TREND GRAPHS

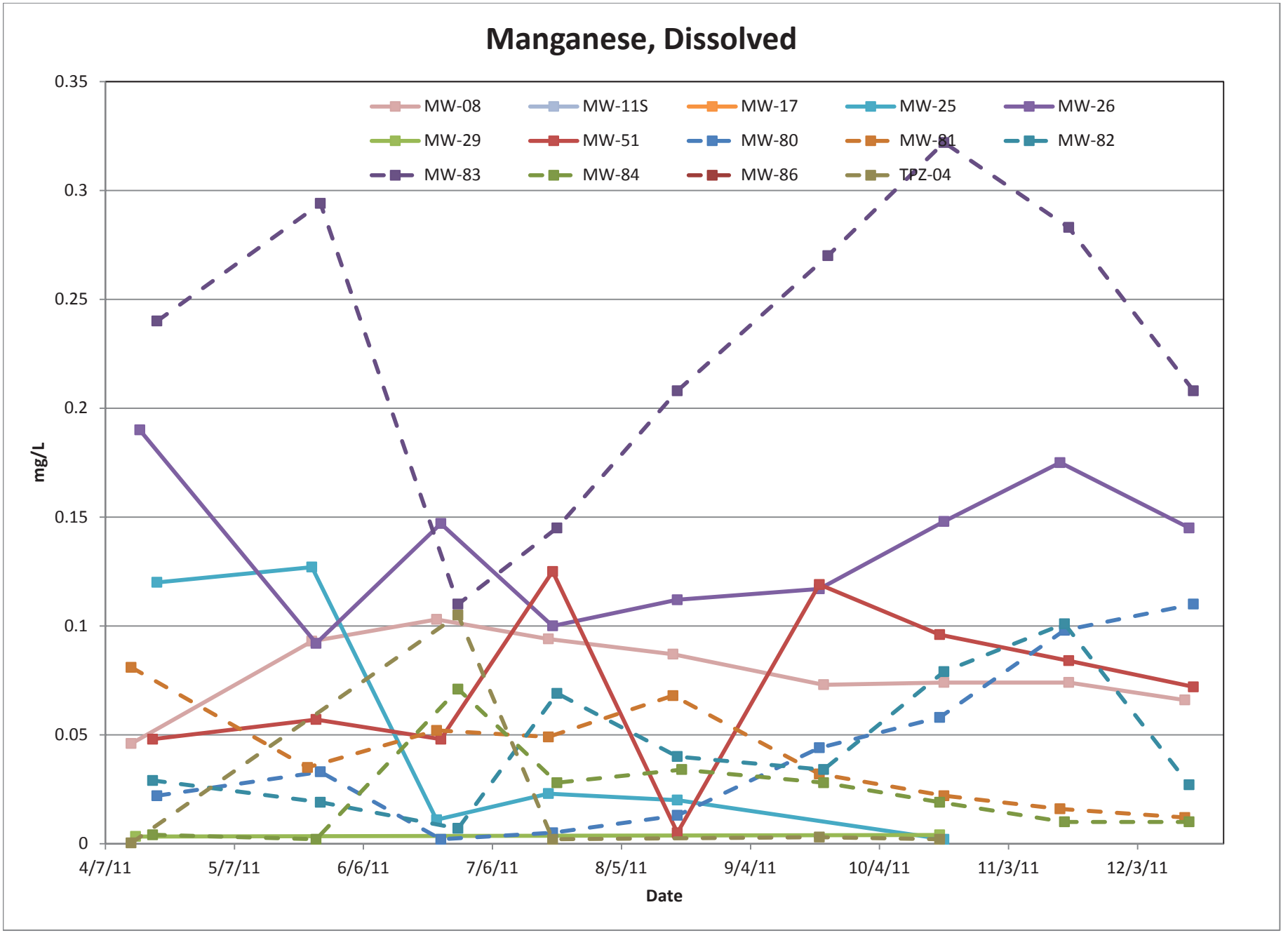

Chromium, Total
0.12
0.1
0.08
0.06
0.04
0.02
0
mg/L
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

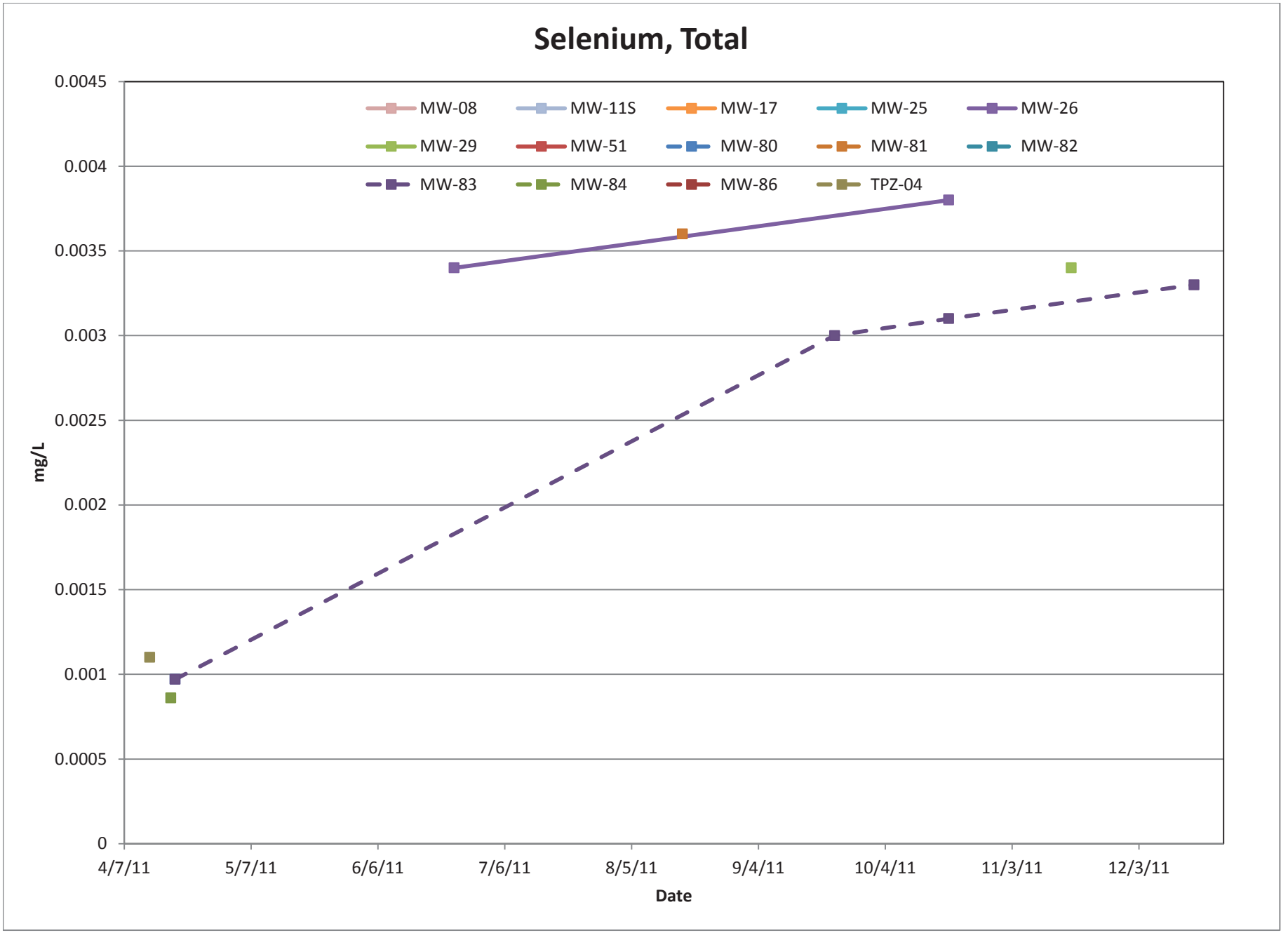

Chromium, Dissolved
0.012
0.01
0.008
0.006
0.004
0.002
0
mg/L
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-80
MW-81
MW-82
MW-82
MW-83
MW-84
MW-86
TPZ-04
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

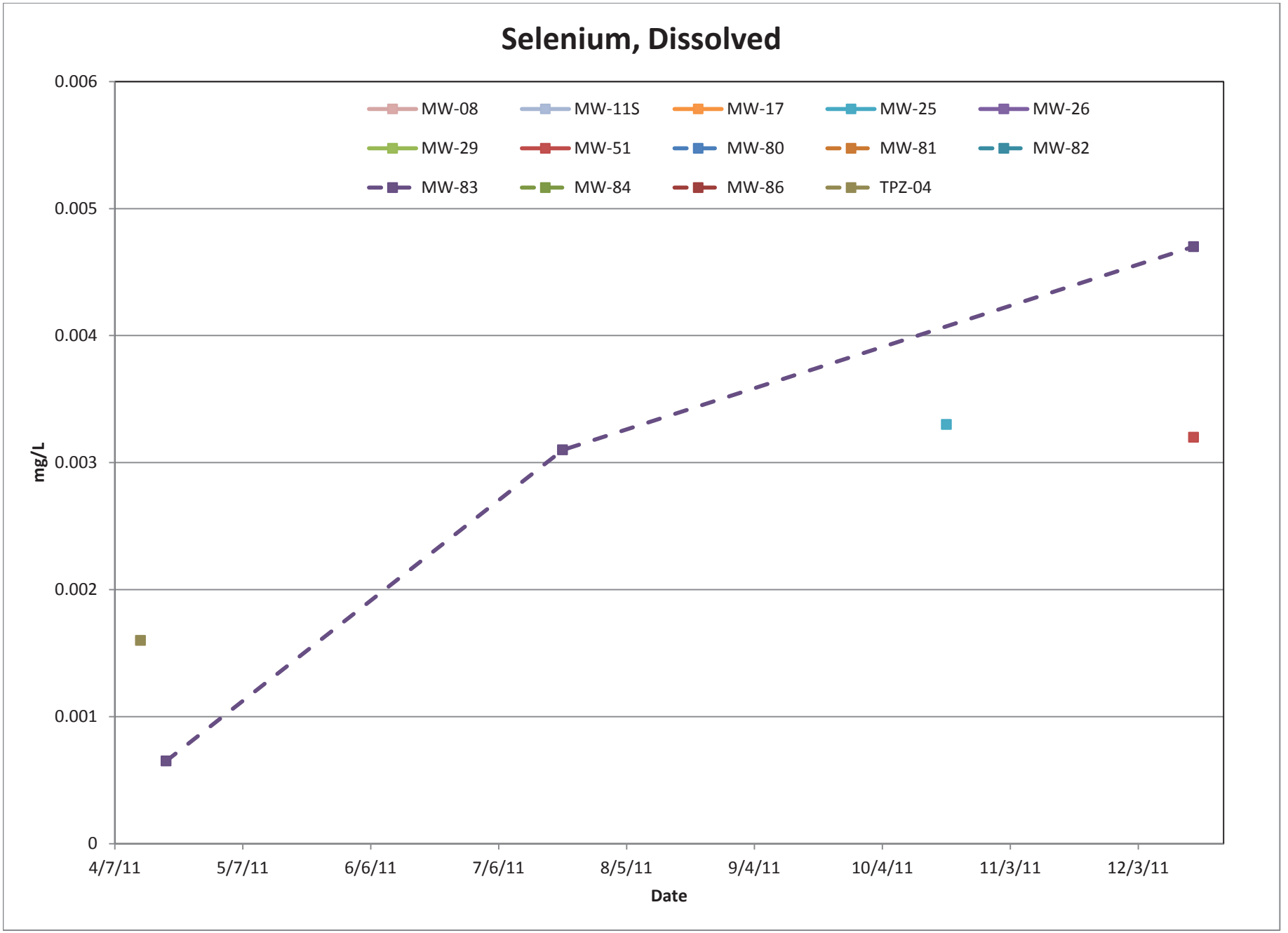

Iron, Total
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
120
100
80
60
40
20
0
mg/L
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

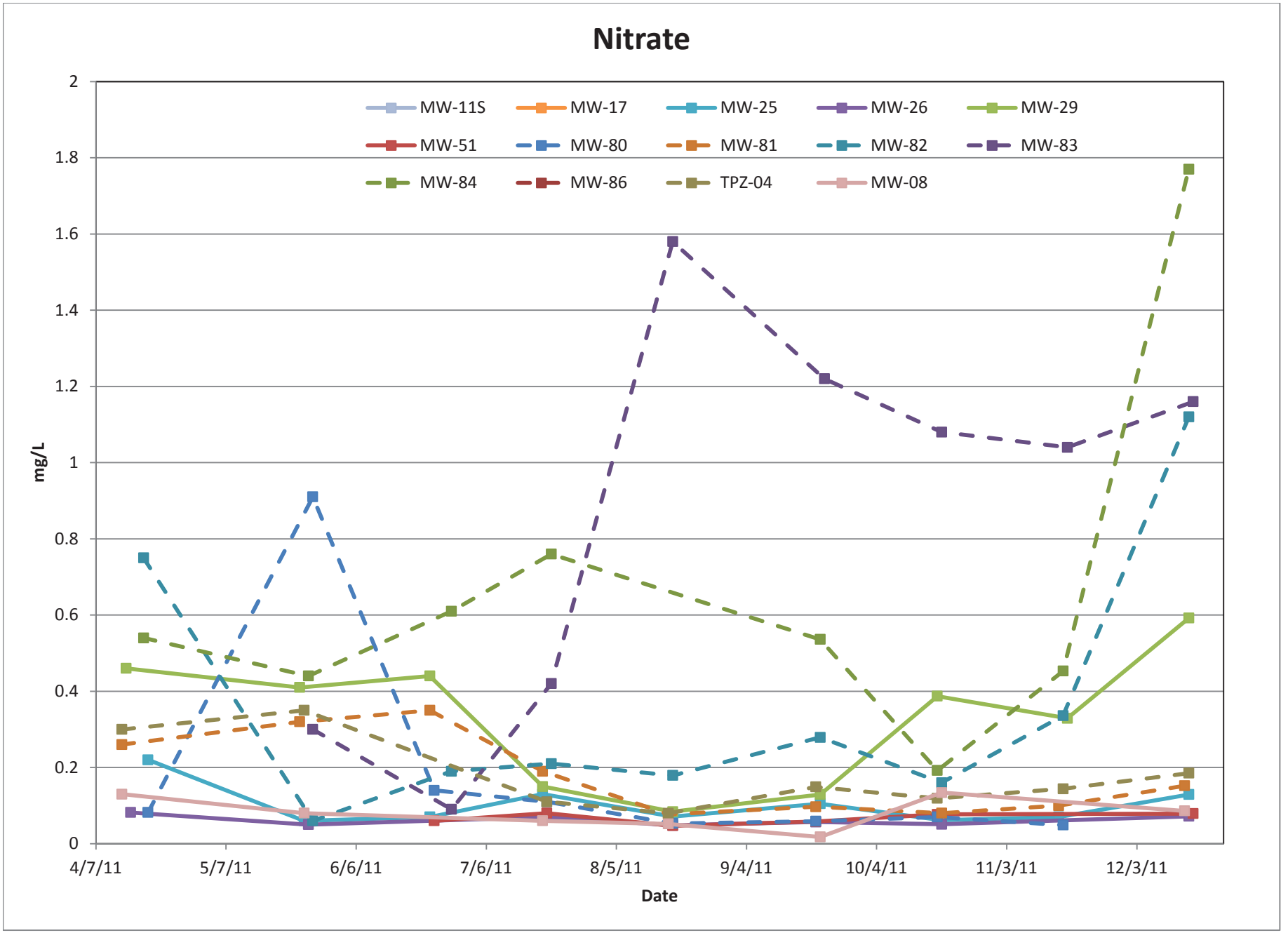

Iron, Dissolved
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
2.5
2
1.5
1
0.5
0
mg/L
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

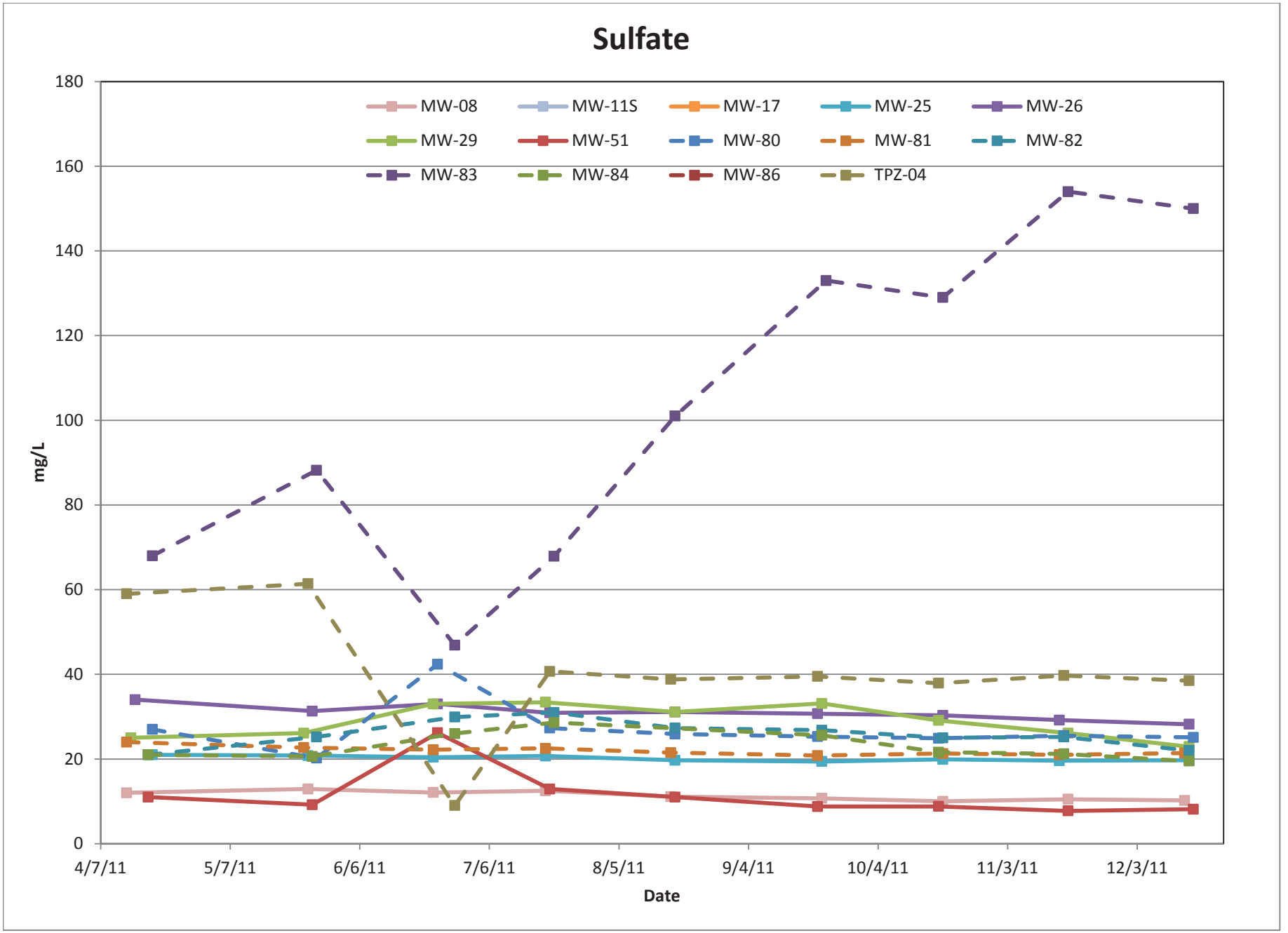

Manganese, Total
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
2
1.5
1
0.5
0
mg/L
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

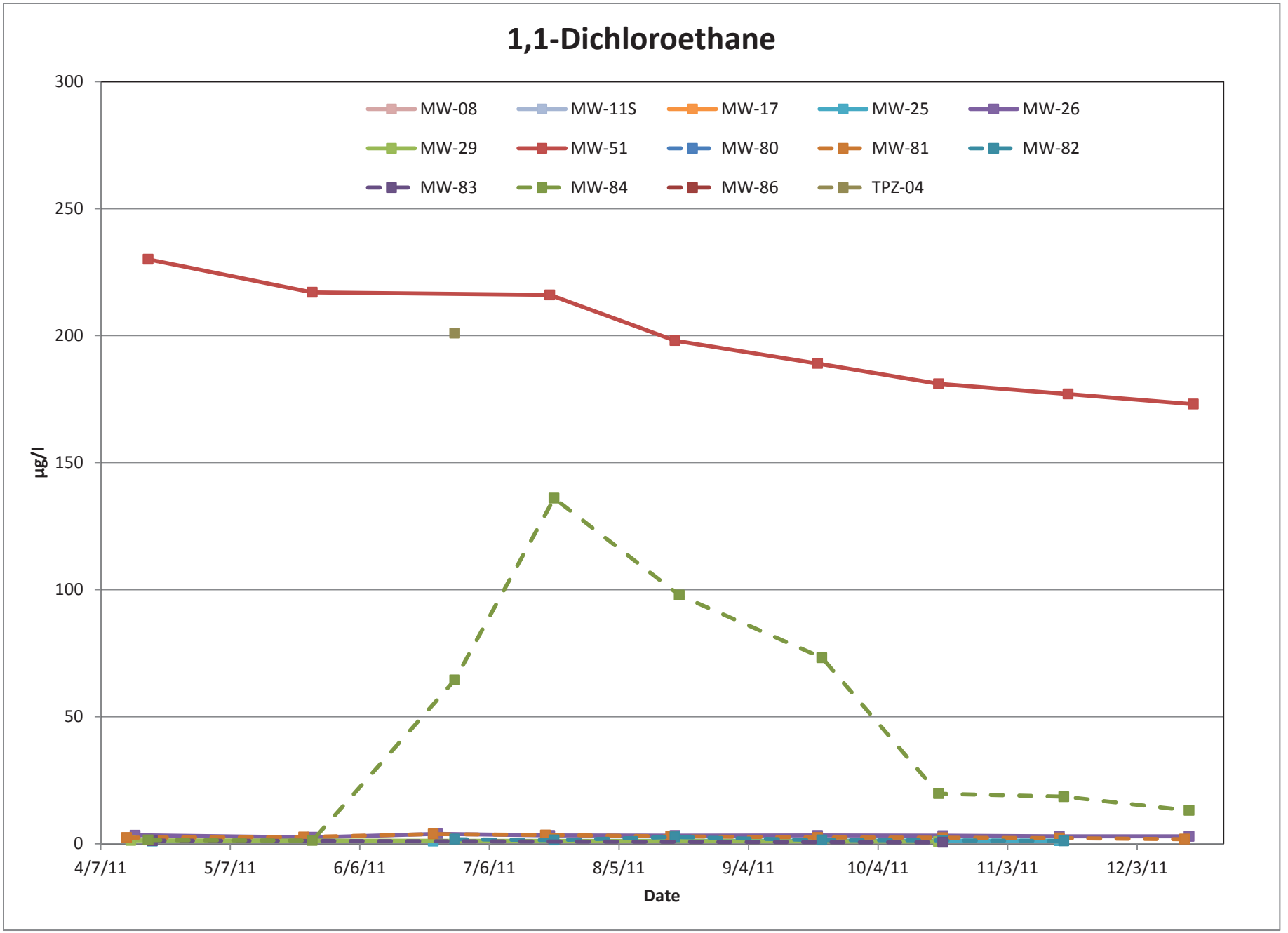

Manganese, Dissolved
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
mg/L
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

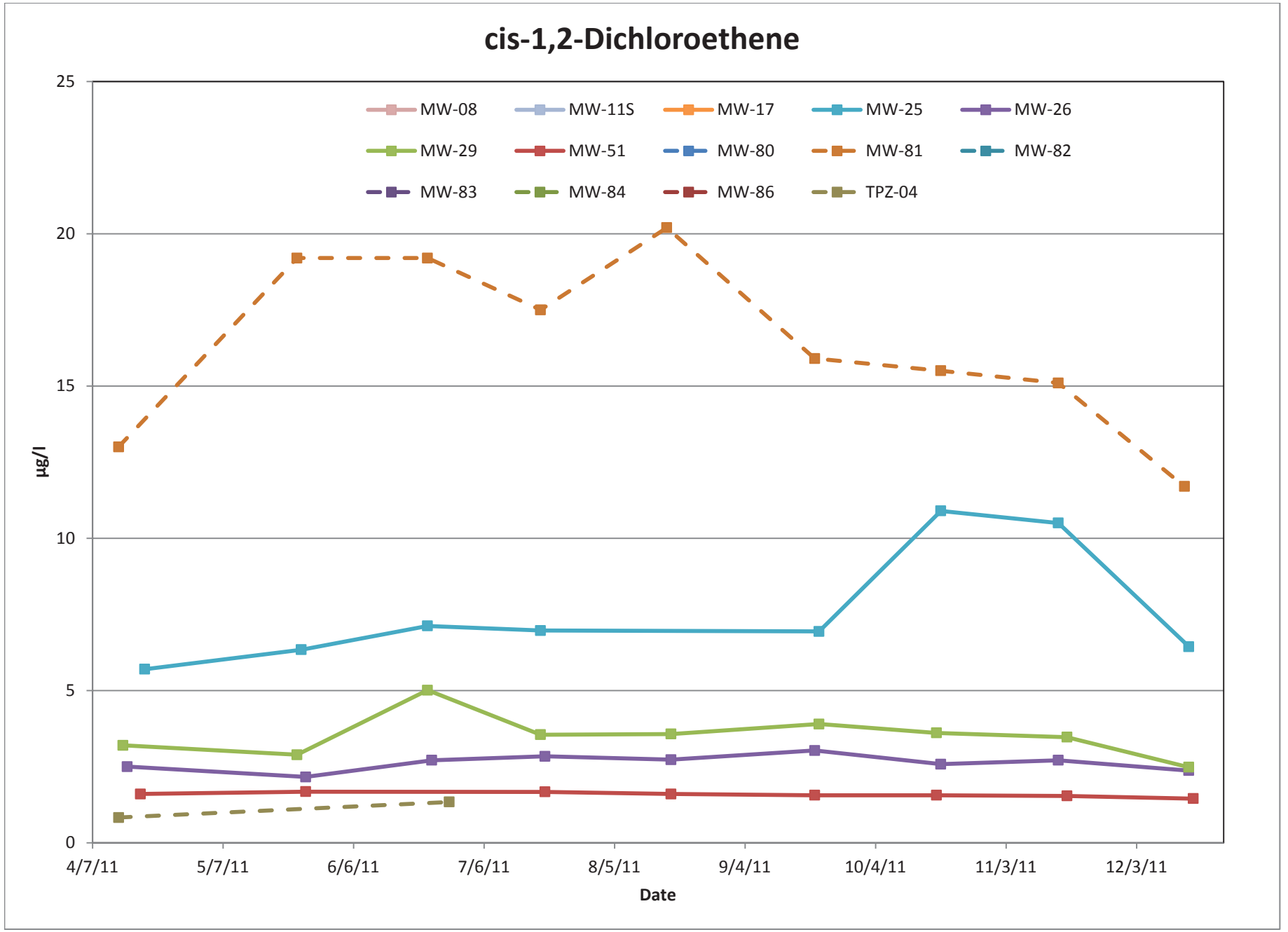

Selenium, Total
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
0.0045
0.004
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
mg/L
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

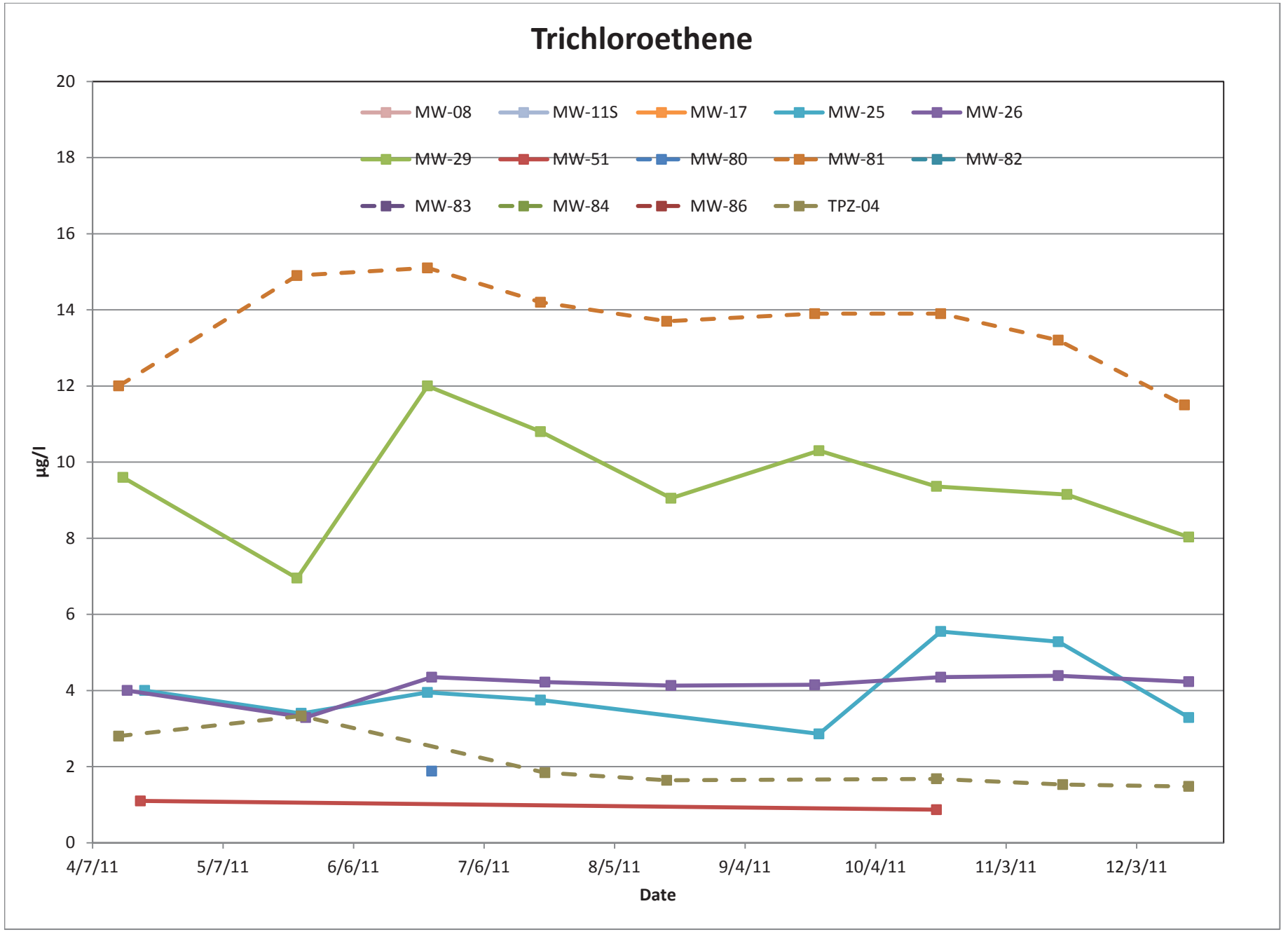

Selenium, Dissolved
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
0.006
0.005
0.004
0.003
0.002
0.001
0
mg/L
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

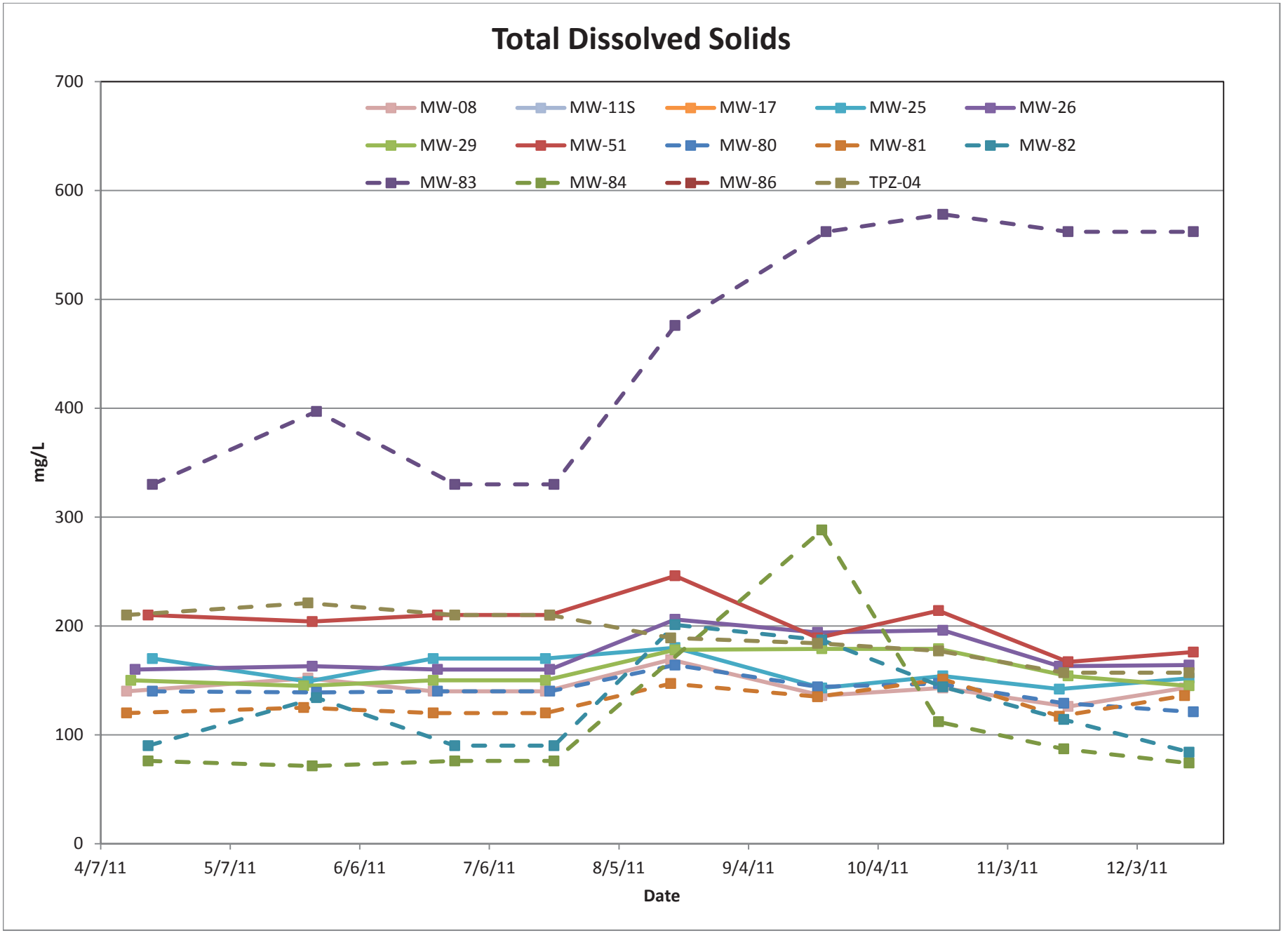

Nitrate
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
MW-08
mg/L
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

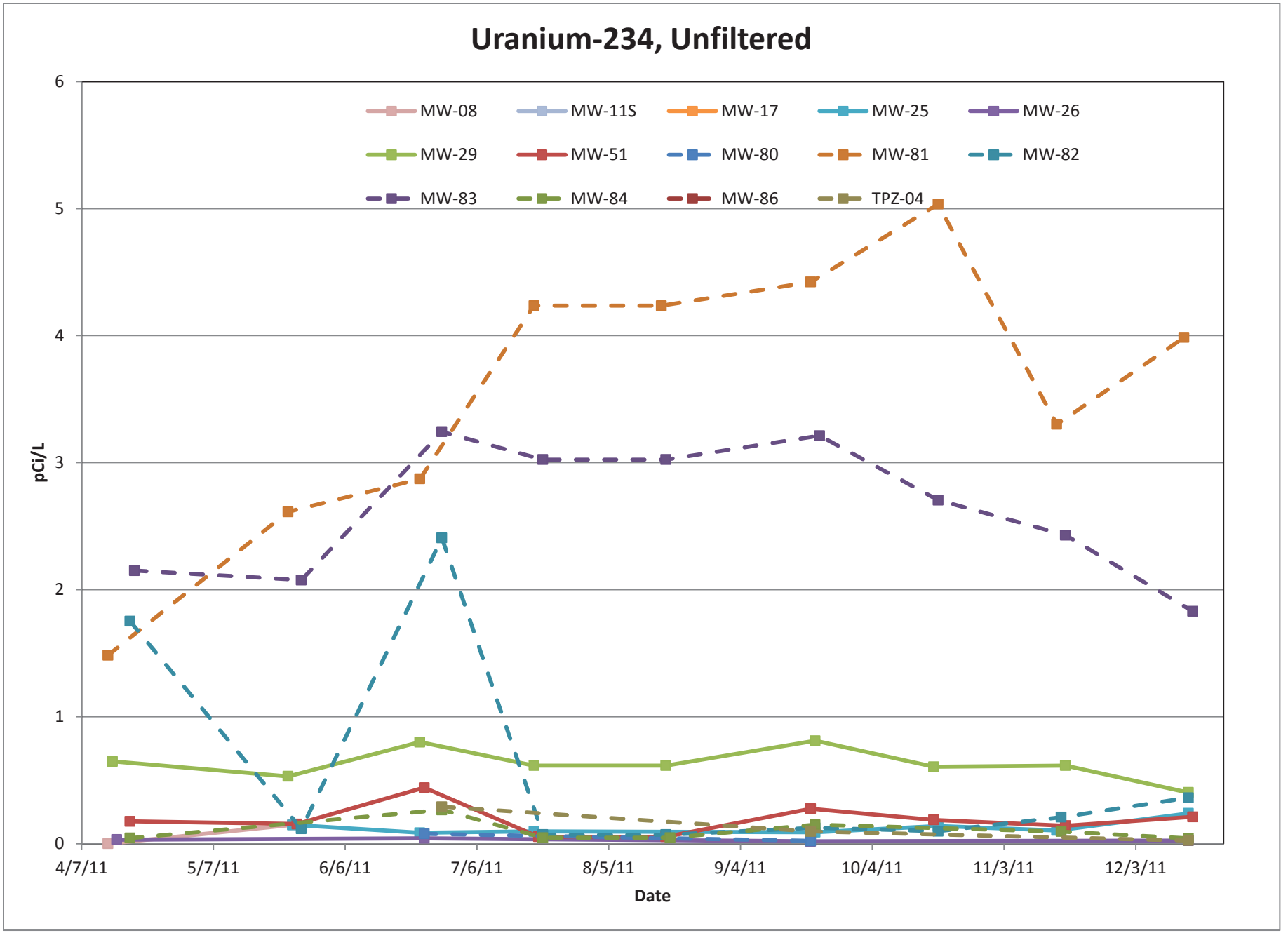

Sulfate
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
180
160
140
120
100
80
60
40
20
0
mg/L
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

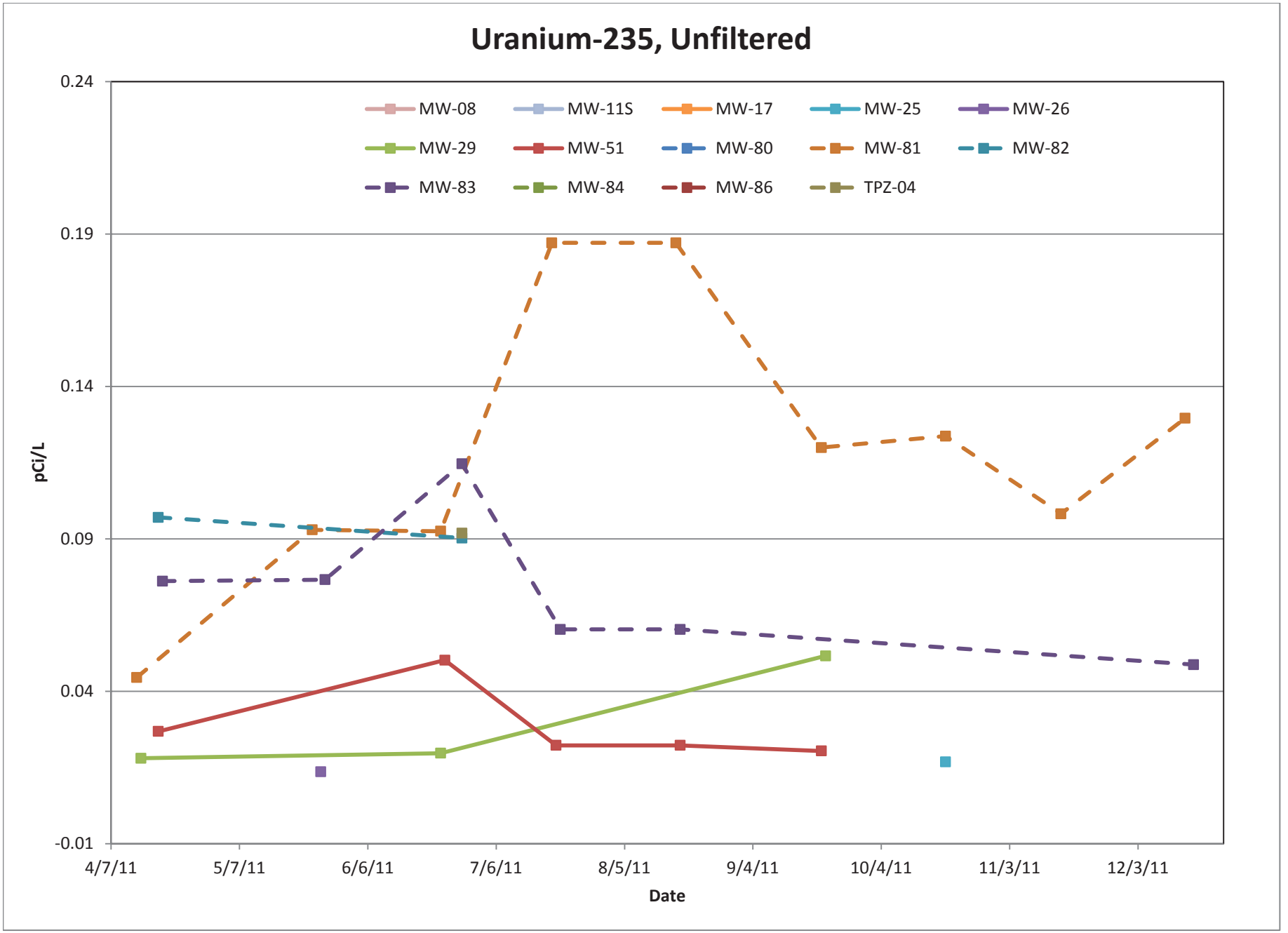

1,1-Dichloroethane
300
250
200
150
100
50
0
µg/l
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

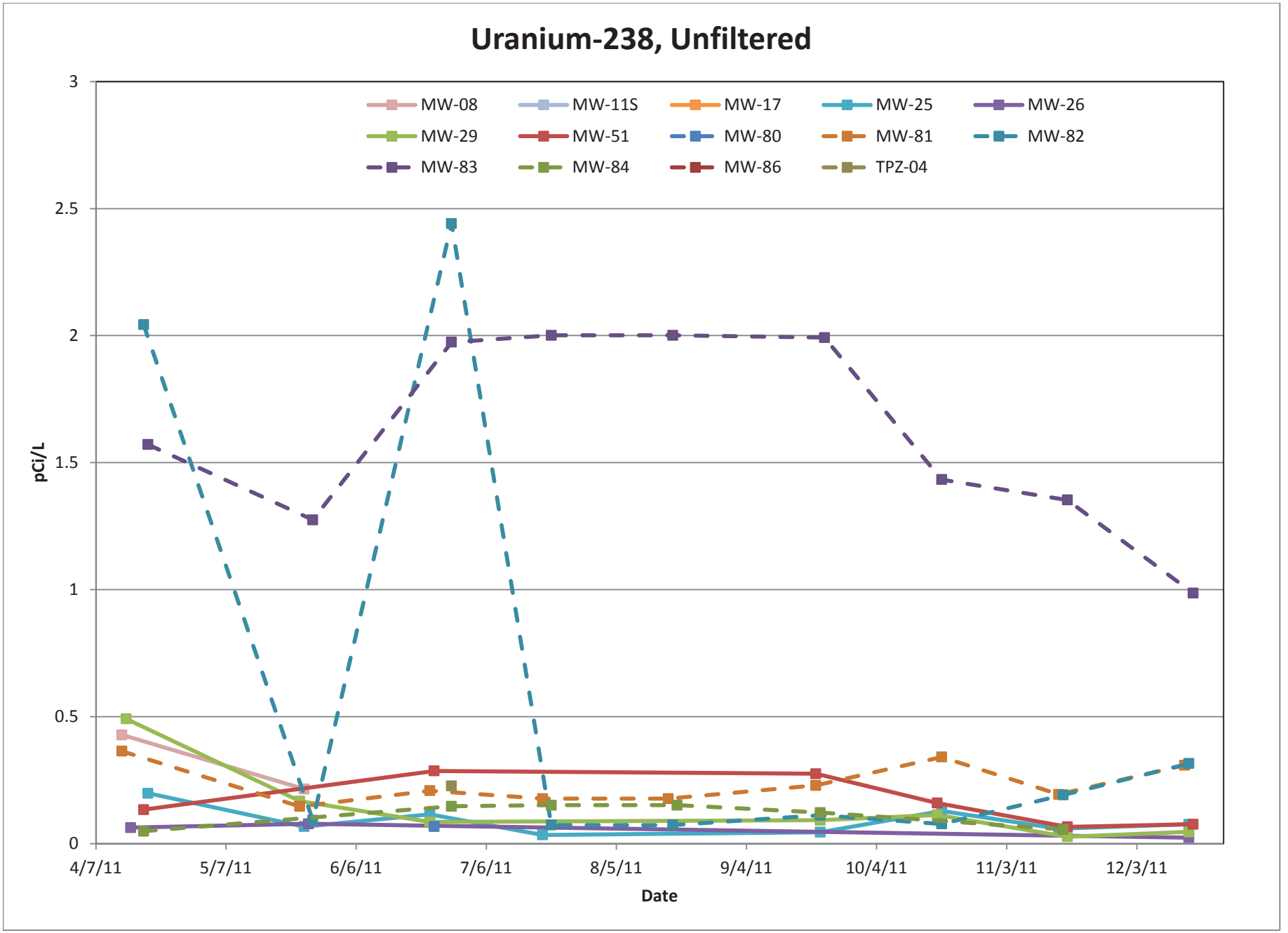

cis-1,2-Dichloroethene
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
µg/l
25
20
15
10
5
0
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

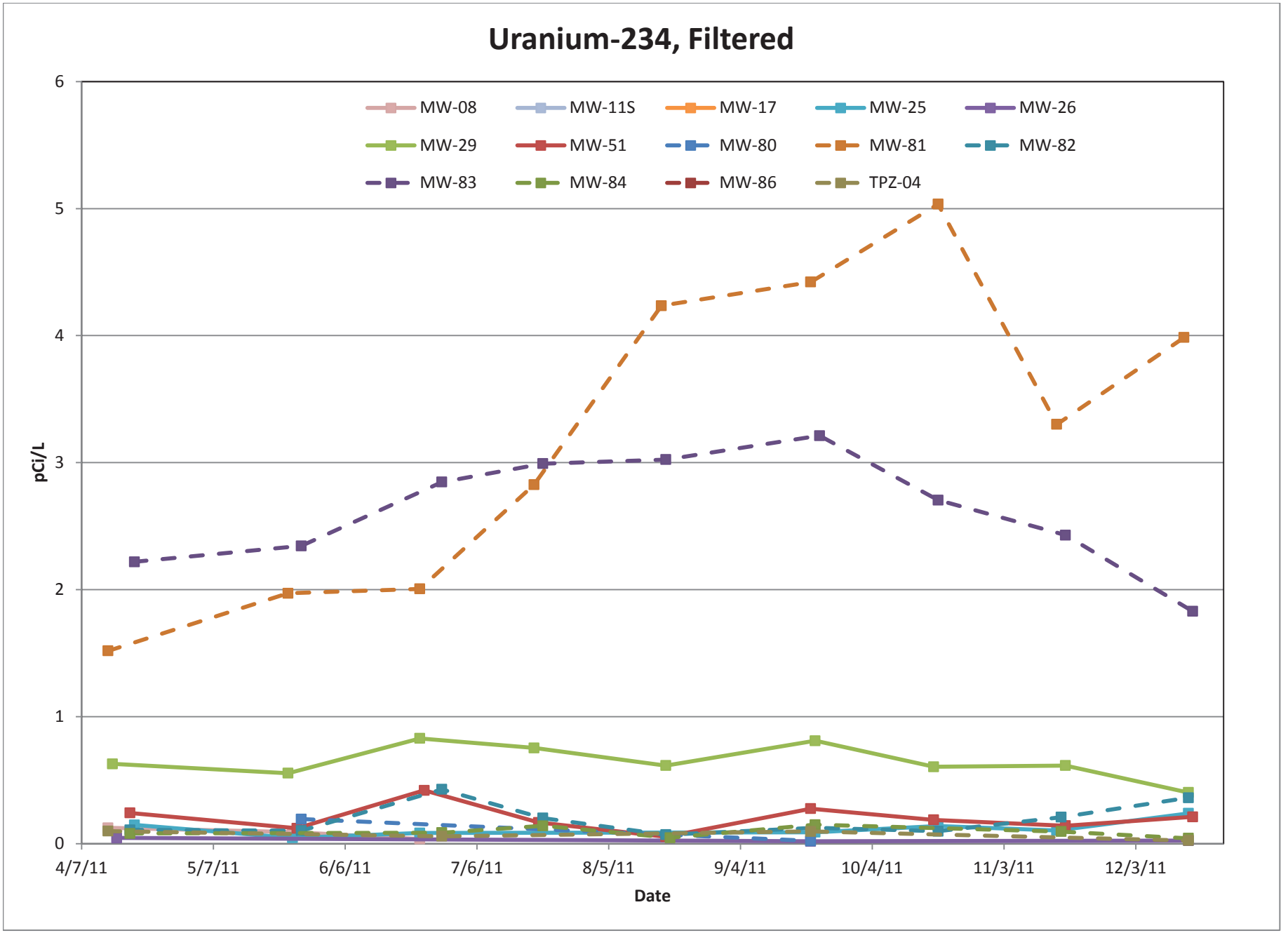

Trichloroethene
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
µg/l
0
2
4
6
8
10
12
14
16
18
20
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

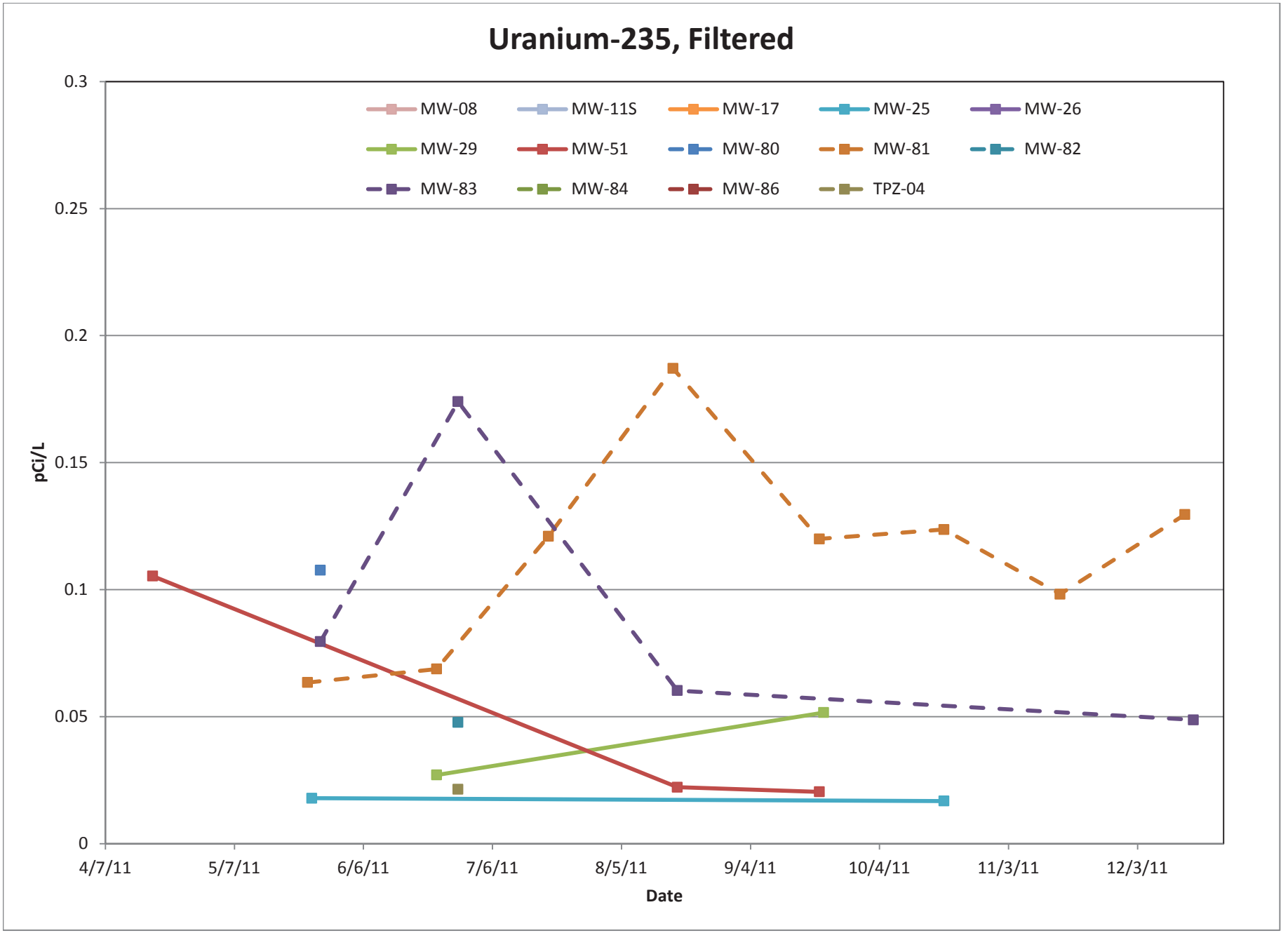

Total Dissolved Solids
700
600
500
400
300
200
100
0
mg/L
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

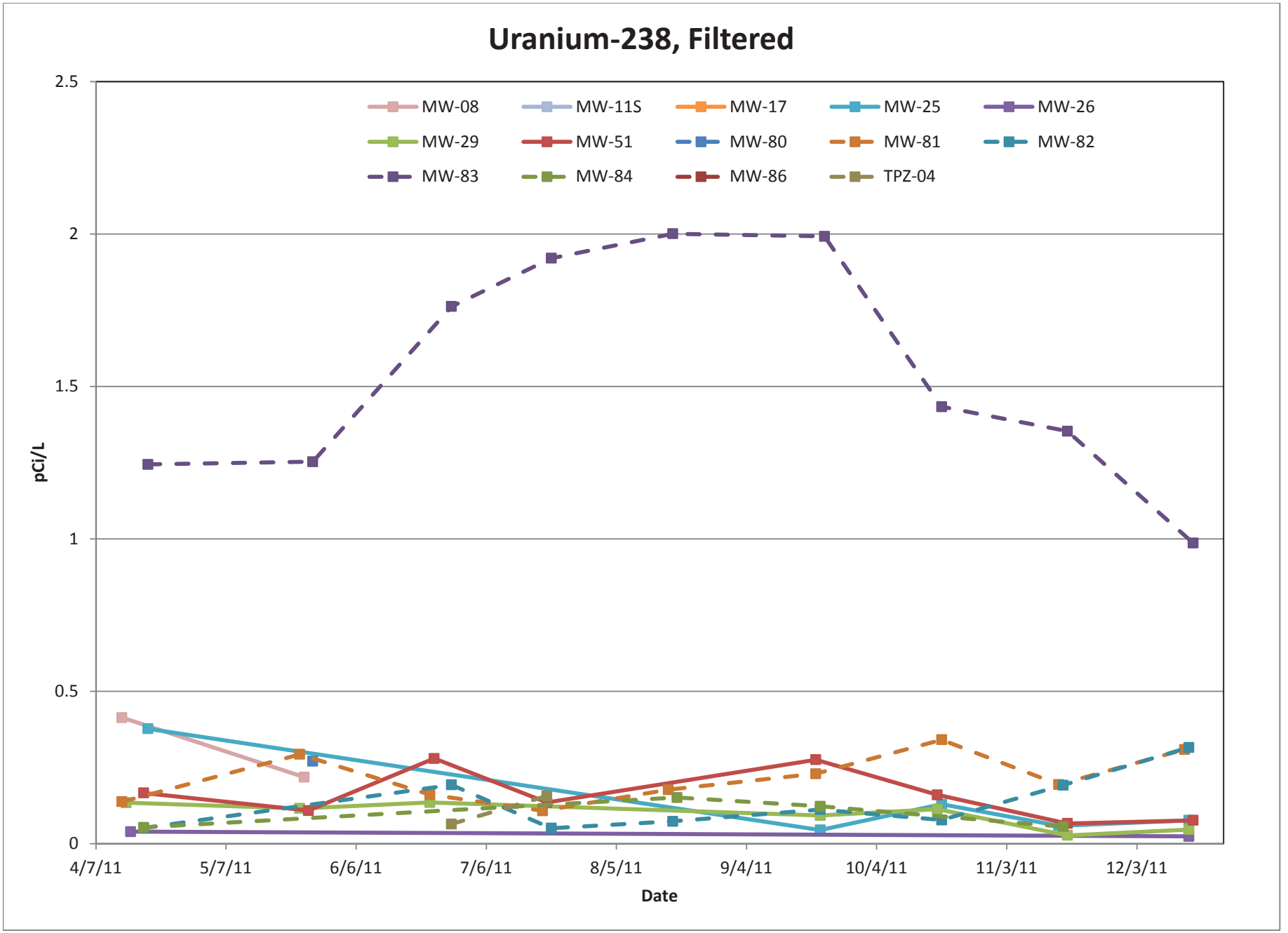

Uranium-234, Unfiltered
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
pCi/L
0
1
2
3
4
5
6
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

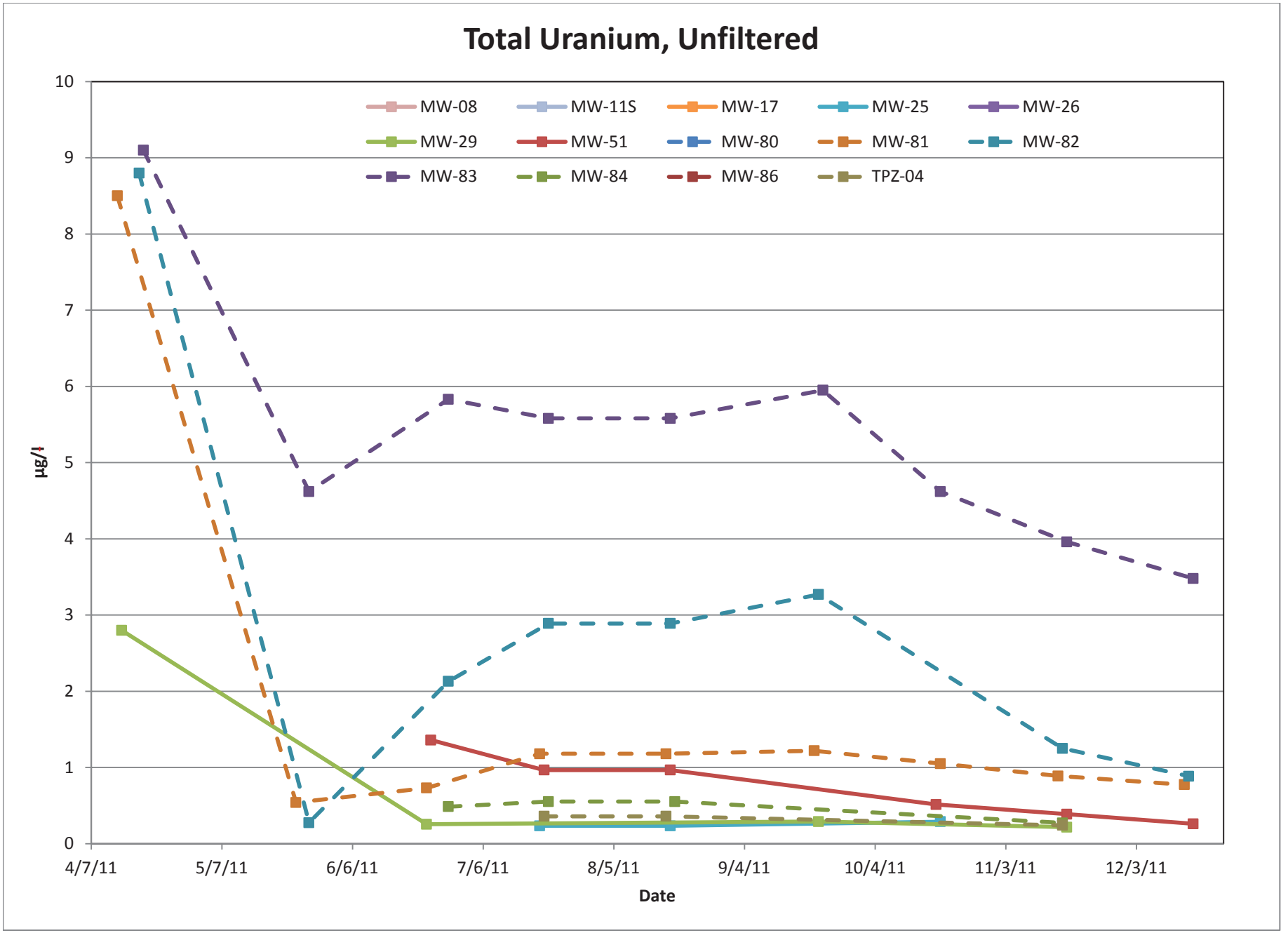

Uranium-235, Unfiltered
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
0.24
0.19
0.14
0.09
0.04
-0.01
pCi/L
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

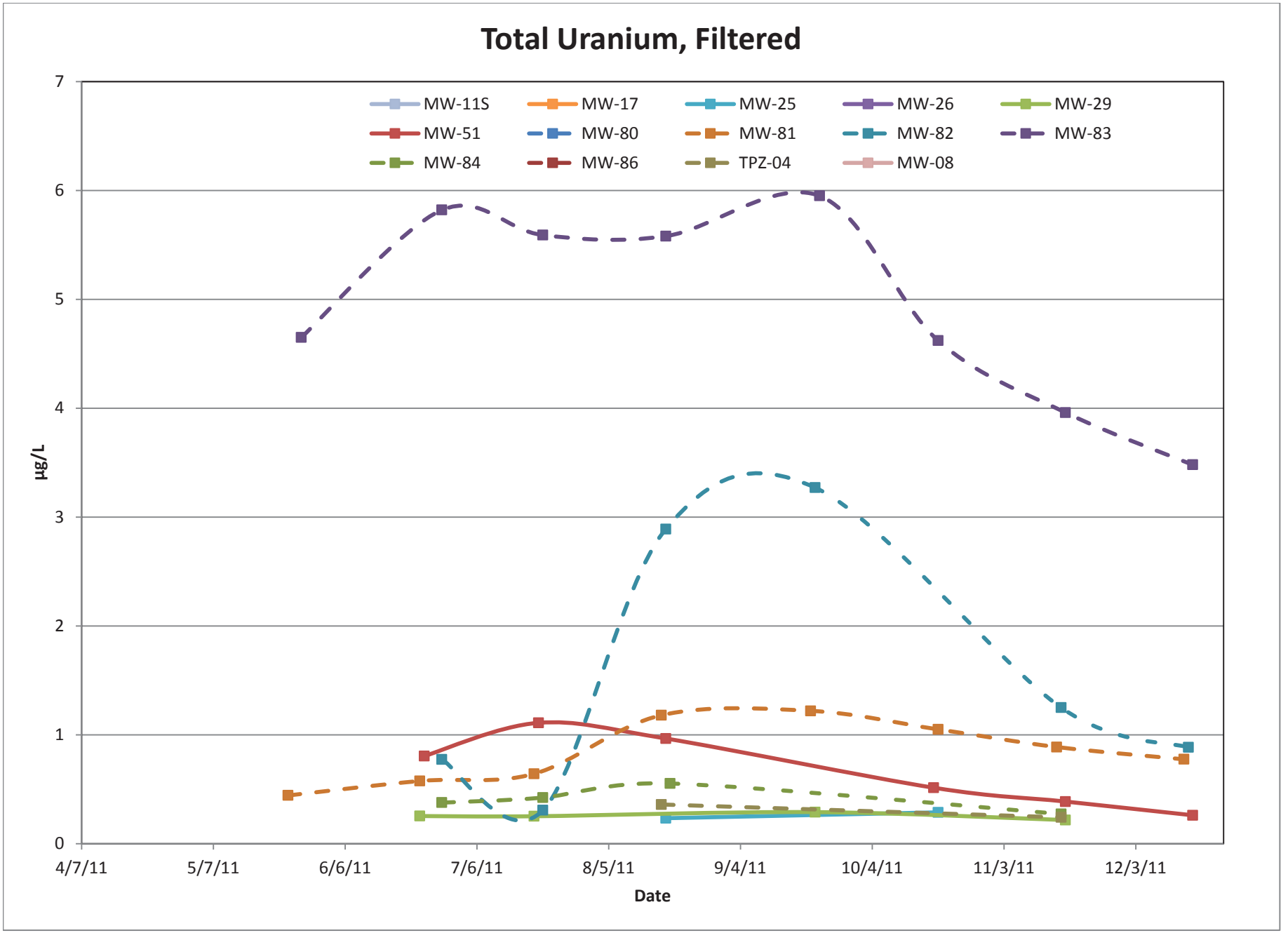

Uranium-238, Unfiltered
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
pCi/L
3
2.5
2
1.5
1
0.5
0
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date


Uranium-234, Filtered
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
pCi/L
0
1
2
3
4
5
6
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date


Uranium-235, Filtered
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
0.3
0.25
0.2
0.15
0.1
0.05
0
pCi/L
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

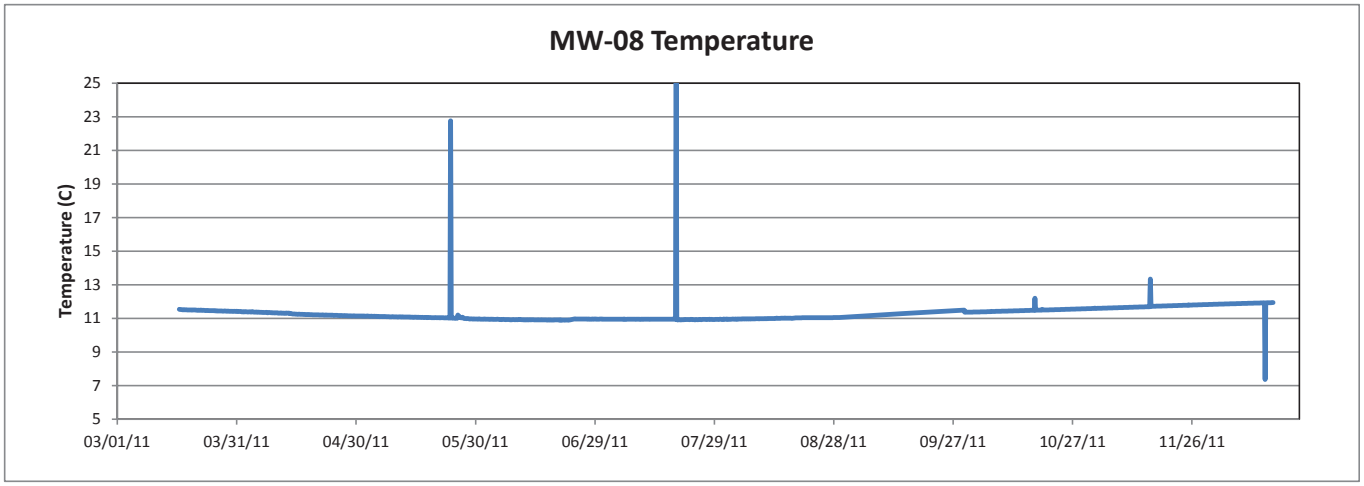

Uranium-238, Filtered
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
2.5
2
1.5
1
0.5
0
pCi/L
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

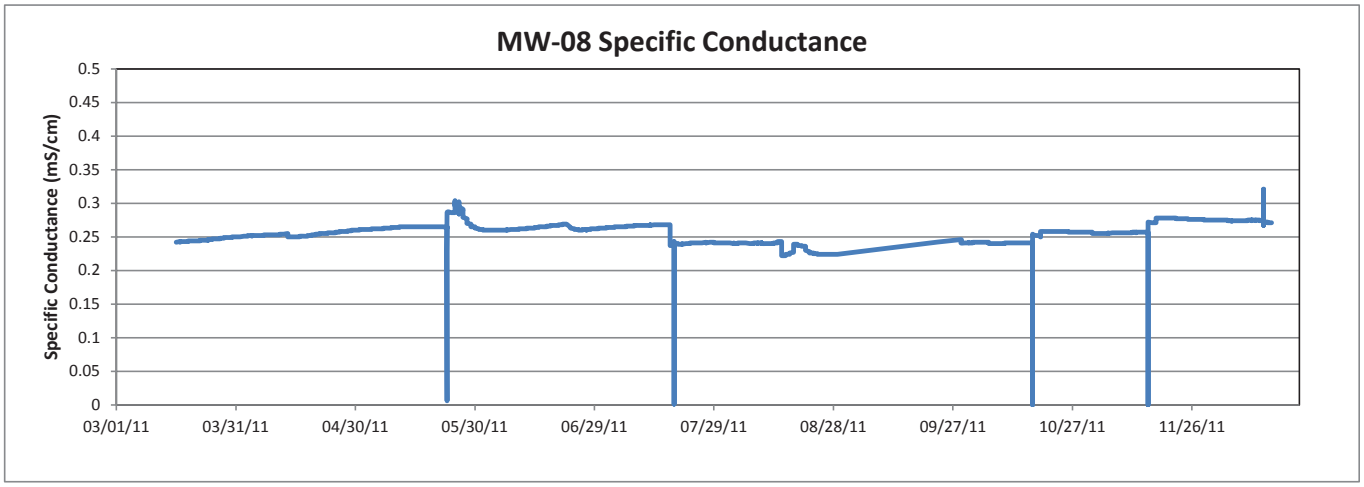

Total Uranium, Unfiltered
MW-08
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
µg/l
10
9
8
7
6
5
4
3
2
1
0
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

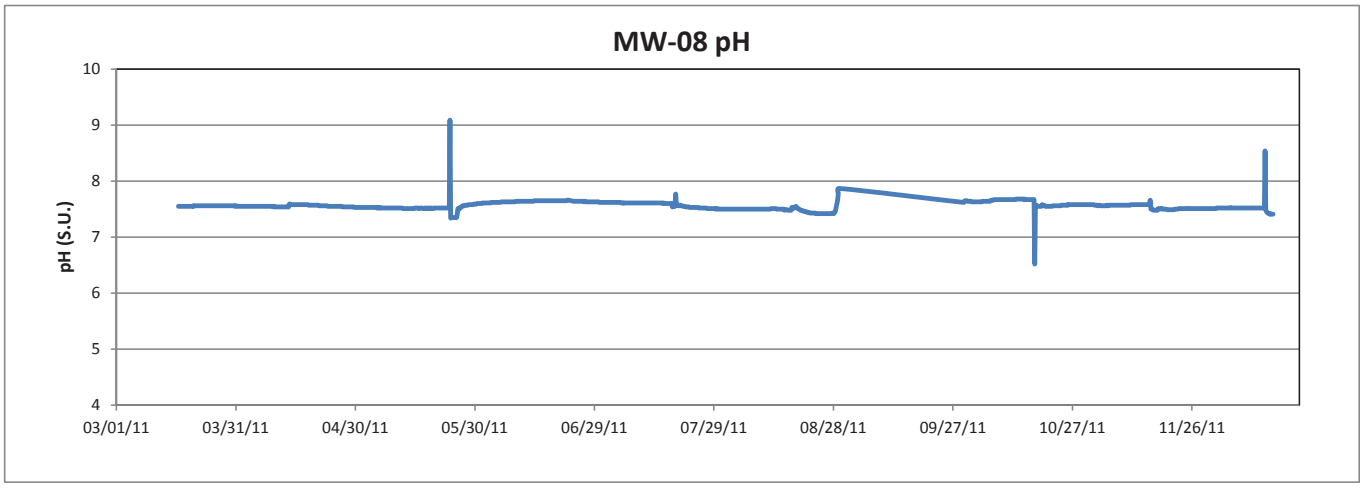

Total Uranium, Filtered
MW-11S
MW-17
MW-25
MW-26
MW-29
MW-51
MW-80
MW-81
MW-82
MW-83
MW-84
MW-86
TPZ-04
MW-08
µg/L
0
1
2
3
4
5
6
7
4/7/11
5/7/11
6/6/11
7/6/11
8/5/11
9/4/11
10/4/11
11/3/11
12/3/11
Date

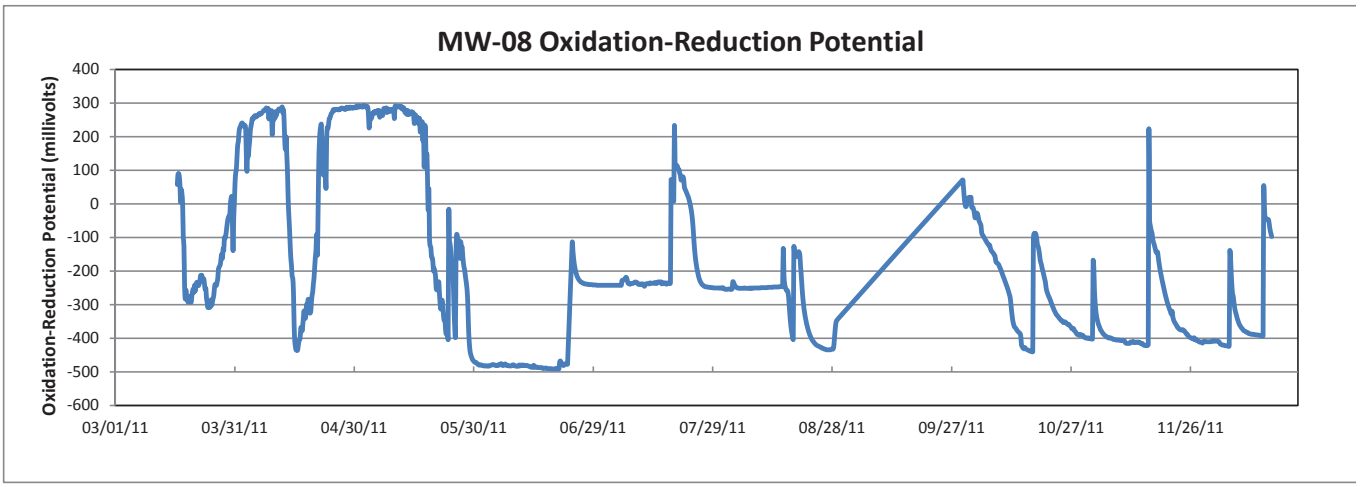
ATTACHMENT 3

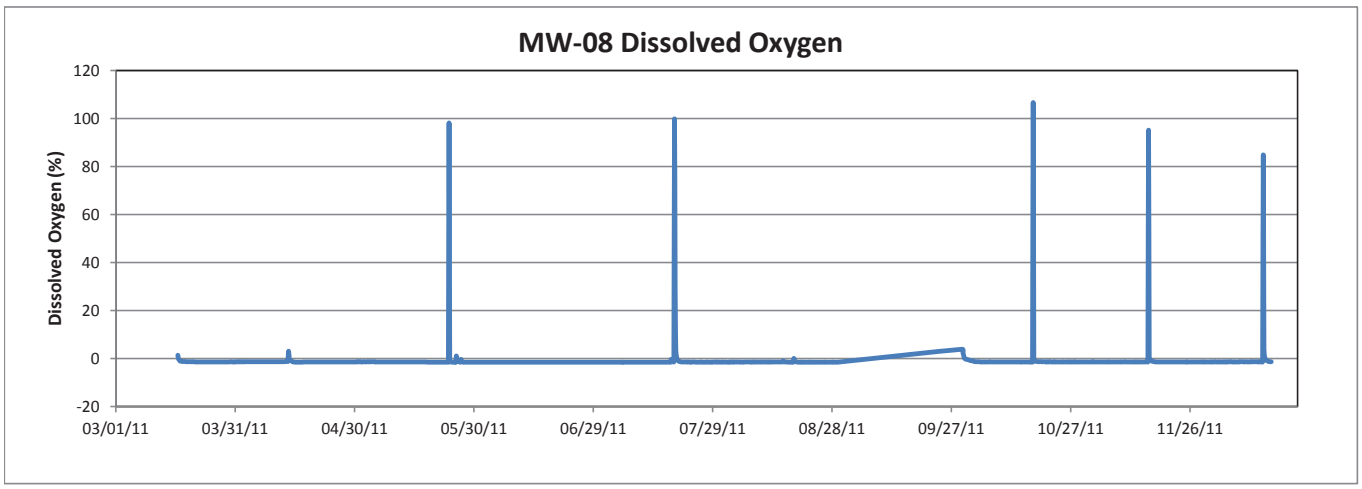
IN-SITU DATA TREND GRAPHS

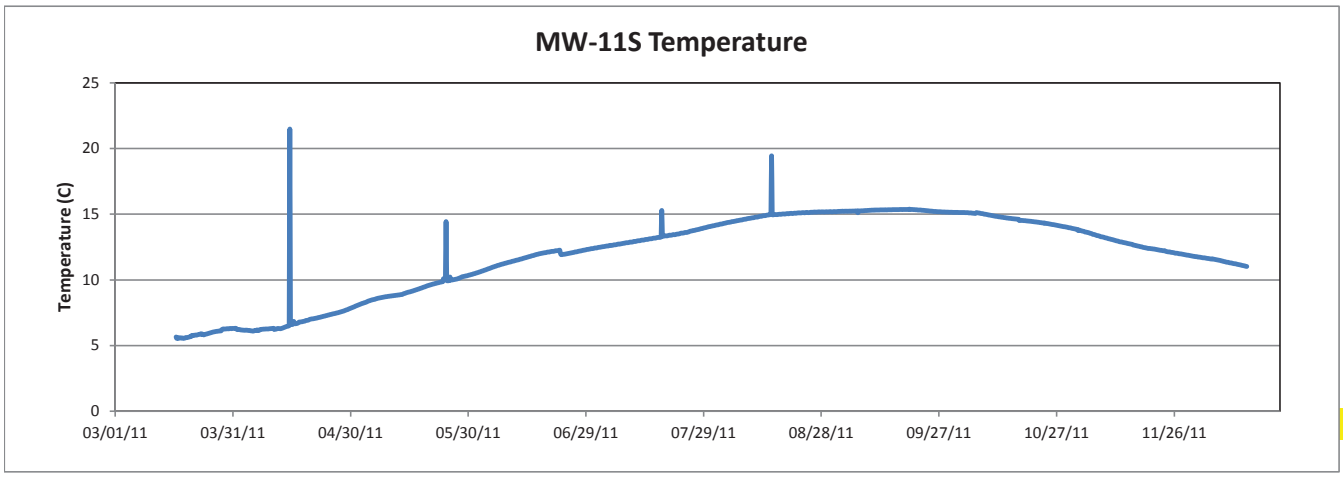

MW-08 Temperature
Temperature (C)
25
23
21
19
17
15
13
11
9
7
5
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

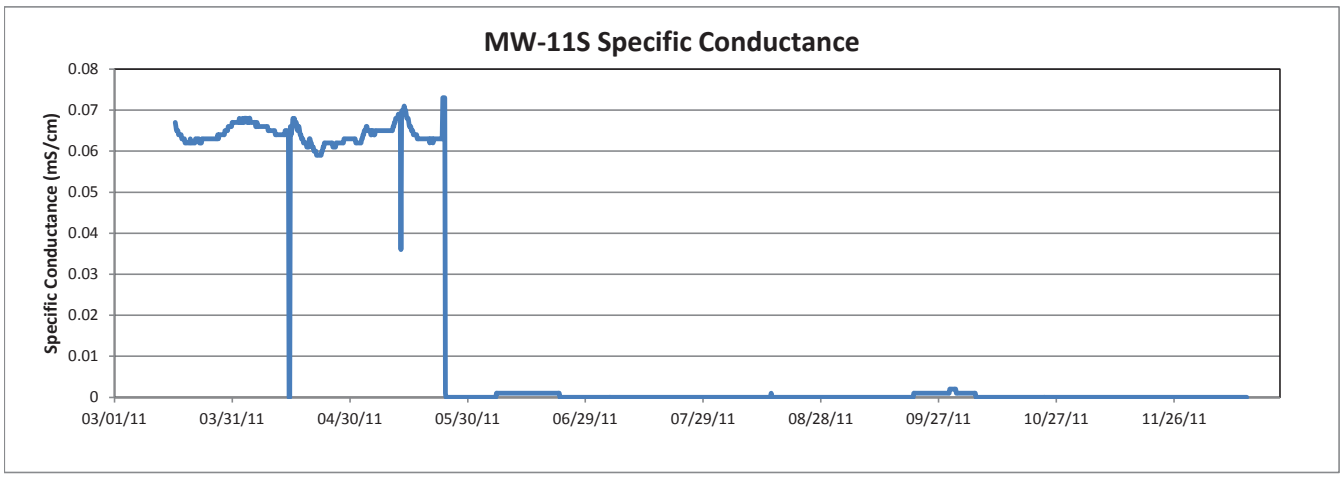

MW-08 Specific Conductance
Specific Conductance (mS/cm)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

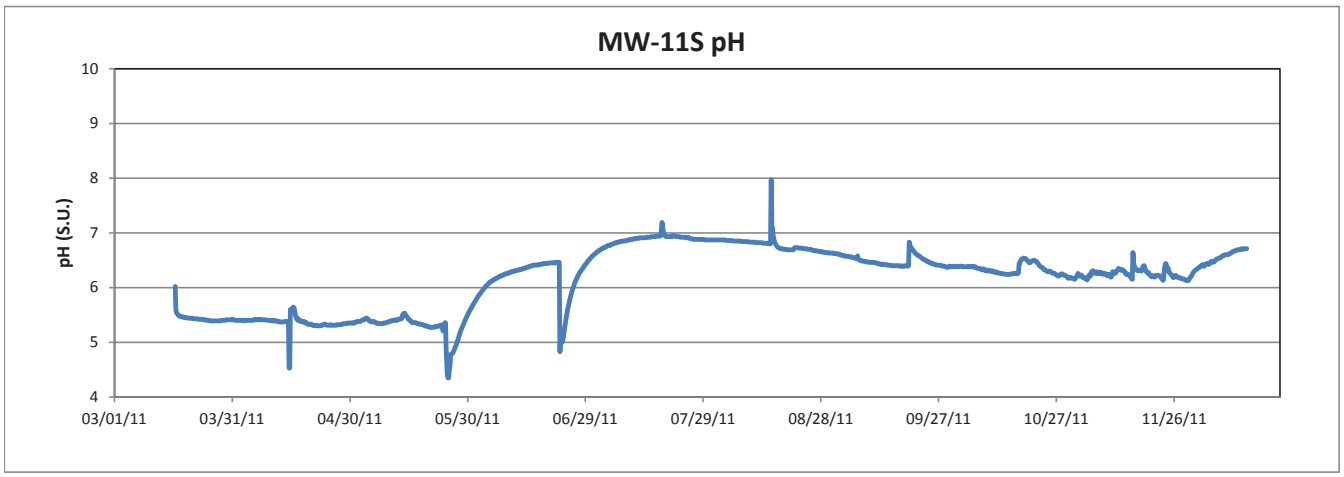

MW-08 pH
pH (S.U.)
10
9
8
7
6
5
4
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

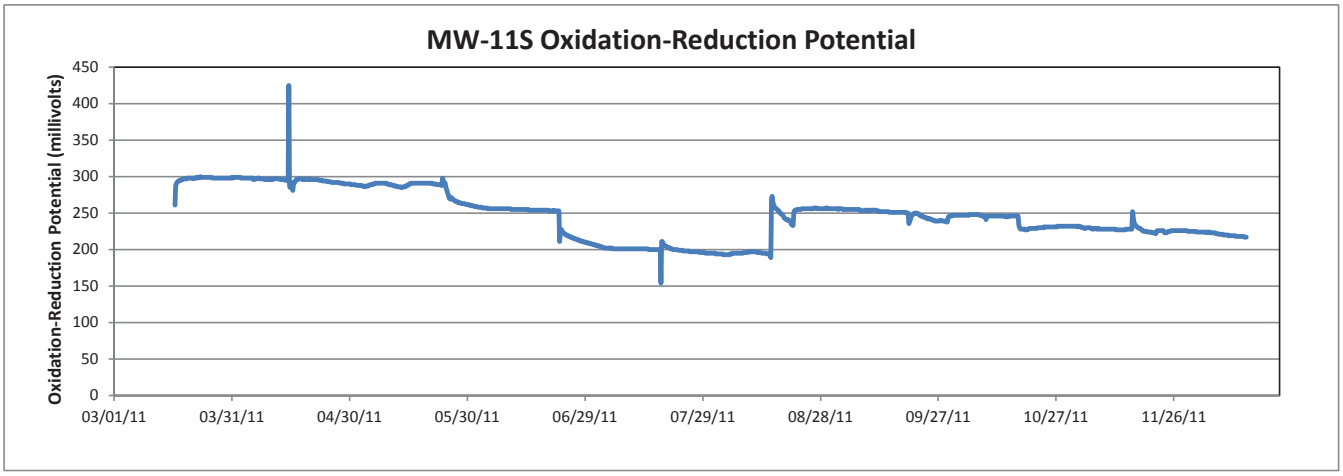

MW-08 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
400
300
200
100
0
-100
-200
-300
-400
-500
-600
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

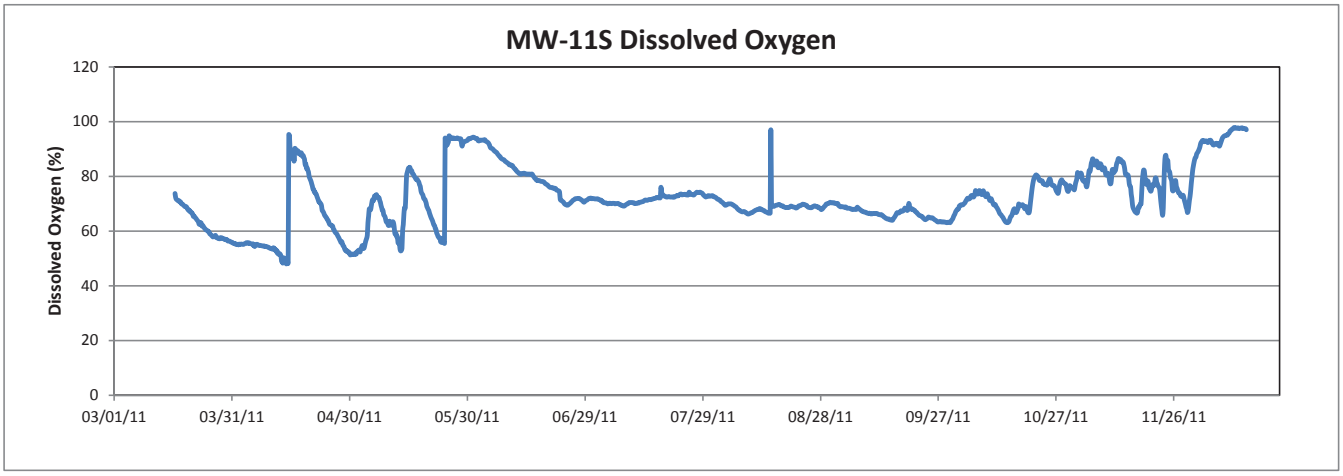

MW-08 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
-20
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

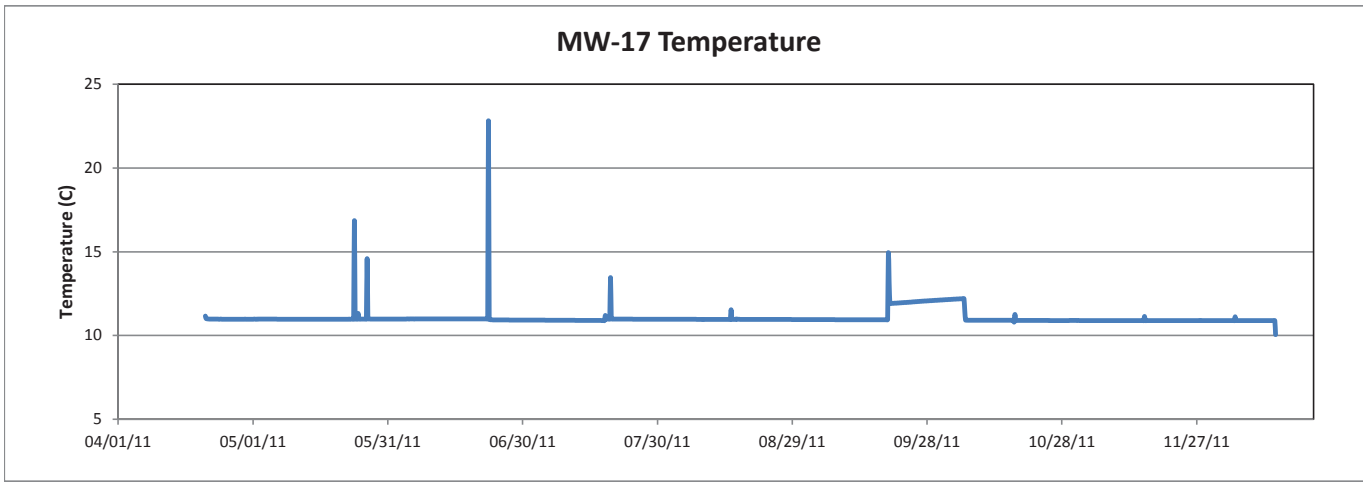

MW-11S Temperature
Temperature (C)
25
20
15
10
5
0
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

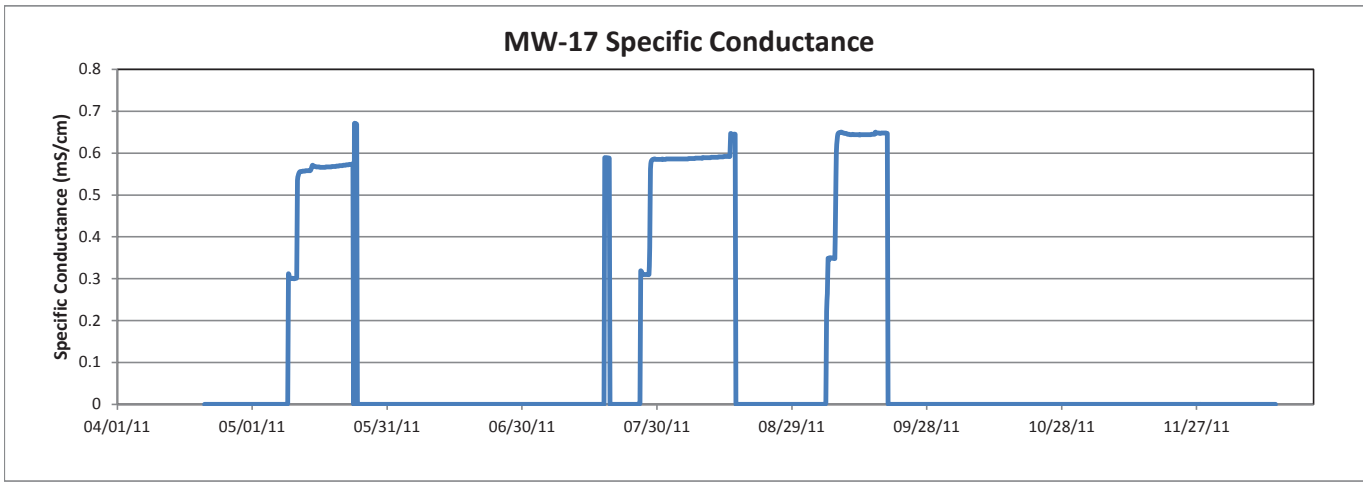

MW-11S Specific Conductance
Specific Conductance (mS/cm)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

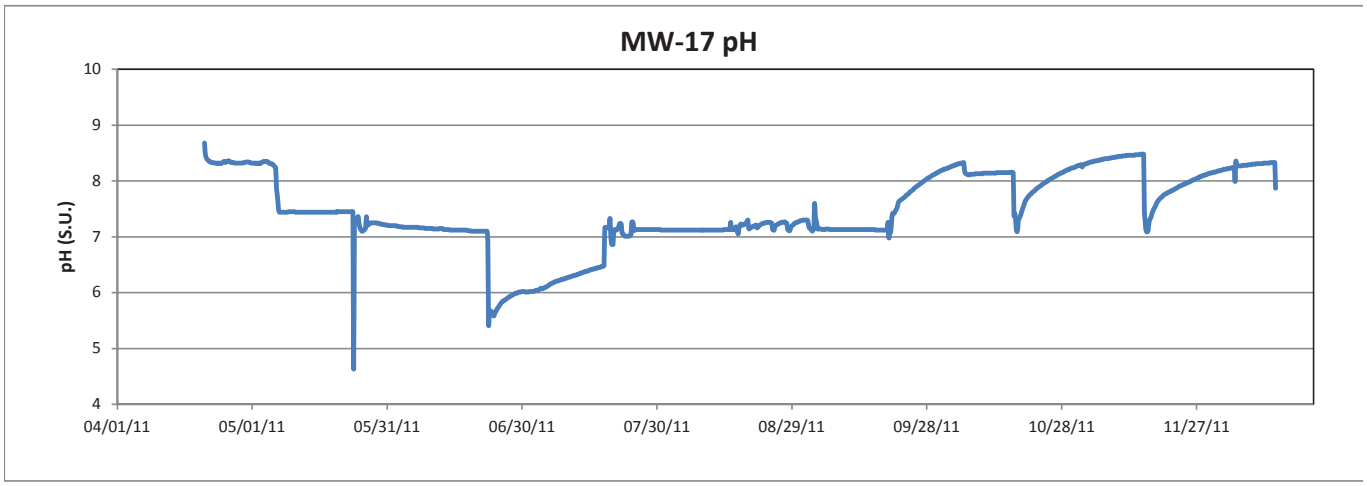

MW-11S pH
pH (S.U.)
10
9
8
7
6
5
4
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

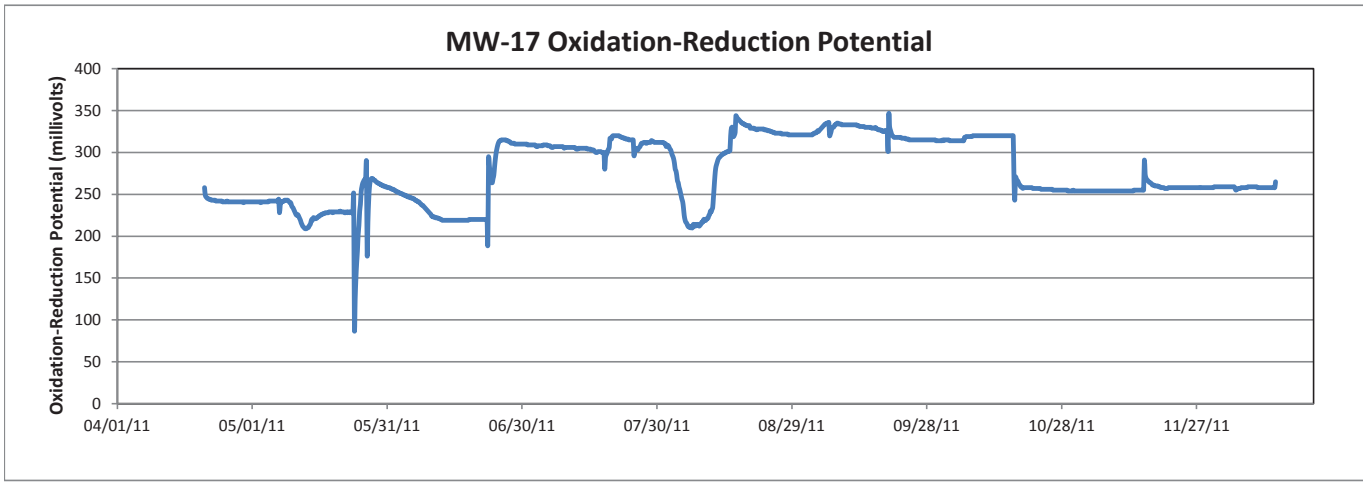

MW-11S Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
450
400
350
300
250
200
150
100
50
0
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

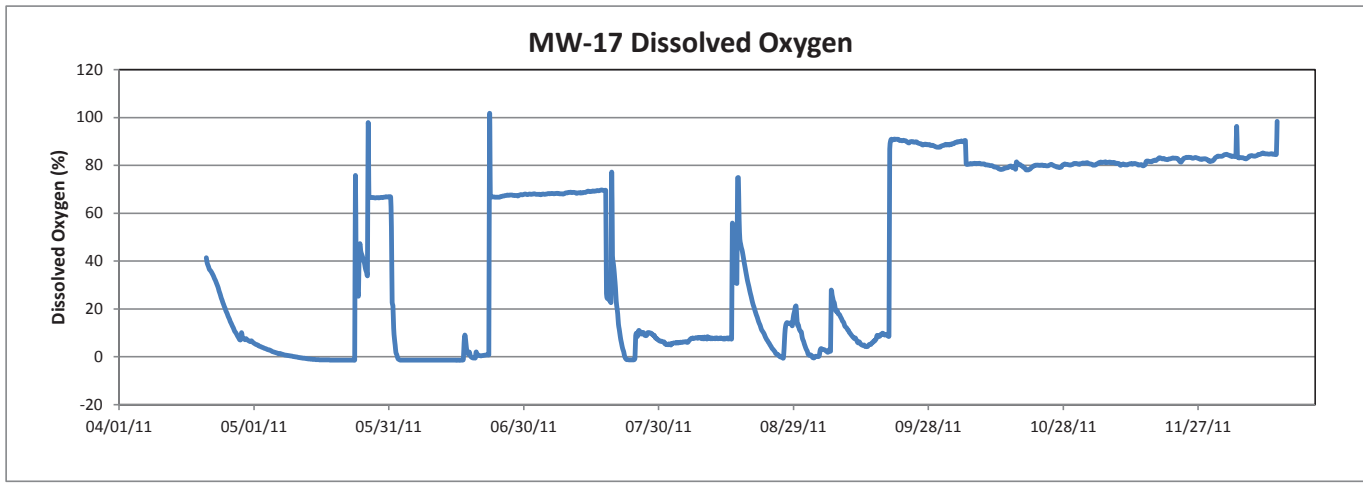

MW-11S Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

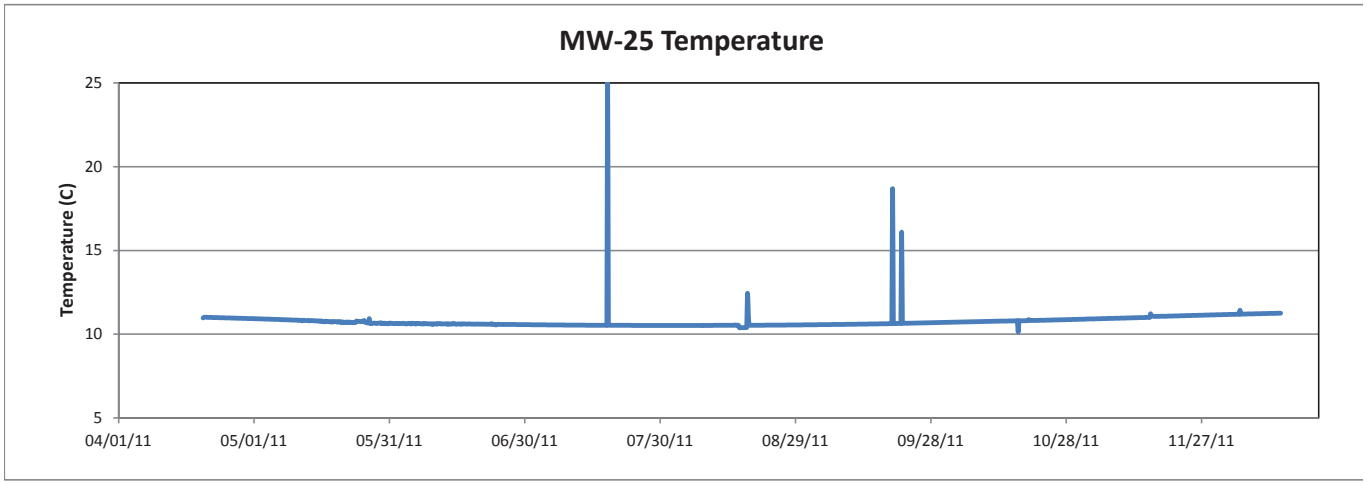

MW-17 Temperature
Temperature (C)
25
20
15
10
5
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

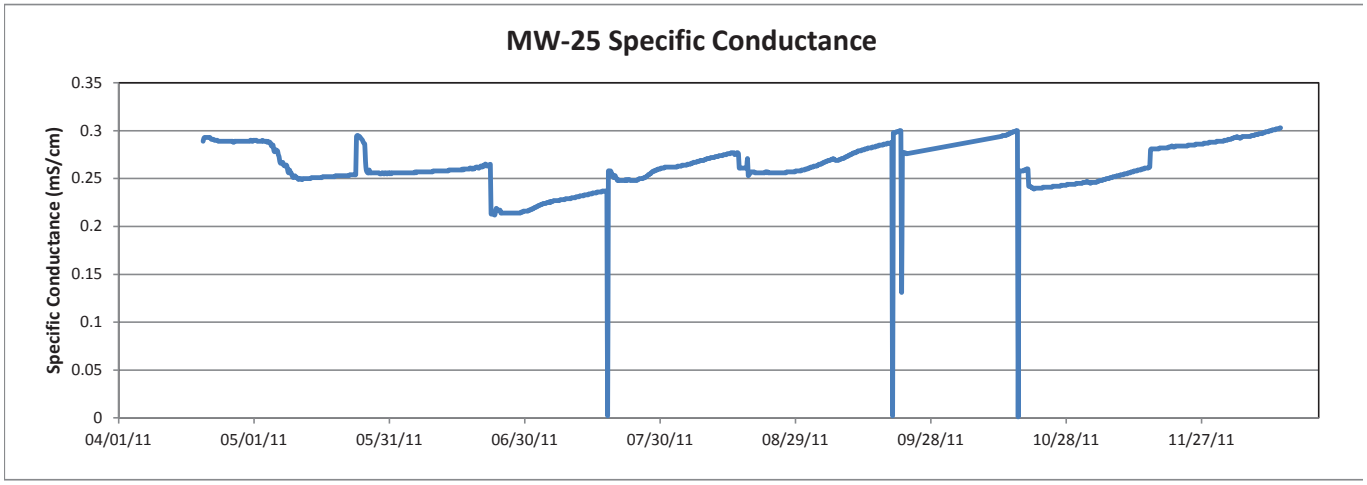

MW-17 Specific Conductance
Specific Conductance (mS/cm)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

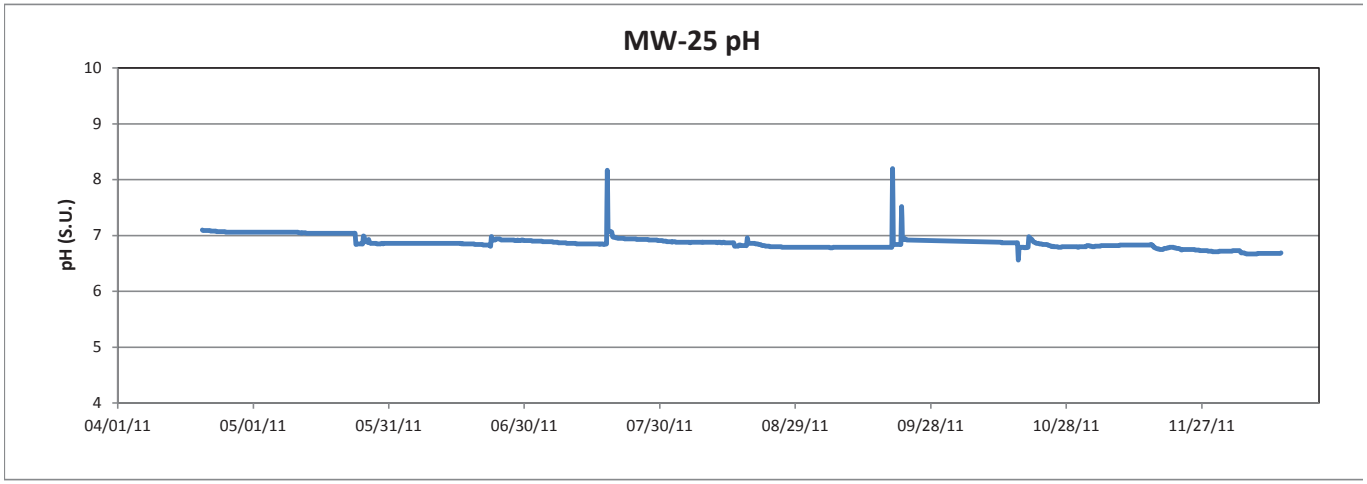

MW-17 pH
pH (S.U.)
10
9
8
7
6
5
4
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

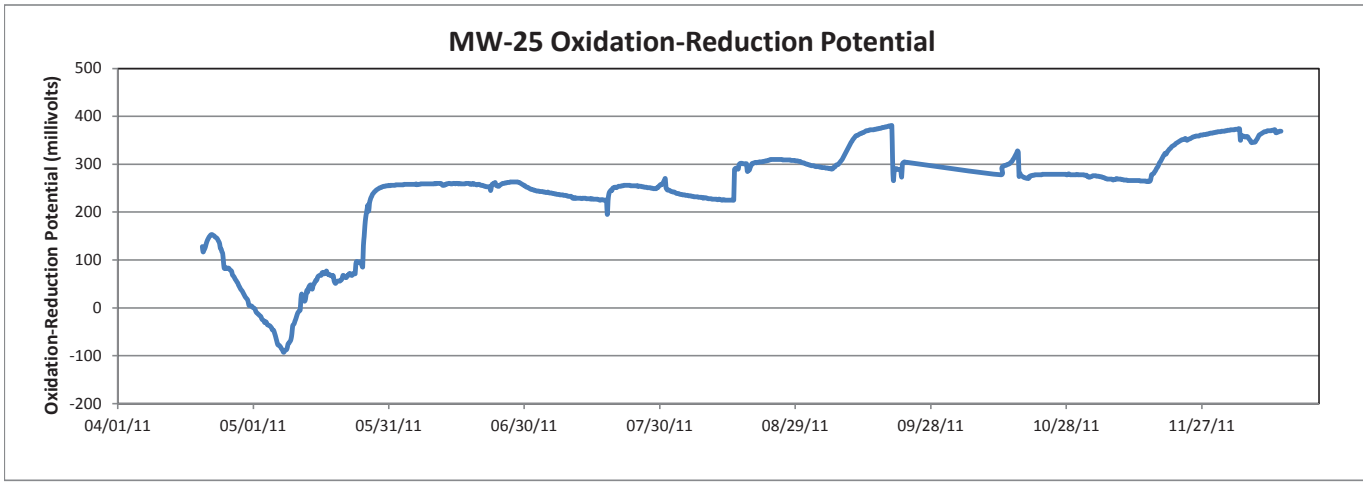

MW-17 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
400
350
300
250
200
150
100
50
0
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

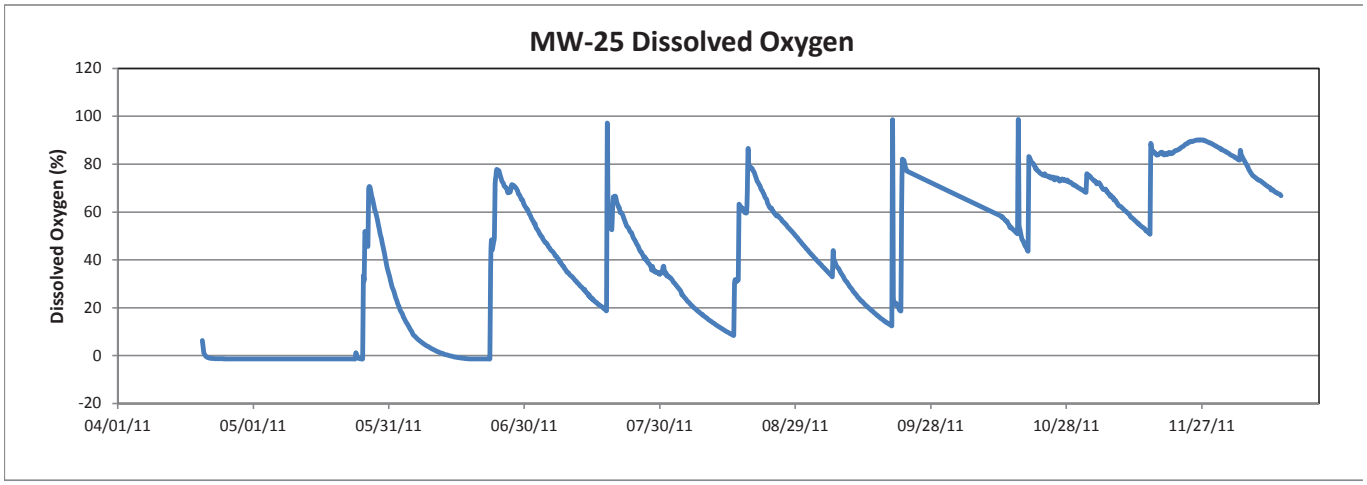

MW-17 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
-20
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

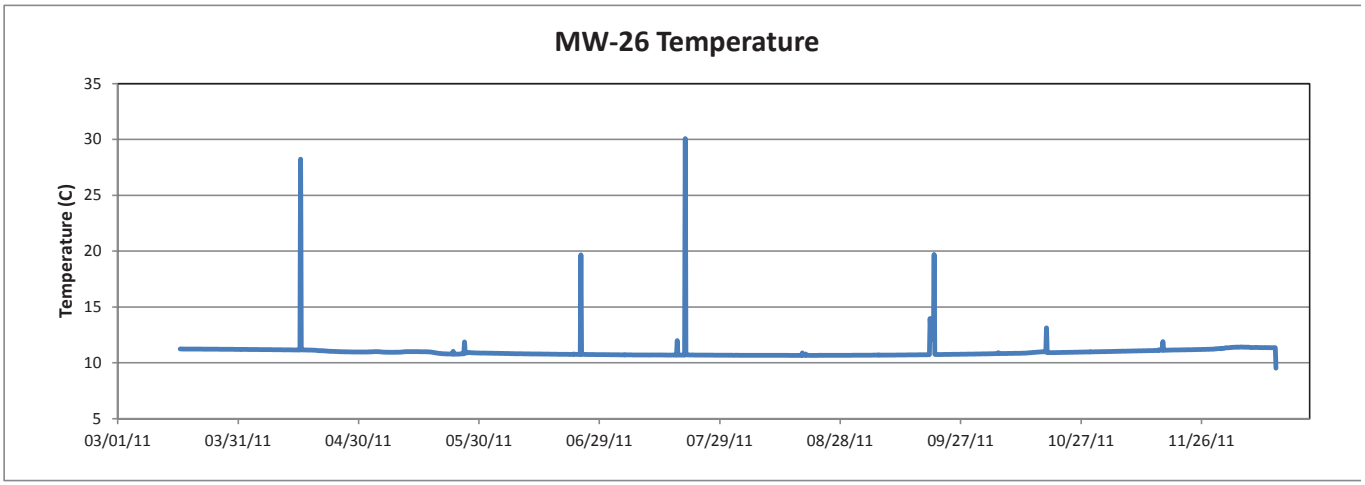

MW-25 Temperature
Temperature (C)
25
20
15
10
5
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

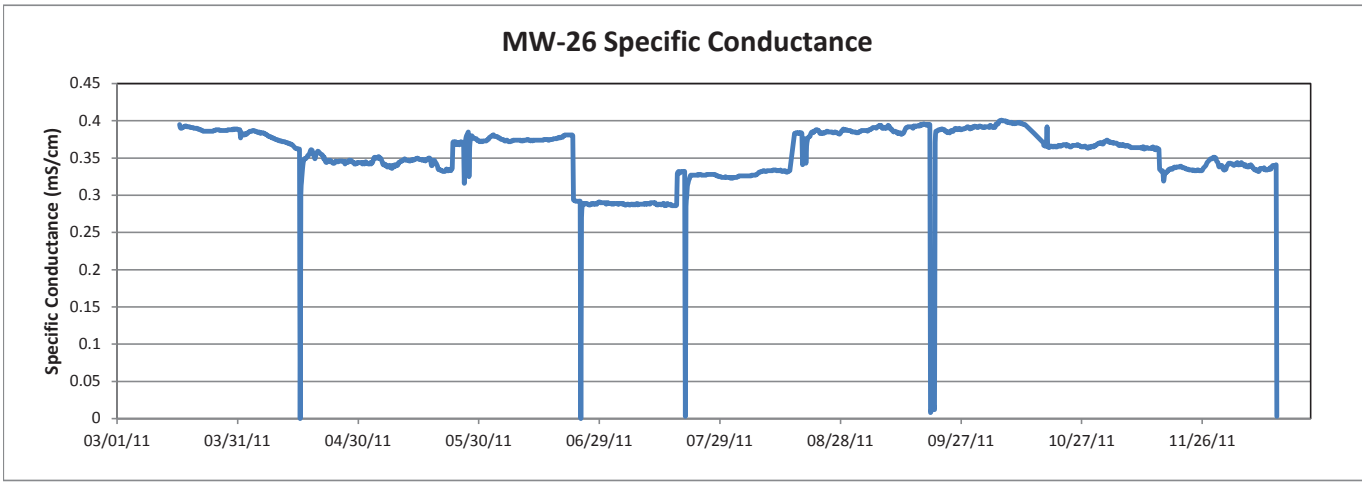

MW-25 Specific Conductance
Specific Conductance (mS/cm)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

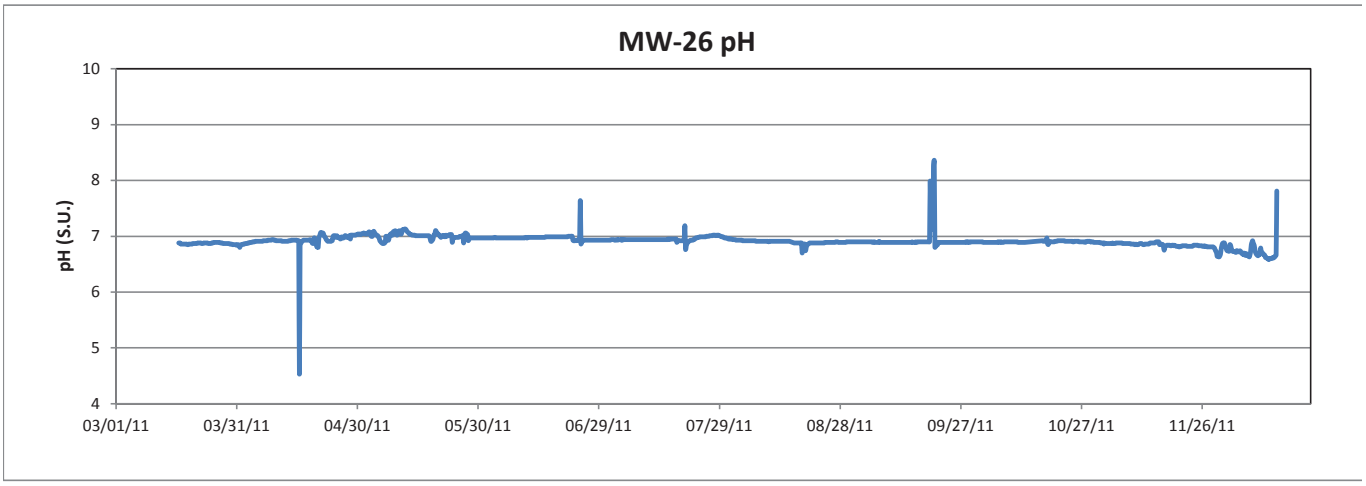

MW-25 pH
pH (S.U.)
10
9
8
7
6
5
4
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

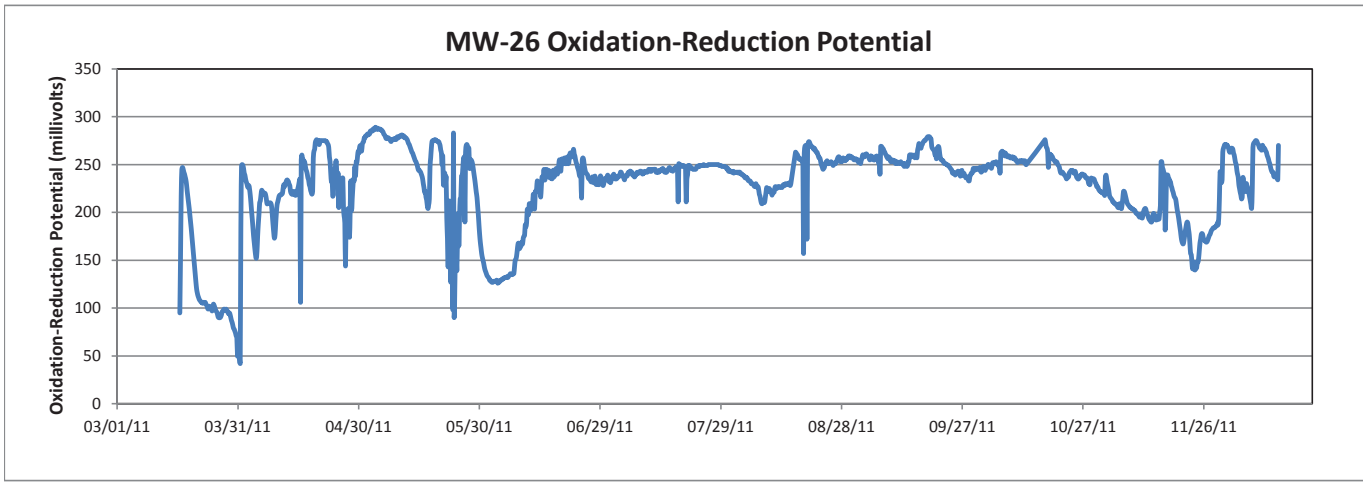

MW-25 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
500
400
300
200
100
0
-100
-200
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

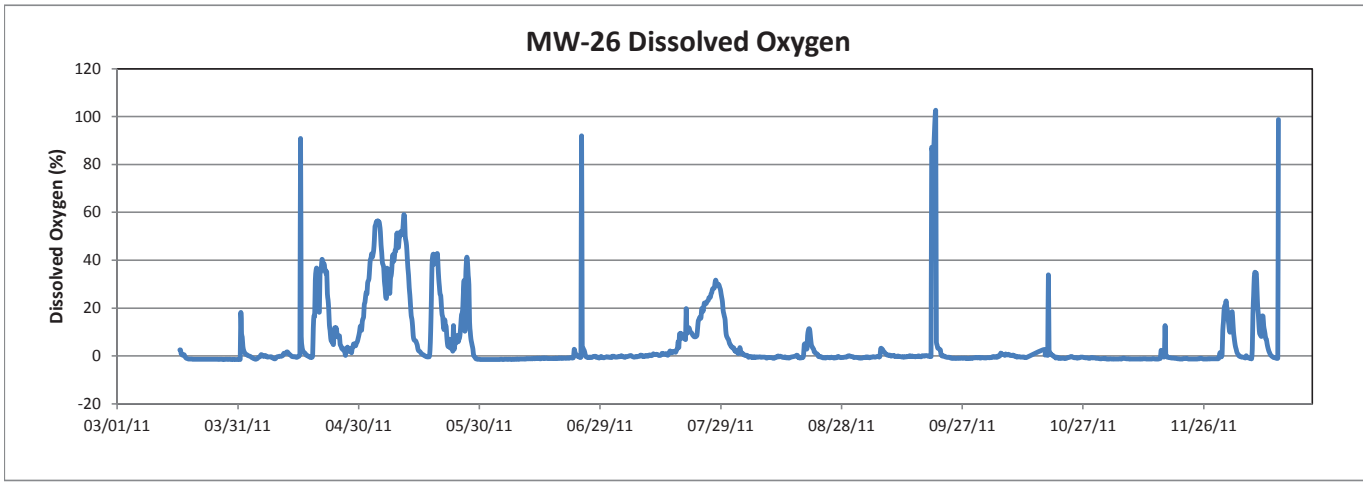

MW-25 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
-20
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

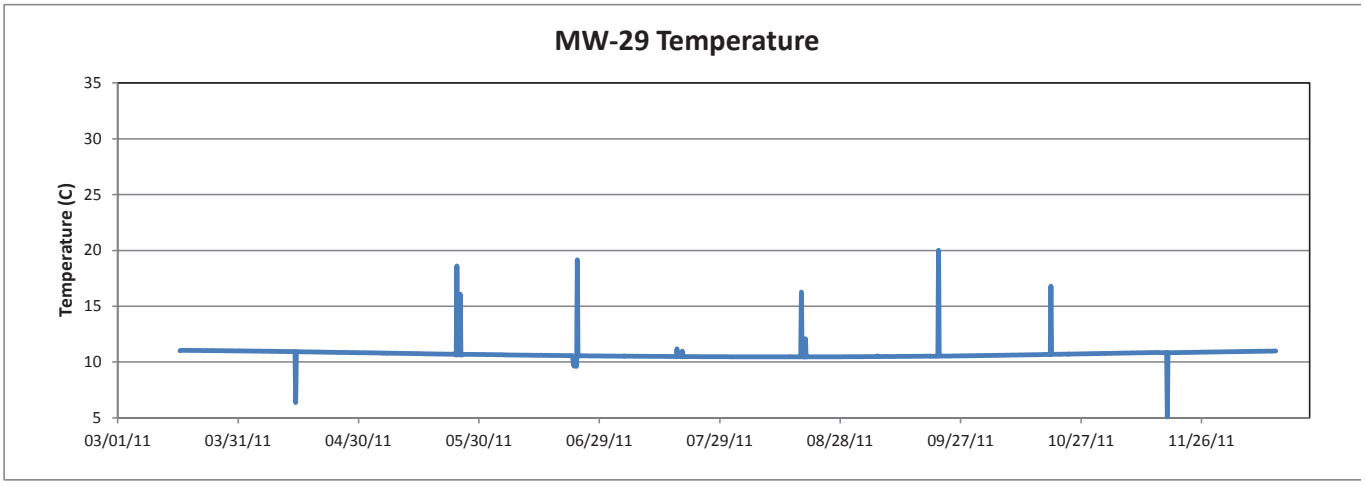

MW-26 Temperature
Temperature (C)
35
30
25
20
15
10
5
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

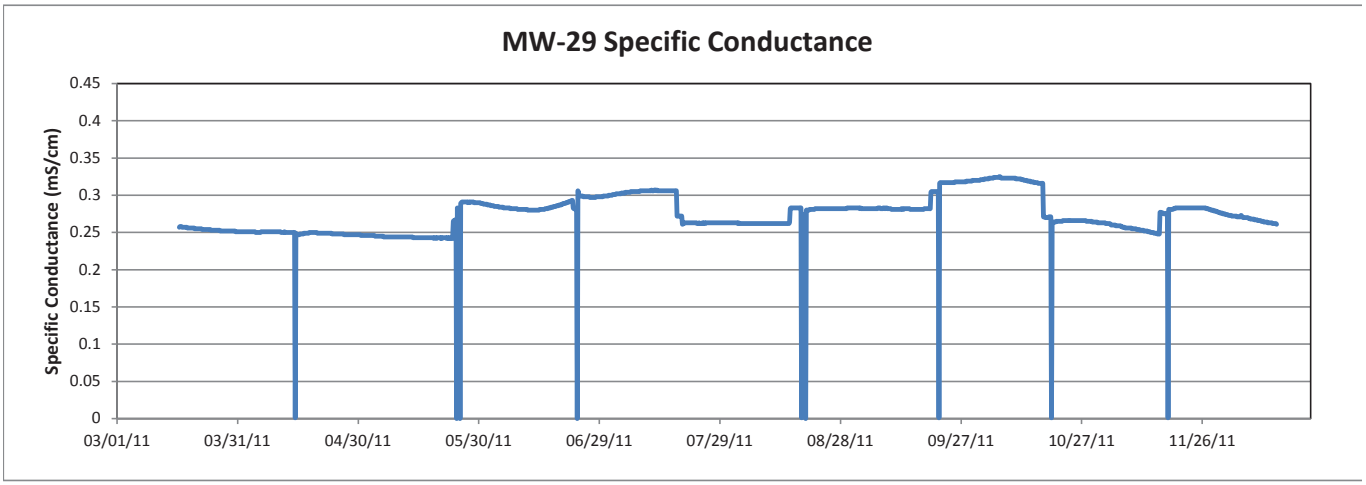

MW-26 Specific Conductance
Specific Conductance (mS/cm)
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

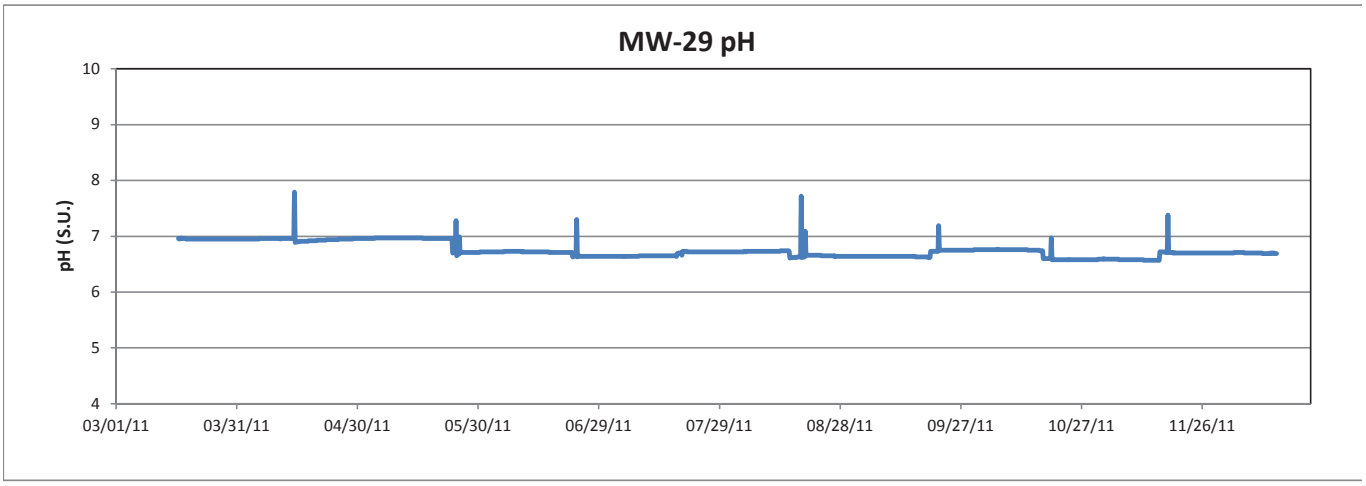

MW-26 pH
pH (S.U.)
10
9
8
7
6
5
4
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

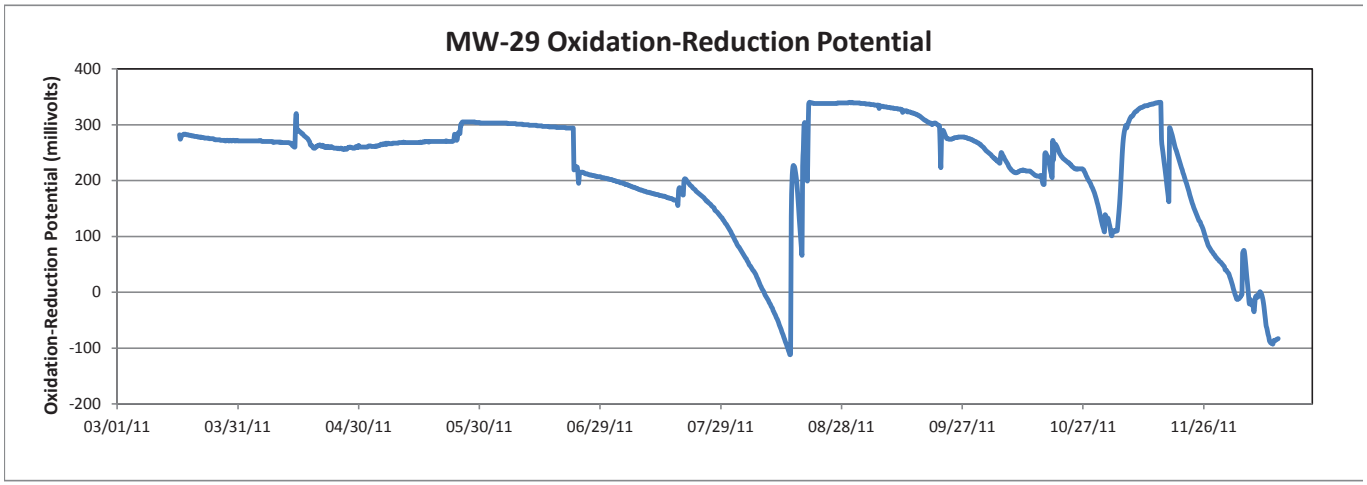

MW-26 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
350
300
250
200
150
100
50
0
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

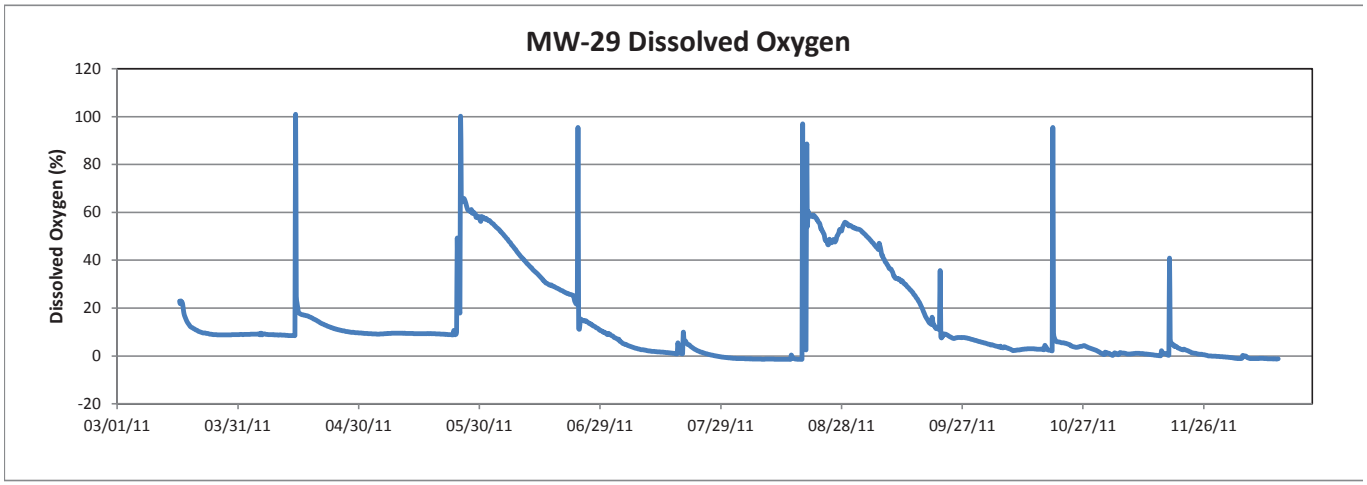

MW-26 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
-20
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

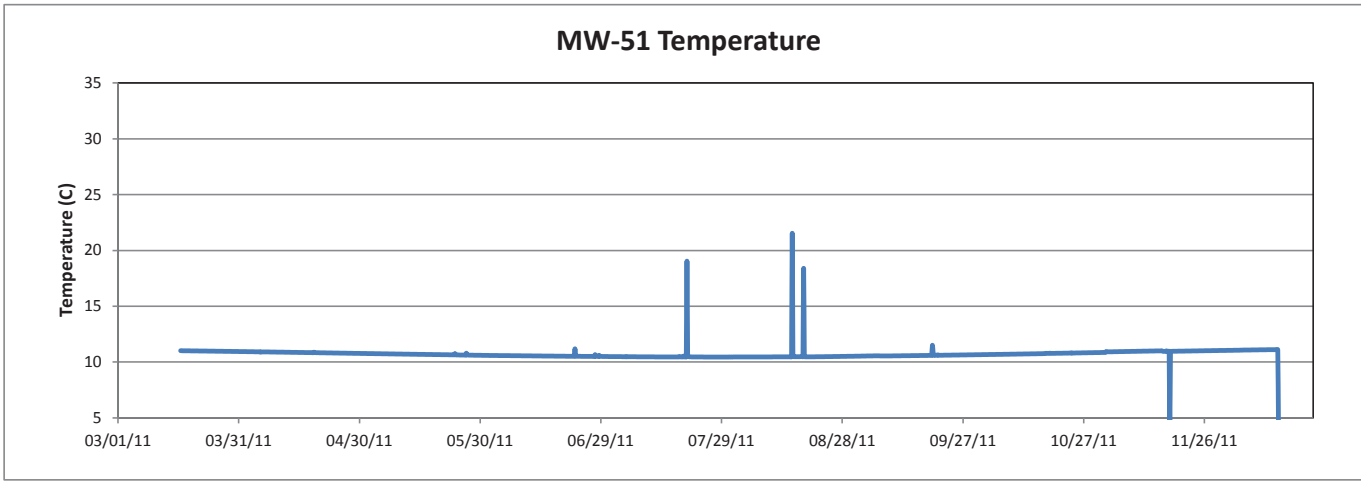

MW-29 Temperature
Temperature (C)
35
30
25
20
15
10
5
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

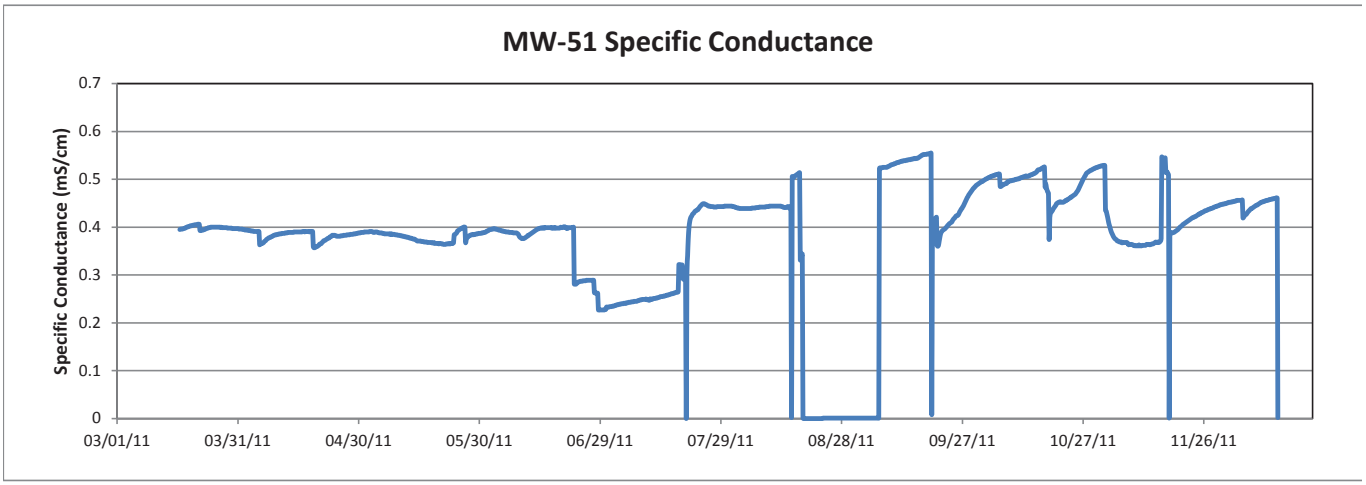

MW-29 Specific Conductance
Specific Conductance (mS/cm)
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

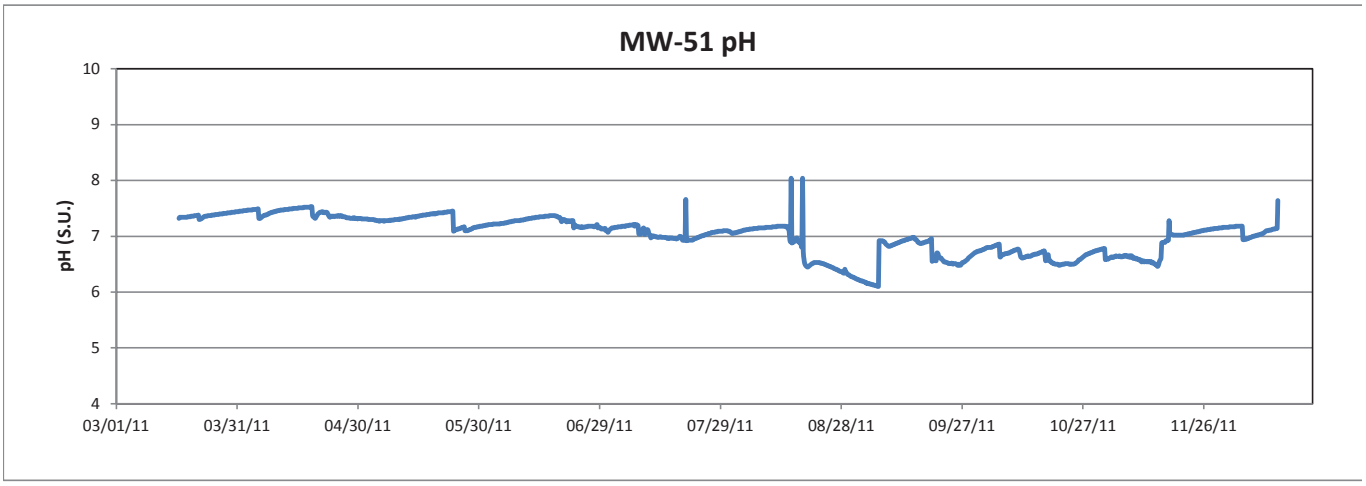

MW-29 pH
pH (S.U.)
10
9
8
7
6
5
4
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

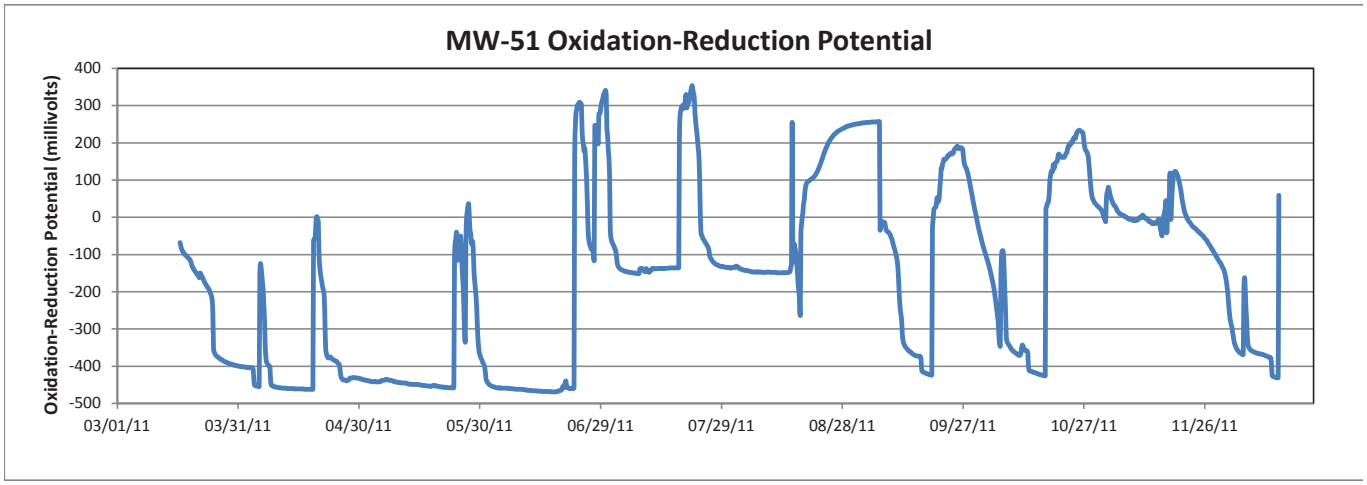

MW-29 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
400
300
200
100
0
-100
-200
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

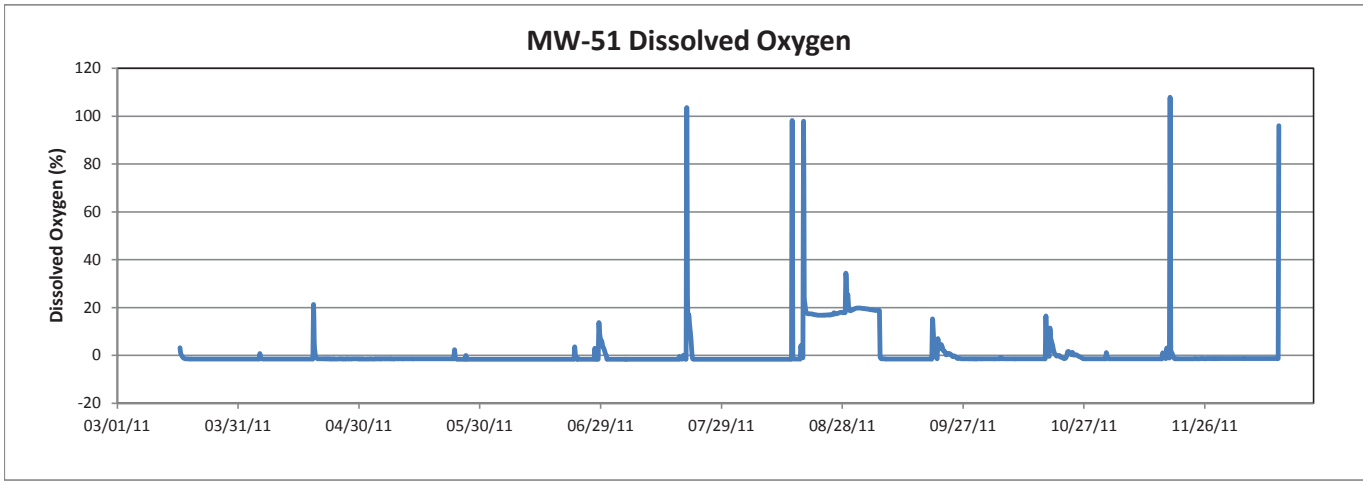

MW-29 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
-20
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

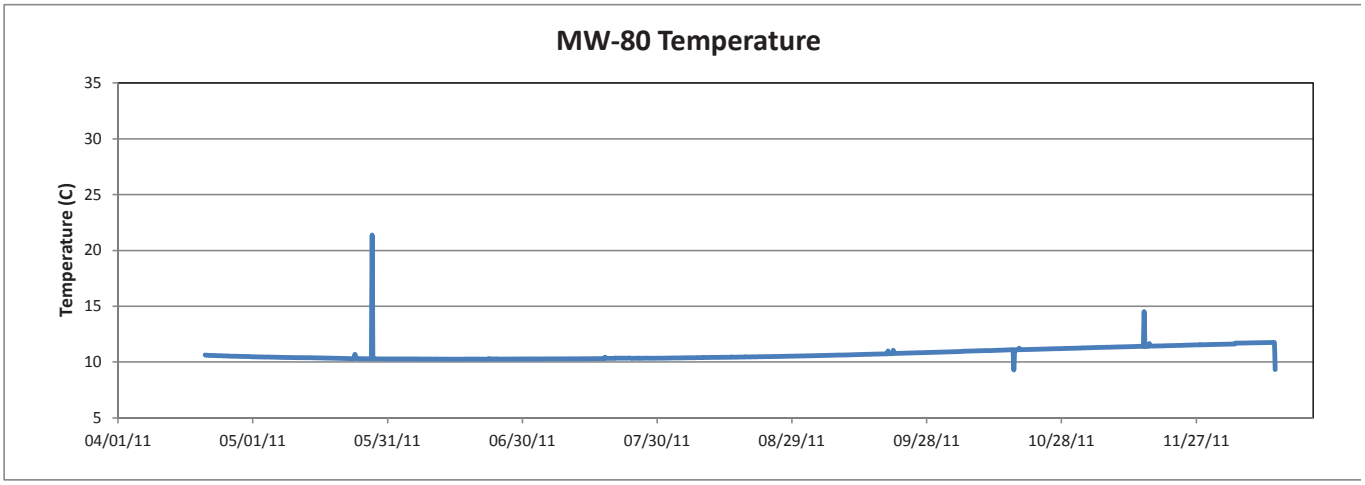

MW-51 Temperature
Temperature (C)
35
30
25
20
15
10
5
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

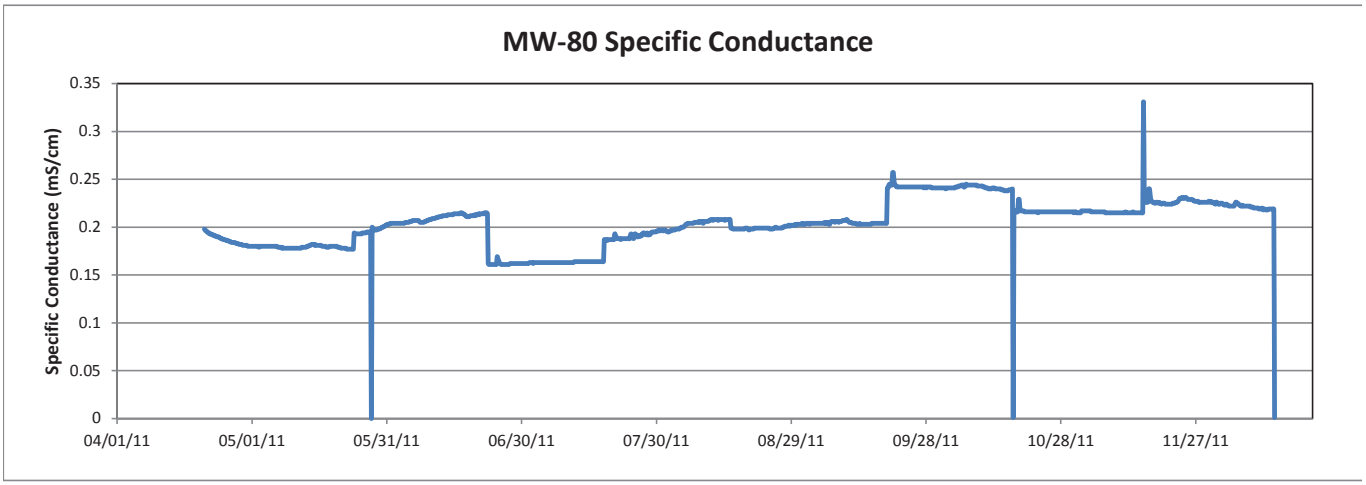

MW-51 Specific Conductance
Specific Conductance (mS/cm)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

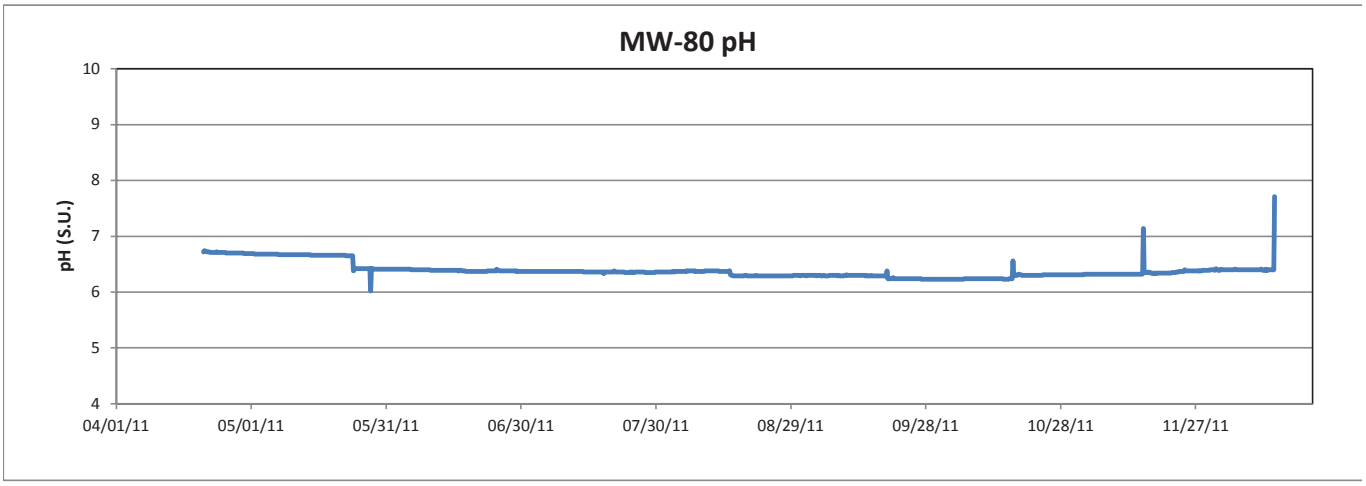

MW-51 pH
pH (S.U.)
10
9
8
7
6
5
4
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

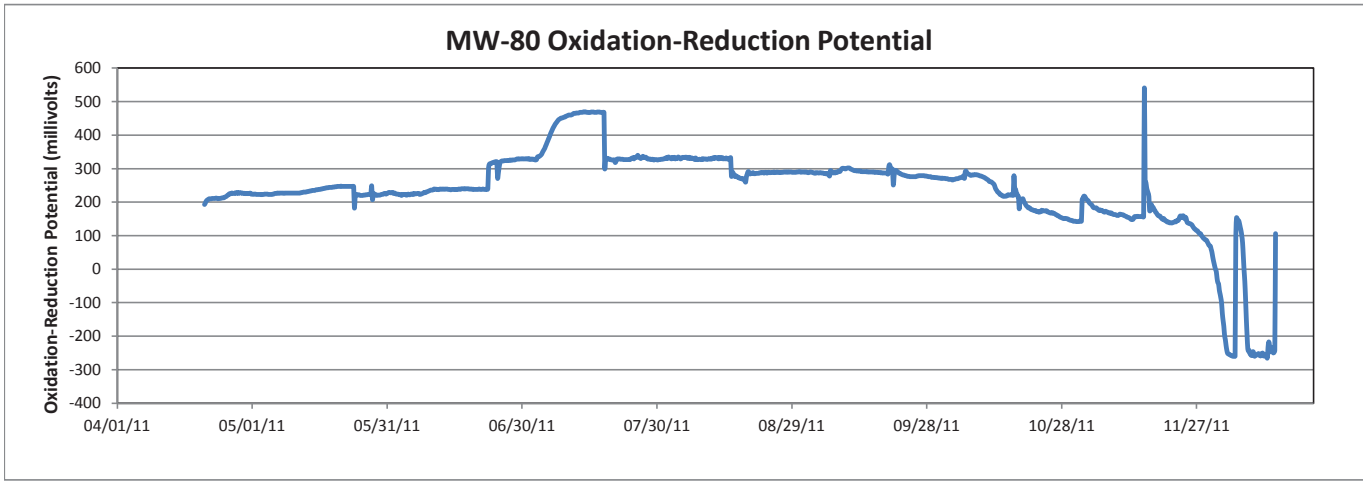

MW-51 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
400
300
200
100
0
-100
-200
-300
-400
-500
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

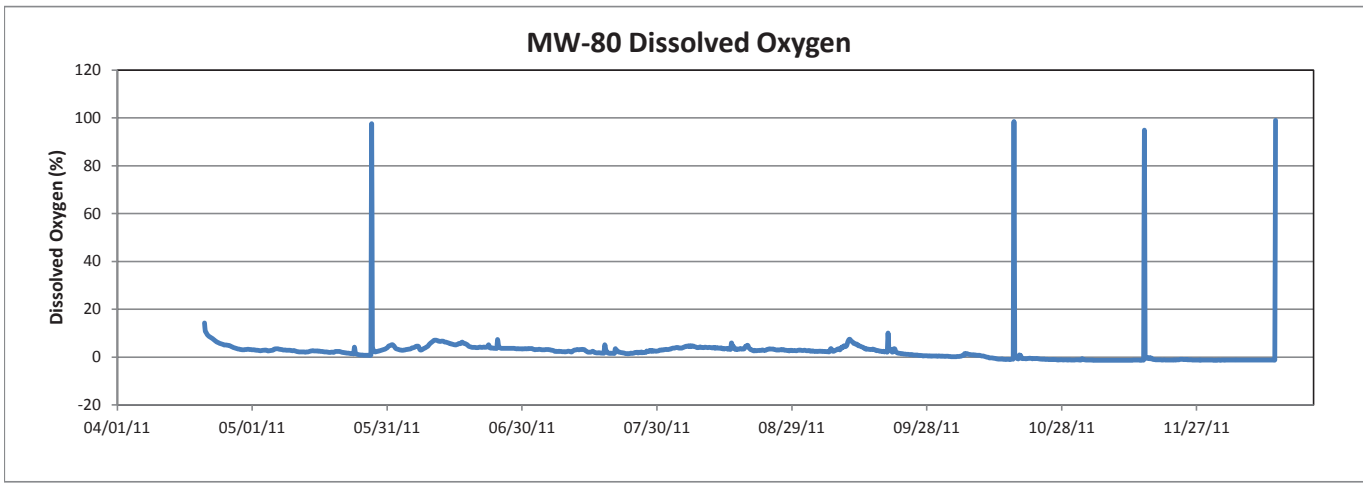

MW-51 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
-20
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

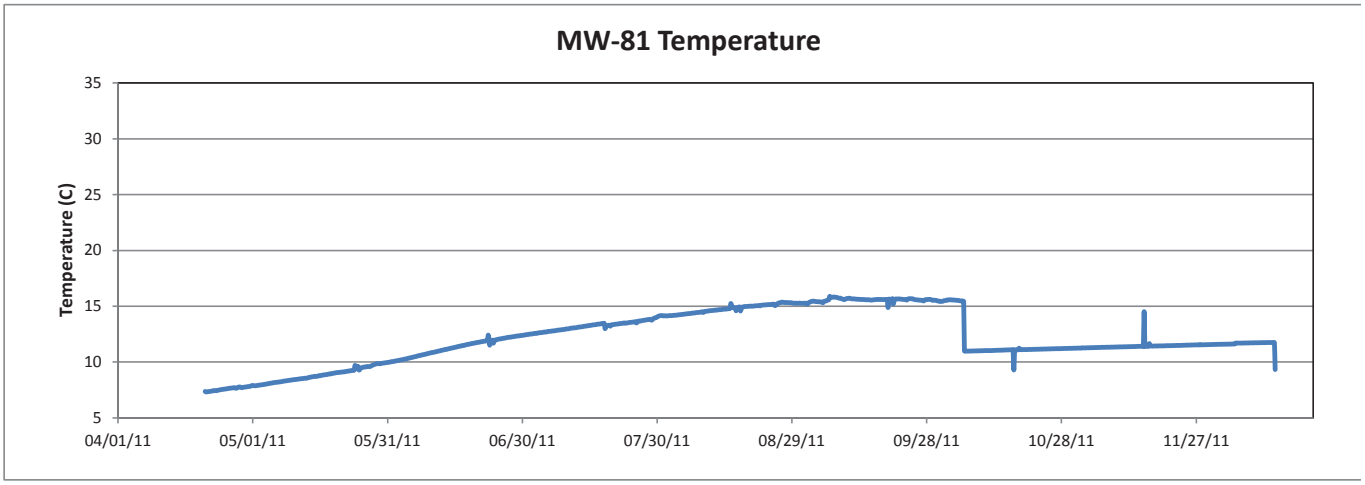

MW-80 Temperature
Temperature (C)
35
30
25
20
15
10
5
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

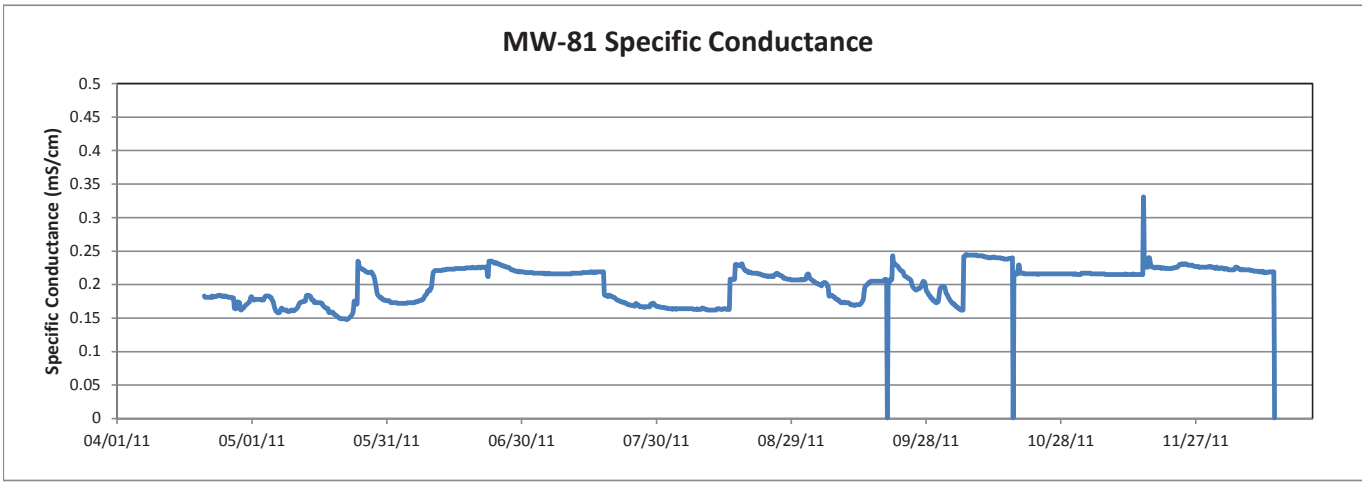

MW-80 Specific Conductance
Specific Conductance (mS/cm)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

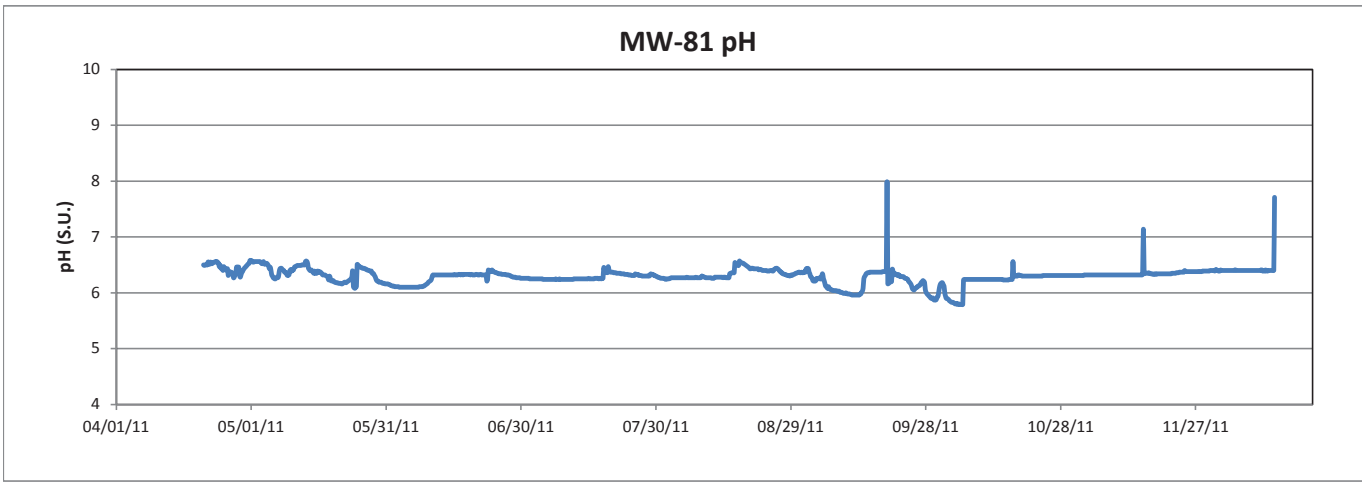

MW-80 pH
pH (S.U.)
10
9
8
7
6
5
4
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

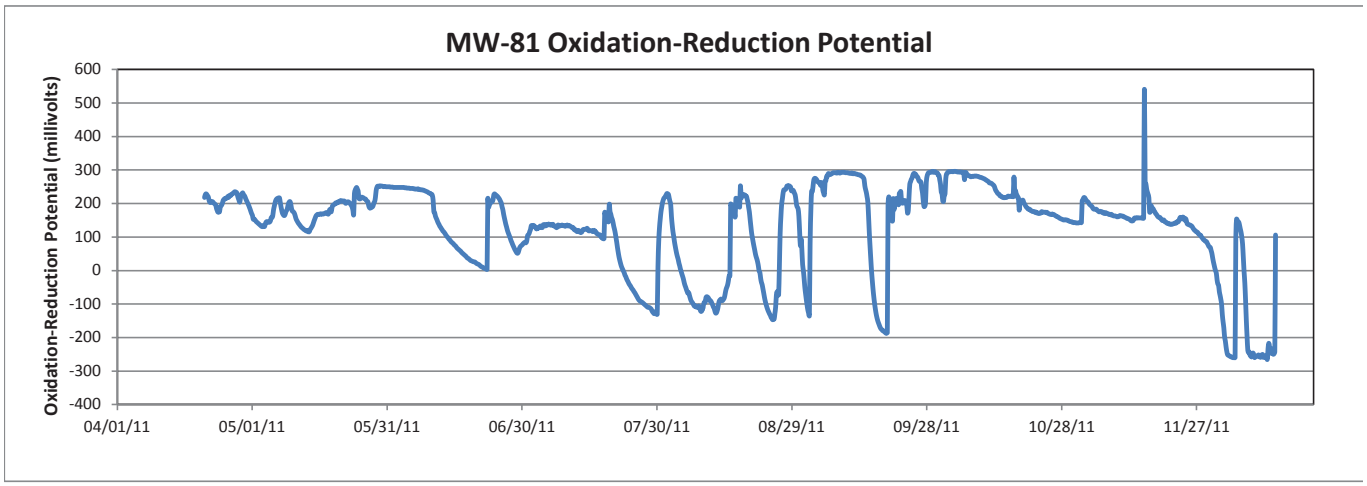

MW-80 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
600
500
400
300
200
100
0
-100
-200
-300
-400
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

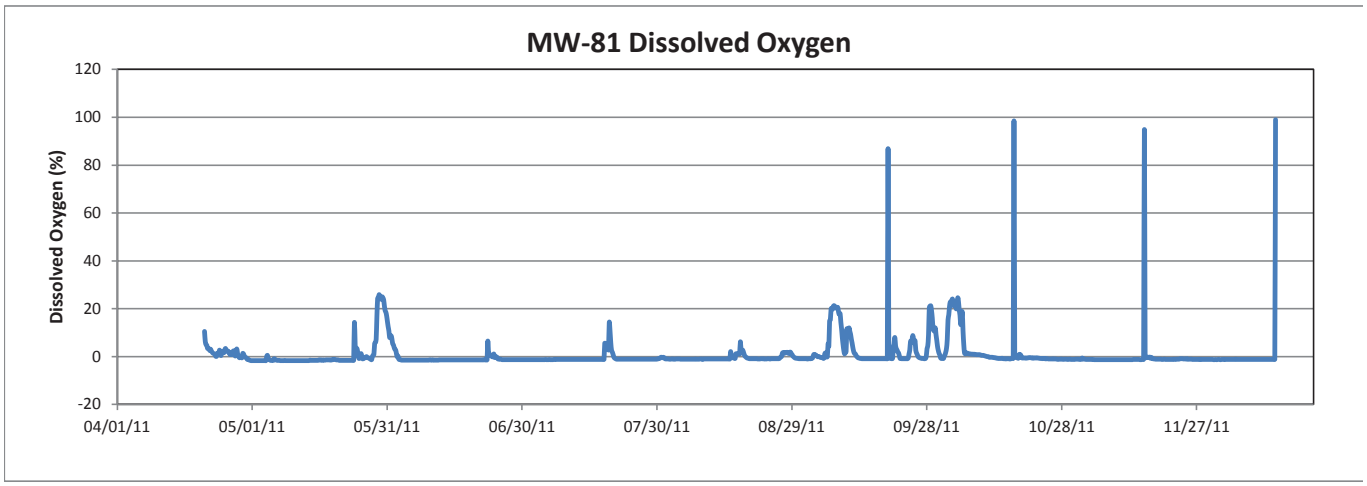

MW-80 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
-20
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

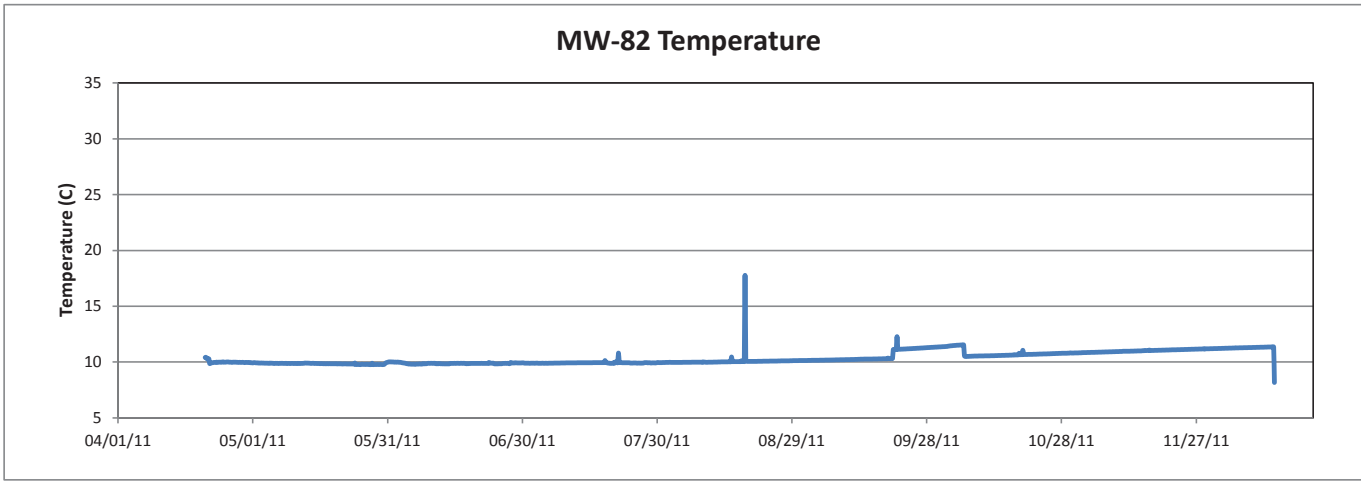

MW-81 Temperature
Temperature (C)
35
30
25
20
15
10
5
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

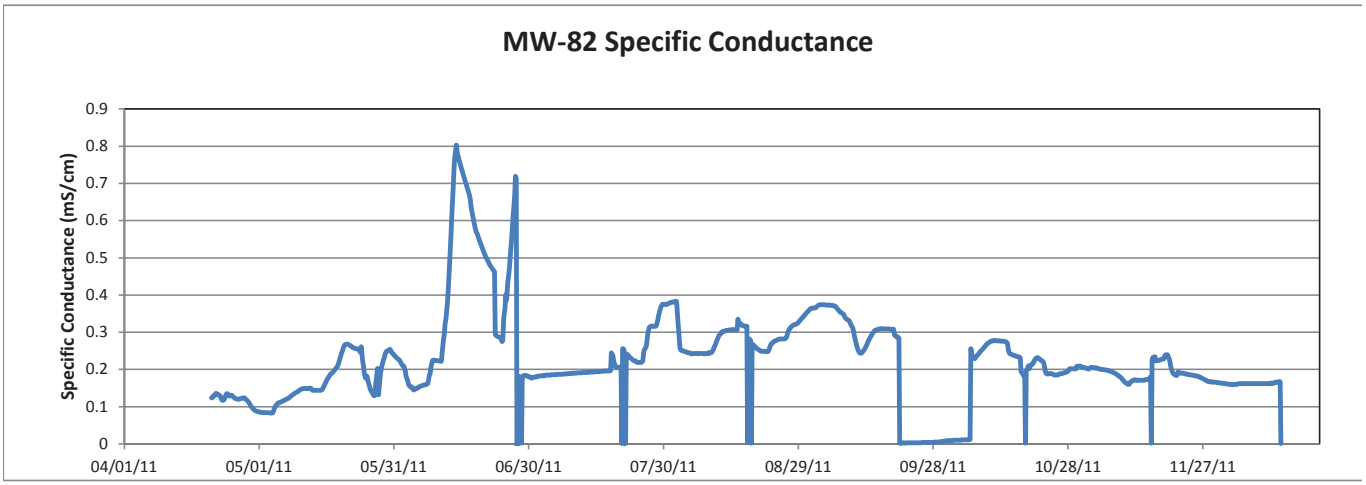

MW-81 Specific Conductance
Specific Conductance (mS/cm)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

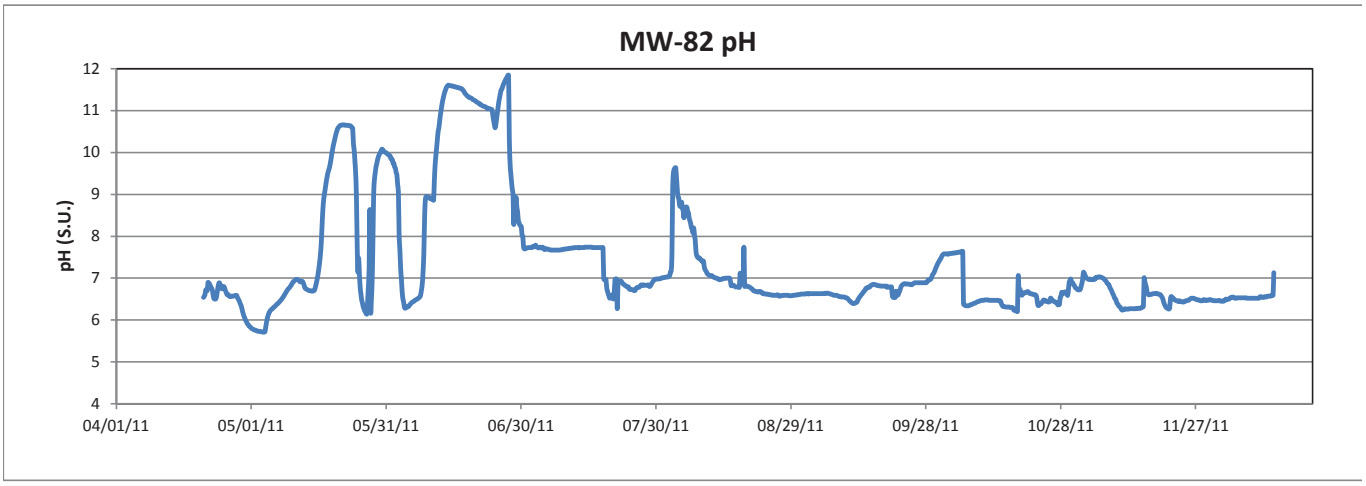

MW-81 pH
pH (S.U.)
10
9
8
7
6
5
4
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

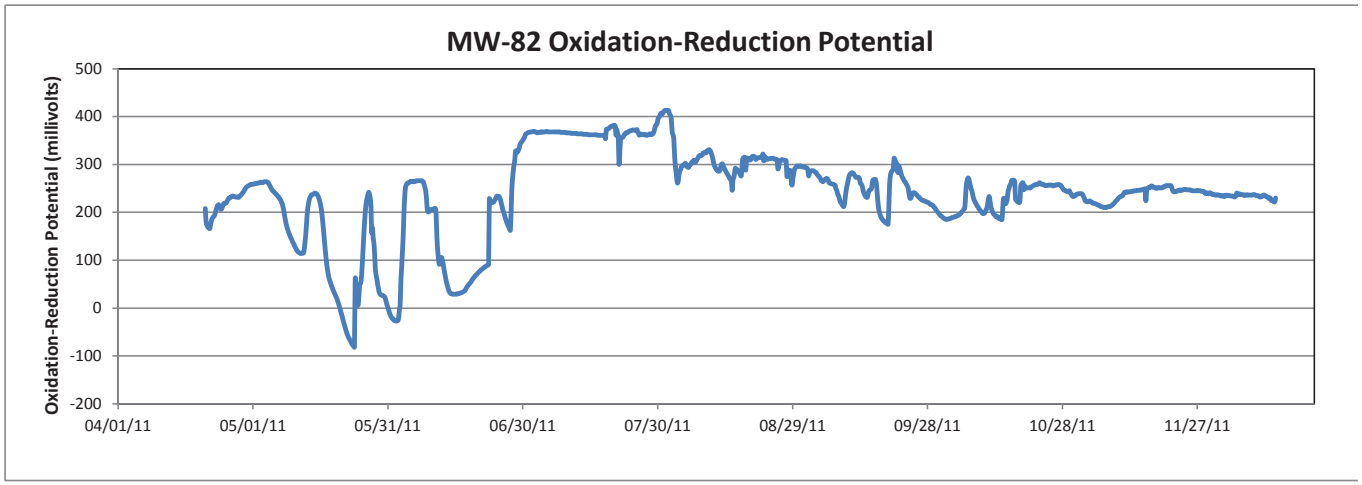

MW-81 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
600
500
400
300
200
100
0
-100
-200
-300
-400
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

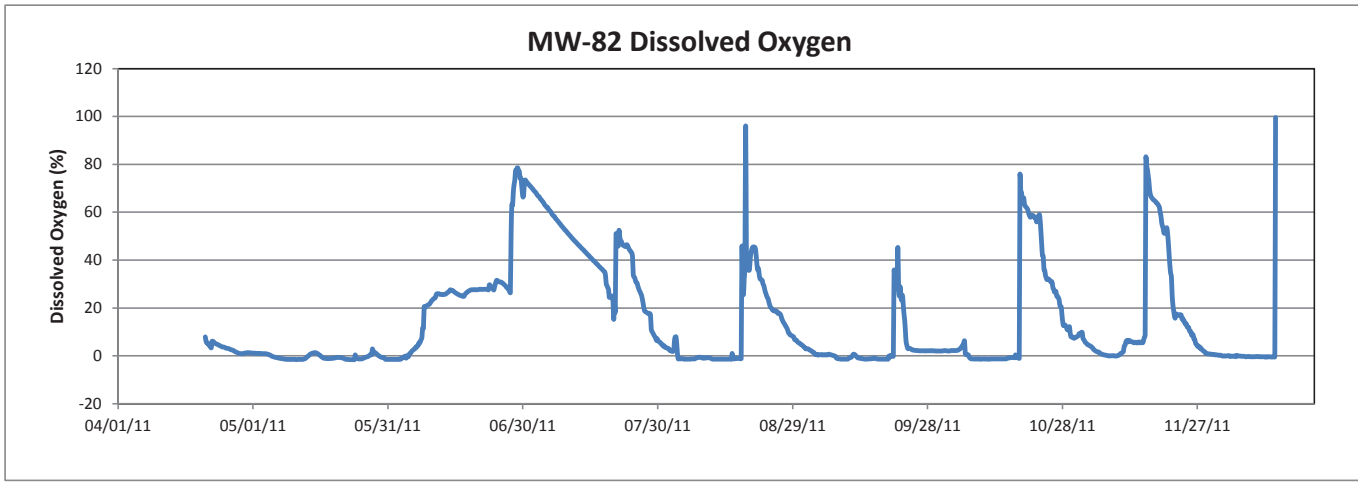

MW-81 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
-20
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

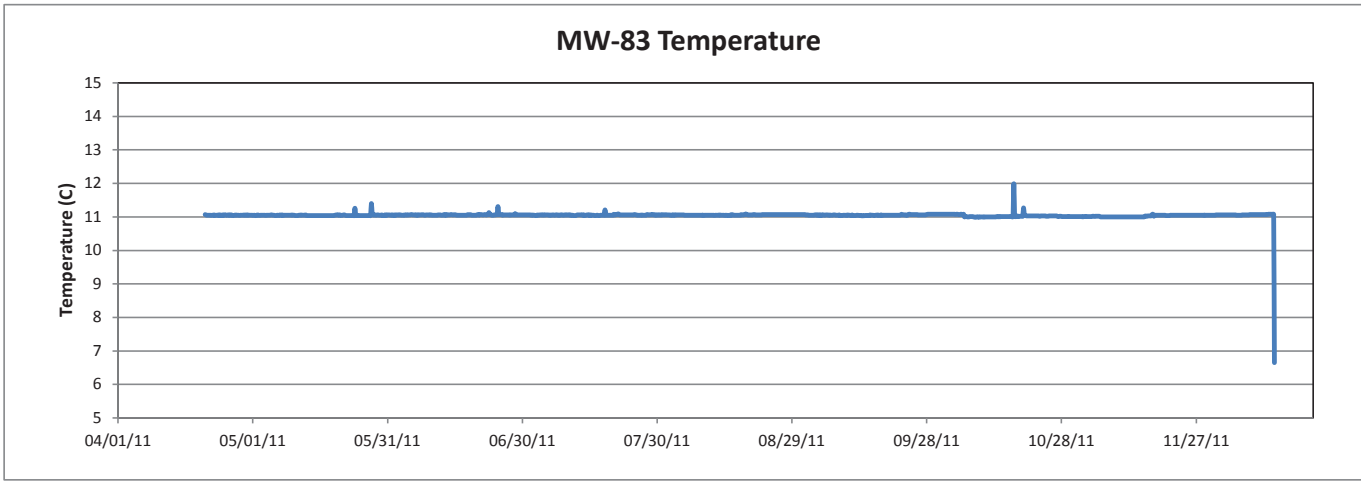

MW-82 Temperature
Temperature (C)
35
30
25
20
15
10
5
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

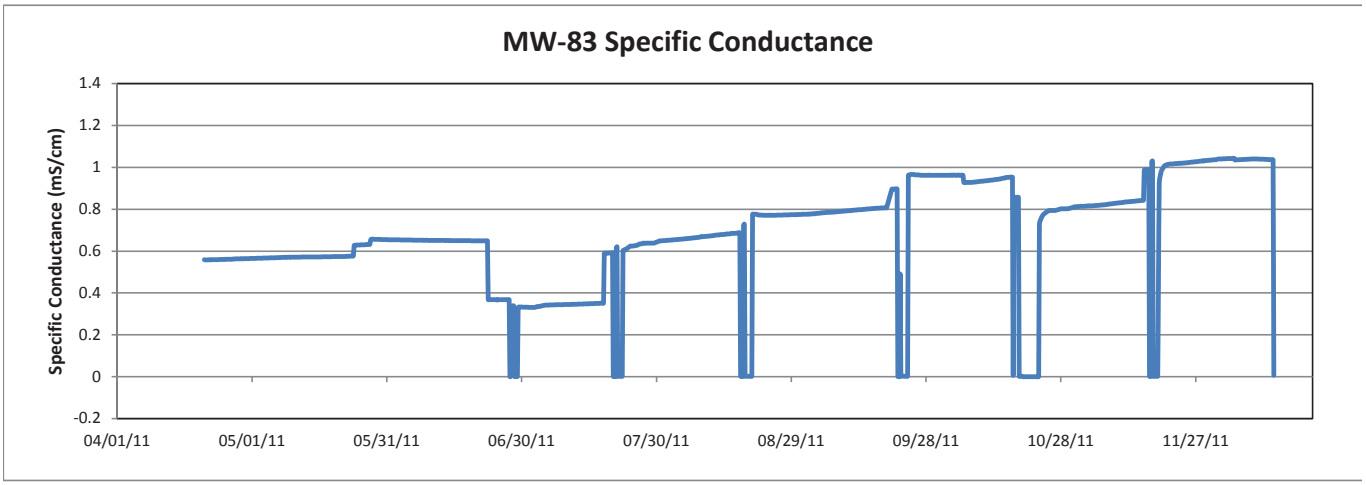

MW-82 Specific Conductance
Specific Conductance (mS/cm)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

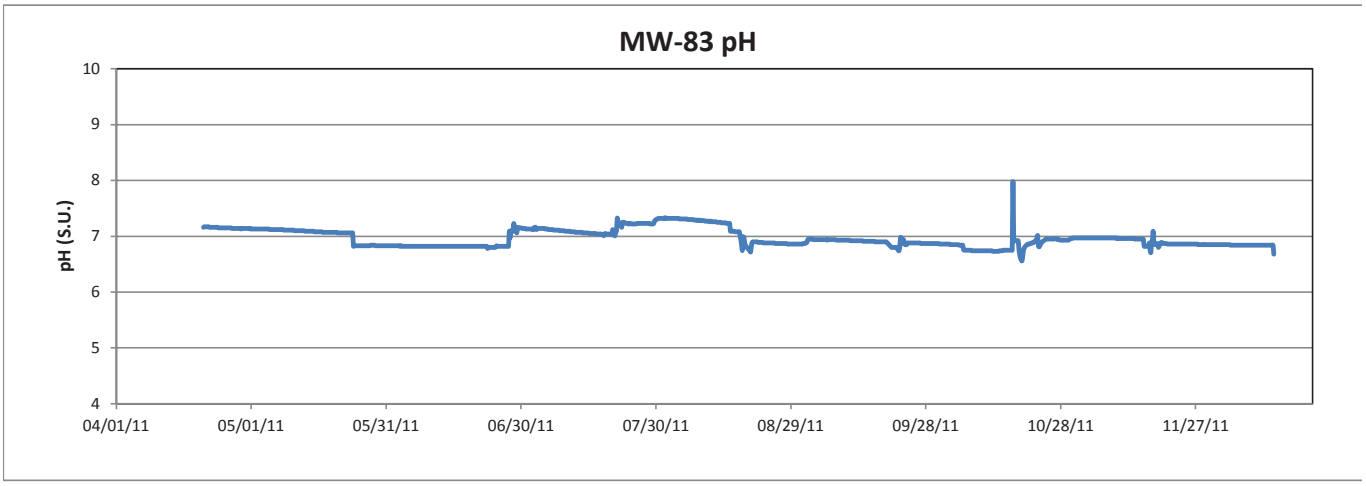

MW-82 pH
pH (S.U.)
12
11
10
9
8
7
6
5
4
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

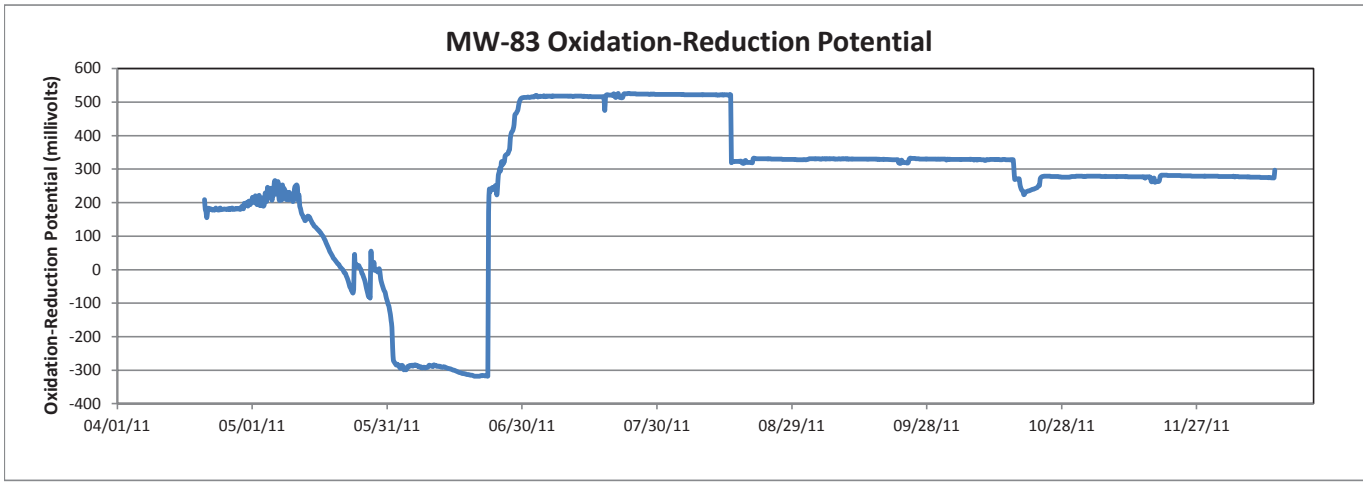

MW-82 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
500
400
300
200
100
0
-100
-200
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

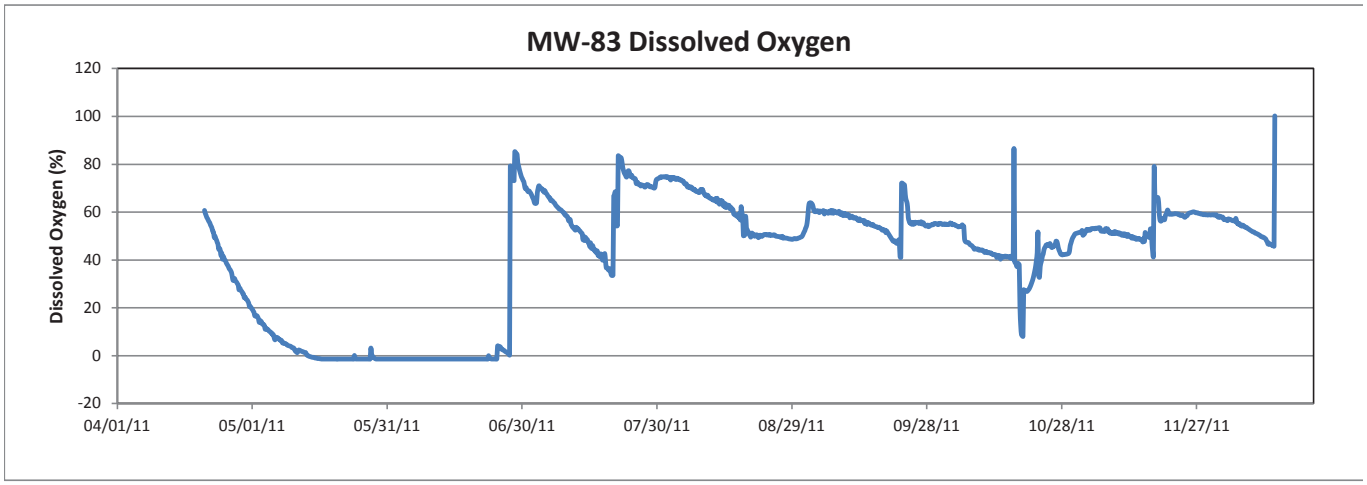

MW-82 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
-20
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

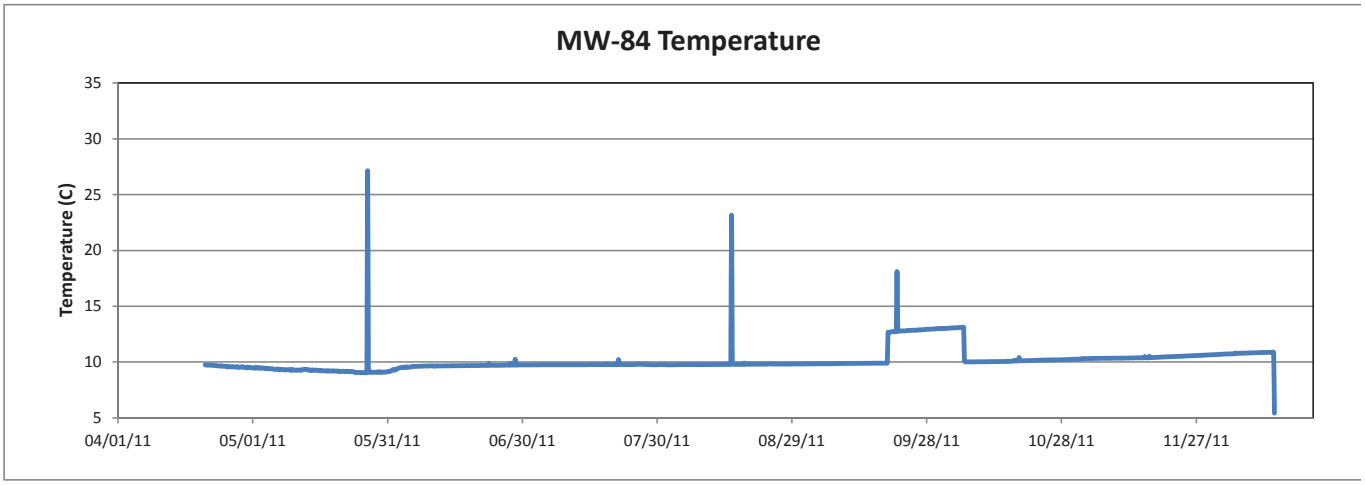

MW-83 Temperature
Temperature (C)
15
14
13
12
11
10
9
8
7
6
5
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

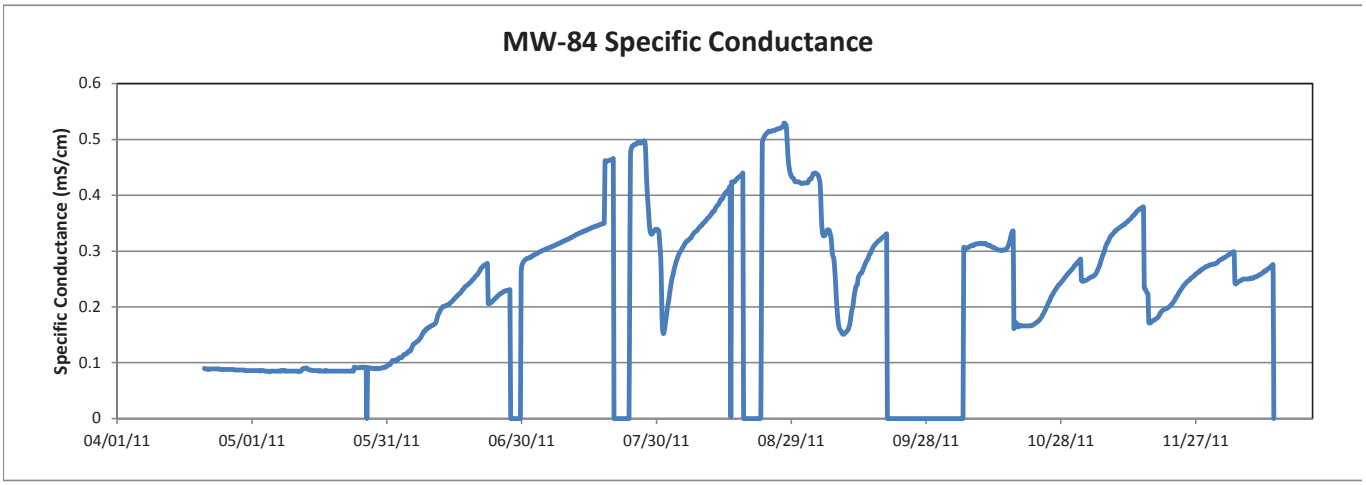

MW-83 Specific Conductance
Specific Conductance (mS/cm)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

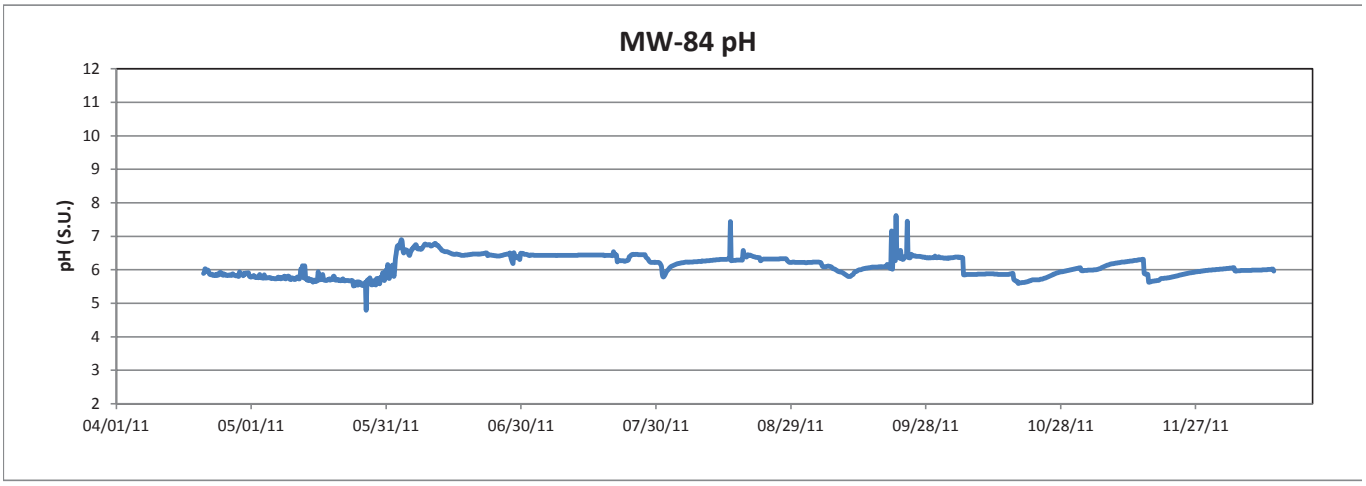

MW-83 pH
pH (S.U.)
10
9
8
7
6
5
4
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

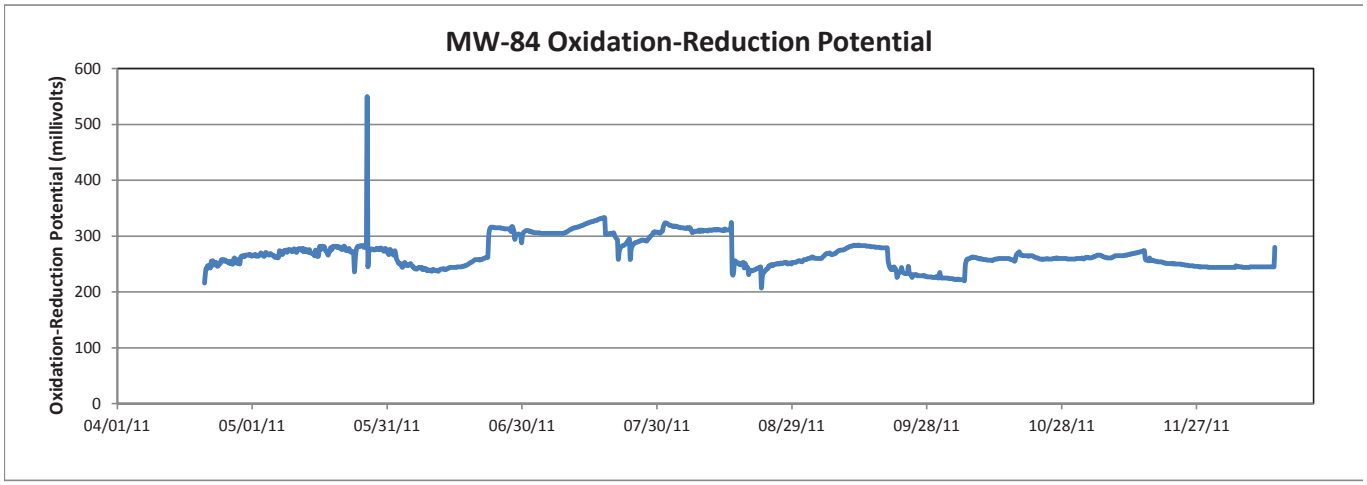

MW-83 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
600
500
400
300
200
100
0
-100
-200
-300
-400
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

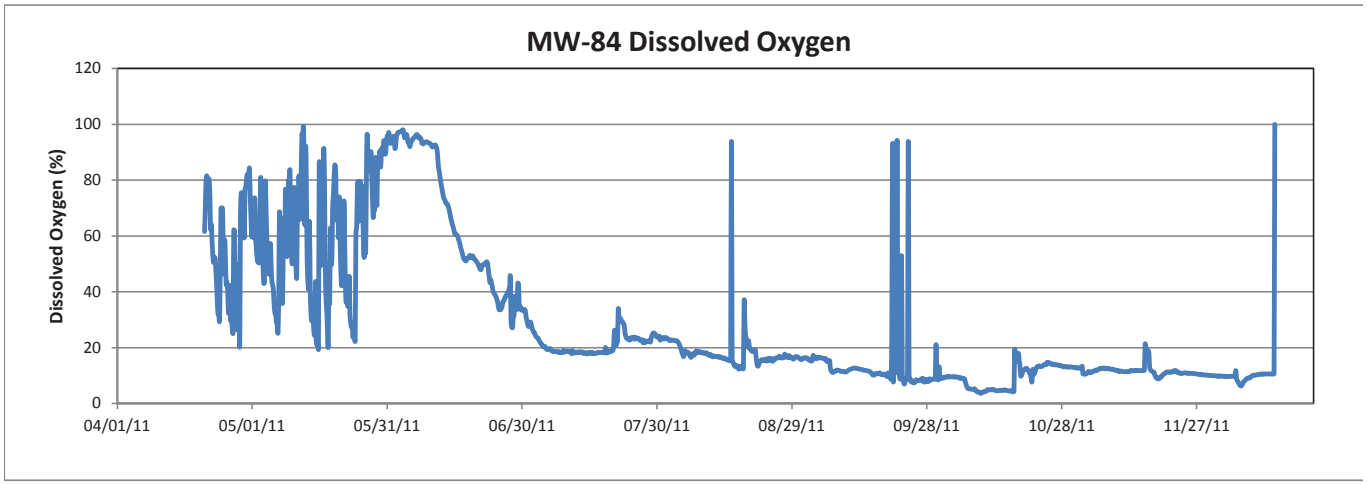

MW-83 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
-20
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

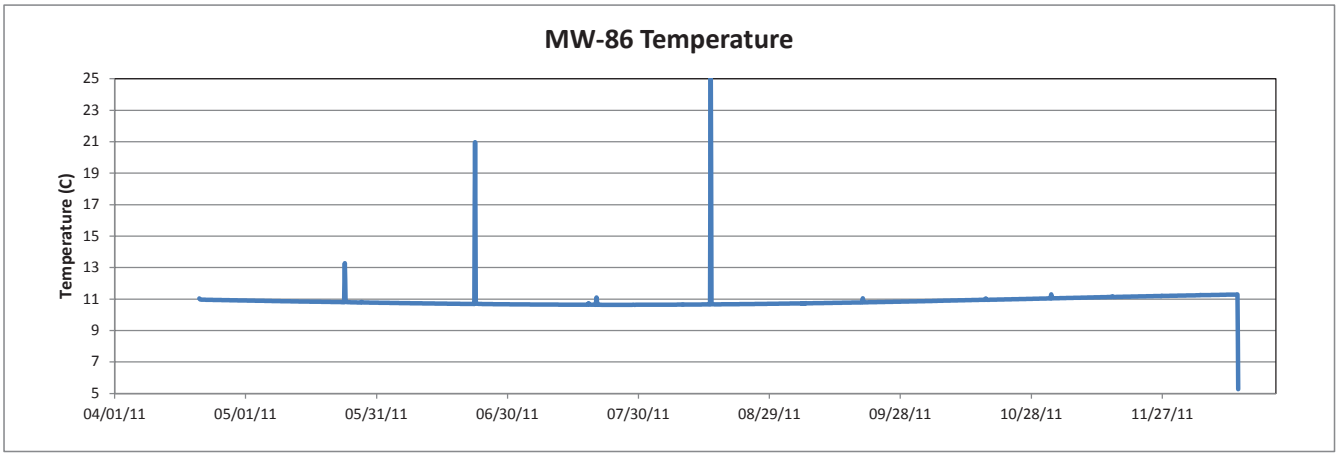

MW-84 Temperature
Temperature (C)
35
30
25
20
15
10
5
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

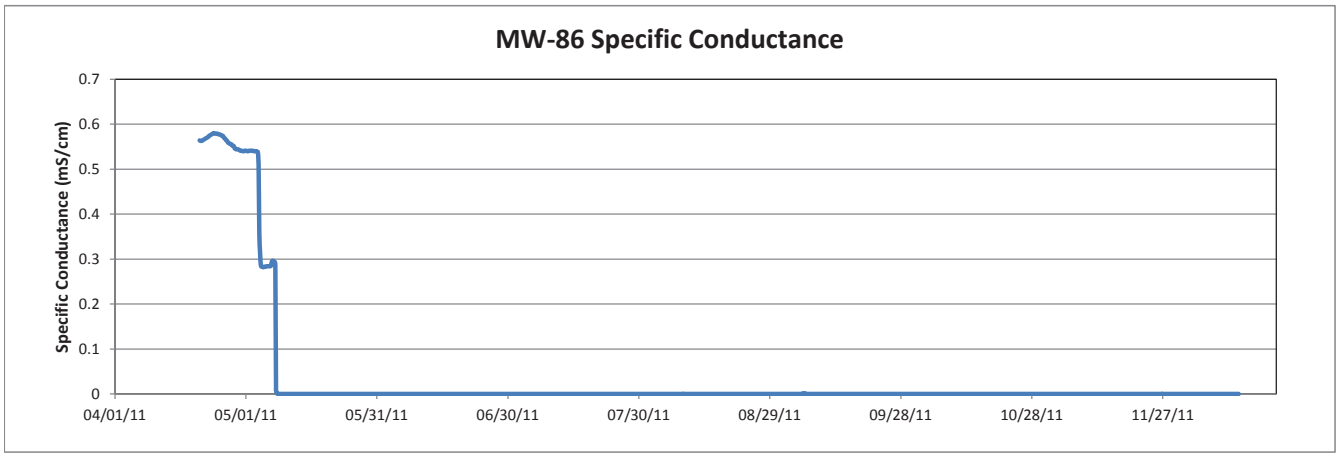

MW-84 Specific Conductance
Specific Conductance (mS/cm)
0.6
0.5
0.4
0.3
0.2
0.1
0
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

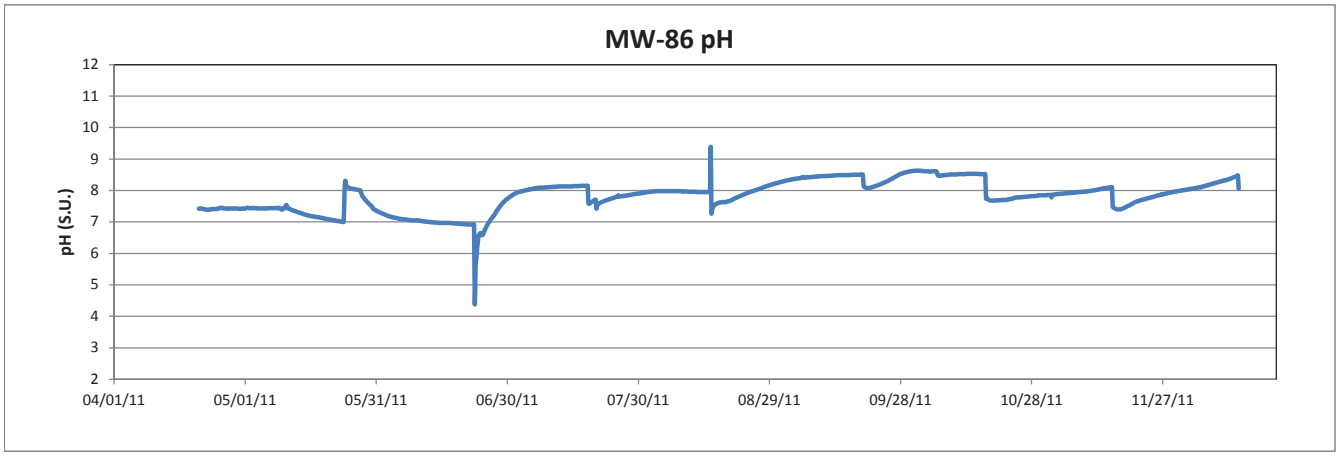

MW-84 pH
pH (S.U.)
12
11
10
9
8
7
6
5
4
3
2
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

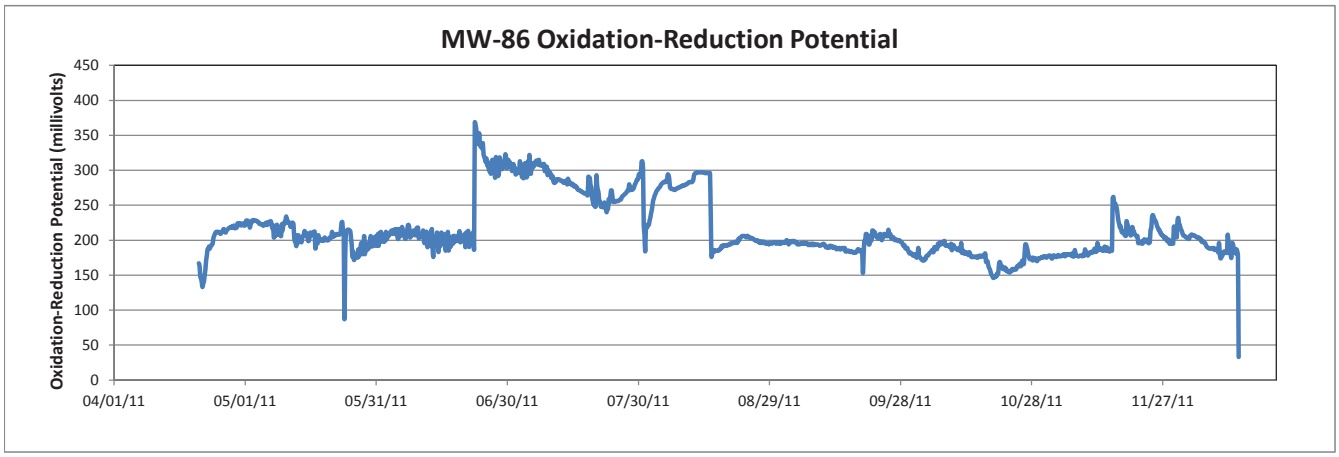

MW-84 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
600
500
400
300
200
100
0
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

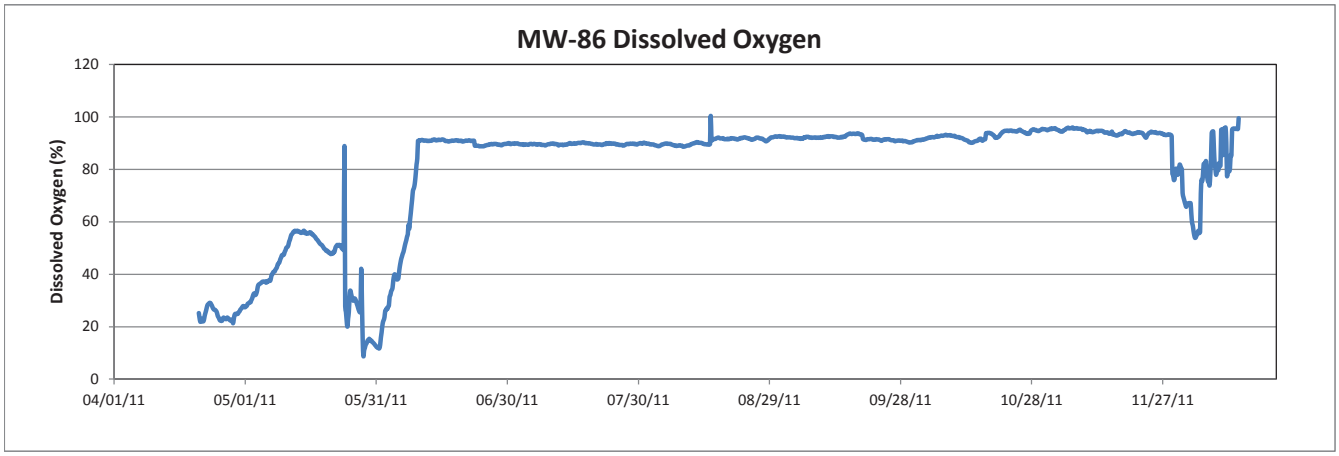

MW-84 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

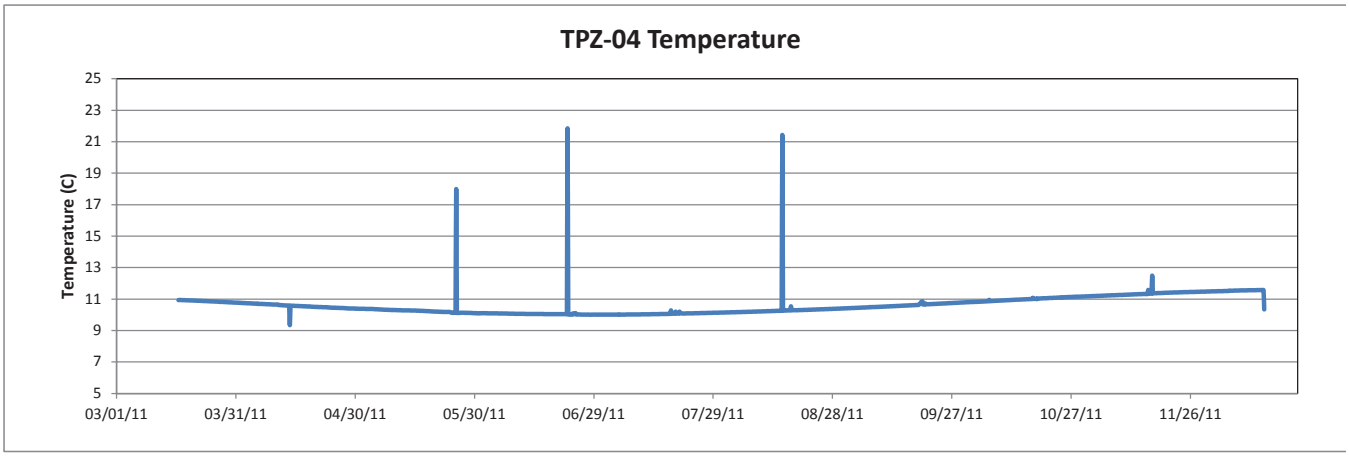

MW-86 Temperature
Temperature (C)
25
23
21
19
17
15
13
11
9
7
5
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

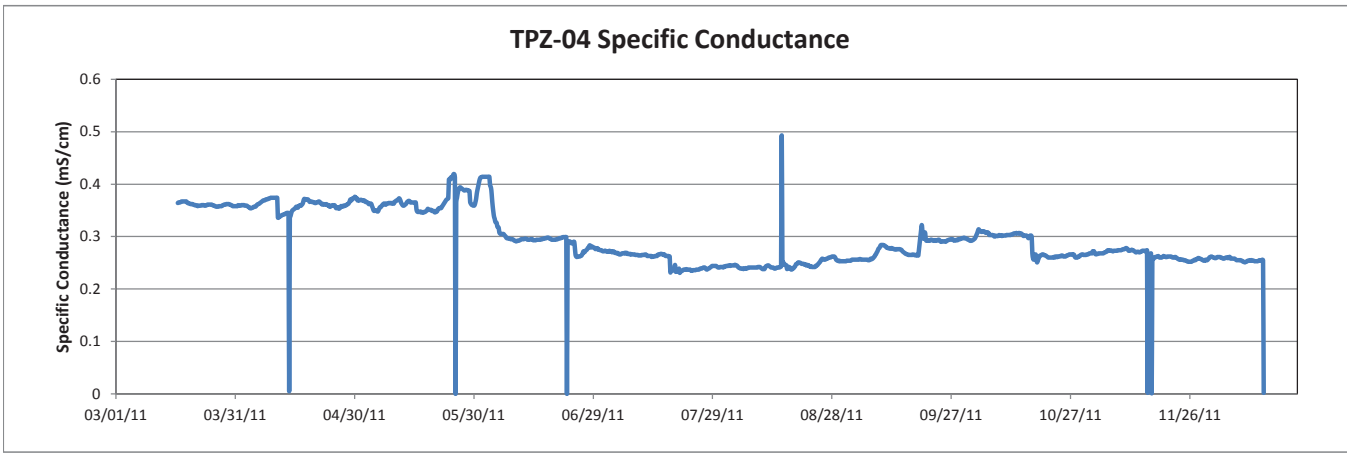

MW-86 Specific Conductance
Specific Conductance (mS/cm)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

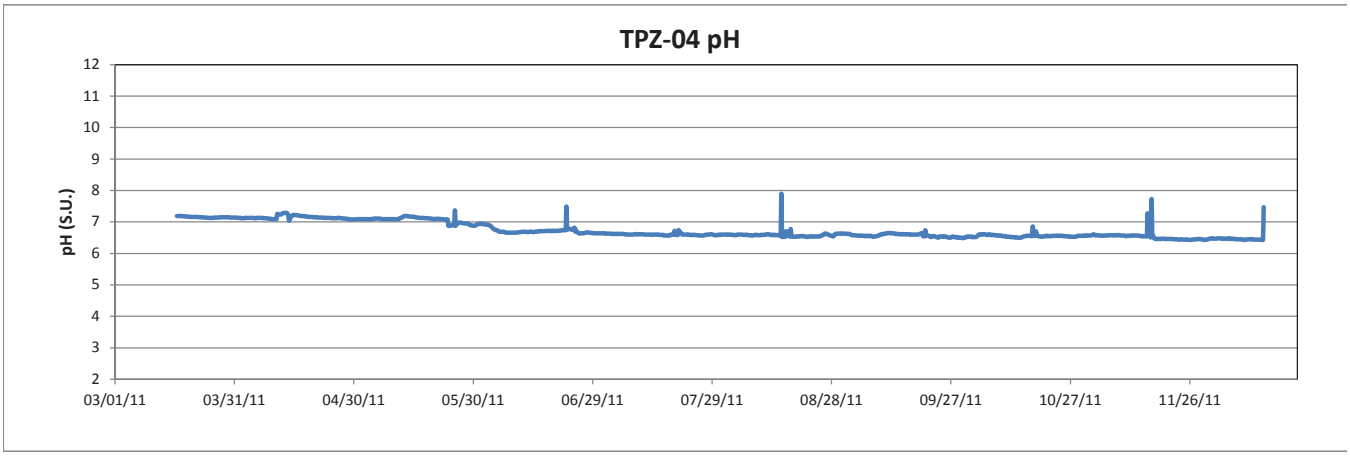

MW-86 pH
pH (S.U.)
12
11
10
9
8
7
6
5
4
3
2
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

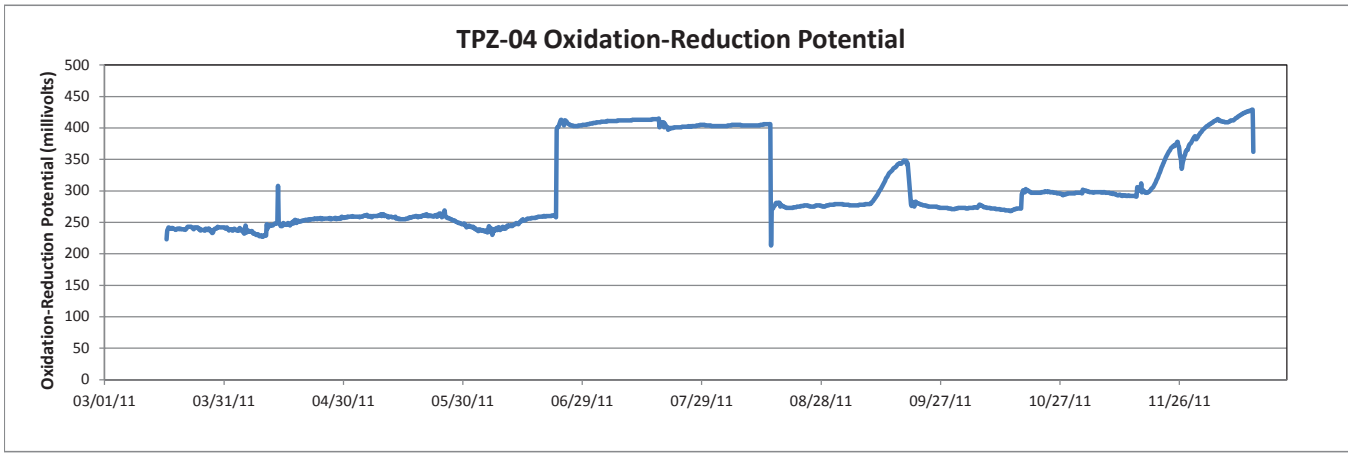

MW-86 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
450
400
350
300
250
200
150
100
50
0
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11

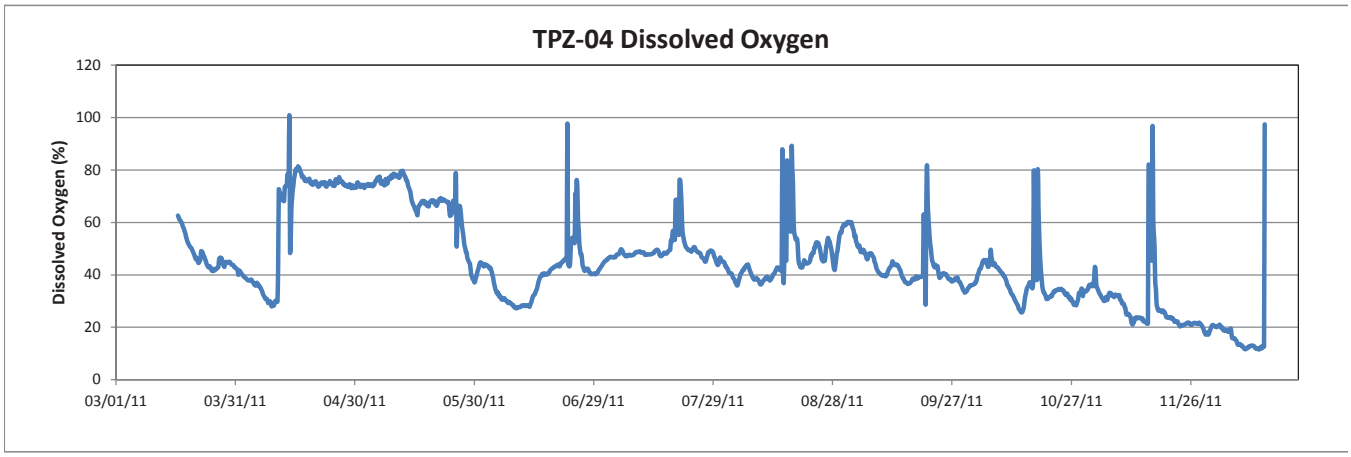

MW-86 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
04/01/11
05/01/11
05/31/11
06/30/11
07/30/11
08/29/11
09/28/11
10/28/11
11/27/11


TPZ-04 Temperature
Temperature (C)
25
23
21
19
17
15
13
11
9
7
5
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11


TPZ-04 Specific Conductance
Specific Conductance (mS/cm)
0.6
0.5
0.4
0.3
0.2
0.1
0
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11


TPZ-04 pH
pH (S.U.)
12
11
10
9
8
7
6
5
4
3
2
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11


TPZ-04 Oxidation-Reduction Potential
Oxidation-Reduction Potential (millivolts)
500
450
400
350
300
250
200
150
100
50
0
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11


TPZ-04 Dissolved Oxygen
Dissolved Oxygen (%)
120
100
80
60
40
20
0
03/01/11
03/31/11
04/30/11
05/30/11
06/29/11
07/29/11
08/28/11
09/27/11
10/27/11
11/26/11

APPENDIX B

SLDA ANNUAL GROUNDWATER SAMPLING PLAN

US Army Corps of Engineers®
Buffalo District
BUILDING STRONG®

Formerly Utilized Sites Remedial Action Program (FUSRAP)

Shallow Land Disposal Area (SLDA) Site Monitoring Plan

May 2013

Table of Contents

1. Introduction

1.1 Background

The United States Army Corps of Engineers (USACE) is the Lead Federal Agency under the Formerly Utilized Sites Remedial Action Program (FUSRAP), and is responsible for the remediation and operations and maintenance of the Shallow Land Disposal Area (SLDA) Site (hereafter referred to as the "site"), in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The USACE Buffalo District (LRB) supports the Pittsburgh District (LRP) in these efforts for the SLDA Site. The site is located in Parks Township, Armstrong County, Pennsylvania, about 23 miles (37 kilometers) east-northeast of Pittsburgh, Pennsylvania.

The 44-acre site (18 hectares) includes ten trenches. The trenches located on the SLDA site are actually a series of disposal pits located close to each other, giving the general appearance of trenches. The area covered by these trenches is approximately 1.2 acres (0.49 hectares). The term "trench" is used in this report to describe these disposal pits for consistency with previously reported information for the site. The waste disposal area is separated into two general areas; one area containing Trenches 1 through 9 (referred to as the upper trench area) and a second area comprised of Trench 10. The land slopes downward from the southeast (Trenches 1 through 9) toward the northwest (Trench 10), describing a change in elevation of approximately 115 feet (35 meters) over a distance of approximately 1,000 feet (310 meters).

The SLDA is predominantly an open field, with wooded vegetation along most of the northeastern boundary and in the southeastern and southern corners. A small, intermittent stream, identified as Dry Run, collects surface runoff from the site and from several groundwater seeps located along the hillside. A portion of the flow in Dry Run infiltrates through the coal mine spoils in the vicinity of Trench 10 and into the abandoned coal mines that underlie the majority of the site. The balance of Dry Run flow continues off site, northwest to the Kiskiminetas River.

Land use surrounding the SLDA site is mixed, consisting of medium-sized residential communities and individual rural residences, small farms with croplands and pastures, idle farmland, forestlands, and light industrial areas. The closest community is Kiskimere, which is adjacent to and to the south of the SLDA. Some residences within this community are located within several hundred feet of the SLDA.

1.2 Purpose

This Monitoring Plan (MP) has been prepared to define monitoring activities to be conducted as part of the FUSRAP investigations of the site.

Specific goals of the MP include:

- Define rationale for continued monitoring activities
- Identify the media and locations to be sampled
- Identify the frequency of sampling
- Specify analytical parameters for collected samples

It is recommended that the MP be implemented at the site annually until completion of the remedial action. Monitoring activities should be re-evaluated and modified as necessary to address monitoring requirements and objectives associated with investigation and remediation activities.

2. Previous Monitoring

Historical groundwater monitoring of the site consisted of a site investigation in 1981, site characterization from 1990-1994, another investigation in 1995, and the site owner's quarterly monitoring from 1991-2000.

Groundwater monitoring was conducted by USACE in 2003 and 2004 as part of remedial investigation (RI) activities. The following parameters were addressed in the RI monitoring events:

- Radium-228
- Uranium
- Thorium
- Plutonium-239,241
- Americium-241

In addition, a subset (10%) of the RI samples were analyzed for cesium-137, cobalt-60, thorium-230, radium-226, plutonium-238, 240, 242, and gross alpha and beta.

This previous sampling of groundwater has indicated FUSRAP-related constituents are not impacting groundwater on site.

However, as the beginning of site remediation approached, USACE proactively developed a groundwater monitoring program to monitor the groundwater and capture data for any change in conditions that would release contamination to the groundwater as a result of our excavation activities. The program included monthly sampling of 14 wells located downgradient of the trenches for a suite of analyses including: isotopic uranium, isotopic thorium, radium-228, plutonium-239, 241, americium-241, total uranium, TAL metals plus molybdenum, anions, VOCs, SVOCs, total organic carbon, and total dissolved solids. The radiological and metals analyses were collected as both unfiltered and filtered samples. The wells included in the program are comprised of eight pre-existing wells and six new wells which were installed in April 2011. They are: MW-08, MW-11S, MW-17, MW-25, MW-26, MW-29, MW-51, MW-80, MW-81, MW-82, MW-83, MW-84, MW-86, and TPZ-04. This sampling was conducted from April through December of 2011, however, when site remediation was suspended, so was this monitoring program.

3. Monitoring Program Objective

The overarching objective of the Monitoring Program is to ensure the protection of human health and safety from FUSRAP-related constituents of concern at the SLDA FUSRAP site. The USACE MP dictates an optimal monitoring array that will achieve the following objective:

a) Work cooperatively with the U.S. Environmental Protection Agency and PaDEP to provide assurance to residents living to the south of the site that they are not being impacted by FUSRAP-related contamination.

4. Planned Monitoring Activities

To meet the monitoring program objective, annual groundwater monitoring will be conducted of wells to the south of the site, in an area between the site and the neighboring residences. Table 1 presents a complete summary of the proposed monitoring for the site and describes the monitoring rationale for each monitoring well or sample point included in the program. Both unfiltered (total fraction) and field filtered (dissolved fraction) groundwater samples will be analyzed for the constituents shown in Table 2. Filtered samples will be collected in the field by utilizing a disposable 0.45 micron in-line filter. The only field provided quality control samples will be field duplicates. They will be collected at a rate of approximately one field duplicate for every ten regular samples.

Contaminant migration monitoring samples will be collected at twenty-four (24) groundwater locations as described in Attachment 1. Attachment 1 shows the conceptual site model as well as a series of groundwater contour maps (showing groundwater flow direction) that were presented in the RI report. This type of continued monitoring will assist in ensuring that on-site groundwater contamination does not pose a threat to human receptors nor reach levels that promote unacceptable risk to the environment.

4.1 Groundwater flow will be monitored by collecting static water level measurements from all accessible groundwater wells (including peizometers, temporary sampling points, etc.) prior to initiating sampling. These wells are shown on Figure 1 and listed in Table 1. Table 1 also highlights 22 wells that are not shown on Figure 1; these wells will be decommissioned under remedial actions and only used for groundwater level measurements while available. All static water level measurements will be made using an electronic resistivity probe (water level meter) and will be recorded to the nearest 0.01 foot below the top of the well casing. The meter will be cleaned prior to use in each well.

4.2 The groundwater sampling will be comprised of twenty-four well locations. These locations are shown in Figure 2. Low-flow sampling techniques consistent with guidance from U.S. EPA (Puls and Barcelona, 1996) and DoD (DoD, 2013) will be utilized where possible during groundwater sampling. During well purging, the following field parameters will be recorded until stabilization has occurred: temperature, pH, specific

conductance, oxidation-reduction potential, turbidity, and dissolved oxygen. Poorly producing wells may require the use of a bailer to collect water, which may be composited over a several day period to obtain sufficient volume for filling sample containers.

4.3 Samples will be packaged according to standard practices, and shipped to a DoD ELAP accredited laboratory(ies). Laboratory data will be reviewed and qualified per laboratory performance quality indicators, the applicable laboratory and method criteria, and the DoD Quality Systems Manual.

4.4 Investigation Derived Watse (IDW) – The IDW will consist of solids and liquids. The solid IDW will be used PPE, tubing, filters, and other general trash. It will be bagged and left on site for future disposition. The liquid IDW will consist of purge water. The liquid IDW will be containerized in an on-site holding tank located in the Materials Processing Building and stored for future disposition.

Table 1. Shallow Land Disposal Area FUSRAP Site Monitoring Program Summary

Well/Location	Top of Casing Elevation (ft AMSL)	Zone	Up (U) or Down (D) Gradient from Disposal Areas	Monitoring Activity			Rationale
				Water Level	Unfiltered GW	Filtered GW	
02U11	925.99	OB	D	X			Water Levels
02U13	923.45	OB	D	X			Water Levels
03U05	924.10	OB	D	X			Water Levels
05U07	935.10	OB	U	X			Water Levels
06U05	941.26	OB	D	X			Water Levels
08U04	938.94	OB	D	X			Water Levels
08U05	940.93	OB	D	X			Water Levels
09U07	927.69	OB	D	X			Water Levels
10L31	859.84	UF	U	X	X	X	Contaminant non-migration verification
10L32	848.69	UF	U	X			Water Levels
MW-01	845.79	UF	U	X			Water Levels
MW-02	884.22	DB	U	X			Water Levels
MW-02A	885.43	UF	D	X	X	X	Contaminant non-migration verification
MW-03	890.50	UF	D	X	X	X	Contaminant non-migration verification
MW-04	NA	UF	D	X			Water Levels
MW-05	865.49	UF	U	X	X	X	Contaminant non-migration verification
MW-07	921.52	1S	U/cross gradient	X	X	X	Contaminant non-migration verification
MW-08	931.77	1S	U	X	X	X	Contaminant non-migration verification
MW-09A	945.45	1S	U	X	X	X	Contaminant non-migration verification
MW-11D	909.80	2S	D	X			Water Levels
MW-11S	909.27	OB	D	X			Water Levels
MW-12D	919.31	1S	D	X			Water Levels

Well/Location	Top of Casing Elevation (ft AMSL)	Zone	Up (U) or Down (D) Gradient from Disposal Areas	Monitoring Activity			Rationale
				Water Level	Unfiltered GW	Filtered GW	
MW-13	948.68	1S	U	X	X	X	Contaminant non-migration verification
MW-14	947.33	1S	U	X	X	X	Contaminant non-migration verification
MW-15	940.31	1S	U	X	X	X	Contaminant non-migration verification
MW-17	913.71	2S	D	X			Water Levels
MW-19	861.45	DB	U	X			Water Levels
MW-20	889.87	UF	D	X	X	X	Contaminant non-migration verification
MW-21	888.32	UF	D	X	X	X	Contaminant non-migration verification
MW-22	893.41	DB	D	X	X	X	Contaminant non-migration verification
MW-25	910.07	1S	D	X			Water Levels
MW-26	919.56	1S	D	X			Water Levels
MW-27	929.99	1S	D	X			Water Levels
MW-29	912.53	1S	D	X			Water Levels
MW-32	925.89	1S	U	X	X	X	Contaminant non-migration verification
MW-33	940.76	2S	U	X	X	X	Contaminant non-migration verification
MW-34A	926.84	DB	D	X	X	X	Contaminant non-migration verification
MW-35	913.68	DB	U	X			Water Levels
MW-37	926.58	2S	D	X			Water Levels
MW-39	891.99	UF	D	X	X	X	Contaminant non-migration verification
MW-40	939.63	DB	D	X	X	X	Contaminant non-migration verification
MW-41	912.86	1S	D	X			Water Levels
MW-42	916.50	1S	D	X			Water Levels
MW-43	916.32	2S	D	X			Water Levels
MW-44	930.98	1S	D	X			Water Levels
MW-45	929.90	2S	U	X	X	X	Contaminant non-migration verification
MW-46	924.18	UF	D	X	X	X	Contaminant non-migration verification
MW-47	925.18	OB	U	X	X	X	Contaminant non-migration verification
MW-50	902.02	1S	D	X			Water Levels
MW-51	925.43	1S	D	X			Water Levels
MW-52	924.73	2S	U	X	X	X	Contaminant non-migration verification
MW-53	925.34	2S	D	X			Water Levels
MW-58	838.93	DB	U	X			Water Levels
MW-59	932.45	OB	U	X			Water Levels
MW-61	932.49	2S	U	X	X	X	Contaminant non-migration verification
MW-62	926.22	UF	D	X			Water Levels
MW-64	946.50	OB	U	X			Water Levels
MW-69	947.43	OB	U	X			Water Levels
MW-74	925.30	OB	U	X			Water Levels
MW-80	916.07	1S	D	X			Water Levels
MW-81	898.22	1S	D	X			Water Levels
MW-82	921.22	1S	D	X			Water Levels
MW-83	916.03	OB	D	X			Water Levels
MW-84	923.36	1S	D	X			Water Levels
MW-86	928.02	1S	D	X			Water Levels

Well/Location	Top of Casing Elevation (ft AMSL)	Zone	Up (U) or Down (D) Gradient from Disposal Areas	Monitoring Activity			Rationale
				Water Level	Unfiltered GW	Filtered GW	
NWS-01A	931.57	Varies	Varies	X			Water Levels
NWS-02	946.35	Varies	Varies	X			Water Levels
NWS-03	946.87	Varies	Varies	X			Water Levels
NWS-04	925.25	Varies	Varies	X			Water Levels
NWS-05	914.28	Varies	Varies	X			Water Levels
PZ-01	907.53	OB	D	X			Water Levels
PZ-02	913.49	OB	D	X			Water Levels
PZ-03A	920.72	OB	D	X			Water Levels
PZ-04	920.85	OB	D	X			Water Levels
PZ-05	929.78	OB	D	X			Water Levels
PZ-06A	943.23	OB	D	X			Water Levels
PZ-07	942.67	OB	U	X			Water Levels
PZ-08	933.31	OB	U	X			Water Levels
PZ-09	938.49	OB	U	X	X	X	Contaminant non-migration verification
TPZ-01	924.30	1S	U	X			Water Levels
TPZ-02	926.38	1S	U	X			Water Levels
TPZ-03	895.50	1S	D	X			Water Levels
TPZ-04	914.09	1S	D	X			Water Levels
TPZ-05	916.51	1S	D	X			Water Levels
TPZ-06	907.77	OB	D	X			Water Levels
TPZ-07	917.35	OB	D	X			Water Levels
TPZ-08	924.45	OB	D	X			Water Levels

Notes:

Yellow highlighted wells are not shown on Figure 1 and are scheduled for decommissioning as part of the remedial action

AMSL	above mean sea level
ft	foot (feet)
GW	groundwater
OB	overburden
1S	first shallow bedrock
2S	second shallow bedrock
UF	Upper Freeport
DB	Deep Bedrock

Table 2 shows the analytes and analytical methods that will be utilized for the site monitoring.

Table 2. Site Monitoring Program Analytes and Analytical Methods

Analyte	Fraction	Method
TAL Metals	Filtered and Unfiltered	EPA 6020, Inductively Coupled Plasma Mass-Spectrometry
Total Uranium	Filtered and Unfiltered	ASTM D5174, Trace Uranium by Pulsed-Laser Phosphorimetry
Americium-241	Filtered and Unfiltered	Alpha Spectrometry
Isotopic Plutonium (238, 239/240)	Filtered and Unfiltered	Alpha Spectrometry
Plutonium-241	Filtered and Unfiltered	Liquid Scintillation
Isotopic Thorium (228, 230, 232)	Filtered and Unfiltered	Alpha Spectrometry
Isotopic Uranium (234, 235, 238)	Filtered and Unfiltered	Alpha Spectrometry

5. Safety

The presence of contaminated soils at the site represents a potential health hazard to individuals who access the site. All USACE personnel will be required to follow the health and safety measures that are documented separately in the Buffalo District SLDA Site Safety and Health Plan.

6. References

Department of Defense (DoD). *DoD Environmental Field Sampling Handbook, Revision 1.0*, DoD Environmental Data Quality Workgroup, April 2013.

Puls, R. and M. Barcelona. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*, EPA Issue Paper (EPA/540/S-95/04), April 1996.

U.S. Army Corps of Engineers (USACE). *Shallow Land Disposal Area Remedial Investigation Report,* U.S. Army Corps of Engineers, October 2005.

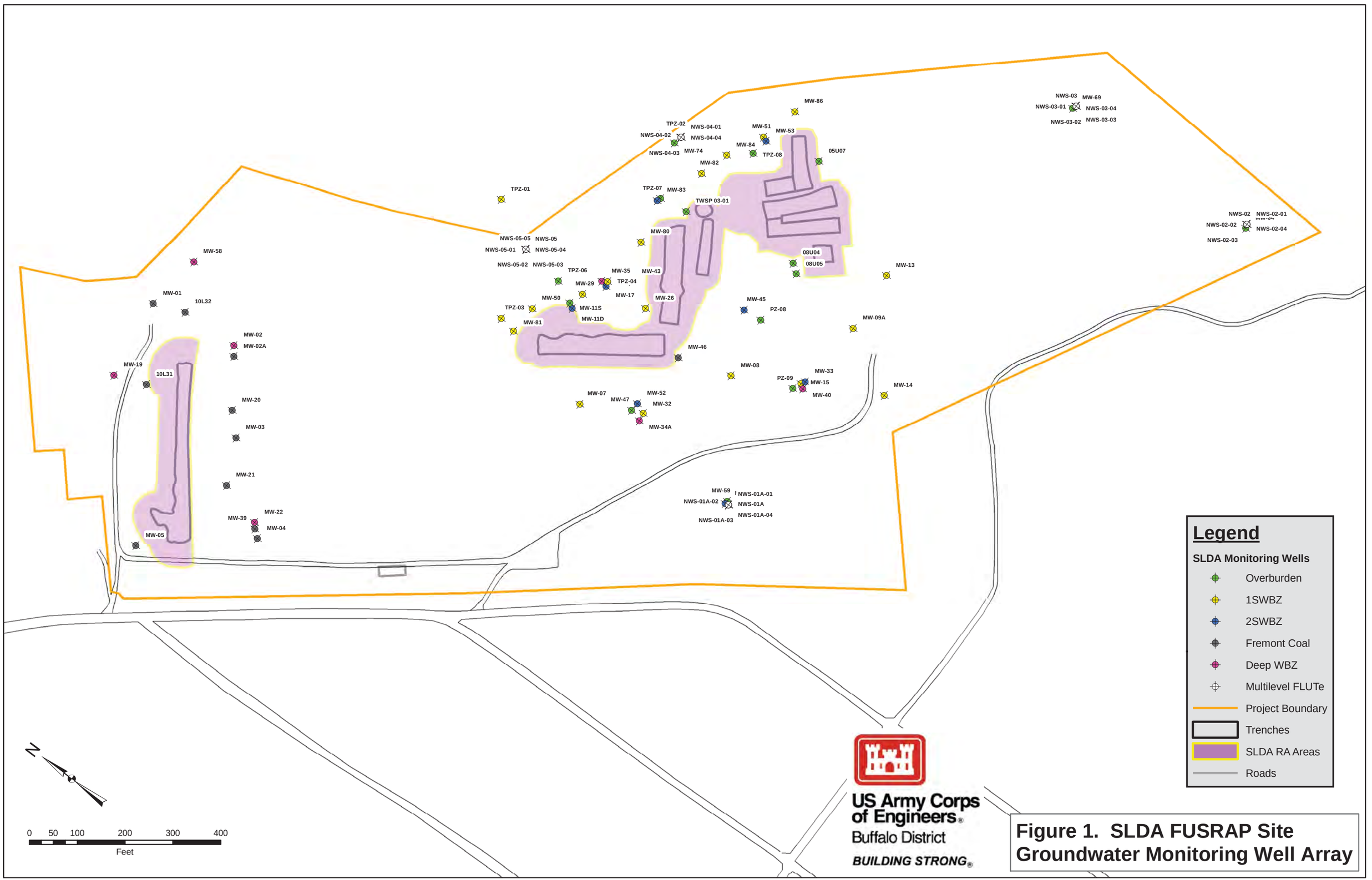


Figure 1. SLDA FUSRAP Site Groundwater Monitoring Well Array

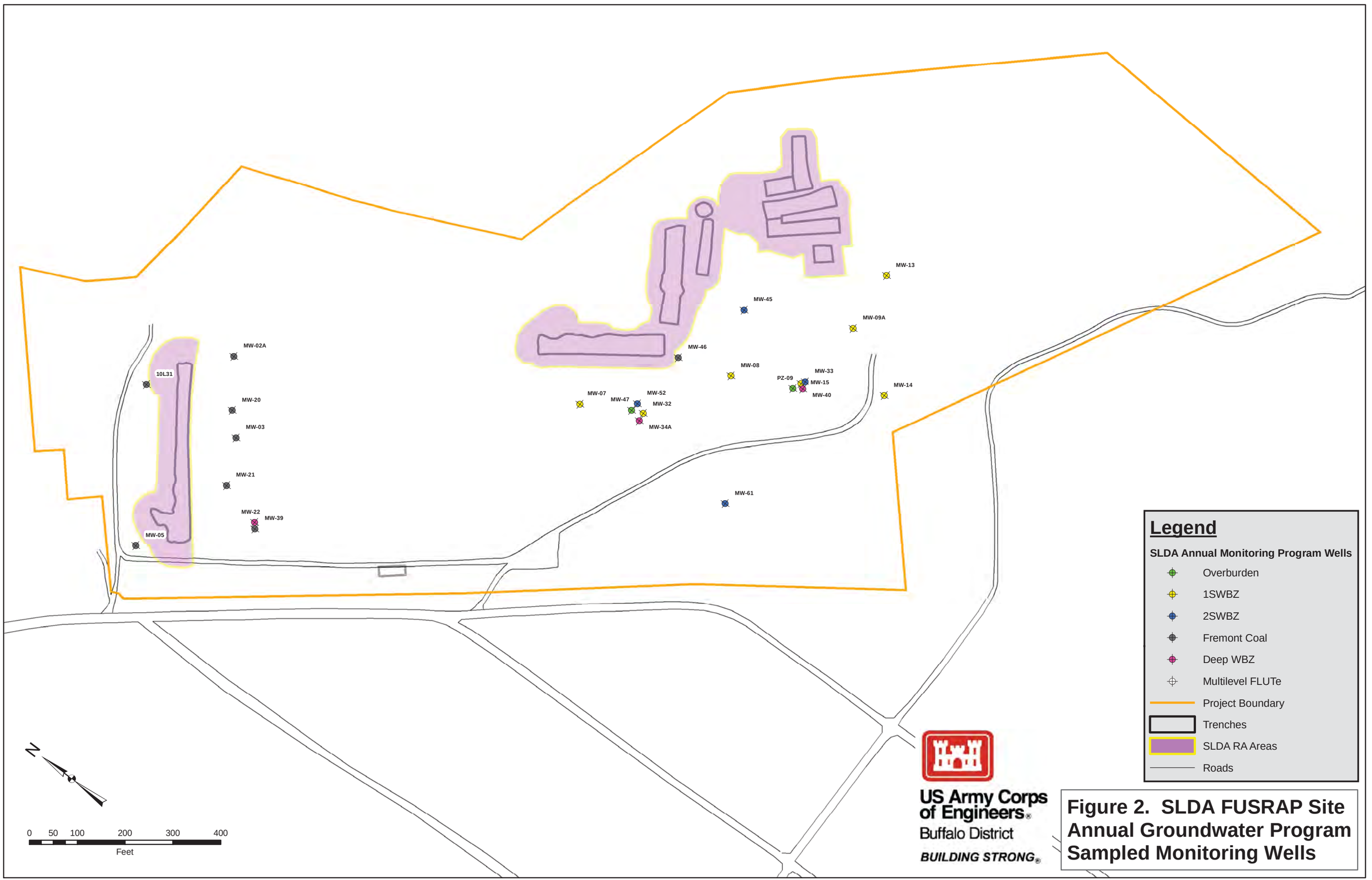
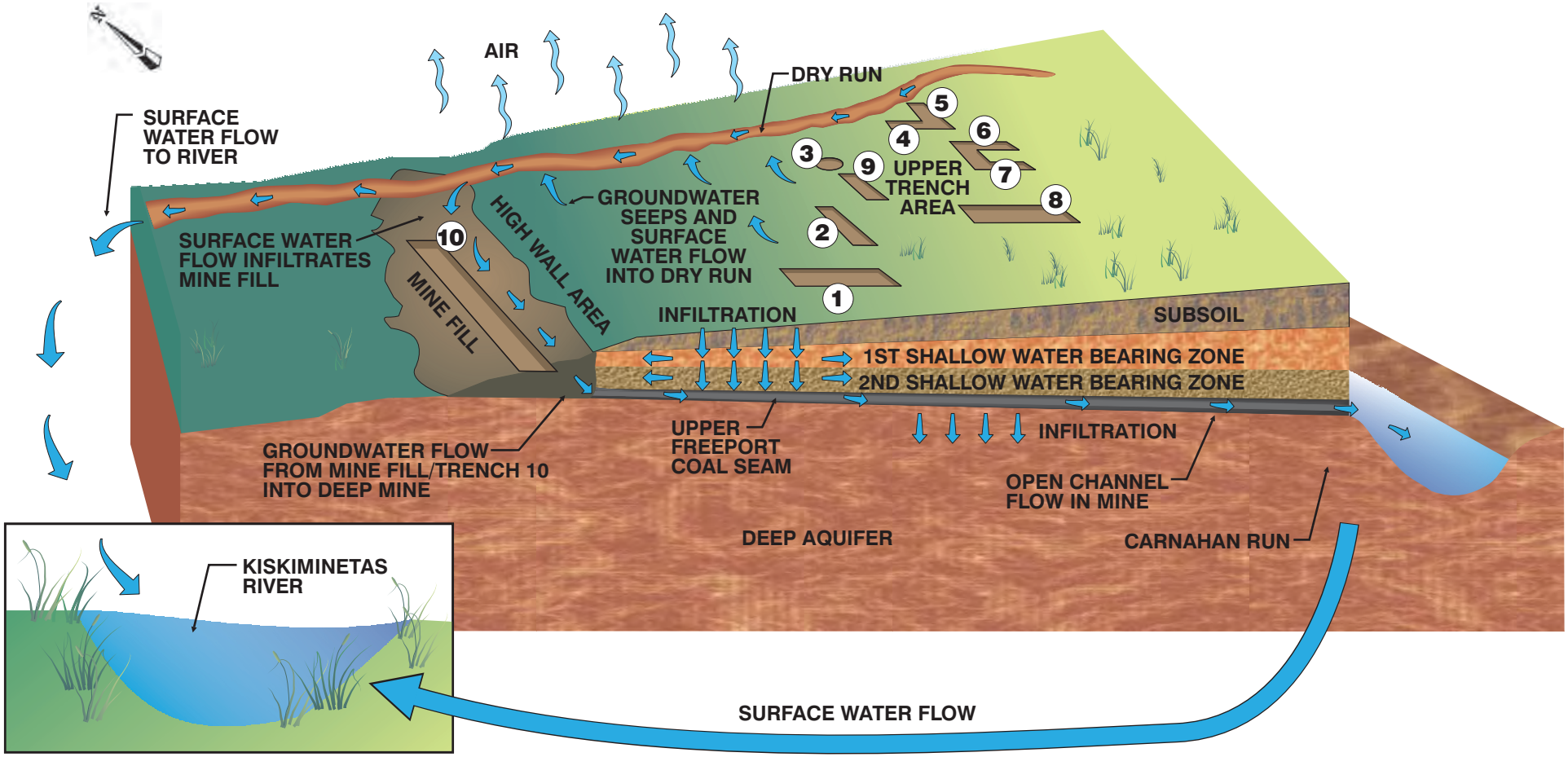


Figure 2. SLDA FUSRAP Site Annual Groundwater Program Sampled Monitoring Wells

Attachment 1

AG18569-11173429-051204-GCM

SLDA GROUNDWATER MONITORING PROGRAM CONCEPTUAL SITE MODEL FOR GROUNDWATER AND SURFACE-WATER EXPOSURE

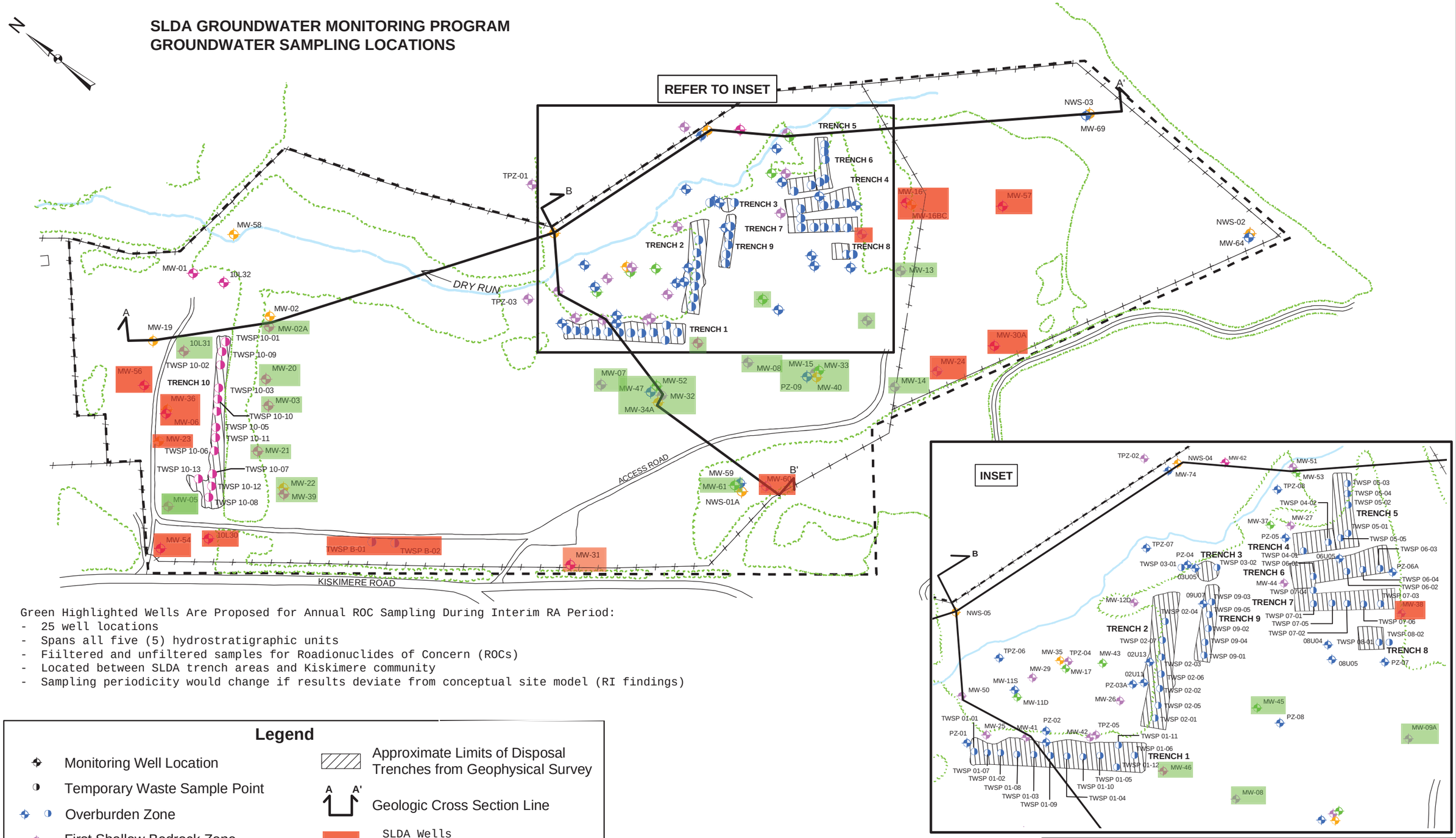


United States Army Corps of Engineers

SLDA CONCEPTUAL SITE MODEL

Sampling Program

SLDA GROUNDWATER MONITORING PROGRAM
GROUNDWATER SAMPLING LOCATIONS



Green Highlighted Wells Are Proposed for Annual ROC Sampling During Interim RA Period:
- 25 well locations
- Spans all five (5) hydrostratigraphic units
- Fiiltered and unfiltered samples for Roadionuclides of Concern (ROCs)
- Located between SLDA trench areas and Kiskimere community
- Sampling periodicity would change if results deviate from conceptual site model (RI findings)

Legend

- Monitoring Well Location
- Temporary Waste Sample Point
- Overburden Zone
- First Shallow Bedrock Zone
- Second Shallow Bedrock Zone
- Upper Freeport Zone
- Deep Bedrock Zone
- Approximate Limits of Disposal Trenches from Geophysical Survey
- A A' Geologic Cross Section Line
- SLDA Wells Decommissioned
- SLDA Wells Proposed for Annual Sampling During Interim RA Period

0 100 200 400 Feet

SLDA Wells Proposed for In-situ Monitoring and Confirmatory Sampling During RA Events

RA Support Figure

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SLDA Groundwater Flow Maps and Monitoring Well Locations

1. Pairs of groundwater contour and flow maps for each of the five water bearing zones are presented in the next 10 figures (from Remedial Investigation report).

2. The figures show groundwater flow directions during January 2004 and June 2004; note that flow directions do not grossly change between these periods.

3. The maps are annotated to show which wells will be sampled in each groundwater zone.

N

DRY RUN

ACCESS ROAD

KISKIMERE ROAD

TRENCH 1
TRENCH 2
TRENCH 3
TRENCH 4
TRENCH 5
TRENCH 6
TRENCH 7
TRENCH 8
TRENCH 9
TRENCH 10

MW-74, Dry
TPZ-08, Dry
MW-69, 934.46
TPZ-07, 912.25
PZ-05, 909.83
06U05, 933.36
PZ-04, 901.21
03U05, 911.05
PZ-06A, 939.29
MW-64, 934.20
08U04, NM
TPZ-06, Dry
02U13, 913.15
08U05, 925.46
PZ-07, 938.89
MW-11S, 899.10
PZ-03A, 904.19
02U11, 905.58
PZ-02, 895.96
01U17, 902.74
PZ-08, 924.80
PZ-01, 894.84
PZ-09, 931.67
MW-47, 905.25
MW-59, 926.61

895 900 905 910 915 920 925 930 935

Legend

- Monitoring Well
- Piezometer
- 935 Groundwater Elevation Contour
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction
- MW-47, 905.25 (Location ID; Groundwater Elevation (ft amsl))

SLDA Wells Decommissioned

SLDA Wells Proposed for Annual Sampling During Interim RA Period

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - OVERBURDEN
(JANUARY 2004)

FIGURE 2-16

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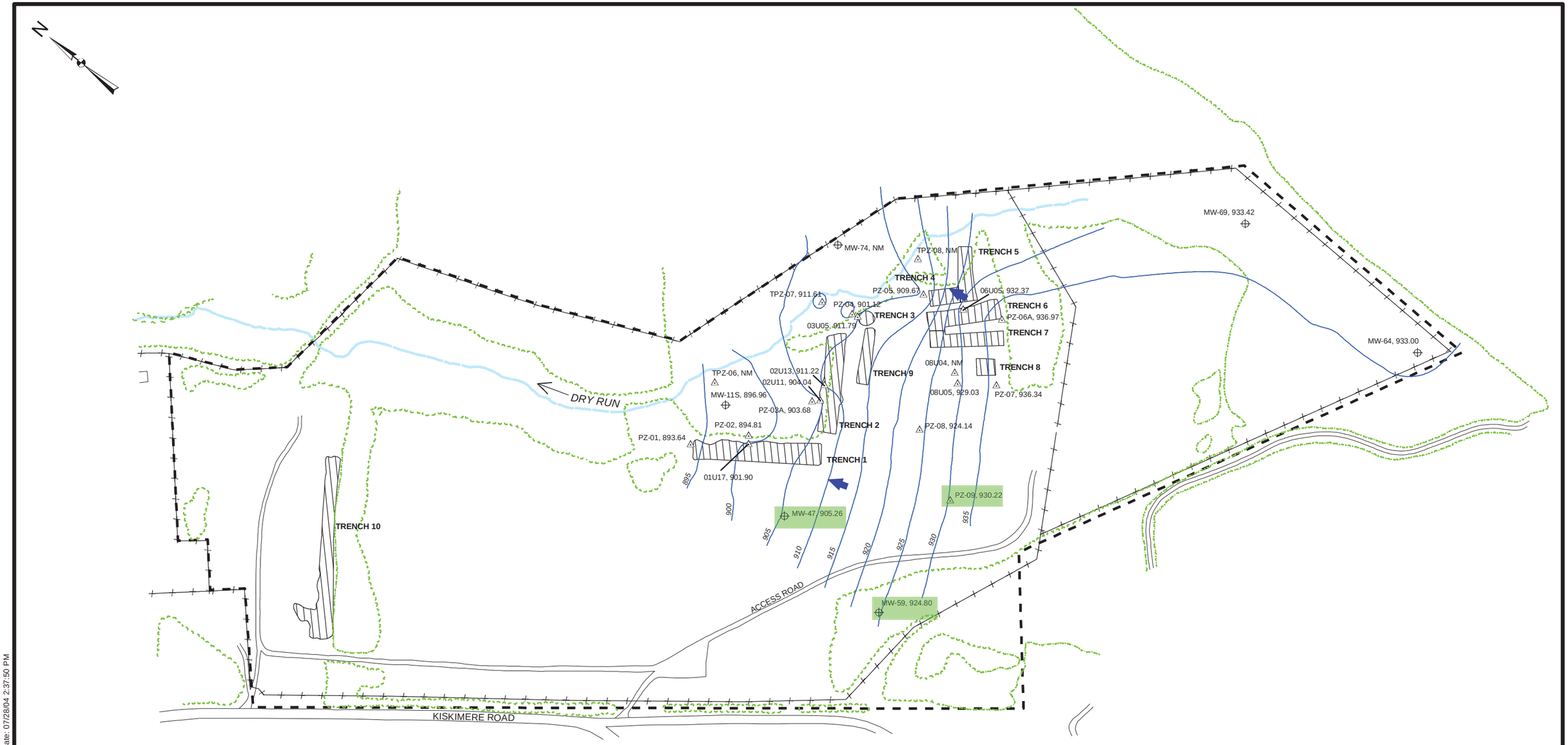

Legend

- Monitoring Well
- Piezometer
- 935 Groundwater Elevation Contour
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction
- MW-47, 905.26 (Location ID; Groundwater Elevation (ft amsl))

SLDA Wells Decommissioned

SLDA Wells Proposed for Annual Sampling During Interim RA Period

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - OVERBURDEN
(JUNE 2004)

FIGURE 2-23

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N

DRY RUN

ACCESS ROAD

KISKIMERE ROAD

TPZ-02, 891.03
NWS-04-01, Dry
MW-51, 893.33
NWS-03-01, 886.08
MW-27, 891.35
TPZ-01, 880.79
TRENCH 5
TRENCH 4
TRENCH 3
TRENCH 6
MW-44, Dry
MW-12D, 889.39
TRENCH 7
MW-35, 901.52
NWS-05-01, Dry
NWS-02-01, 926.34
TRENCH 8
TPZ-04, 894.50
TRENCH 9
MW-29, 894.42
MW-13, 925.54
MW-30, 864.64
MW-26, 888.99
TPZ-03, 886.13
TRENCH 2
MW-09A, 924.75
MW-25, 892.49
MW-41, 893.01
TRENCH 1
MW-08, 918.49
MW-15, 927.48
MW-42, 881.68
TPZ-05, 893.92
MW-24, 933.19
MW-07, 887.01
MW-32, 879.77
MW-14, 933.42
TRENCH 10
MW-60, 883.77
NWS-01A-01, Dry

890 895 900 905 910 915 920 925 930

Legend

- Monitoring Well
- Piezometer
- 890 Groundwater Elevation Contour
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction
- MW-32, 879.77 (Location ID; Groundwater Elevation (ft amsl))

Notes:
1) MW-42 was not used to generate groundwater elevation contours due to a possible anomalous reading.
2) Groundwater elevation contour data includes data from FLUTe locations.

SLDA Wells Decommissioned

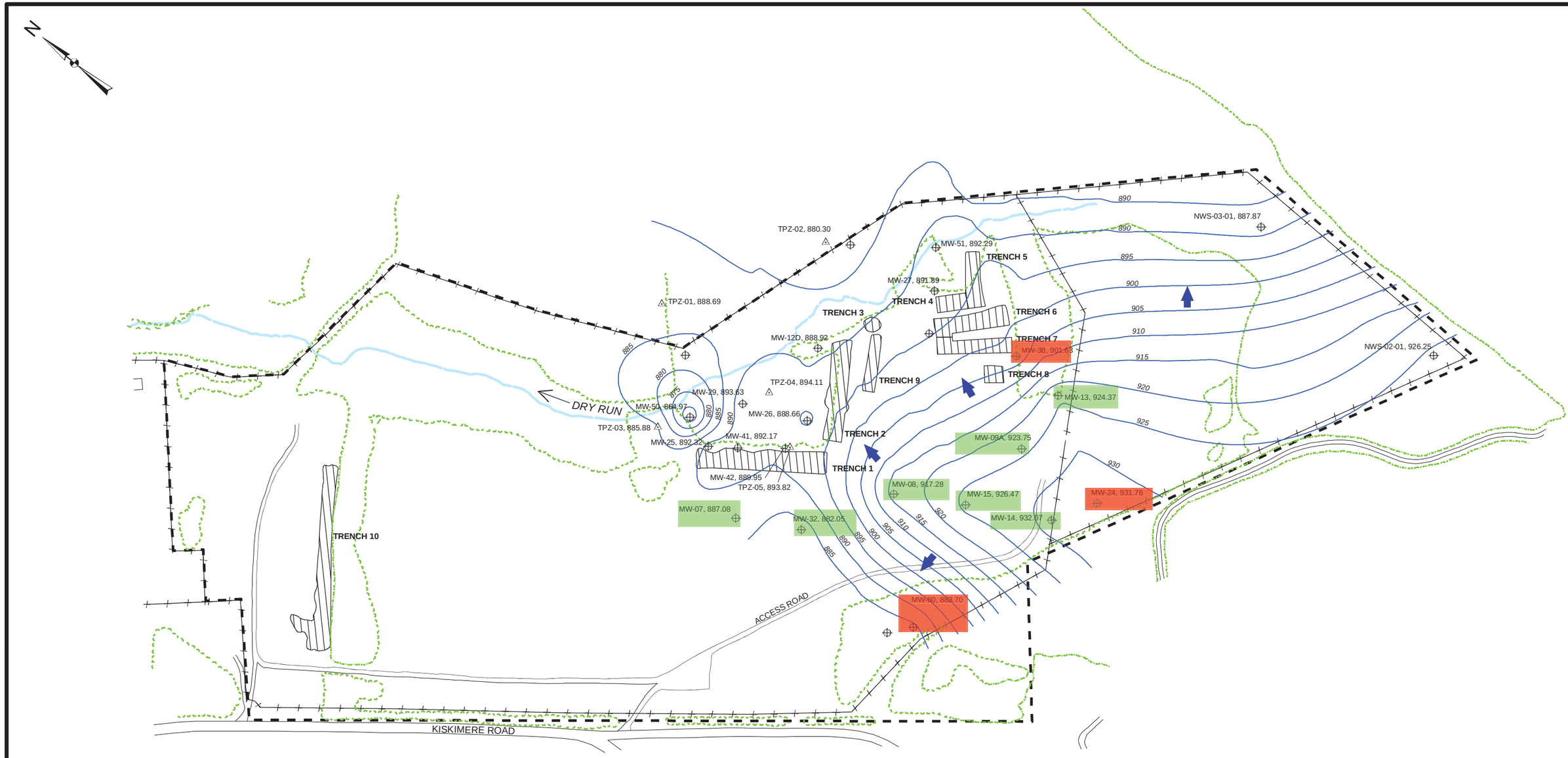
SLDA Wells Proposed for Annual Sampling During Interim RA Period

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - FIRST SHALLOW BEDROCK HYDROSTRATIGRAPHIC ZONE (JANUARY 2004)

FIGURE 2-17

N:\11171431.00000\GIS\ArcMap\WaterlevelsWGC_11104_1S_AD.mxd Date: 05/12/04 11:48:10 AM



Legend

- Monitoring Well
- Piezometer
- 890 Groundwater Elevation Contour
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction
- MW-32, 882.05 (Location ID; Groundwater Elevation (ft amsl))

Notes:
1) MW-42 was not used to generate groundwater elevation contours due to a possible anomalous reading.
2) Groundwater elevation contour data includes data from FLUTe locations NWS-02 and NWS-03

SLDA Wells Decommissioned

SLDA Wells Proposed for Annual Sampling During Interim RA Period

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - FIRST SHALLOW BEDROCK HYDROSTRATIGRAPHIC ZONE (JUNE 2004)

FIGURE 2-24

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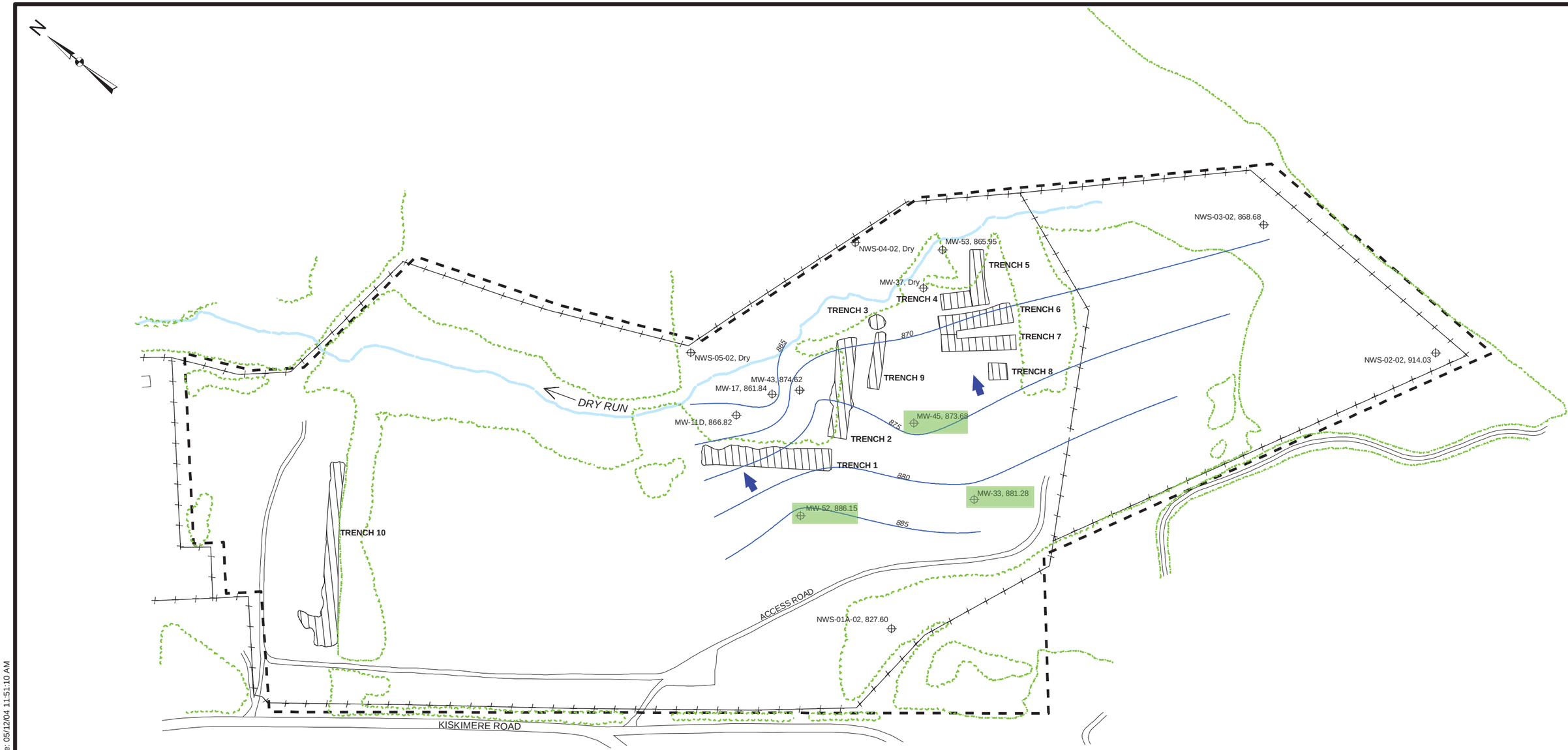


Legend

- Monitoring Well
- Groundwater Flow Direction
- 890 Groundwater Elevation Contour
- MW-52, 886.15 (Location ID; Groundwater Elevation (ft amsl))
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey

Notes:
1) NWS-02-02 and NWS-01A-02 were not used to generate groundwater elevation contours due to a possible anomalous reading.

SLDA Wells Decommissioned

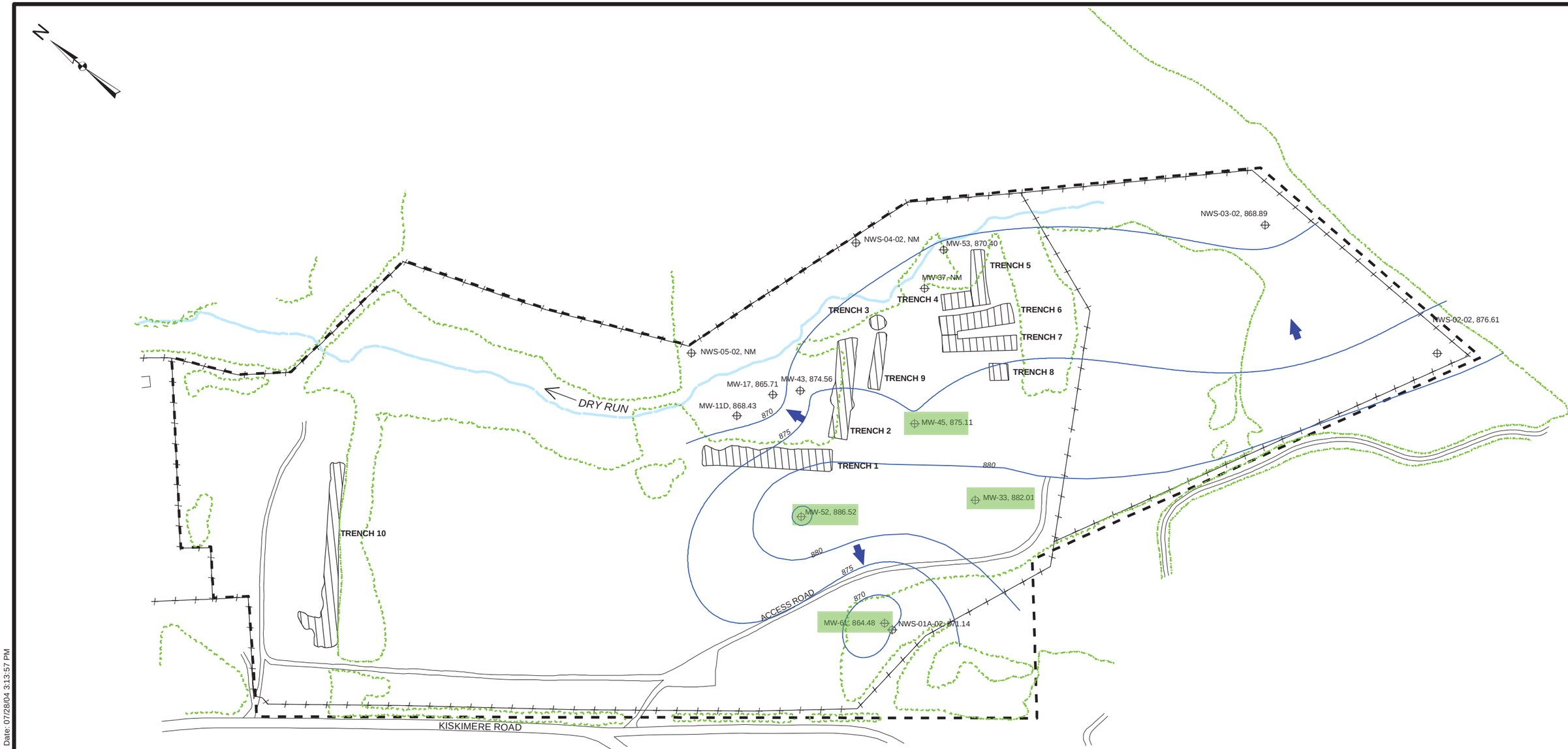
SLDA Wells Proposed for Annual Sampling During Interim RA Period

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - SECOND SHALLOW BEDROCK HYDROSTRATIGRAPHIC ZONE (JANUARY 2004)

FIGURE 2-18

N:\11171431.00000\GIS\ArcMap\WaterlevelsWGC_11104_2S.mxd Date: 05/12/04 11:51:10 AM



Legend

- Monitoring Well
- Groundwater Flow Direction
- 890 Groundwater Elevation Contour
- Site Boundary
- SLDA Disposal Trenches
- MW-52, 886.52 (Location ID; Groundwater Elevation (ft amsl))

Notes:
1) Groundwater elevation contour data includes data from FLUTe locations.

SLDA Wells Decommissioned

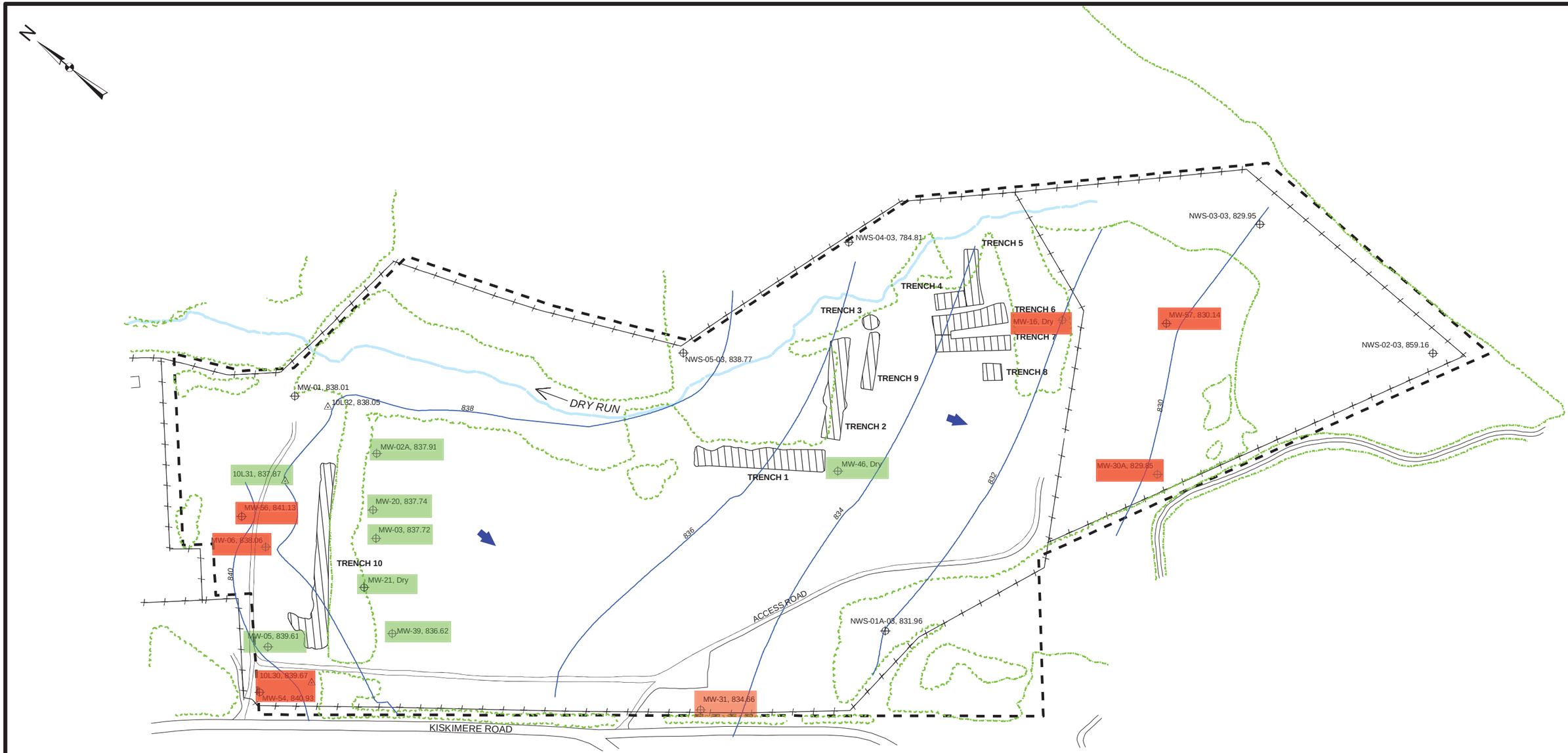
SLDA Wells Proposed for Annual Sampling During Interim RA Period

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - SECOND SHALLOW BEDROCK HYDROSTRATIGRAPHIC ZONE (JUNE 2004)

FIGURE 2-25

N:\11171431.00000\GIS\ArcMap\WaterlevelsIWGC_060704_2S_AD.mxd Date: 07/28/04 3:13:57 PM



Legend

- Monitoring Well
- Piezometer
- 890 Groundwater Elevation Contour
- Groundwater Flow Direction
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Site Boundary
- MW-52, 886.15 (Location ID; Groundwater Elevation (ft amsl))

Notes:
1) NWS-02-03 and NWS-04-03 were not used to generate groundwater elevation contours due to a possible anomalous reading.

SLDA Wells Decommissioned

SLDA Wells Proposed for Annual Sampling During Interim RA Period

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - UPPER FREEPORT COAL HYDROSTRATIGRAPHIC ZONE (JANUARY 2004)

FIGURE 2-19

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N

MW-62, 836.87
NWS-04-03, 796.66
NWS-03-03, 830.05
NWS-05-03, 837.63
NWS-02-03, 832.27
NWS-01A-03, 831.69
MW-01, 837.63
10L32, 837.94
DRY RUN
MW-02A, 837.71
10L31, 837.52
MW-56, 839.98
MW-20, 837.58
MW-03, 837.54
MW-06, 837.71
TRENCH 10
MW-21, NM
MW-39, 836.48
MW-05, 838.88
10L30, 839.64
MW-54, 841.17
MW-16, NM
MW-57, 829.98
MW-30A, 829.76
MW-46, NM
MW-31, 834.55
TRENCH 1
TRENCH 2
TRENCH 3
TRENCH 4
TRENCH 5
TRENCH 6
TRENCH 7
TRENCH 8
TRENCH 9
836
834
832
830
838
840
ACCESS ROAD
KISKIMERE ROAD

Legend

- Monitoring Well
- Piezometer
- 890 Groundwater Elevation Contour
- Groundwater Flow Direction
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Site Boundary
- MW-52, 886.52 (Location ID; Groundwater Elevation (ft amsl))

Notes:
1) NWS-02-03 and NWS-04-03 were not used to generate groundwater elevation contours due to a possible anomalous reading.

SLDA Wells Decommissioned

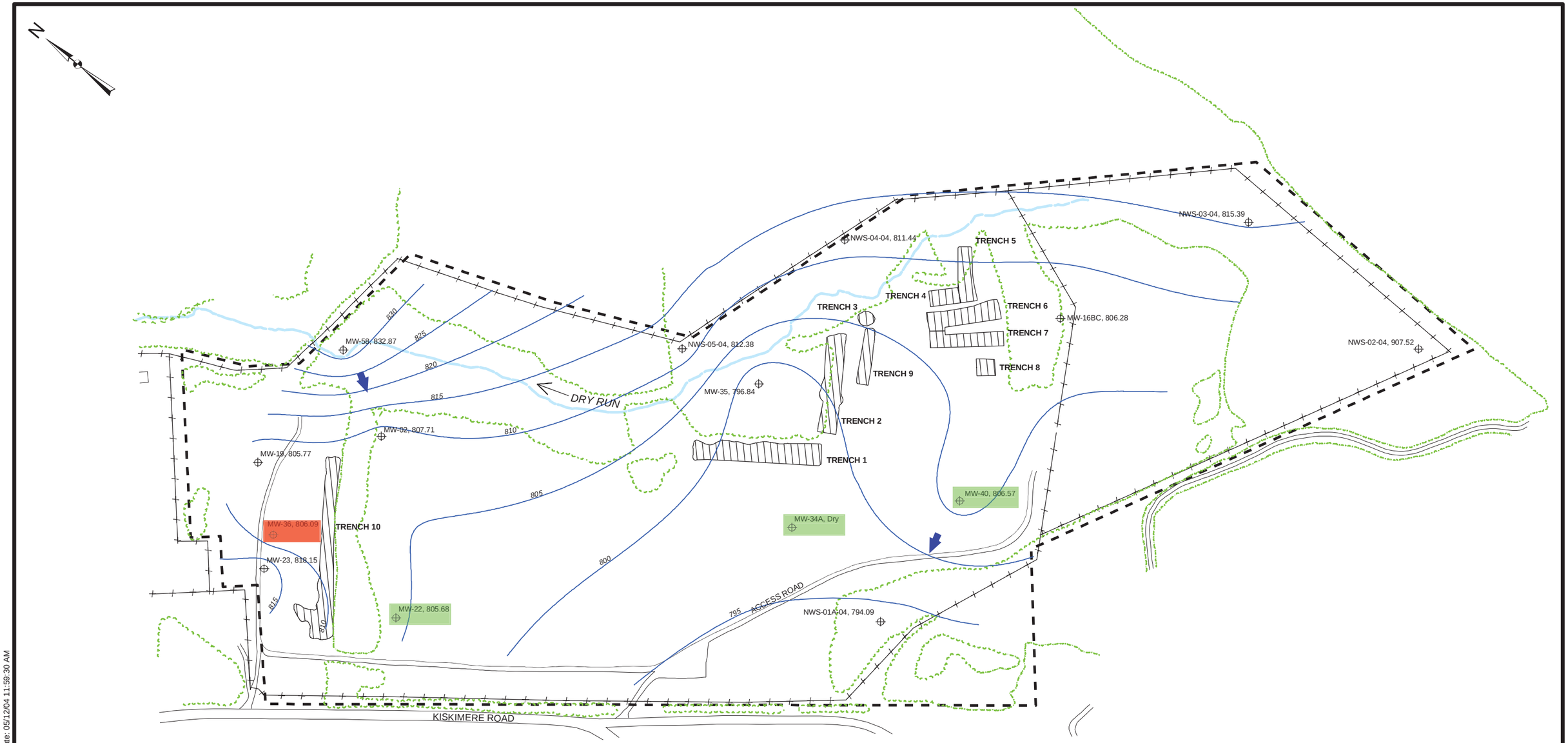
SLDA Wells Proposed for Annual Sampling During Interim RA Period

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - UPPER FREEPORT COAL HYDROSTRATIGRAPHIC ZONE (JUNE 2004)

FIGURE 2-26

N:\111714431.00000\GIS\ArcMap\WaterlevelsWGC_060704_UF.mxd Date: 07/28/04 3:22:57 PM



Legend

- Monitoring Well
- Groundwater Elevation Contour (890)
- Site Boundary
- Approximate Limits of Disposal Trenches from Geophysical Survey
- Groundwater Flow Direction
- MW-22, 805.68 (Location ID; Groundwater Elevation (ft amsl))

Notes:
1) NWS-02-04 was not used to generate groundwater elevation contours due to a possible anomalous reading.

SLDA Wells Decommissioned

SLDA Wells Proposed for Annual Sampling During Interim RA Period

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - DEEP BEDROCK HYDROSTRATIGRAPHIC ZONE (JANUARY 2004)

FIGURE 2-21

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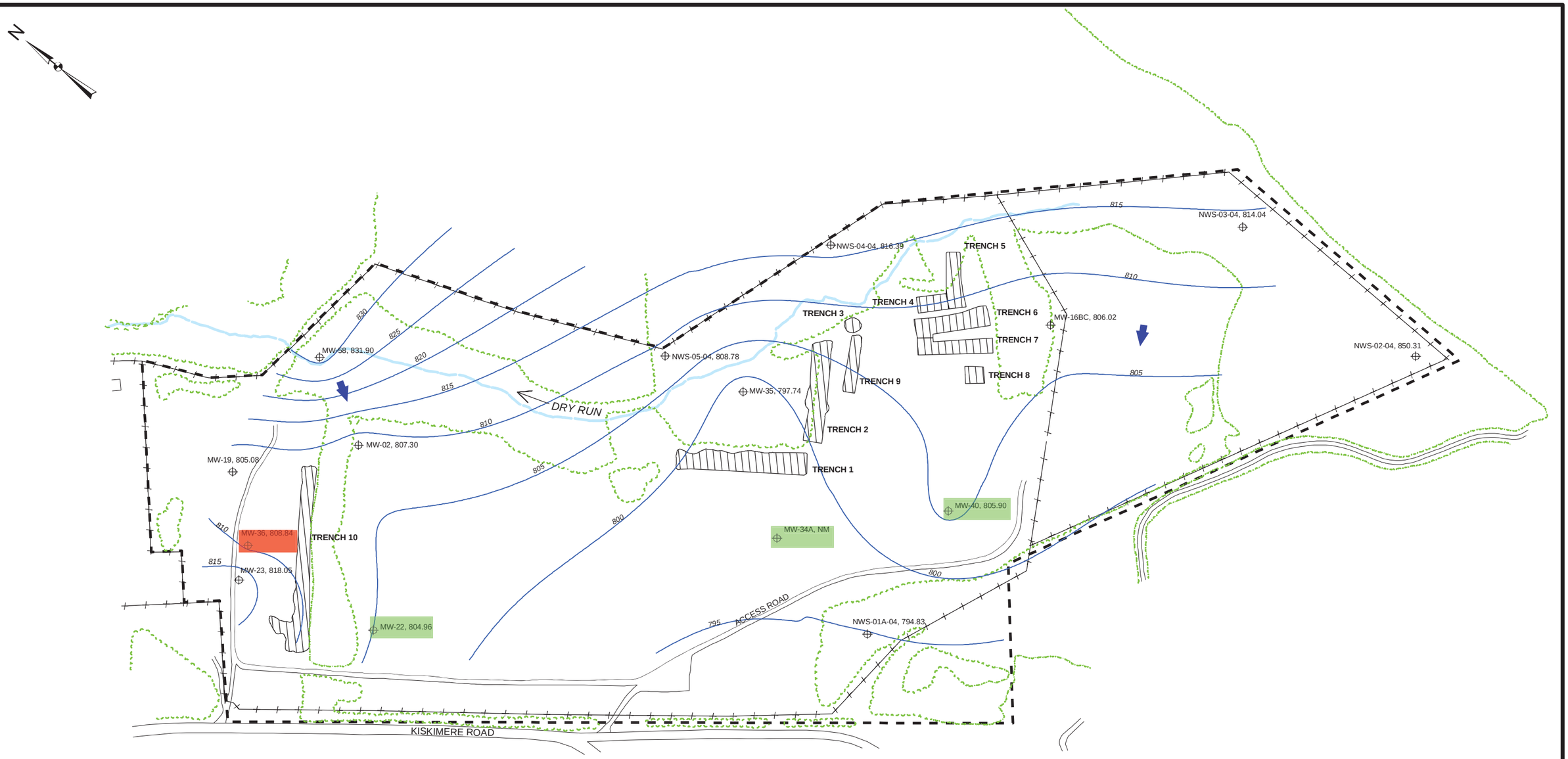

Legend

- Monitoring Well
- Groundwater Elevation Contour (890)
- Site Boundary
- SLDA Disposal Trenches
- Groundwater Flow Direction
- MW-22, 804.96 (Location ID; Groundwater Elevation (ft amsl))

Notes:
1) Groundwater elevation contour data includes data from FLUTe locations.
2) NWS-02 was not used to generate groundwater elevation contours due to a possible anomalous reading.

- SLDA Wells Decommissioned
- SLDA Wells Proposed for Annual Sampling During Interim RA Period

0 100 200 400 Feet

SHALLOW LAND DISPOSAL AREA
GROUNDWATER ELEVATION CONTOUR MAP - DEEP BEDROCK HYDROSTRATIGRAPHIC ZONE (JUNE 2004)

FIGURE 2-27

N:\111714310000\GIS\ArcMap\Waterlevels\WGC_060704_DB_AD.mxd Date: 07/28/04 3:32:51 PM

APPENDIX C

U.S. Environmental Protection Agency, Directive number 9283.1-14
Memorandum: Use of Uranium Drinking Water Standards under 40 CFR 141 and 40 CFR 192 as Remediation Goals for Groundwater at CERCLA sites

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV - 6 2001

Directive no. 9283.1-14

MEMORANDUM

SUBJECT: Use of Uranium Drinking Water Standards under 40 CFR 141 and 40 CFR 192 as Remediation Goals for Groundwater at CERCLA sites

FROM: Elaine F. Davies, Acting Director
Office of Emergency and Remedial Response (OERR)
Office of Solid Waste and Emergency Response

Stephen D. Page, Director
Office of Radiation and Indoor Air (ORIA)
Office of Air and Radiation

TO: Addressees

PURPOSE

This memorandum addresses the use of uranium standards in 40 CFR Part 141 and 40 CFR Part 192 when setting remediation goals for ground waters that are current or potential sources of drinking water at Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) sites. Today's memorandum will be of interest to site decisionmakers that have uranium as a contaminant of concern in groundwater at their CERCLA site.

This document provides guidance to Regional staff, in dealing with the public and the regulated community, regarding how EPA intends to implement the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). It describes national policy. This document is not a substitute for EPA's statutes or regulations, nor is it a regulation itself. Thus, it cannot impose legally-binding requirements on EPA, States, or the regulated community, and may not apply to a particular situation based upon the circumstances.

Directive no. 9283.1-14

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FROM: Elaine F. Davies, Acting Director
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PURPOSE

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This document provides guidance to Regional staff, in dealing with the public and the regulated community, regarding how EPA intends to implement the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). It describes national policy. This document is not a substitute for EPA's statutes or regulations, nor is it a regulation itself. Thus, it cannot impose legally-binding requirements on EPA, States, or the regulated community, and may not apply to a particular situation based upon the circumstances.

BACKGROUND

All remedial actions at CERCLA sites must be protective of human health and the environment and comply with applicable or relevant and appropriate requirements (ARARs) unless a waiver is justified. Cleanup levels for response actions under CERCLA are developed based on site-specific risk assessments, ARARs, and/or to-be-considered material[1] (TBCs). The determination of whether a requirement is applicable, or relevant and appropriate, must be made on a site-specific basis (see 40 CFR §300.400(g)).

CERCLA GROUNDWATER PROTECTION

"EPA expects to return usable ground waters to their beneficial uses whenever practicable." (see 40 CFR §300.430(a)(1)(iii)(F)). In general, drinking water standards provide relevant and appropriate cleanup levels for ground waters that are a current or potential source of drinking water. However, drinking water standards generally are not relevant and appropriate for ground waters that are not a current or potential source of drinking water (see 55 FR 8732, March 8, 1990). Drinking water standards include federal maximum contaminant levels (MCLs) and/or non-zero maximum contaminant level goals (MCLGs) established under the Safe Drinking Water Act (SDWA), or more stringent state drinking water standards. Other regulations may also be ARARs as provided in CERCLA §121(d)(2)(B).

The Agency issued guidance concerning ground water use determinations in a memo from Office of Solid Waste and Emergency Response Assistant Administrator to the Regions entitled "The Role of CSGWPPs in EPA Remediation Programs" (OSWER Directive 9283.1-09), April 4, 1997. This guidance states that EPA generally defers to State determination of current and future groundwater uses, when the State has a Comprehensive State Ground Water Protection Program (CSGWPP) that has been endorsed by EPA and has provisions for site-specific decisions. For States that do not have an EPA-endorsed CSGWPP (or whose CSGWPPs do not have provisions for making site-specific determinations of groundwater use, resource value, priority or vulnerability), EPA uses either "EPA Guidelines for Ground-Water Classification" (Final Draft, December 1986), or State groundwater classifications or similar State designations, whichever classification scheme leads to more stringent remediation goals.

[1]To-be-considered material, TBCs include non-promulgated advisories or guidance issued by Federal or State governments that are not legally binding and do not have the status of potential ARARs. However, TBCs should be considered along with ARARs as part of the site risk assessment and may be used in determining the necessary level of cleanup for protection of health and the environment.

MASS AND ACTIVITY (pCi/L and µg/L)

Concentrations of radionuclides in water are typically expressed in terms of "activity" of the radionuclide per unit of volume in the water (e.g., picocuries per liter or pCi/L). Activity measures the rate of disintegration of a radionuclide per unit mass (for soil, sediment, and foodstuffs) or volume (for air and water). Because the carcinogenic effect of a radionuclide is due to its disintegration rate, which occurs during its decay process, concentrations of radionuclides are generally measured in terms of activity for health evaluation purposes.

Uranium is the only radionuclide for which the chemical toxicity has been identified to be comparable to or greater than the radiotoxicity, and for which a reference dose (RfD) has been established to evaluate chemical toxicity. The RfD is an estimate of a daily ingestion exposure to the population, including sensitive subgroups, that is likely to be without an appreciable risk of deleterious effects during a lifetime. Uranium in soluble form is a kidney toxin. The relative risk of uranium kidney toxin effects correspond to the level of exposure to the uranium mass concentrations; the oral RfD of uranium is expressed in terms of mass (0.6 µg/kg/day).

RADIONUCLIDE MCLs

On July 9, 1976, EPA promulgated 40 CFR Part 141 *Drinking Water Regulations: Radionuclides* (1976 MCL rule). This 1976 MCL rule included the following MCLs: 5 pCi/L for radium-226 and radium-228 combined; 15 pCi/L for gross alpha particle activity (including radium 226, but excluding uranium and radon); and a concentration that produces a dose equivalent of 4 mrem/yr or less to the total body or any internal organ for the sum of the doses from man-made beta particles and photon emitters. A list of radionuclides that are addressed by the gross alpha MCL are provided in Attachment A to today's memorandum. Also, provided in Attachment B to today's memorandum is a list of radionuclide concentrations calculated using the 4 mrem/yr beta particles and photon emitters MCL standard.

On December 7, 2000, EPA amended 40 CFR Part 141 (65 FR 76708, December 7, 2000) *National Primary Drinking Water Regulations; Radionuclides* (2000 MCL rule). This 2000 MCL rule established requirements for uranium, and retained the existing requirements for combined radium-226 and radium-228, gross alpha particle radioactivity, and beta particle and photon radioactivity. The 2000 MCL rule did include MCLGs of zero for the last four contaminants (see 40 CFR § 141.55).

The 2000 MCL rule established an MCL for uranium of 30 micrograms per liter (µg/L). For the MCL rulemaking, EPA assumed a typical conversion factor of 0.9 pCi/µg for the mix of uranium isotopes found at public water systems, which means that an MCL of 30 µg/L will typically correspond to 27 pCi/L. EPA considered the 30 µg/L level (which corresponds to a

27 pCi/L level) to be appropriate since it is protective for both kidney toxicity and cancer. However, the relationship between mass concentration (µg/L) and activity (pCi/L) is dependent upon the relative mix of the radioactive isotopes (e.g., uranium-234, uranium-235, uranium-238) that comprise the uranium at a particular drinking water source.[2] In circumstances with more extreme conversion factors (> 1.5 pCi/µg), uranium activity levels may exceed 40 pCi/L. In these circumstances, EPA recommends in the 2000 MCL rule that drinking water systems mitigate uranium levels to 30 pCi/L or less, to provide greater assurance that adequate protection from cancer health effects is being afforded (see 65 FR at page 76715).

UMTRCA GROUNDWATER STANDARDS

On January 11, 1995, EPA promulgated 40 CFR Part 192 (60 FR 2854, January 11, 1995) *Groundwater Standards for Remedial Actions at Inactive Uranium Processing Sites* (UMTRCA rule*)*.[3] Included in these standards is a constituent concentration limit for the combined level of uranium-234 and uranium-238 in groundwater. These standards were developed specifically for the cleanup of uranium mill tailings at 24 sites designated under Section 102(a)(1) of UMTRCA (Title I sites). The list of 24 Title I sites is a closed set chosen in 1979 that cannot be expanded without congressional action. The standards were developed to ensure that all currently used and reasonably expected drinking water supplies near these 24 sites, both public and private, are adequately protected for use by present and future generations. The concentration limit for the combined level of uranium-234 and uranium-238 is 30 pCi/L.

IMPLEMENTATION

The following subsections will clarify the use of standards under 40 CFR Part 141 and 40 CFR Part 192 as ARARs when setting remediation levels for uranium in groundwater at CERCLA sites.

MCLs AND UMTRCA AS APPLICABLE REQUIREMENTS

The uranium drinking water standards contained within 40 CFR Part 141 are potentially applicable requirements only for community water systems designated under § 141.26 (see 65 FR 76708, 76748 (December 7, 2000)). The uranium groundwater standards contained within

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[2]For further discussion of mass and activity, including the formula to convert between the two measurement units, see U.S. EPA "Radiation Risk Assessment At CERCLA Sites: Q & A" EPA 540/R/99/006, December 1999, pp. 5-6.

[3]These standards were developed pursuant to Section 275 of the Atomic Energy Act (42 U.S.C. 2022), as amended by Section 206 of the Uranium Mill Tailings Radiation Control Act of 1978 (42 U.S.C. 7918) (UMTRCA).

40 CFR Part 192 are potentially applicable requirements only for the 24 Title I sites designated under Section 206 of UMTRCA.

MCLs AND UMTRCA AS RELEVANT AND APPROPRIATE REQUIREMENTS

In general, because the MCLG is zero for the radionuclides included in 40 CFR Part 141, the MCLs for these radionuclides are potentially relevant and appropriate requirements at sites with radioactive contamination in groundwaters that are current or potential sources of drinking water. In particular, **the uranium MCL of 30 µg/L is a potentially relevant and appropriate requirement for groundwaters that are current or potential sources of drinking water that have any of the uranium isotopes as a contaminant of concern**. Thus, for these radionuclides, the MCL concentration of 30 µg/L is generally used as the cleanup level for groundwater that is a current or potential source of drinking water, and is to be attained throughout the plume at the completion of the response action.

If either uranium-234 or uranium-238 is a contaminant of concern in ground waters that are current or potential sources of drinking water, and the site is not a Title I UMTRCA site, then the uranium UMTRCA standard under 40 CFR Part 192 of 30 pCi/L is a potentially relevant and appropriate requirement. Please note that this means both the uranium MCL (40 CFR Part 141) and the uranium UMTRCA (40 CFR Part 192) standards may be selected as relevant and appropriate requirements for addressing uranium contamination in ground water at the same CERCLA site. Since both standards establish levels of uranium in groundwater that are acceptable for drinking, EPA would expect that whenever the uranium UMTRCA ground water standard is a relevant and appropriate requirement, the uranium MCL will also be a relevant and appropriate standard. Selecting both the MCL and UMTRCA standards will ensure that the kidney toxicity and carcinogenic health effects posed by uranium are adequately addressed.

MCL PREAMBLE AS A TO-BE-CONSIDERED

In addition, the preamble recommendation to public water systems concerning extreme pCi/µg conversion factors in the uranium 2000 MCL rulemaking may be a TBC. **In situations where the mix of uranium isotopes means that attaining the uranium MCL of 30 µg/L may result in residual activity levels of uranium of greater than 40 pCi/L for total uranium, and a site-specific risk assessment demonstrates that 30 pCi/L is protective, then we recommend 30 pCi/L as a suitable cleanup level in addition to 30 µg/L.** This recommendation is made to ensure an equivalent level of protection from the carcinogenic effects of uranium at CERCLA sites and public water systems, and is therefore consistent with the recommendation made in the preamble to the 2000 MCL rule.

CONDUCTING GROUNDWATER RESPONSES FOR 40 CFR PART 141 AND/OR 40 CFR PART 192 ARAR COMPLIANCE

When either the uranium MCL and/or the 30 pCi/L uranium UMTRCA standard is considered a relevant and appropriate requirement, or the preamble to the uranium 2000 MCL rulemaking is a TBC, then CERCLA response actions should be conducted using the approach found in the NCP and Superfund guidance (e.g., determining groundwater use, point of compliance, areas of flexibility). Because the CERCLA approach for attaining the uranium MCL is more stringent than the UMTRCA approach 40 CFR Part 192, using the CERCLA approach automatically insures compliance with the UMTRCA groundwater standard as an ARAR. For example, the CERCLA approach for complying with the MCL throughout the plume is more stringent than the UMTRCA approach of complying with the groundwater standard only in the uppermost aquifer. Thus if an MCL is attained throughout the plume, the groundwater standard will also be attained in the uppermost aquifer. Key documents that include guidance on the Superfund approach to evaluating and remediating groundwater include: "Presumptive Response Strategy and Ex-Situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites" (OSWER Directive No. 9283.1-12), October 1996; "The Role of CSGWPPs in EPA Remediation Programs" (OSWER Directive No. 9283.1-09), April 4, 1997, and; the "Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites" (OSWER Directive No. 9200.4-17P), April 21, 1999). These and other Superfund groundwater guidance documents may be found on the Internet at: http://www.epa.gov/superfund/resources/gwdocs/index.htm.

Guidance documents that address establishing contaminant levels in soil to protect groundwater include: "Soil Screening Guidance for Radionuclides: User's Guide" (OSWER Directive No. 9355.4-16A), October 2000, and "Soil Screening Guidance for Radionuclides: Technical Background Document" (OSWER Directive No. 9355.4-16), October 2000. These Superfund guidance documents may be found on the Internet at: http://www.epa.gov/superfund/resources/radiation/radssg.htm.

FURTHER INFORMATION

The subject matter specialist for this directive is Stuart Walker of OERR 703-603-8748. General questions about this directive, should be directed to 1-800-424-9346.

Addressees:
National Superfund Policy Managers, Regions 1-10
Superfund Branch Chiefs, Regions 1-10
Superfund Branch Chiefs, Office of Regional Counsel, Regions 1-10
Radiation Program Managers, Regions 1, 4, 5, 6, 7, 10

Radiation Branch Chief, Region 2
Residential Domain Section Chief, Region 3
Radiation and Indoor Air Program Branch Chief, Region 8
Radiation and Indoor Office Director, Region 9
Federal Facilities Leadership Council
OERR Center Directors
OERR NARPM co-chairs
OERR Records Manager

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Craig Hooks, FFEO
Barry Breen, OSRE
Joanna Gibson, HOSC/OERR
Earl Salo, OGC
Jeff Josephson, Region 2

Attachment A: List of Man-made and Naturally-Occurring Radionuclides addressed by 15 pCi/L gross alpha particle activity MCL standard[4]

Nd-144	Ra-219	U-235
Sm-147	Ra-223	U-236
Sm-148	Ra-224	U-238
Po-208	Ra-226	Pa-231
Bi-210	Rn-220	Pu-236
Bi-211	Fr-221	Pu-238
Bi-212	Fr-223	Pu 239
Bi-213	Ac-225	Pu-240
Bi-214	Ac-227	Pu-241
Po-210	Th-227	Pu-242
Po-212	Th-228	Np-237
Po-213	Th-229	Am-241
Po-214	Th-230	Cm-242
Po-215	Th-232	Cm-244
Po-216	U-230	Cm-245
Po-218	U-232	Cm-248
At-217	U-233	Bk-248
At-218	U-234	Cf-250
Tl-217		

[4]This list includes only those radionuclides with half lives exceeding 4 days.

Attachment B: List of Radionuclides addressed by 4 mrem/yr man-made beta particles and photon emitters MCL standard[5]

Nuclide	pCi/l	Nuclide	pCi/l	Nuclide	pCi/l	Nuclide	
H-3	20,000	Sr-85 m	20,000	Sb-124	60	Er-169	300
Be-7	6,000	Sr-85	900	Sb-125	300	Er-171	300
C-14	2,000	Sr-89	20	Te-125m	600	Tm-170	100
F-18	2,000	Sr-90	8	Te-127	900	Tm-171	1,000
Na-22	400	Sr-91	200	Te-127m	200	Yb-175	300
Na-24	600	Sr-92	200	Te-129	2,000	Lu-177	300
Si-31	3,000	Y-90	60	Te-129m	90	Hf-181	200
P-32	30	Y-91	90	Te-131m	200	Ta-182	100
S-35 inorg	500	Y-91m	9,000	Te-132	90	W-181	1,000
Cl-36	700	Y-92	200	I-126	3	W-185	300
Cl-38	1,000	Y-93	90	I-129	1	W-187	200
K-42	900	Zr-93	2,000	I-131	3	Re-186	300
Ca-45	10	Zr-95	200	I-132	90	Re-187	9,000
Ca-47	80	Zr-97	60	I-133	10	Re-188	200
Sc-46	100	Nb-93m	1,000	I-134	100	Os-185	200
Sc-47	300	Nb-95	300	I-135	30	Os-191	600
Sc-48	80	Nb-97	3,000	Cs-131	20,000	Os-191m	9,000
V-48	90	Mo-99	600	Cs-134	80	Os-193	200
Cr-51	6,000	Tc-96	300	Cs-134m	20,000	Ir-190	600
Mn-52	90	Tc-96m	30,000	Cs-135	900	Ir-192	100
Mn-54	300	Tc-97	6,000	Cs-136	800	Ir-194	90
Mn-56	300	Tc-97m	1,000	Cs-137	200	Pt-191	300
Fe-55	2,000	Tc-99	900	Ba-131	600	Pt-193	3,000
Fe-59	200	Tc-99m	20,000	Ba-140	90	Pt-193m	3,000
Co-57	1,000	Ru-97	1,000	La-140	60	Pt-197	300
Co-58	300	Ru-103	200	Ce-141	300	Pt-197m	3,000
Co-58m	9000	Ru-105	200	Ce-143	100	Au-196	600
Co-60	100	Ru-106	30	Ce-144	30	Au-198	100
Ni-59	300	Rh-103m	30,000	Pr-142	90	Au-199	600
Ni-63	50	Rh-105	300	Pr-143	100	Hg-197	900
Ni-65	300	Pd-103	900	Nd-147	200	Hg-197m	600
Cu-64	900	Pd-109	300	Nd-149	900	Hg-203	60
Zn-65	300	Ag-105	300	Pm-147	600	Tl-200	1,000
Zn-69	6,000	Ag-110m	90	Pm-149	100	Tl-201	900
Zn-69m	200	Ag-111	100	Sm-151	1,000	Tl-202	300
Ga-72	100	Cd-109	600	Sm-153	200	Tl-204	300

[5]For those isotopes where an MCL is calculated, concentration values were rounded using the same format as EPA guidance for the 1976 MCL rulemaking.

Nuclide	pCi/l	Nuclide	pCi/l	Nuclide	pCi/l	Nuclide	
Ge-71	6,000	Cd-115	90	Eu-152	200	Pb-203	1,000
As-73	1,000	Cd-115m	90	Eu-154	60	Bi-206	100
As-74	100	In-113m	3,000	Eu-155	600	Bi-207	200
As-76	60	In-114m	60	Gd-153	600	Pa-230	600
As-77	200	In-115	300	Gd-159	200	Pa-233	300
Se-75	900	In-115m	1,000	Tb-160	100	Np-239	300
Br-82	100	Sn-113	300	Dy-165	1,000	Pu-241	300
Rb-86	600	Sn-125	60	Dy-166	100	Bk-249	2,000
Rb-87	300	Sb-122	90	Ho-166	90		