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March 22, 2012

Ms. Rachel Patton
Department of Environmental Quality
Tidewater Regional Office
5636 Southern Boulevard
Virginia Beach, VA 23462

RE: First Annual CASE Report
Chesapeake Energy Center
Landfill Permit No. 440

Dear Ms. Patton:

Please find enclosed the Corrective Action Status Evaluation (CASE) prepared for the first year of corrective action monitoring at the Chesapeake Energy Center (CEC) Industrial Landfill, Chesapeake, Virginia. This initial CASE report was prepared in accordance with the May 2011 Corrective Action Monitoring Plan (CAMP) and Solid Waste Facility Permit Number 440, Permit Module XIV.J.

Should you have any questions or comments, please feel free to contact me at (804) 273-2929, or Donald Hintz of Dominion Electric Environmental Services at (804) 273-3552.

Sincerely,

Cathy C. Taylor

Cathy C. Taylor
Director
Electric Environmental Services

Enclosures

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CORRECTIVE ACTION STATUS EVALUATION

CHESAPEAKE ENERGY CENTER
INDUSTRIAL LANDFILL
CHESAPEAKE, VIRGINIA
SOLID WASTE PERMIT NO. 440

MARCH 16, 2012

Prepared for:

Dominion Resources Services, Inc.
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SIGNATURE PAGE

Corrective Action Status Evaluation (CASE)

***Prepared for*:**
Chesapeake Energy Center Industrial Landfill
Chesapeake, Virginia
Solid Waste Permit #440

***For Submittal to*:**
Virginia Department of Environmental Quality

I certify that I am a qualified groundwater scientist who has received a baccalaureate or post-graduate degree in the natural sciences or engineering and who has sufficient training and experience in groundwater hydrology and related fields as demonstrated by state professional registration and completion of an accredited university program that enable me to make sound professional judgments regarding groundwater monitoring, contaminant fate and transport, and corrective action.

I further certify that this report was prepared by me or by a subordinate working under my direction.

_____ _____

Kelly Hicks, P.G. Date
Senior Geologist

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

FIGURES

TABLES

APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

ACL	Alternate Concentration Level
ACM	Assessment of Corrective Measures
CAMP	Corrective Action Monitoring Plan
CAP	Corrective Action Plan
CASE	Corrective Action Status Evaluation
CCB	Coal combustion by-product
CEC	Chesapeake Energy Center
cm/sec	Centimeters per Second
COC	Constituent of Concern
DO	Dissolved Oxygen
EPA	United States Environmental Protection Agency
ft	Feet
GPS	Groundwater Protection Standard
LOQ	Limit of Quantitation
MCL	Maximum Contaminant Level
mg/L	Milligrams per liter
MNA	Monitored Natural Attenuation
msl	Mean Sea Level
N&ES	Nature and Extent Study
ORP	Oxidation Reduction Potential
SBER	Southern Branch of the Elizabeth River
SSI	Statistically Significant Increase
S.U.	Standard Units
µg/L	Micrograms per liter
UMHOS	Micromhos
URS	URS Corporation
VDEQ	Virginia Department of Environmental Quality
VSWMR	Virginia Solid Waste Management Regulations

1.0 BACKGROUND AND SITE DESCRIPTION

1.1 INTRODUCTION

This document is the first Corrective Action Status Evaluation (CASE) prepared for the first year of corrective action monitoring at the Chesapeake Energy Center (CEC) Industrial Landfill (the Site). This initial CASE report was prepared in accordance with the May 2011 Corrective Action Monitoring Plan (CAMP) and Solid Waste Facility Permit Number 440, Permit Module XIV.J.

On March 10, 2011, the Virginia Department of Environmental Quality (VDEQ) issued a major Permit amendment for the Chesapeake Energy Center Industrial Landfill, Permit #440, to incorporate a corrective action plan (CAP) into Module XIV of the Permit. The purpose of the CAP is to:

- Be protective of human health and the environment;
- Achieve the groundwater protection standard (GPS);
- Control the source of the release to reduce or eliminate, to the maximum extent practicable, further releases of solid waste constituents into the environment; and
- Comply with the standards for the management of waste.

The remedy chosen for the Site is adsorption-based monitored natural attenuation (MNA) of the constituent plume.

1.2 PURPOSE

The purpose of the CASE is to document on a periodic basis the performance of the CAP program at the Site. The report is organized to address the following key issues when using MNA as a remedy:

1. Summary of site background and site description (Section 1.0).
2. Summary of the approved CAP monitoring program (Section 2.0).
3. An evaluation of current groundwater elevations, flow, and velocity conditions (Section 3.0).
4. Summary of CAP monitoring results for the first year and discussion of constituent concentrations along distinct flow paths (Section 4.0).
5. Summary of performance indicator parameter results for the first year (Section 5.0).
6. An evaluation of the conceptual site model (Section 6.0).
7. Recommended changes in the monitoring program based on data evaluations (Section 7.0).

1.3 SITE BACKGROUND

The CEC Industrial Landfill is operated by Virginia Electric and Power Company doing business as Dominion Generation (Dominion). The landfill was constructed in 1985 with a geomembrane liner and serves as an active industrial landfill for the disposal of coal ash. The landfill is used exclusively for the disposal of coal combustion by-products (CCB) generated at the power station.

1.4 PHYSICAL SETTING

The CEC Industrial Landfill is located at 2701 Vepco Street, in Chesapeake, Virginia, approximately eight miles west of Virginia Beach and seven miles south of the City of Norfolk. The facility is located on an inverted L-shaped peninsula measuring approximately 6,000 feet (ft) from south to north and 1,200 to 4,000 ft from west to east (Figure 1). The Facility is located north of and inside the Interstate 64/664 beltway, which encircles/connects Chesapeake, Norfolk, Portsmouth, and Hampton, Virginia.

The landfill encompasses approximately 22.25 acres. The ground surface is relatively flat and ranges from approximately elevation 5 to 12 ft mean sea level (msl), with the exception of the landfill. The Facility is bounded to the north by the Norfolk and Western rail line and Military Highway (Route 13/460), to the east by the Southern Branch of the Elizabeth River (SBER), and to the west by a non-contact cooling water discharge channel. The peninsula, on which the facility is situated, is surrounded by the SBER, Deep Creek, and a cooling water discharge canal on its eastern, southern, and western flanks, respectively. Adjoining land use around the landfill is zoned M-2 general industrial district with various industrial facilities located across the SBER from the landfill. There are no known users of the shallow water aquifer in the area of the Facility.

1.5 GEOLOGY AND HYDROGEOLOGY

CEC is located within the Atlantic Coastal Plain physiographic province, approximately 75 miles east of the Fall Line, which separates the Coastal Plain from the Piedmont physiographic province. Altitudes in the vicinity of the Facility range from 0 to 25 ft above msl.

Locally, based on published geologic literature and boring logs, the geologic stratigraphy from the ground surface down consists of existing fill, recent alluvial deposits, the Tabb Formation, and the Yorktown Formation. The clayey sands of fill were used to construct the inner and outer perimeter dikes surrounding the former ash pond/landfill. Alluvial deposits consist of Holocene alluvium, sand, and marsh sediment representing an estuarine-beach, tidal marsh depositional environment and are described as fluvial silt, sand, and clay with organic material (peat). The Quaternary Tabb Formation represents a fluvial estuarine and

brackish marine depositional environment and is described as silty sand. In the area of the Facility, the Lynnhaven Member of the Tabb Formation is present and consists of pebbly and cobbly sand grading upward into muddy, fine sand and silt (VDMR, 1993). The Pliocene Yorktown Formation is a bluish-gray, greenish- and dark greenish-gray, very fine to coarse sand, in part glauconitic and phosphoric, commonly very shelly and interbedded with sandy and silty clay (Powars, 2000).

The hydrogeologic framework of the shallow aquifer system in the vicinity of the Facility is composed of the Columbia Aquifer, the Yorktown Confining Unit, and the Yorktown-Eastover Aquifer. The Columbia water table aquifer is the uppermost aquifer present beneath the landfill. The Columbia Group Aquifer is unconfined (water table); however, clayey fine sand, silt, clay, and peat deposits within the aquifer cause local confined to semi-confined conditions in some areas (Smith and Harlow, 2001).

The Yorktown Confining Unit is defined as a series of coalescing clay layers at or near the top of the Yorktown Formation. The principal water-bearing zones within the Yorktown Formation occur within 50 to 100 feet of its surface. The Yorktown-Eastover Aquifer is defined as the predominantly sandy deposits of the Yorktown Formation and the upper part of the Eastover Formation above the confining clays of the St. Mary's Formation (Meng and Harsh, 1988).

Groundwater movement through the unconfined and confined aquifers is generally lateral with discharge into surrounding water bodies including the SBER and Deep Creek. Some groundwater movement also occurs vertically from confining units into deeper confined aquifers.

1.6 MONITORING HISTORY

Phase I groundwater monitoring at the Facility began in January 18, 1984. As a result of confirmed statistically significant increases (SSI) above background for the indicator parameter pH in June 1994, the Facility moved to the Phase II groundwater monitoring program.

GPS were developed for the Facility in accordance with Amendment 2 of the Virginia Solid Waste Management Regulations (VSWMR) as promulgated and finalized by the VDEQ on May 23, 2001. The VDEQ approved a final variance for establishing alternate concentration limits (ACLs) as GPS on March 18, 2002. A major permit amendment to the original permit (issued July 27, 1984) was approved in a VDEQ letter dated April 16, 2002.

Arsenic was reported in the uppermost water-bearing zone underlying the facility at concentrations above the GPS during the 2002 second semi-annual sampling event (September 17, 2002). As a result, a Nature and

Extent Study (N&ES) and Assessment of Corrective Measures (ACM) for the CEC landfill, under the regulations for Corrective Action (9 VAC 20-80-310), was submitted to VDEQ on June 19, 2003. In addition, concentrations of sulfide at levels above the GPS (non risk-based) were reported during September 2002 and both 2003 sampling events. Revised ACM and N&ES Reports were submitted in January 2004, in response to VDEQ comments dated October 2, 2003.

In response to ACM comments received from the VDEQ in a letter dated June 27, 2005, the Facility installed six deep wells at the following locations: CECW-2, CECW-3, CECW-8, CECW-5, PO-8, and PO-10 in November 2005. The wells were installed to generate additional hydrogeological data for the remedial alternatives evaluation. Finalized revisions to the Corrective Action Plan were submitted to VDEQ in February 2008.

In response to identified concentrations of cobalt and beryllium at levels above the GPS during the 2010 first semi-annual sampling event, Dominion submitted an addendum to the ACM report on July 22, 2010. In addition, Dominion included cobalt and beryllium in the CAP for the Site.

On March 10, 2011, the CAP and CAMP were added to the Facility permit by permit amendment. Quarterly corrective action groundwater monitoring began in April 2011. As detailed in the CAMP, the first CASE report will be submitted 60 days following the 4th quarterly sampling event of the first year of sampling.

2.0 CAP MONITORING PROGRAM

CAP monitoring was implemented at the Site in the second quarter of 2011 in response to the major Permit Amendment incorporating the CAP on March 10, 2011 in accordance with Permit Module XIV. The CAP system monitors the quality of groundwater from a set of wells consisting of background, performance, and sentinel wells to determine if the MNA remedy is performing as designed and to determine if the constituent plume has migrated. The following sections summarize the CAP monitoring program.

2.1 PROGRAM OBJECTIVES

The CAP monitoring program is designed to accomplish the following objectives:

- Determine the extent (horizontally and vertically) of the plume;
- Demonstrate that natural attenuation is occurring according to expectations;
- Detect changes in environmental conditions that may reduce the efficacy of the MNA process;
- Verify that the plume is not expanding offsite; and
- Verify progress towards attainment of cleanup objectives (GPS).

2.2 WELL NETWORK

The Facility well network consists of the following (see Figure 2):

Upgradient Wells (2)	MW-4R, MW-5
Compliance Wells (10)	CECW-1, CECW-2, CECW-3, CECW-4, CECW-5, CECW-6I, PO-8, PO-9, PO-10, PO-11
Performance Wells (13)	MW-5, MW-5D, CECW-1, CECW-1D, CECW-2, CECW-2D, CECW-3, CECW-3D, CECW-6I, PO-8, PO-8D, PO-10, PO-10D
Sentinel Wells (5)	CECW-6D, CECW-8, CECW-8D, CECW-10R, CECW-15

These wells are used to verify that individual constituent of concern (COC) concentrations, plume boundaries, and overall progression towards remedial endpoints (GPS) are acceptable over time and space. Well construction data and diagrams for the above listed wells are included in the CAP, included in Permit Module XIV.

Upgradient monitoring wells are designed to provide site specific background data and are monitored as part of the Phase II monitoring program. Compliance wells are monitored to determine whether the landfill has impacted groundwater quality at the waste management unit boundary as part of the Phase II monitoring program. Performance wells are positioned to provide data on the effectiveness of speciation in reducing the inorganic concentrations to GPS levels. Sentinel wells are designed to ensure that there is no expansion of the plume or impact to sensitive receptors as a result of changes in plume migration and should therefore show no GPS exceedances.

2.3 GROUNDWATER MONITORING CONSTITUENTS

The MNA program constituent monitoring list COCs and performance parameters.

2.3.1 Constituents of Concern (COCs)

COCs are the following VSWMR Table 3.1 Column B constituents, which have been detected in Site monitoring wells at levels above their respective GPS:

- Arsenic
- Beryllium
- Cobalt
- Sulfide

COC parameter sampling is required at all CAP monitoring locations.

2.3.2 Performance Parameters

Performance parameters consist of the following:

Parameter Group	Constituent	Analytical Method
Primary Performance Parameters	Arsenic, dissolved	SW-846 Method 7010
	Arsenic III and V	
	Beryllium, dissolved	
	Cobalt, dissolved	
	Iron, total	SW-846 Method 7000B
	Iron, dissolved	
	Sulfide, dissolved	SW-846 Method 9034

Parameter Group	Constituent	Analytical Method
Water Quality Parameters	Manganese	SW-846 Method 7000B
	Dissolved Oxygen Oxidation Reduction Potential pH Specific Conductance Temperature Turbidity	Field Measurements

Performance parameter sampling is required at all performance and sentinel well locations.

2.4 SAMPLING FREQUENCY

Permit Module XIV.I requires sampling for performance parameters and COCs on a quarterly basis for two years and semi-annually thereafter. To date, four quarterly rounds of CAP samples have been collected (April 2011 – January 2012). Semi-annual sampling of CAP parameters will begin in 2013. Sampling will continue until no VSWMR Table 3.1 Column B constituents have been detected above their respective GPS for three consecutive years.

2.5 SURFACE WATER

In accordance with Permit Module XIV.P, surface water sampling is required at the sampling frequency described in Section 2.4 for the parameters listed below to determine if constituents in the groundwater plume are discharging to surface water on site. Surface water stations SW-1, SW-2, SW-3, and SW-4 are located at the perimeter of the landfill (see Figure 2).

Parameter Group	Constituent	Analytical Method
COCs	Arsenic, total	SW-846 Method 7010
	Arsenic III and V	
	Beryllium, total	
	Cobalt, total	
	Sulfide, total	SW-846 Method 9034
Performance Parameters	Iron, total	SW-846 Method 7000B
	Manganese	SW-846 Method 7000B
	Total Suspended Solids	SM 2540D
	Dissolved Oxygen Oxidation Reduction Potential pH Specific Conductance Temperature Turbidity	Field Measurements

3.0 HYDROLOGIC EVALUATION

The following sections provide an evaluation of static groundwater levels and flow in the uppermost aquifer (shallow and deep) at the Site.

3.1 GROUNDWATER ELEVATION

Static water elevations have been measured at each groundwater monitoring well prior to purging and sampling for each event since MNA remedy implementation. Static water level data for shallow and deep wells are summarized in the tables below.

Groundwater Elevation Data (feet mean sea level, ft msl) – Shallow Wells

Shallow Well ID	Apr-11	Jul-11	Nov-11	Jan-12
MW-5	4.24	3.74	4.19	3.19
CECW-1	6.73	4.96	6.98	6.36
CECW-2	4.37	6.02	6.32	6.37
CECW-3	12.05	13.49	13.47	12.69
CECW-6I	1.42	1.80	3.32	1.26
CECW-8	-1.48	0.79	--	0.66
CECW-10R	1.42	1.44	2.31	1.82
CECW-15	-0.40	-0.40	2.00	1.20
PO-8	-0.34	0.96	1.46	0.76
PO-10	3.06	3.36	3.59	3.74

Groundwater Elevation Data (ft msl) – Deep Wells

Deep Well ID	Apr-11	Jul-11	Nov-11	Jan-12
MW-5D	4.21	5.06	4.79	3.16
CECW-1D	1.35	-0.08	1.85	1.00
CECW-2D	2.39	2.69	2.79	2.69
CECW-3D	10.30	11.27	11.44	10.57
CECW-6D	1.77	1.74	2.84	1.49
CECW-8D	0.98	1.00	1.58	1.68
PO-8D	0.68	0.83	-3.82	1.52
PO-10D	3.04	2.93	3.57	3.29

Groundwater elevation data for shallow wells has also been graphed on Figure 3 and groundwater elevation data for deep wells has been graphed on Figure 4. During the past year, groundwater elevations appear to be fairly stable with seasonal variations.

3.2 GROUNDWATER FLOW DIRECTION

Potentiometric surface maps were prepared for the shallow upper aquifer and deep upper aquifer using January 2012 groundwater elevations. Review of Figures 5 and 6 indicate that the overall direction of groundwater flow in the uppermost aquifer is radially outward from the landfill toward the cooling water channel, Deep Creek, and the Southern Branch of the Elizabeth River.

3.3 GROUNDWATER FLOW RATE

Based on January 2012 groundwater elevations, an average groundwater flow velocity as calculated for the shallow and deep portions of the uppermost aquifer at the Site using the equation below:

(1) $$V = Ki/n_e$$

Where:

V = groundwater flow velocity

K = hydraulic conductivity (average determined from ACM slug tests)

i = hydraulic gradient

n_e = effective porosity

The following values were substituted into Equation 1:

Variable	Units	Shallow	Deep
K	ft/day	4.80	0.212
I	ft/ft	0.025	0.017
n_e	unitless	0.30	0.30
V	ft/day	0.400	0.012
V	ft/year	146.0	4.38

Using the equation, the average groundwater flow velocity in the shallow portion of the uppermost aquifer is 146 ft/year and the groundwater flow velocity in the deeper portion of the uppermost aquifer is 4.38 ft/year.

4.0 COC DATA EVALUATION

The following sections summarize arsenic, beryllium, cobalt, and sulfide monitoring results at the Site. For each COC, the following data is presented:

- Data collected at all performance wells, sentinel wells, and surface water locations since implementation of corrective action in April 2011 is summarized in Table 1.

- Historical compliance groundwater monitoring data collected from November 2000 through January 2012 is summarized in Table 2. This time frame was used because the November 2000 sampling event was the first event to analyze for an updated groundwater monitoring list to include beryllium, cobalt, and sulfide.

- Summary statistics including number of detections, if detections are greater than the laboratory limit of quantitation (LOQ), minimums, maximums, means, and if GPS has been exceeded is provided in Table 3.

- Trend tests were performed on COCs (total fractions only). The non-parametric Mann-Kendall trend tests were performed to determine upwards or downwards trends in concentrations over time. A non-parametric trend test was used so trend results would be comparable despite differences in data normality. Trend analyses were performed for each parameter in each well where there were at least eight data points with detections greater than 50%. Trend analyses were not performed for COCs on wells CAP wells MW-5D, CECW-1D, CECW-2D, CECW-3D, CECW-6D, CECW-8, CECW-8D, CECW-10R, CECW-15, PO-8D, and PO-10D due to insufficient data collected to date. Complete trend analyses are provided in Appendix A.

4.1 ARSENIC

Arsenic (total) first exceeded its GPS of 50 micrograms per liter (µg/L) during the 2002 second semi-annual sampling event in permitted downgradient compliance wells CECW-1 and PO-10. In 2004, the GPS was lowered to 10 µg/L in anticipation of the 2006 revised United States Environmental Protection Agency (EPA) maximum contaminant level (MCL). Since the initial GPS exceedances, arsenic has also been found at concentrations above the GPS in permitted wells MW-4R, CECW-2, CECW-3, CECW-4, CECW-5, CECW-6I, PO-8, PO-9, PO-10, and PO-11.

4.1.1 Total Arsenic

CAP monitoring of total arsenic indicates concentrations above the GPS at wells CECW-1, CECW-1D, CECW-2, CECW-2D, CECW-3, CECW-3D, CECW-6I, CECW-6D, CECW-8, CECW-8D, CECW-10R, PO-8, PO-10, and PO-10D. The highest total arsenic concentrations are found in wells nearest to the landfill (CECW-3, CECW-3D, and CECW-6I) and concentrations are lowest at wells closest to the surface water (CECW-8 and CECW-15). Total arsenic was not detected in surface water samples at concentrations above the LOQ.

Trend analyses of total arsenic concentrations indicate no trends in data with the exception of upwards trends detected in upgradient well MW-5 and downgradient well PO-10. Given the overall lack of trend in data for the wells surrounding the landfill and near surface water, the arsenic plume appears to be stable.

4.1.2 Dissolved Arsenic

CAP monitoring of dissolved arsenic indicates concentrations above the GPS at wells CECW-1, CECW-1D, CECW-2D, CECW-3, CECW-3D, CECW-6I, CECW-6D, CECW-8, CECW-8D, CECW-10R, PO-8, PO-10, and PO-10D. Similarly to total arsenic, the highest dissolved arsenic concentrations are found in wells nearest to the landfill (CECW-3D and CECW-6I) and concentrations are lowest at wells closest to the surface water bodies (CECW-8 and CECW-15).

Trend analyses were not performed on dissolved arsenic concentrations given only four quarters of data have been collected to date.

4.1.3 Plume Extent

The first year of CAP monitoring confirms that the surface waters surrounding the landfill peninsula bound the horizontal extent of the arsenic plume. The bar graph provided in Figure 7 of total arsenic concentrations along the flow path from near the landfill at CECW-3 towards PO-10, CECW-8, and surface water, confirms the horizontal extent of the arsenic and confirms that arsenic is attenuating as groundwater flows towards surface water.

The vertical extent of the plume is limited by the presence of the Yorktown confining unit below the water-table aquifer. However, shallow and deep portions of the uppermost aquifer indicate differing arsenic concentrations. The bar graphs presented in Figure 8 graphically show average dissolved arsenic concentrations in shallow and deep well clusters. As seen in Figure 8, concentrations of dissolved arsenic are highest in the reducing environment of the deeper portion of the aquifer near the southern portion of the

peninsula at CECW-2D, CECW-3D, CECW-8D, and PO-10D and dissolved arsenic concentrations are higher in the shallow portion of the aquifer in the northern portion of the peninsula.

4.2 BERYLLIUM

Beryllium (total) first exceeded its GPS of 4 µg/L during the 2010 first semi-annual sampling event in permitted downgradient compliance well PO-11. Compliance monitoring at the Facility has not indicated exceedances above the GPS for other site wells.

4.2.1 Total Beryllium

CAP monitoring of total beryllium indicates a single concentration above the GPS at well CECW-2 in July 2011. Trend analyses of total beryllium concentrations indicate no trends in data with the exception of a downward trend detected in well CECW-3. Given the lack of trend in data in the area of highest total beryllium concentration (CECW-2), the beryllium plume appears to be stable. Total beryllium was not detected in surface water samples.

4.2.2 Dissolved Beryllium

CAP monitoring of dissolved beryllium did not indicate concentrations above the GPS.

4.2.3 Plume Extent

The horizontal extent of the beryllium plume appears to be in the area of well CECW-2 only. Given that beryllium has not been detected in the deeper CECW-2D well, the vertical extent of the beryllium plume appears to be in the shallow portion of the uppermost aquifer in that location.

4.3 COBALT

Cobalt first statistically exceeded its GPS in March 2009 in upgradient well MW-4R with the VDEQ ACL reduction to 4.7 µg/L. Since the initial GPS exceedance, cobalt has also been found at concentrations above the GPS in permitted wells CECW-2, CECW-3, and PO-11.

4.3.1 Total Cobalt

CAP monitoring of total cobalt indicates concentrations above the GPS at wells MW-5D, CECW-2, CECW-3, CECW-6D, and PO-8D. The highest total cobalt concentrations are found in wells MW-5D and CECW-3 and concentrations are lowest at wells closest to the surface water. Total cobalt was not detected in surface water samples at concentrations above the LOQ.

Trend analyses of total cobalt concentrations detected no trends in data indicating a stable plume.

4.3.2 Dissolved Cobalt

CAP monitoring of dissolved cobalt indicates concentrations above the GPS at wells MW-5D, CECW-2, CECW-3, CECW-6D, and PO-8D. Similarly to total cobalt, the highest dissolved cobalt concentrations are found in well MW-5D and concentrations are lowest at wells closest to the surface water bodies.

Trend analyses were not performed on dissolved cobalt concentrations given only four quarters of data have been collected to date.

4.3.3 Plume Extent

Given that the highest concentrations of cobalt are found in the background well, the cobalt plume may be related to background conditions at the Site. In addition, the majority of GPS exceedances occurred in deeper wells indicating the vertical extent of the cobalt plume is mostly in the deep portion of the uppermost aquifer.

4.4 SULFIDE

Sulfide (total) first exceeded its GPS of 2,400 µg/L (LOQ) during the 2003 first semi-annual sampling event in permitted downgradient compliance well CECW-2. Since the initial GPS exceedance, sulfide has also been found at concentrations above the GPS in permitted wells MW-4R, MW-5, CECW-1, CECW-3, CECW-4, CECW-5, CECW-6I, PO-8, PO-9, PO-10, and PO-11.

4.4.1 Total Sulfide

CAP monitoring of total sulfide indicates concentrations above the GPS at wells MW-5, CECW-1, CECW-2, CECW-2D, CECW-3D, CECW-8, PO-8, PO-8D, and PO-10D. The highest total sulfide concentrations are found in well CECW-8 near the SBER. Total sulfide was detected in one quarter each from surface water sampling point SW-2 (200 µg/L) and SW-4 (400 µg/L).

Trend analyses of total sulfide concentrations indicate no trends in data with the exception of downward trends detected in wells PO-8 and PO-10. Given the downward trend in data in the areas of highest total sulfide concentrations, the sulfide plume appears to be stable or shrinking.

4.4.2 Dissolved Sulfide

Dissolved sulfide was only monitored once (January 2012) during the first year of CAP monitoring. CAP monitoring of dissolved sulfide indicates concentrations above the GPS at wells CECW-8 and PO-8. Similarly to total sulfide, the highest dissolved sulfide concentrations are found in well CECW-8.

Trend analyses were not performed on dissolved sulfide concentrations given only one quarter of data has been collected to date.

4.4.3 Plume Extent

The first year of CAP monitoring indicates that the horizontal extent of sulfide is bound by the surrounding surface water bodies. The vertical extent of the plume is confined by of the presence of the Yorktown confining unit below the water-table aquifer and deep and shallow wells results indicate the vertical extent of sulfide extends to the Yorktown confining unit.

5.0 PERFORMANCE PARAMETERS DATA EVALUATION

The following sections summarize MNA performance parameter monitoring since implementation of the remedy in April 2011. A summary of MNA performance indicator parameter sampling results for each well is included in Table 1. Insufficient data exists to date to perform trend analyses on performance indicator parameters; however, future CASE reports will be able to determine trends in performance parameter data.

5.1 ARSENIC SPECIATION

The purpose of arsenic speciation monitoring is to evaluate whether the speciation-based remedy is performing as predicted in reducing the mobility and toxicity of arsenic. Previous studies have identified geochemical reactions within the aquifer that speciate arsenic from a soluble state (As(III)) to an insoluble state (As(V)), thereby reducing dissolved metal concentrations in water.

As(III) and As(V) speciation results for CAP monitoring are summarized in Table 4. Like total and dissolved arsenic concentrations, the highest concentrations of As(III) are found in wells CECW-6I, CECW-3D, and PO-10D and the lowest concentrations are found in wells PO-8, CECW-15, and MW-5D. The highest concentrations of As(V) are found in well CECW-3 and the lowest are found in wells CECW-15 and CECW-8.

The ratio of As(III) to As(V) is included in Table 4 to determine the dominant arsenic species in the aquifer beneath the Stie. Consistent with previous studies, CAP monitoring results indicate As(III) is the predominate arsenic species in wells located close to the waste and as groundwater moves away from the waste area toward surface water, As(V) is the predominant species. This confirms the conceptual model for the Site and indicates that the speciation-based attenuation remedy is still viable.

5.2 IRON AND MANGANESE

The purpose of sampling for iron and manganese is to provide indictors for the adsorption-based remedy process. Previous studies have found dissolved iron and manganese to be oxidizing in the subsurface below the surface waters surrounding the landfill. The oxidizing environment results in sand grains of the aquifer being coated with rust and manganese oxides, which strongly attract arsenic, beryllium, and cobalt and bind the metals to the sand grains taking it out of solution (AMEC, 2010).

Total and dissolved iron have been detected at each CAP monitoring location with the highest concentrations found in well MW-5D and the lowest concentrations found in surface water and wells CECW-3, CECW-8,

and PO-8. Figure 9 shows average total versus dissolved iron concentration at CAP monitoring locations. The presence of higher iron levels in deep wells attenuating toward the surface water bodies indicates that the geochemical environment beneath the Site is oxidizing iron toward the surface and therefore confirms a suitable environment for the adsorption-based remedy. Figure 10 shows average dissolved iron versus average dissolved arsenic concentrations and in general, indicates that higher dissolved iron concentrations result in lower dissolved arsenic concentrations, further confirming the reaction arsenic has with iron.

Manganese has been detected in each well during CAP monitoring with the highest concentrations found in wells MW-5D and CECW-3 and the lowest concentrations in wells CECW-8 and MW-5. Like iron, the presence of higher manganese levels in deep wells attenuating toward the surface water bodies indicates that the geochemical environment beneath the Site is oxidizing manganese towards the surface and therefore confirms a suitable environment for the adsorption-based remedy. The bar chart shown in Figure 11 shows graphically that, in general, higher dissolved manganese concentrations result in lower dissolved arsenic concentrations.

5.3 FIELD WATER QUALITY PARAMETERS

5.3.1 Dissolved Oxygen

Dissolved oxygen (DO) is measured in the field during sample collection. DO is an indicator of the type of aquifer environment (aerobic or anaerobic). As expected, DO concentrations are lowest in the deep wells where iron and manganese are in solution, and highest in surface water and shallow wells where the iron and manganese are precipitated. As seen in Figure 12, in general, higher DO concentrations correlated to reduced dissolved iron and arsenic concentrations. This provides evidence of an environment at the Site that is conducive to constituent attenuation by oxidation as groundwater flows toward the surface water bodies surrounding the landfill.

5.3.2 pH

The pH of groundwater beneath the Site is an indicator of the type of aquifer environment. Average pH measurements recorded from Site wells range from 4.96 to 7.85 standard units (S.U.) with the lowest measurements found in well CECW-15 and the highest found in well CECW-8. In general, the more acidic the groundwater, the higher the dissolved iron content. As seen in Figure 13, lower site pHs coincide with higher dissolved iron concentrations. At the Site, the lower pH values are found in deep wells and increase as groundwater migrates toward surface water bodies where a more neutral value exists. pH measurements to date continue to indicate a suitable geochemical environmental for the adsorption-based remedy.

5.3.3 Specific Conductivity

Specific conductivity is related to the concentration of dissolved ionic constituents in the groundwater. In general, higher specific conductivity values are indicative of higher concentrations of constituents in the groundwater. Site conductivity levels range from 722 to 31,250 micromhos (UMHOS), with the highest levels found in wells CECW-8, CECW-3D, PO-10, and PO-10D. These wells are located in the areas of the highest concentrations of constituents.

5.3.4 Oxidation Reduction Potential (ORP)

ORP is an indicator of the amount of oxygen present in the water and the ability for the geochemical environment to attenuate constituents. As expected, the lowest ORP measurements were recorded near the surface water and swamp areas and the highest ORP readings were recorded in the deep wells. This confirms that as groundwater moves from beneath the landfill toward the surface water bodies, redox reactions can take place and the environment is conducive to the adsorption-based remedy.

5.4 REMEDY SUMMARY

CAP monitoring for the first year continues to indicate a geochemical environment conducive to a speciation-based groundwater remedy. The anoxic groundwater beneath the landfill and the oxidizing environments near the surface water bodies provide evidence that conditions are suitable for MNA.

6.0 CONCEPTUAL SITE MODEL EVALUATION

Figure 14 presents a graphical representation of the conceptual arsenic sorption model for the Site as presented in the CAP (AMEC, 2011). Under this model, the uppermost strata beneath the landfill at the Site is laterally and vertically variable and consists of 1) construction fill that may contain variable quantities of ash, 2) buried bottom and fly ash from the historical sedimentation basin(s) at the Site, and 3) alluvial deposits from Deep Creek and the SBER. Fill and ash layers within these strata are less permeable, with hydraulic conductivity values on the order of 10^{-5} centimeters per second (cm/sec). Below these layers is the Norfolk Formation, which consists of variable quantities of sand and gravel that is more permeable with hydraulic conductivity values on the order of 10^{-3} to 10^{-4} cm/sec and the Yorktown confining unit with conductivity values on the order of 10^{-5} cm/sec the unit likely becomes less permeable with depth. The Norfolk Formation contains a mass of iron minerals and surrounding surface waters provide oxygenated waters. As groundwater passes across the redox boundary below the adjacent estuary, arsenic is adsorbed onto iron oxides and removed from groundwater.

Based on monitoring data collected since implementation of the remedy, the conceptual site model presented in the CAP remains valid.

7.0 SUMMARY AND RECOMMENDATIONS

7.1 SUMMARY OF FINDINGS

The following summarizes the results of data evaluations presented in this CASE:

- CAP monitoring continues to indicate the overall direction of groundwater flow in the uppermost aquifer (shallow and deep) is radially outward from the landfill toward the cooling water channel, Deep Creek, and SBER;

- COC concentrations have reduced or remain stable. Constituent concentrations along the flow path are attenuating and the horizontal and vertical extent of the constituent plume is stable-to-shrinking; thus, the process toward attainment of cleanup objectives (GPS) is continuing;

- Performance monitoring results continue to indicate favorable environmental conditions for the MNA process; and

- The conceptual site model presented in the CAP remains unchanged.

7.2 RECOMMENDATIONS

Based on the findings of the first year of CAP monitoring, natural attenuation is occurring according to expectations. It is recommended that the MNA monitoring program continue without change until the next CASE due by March 10, 2014 or until all remedial action objectives have been met.

8.0 REFERENCES

AMEC Environment & Infrastructure, Inc. (AMEC), 2011. Corrective Action Plan – Revision 1, Chesapeake Energy Center Ash Landfill, Chesapeake, Virginia. June 2011.

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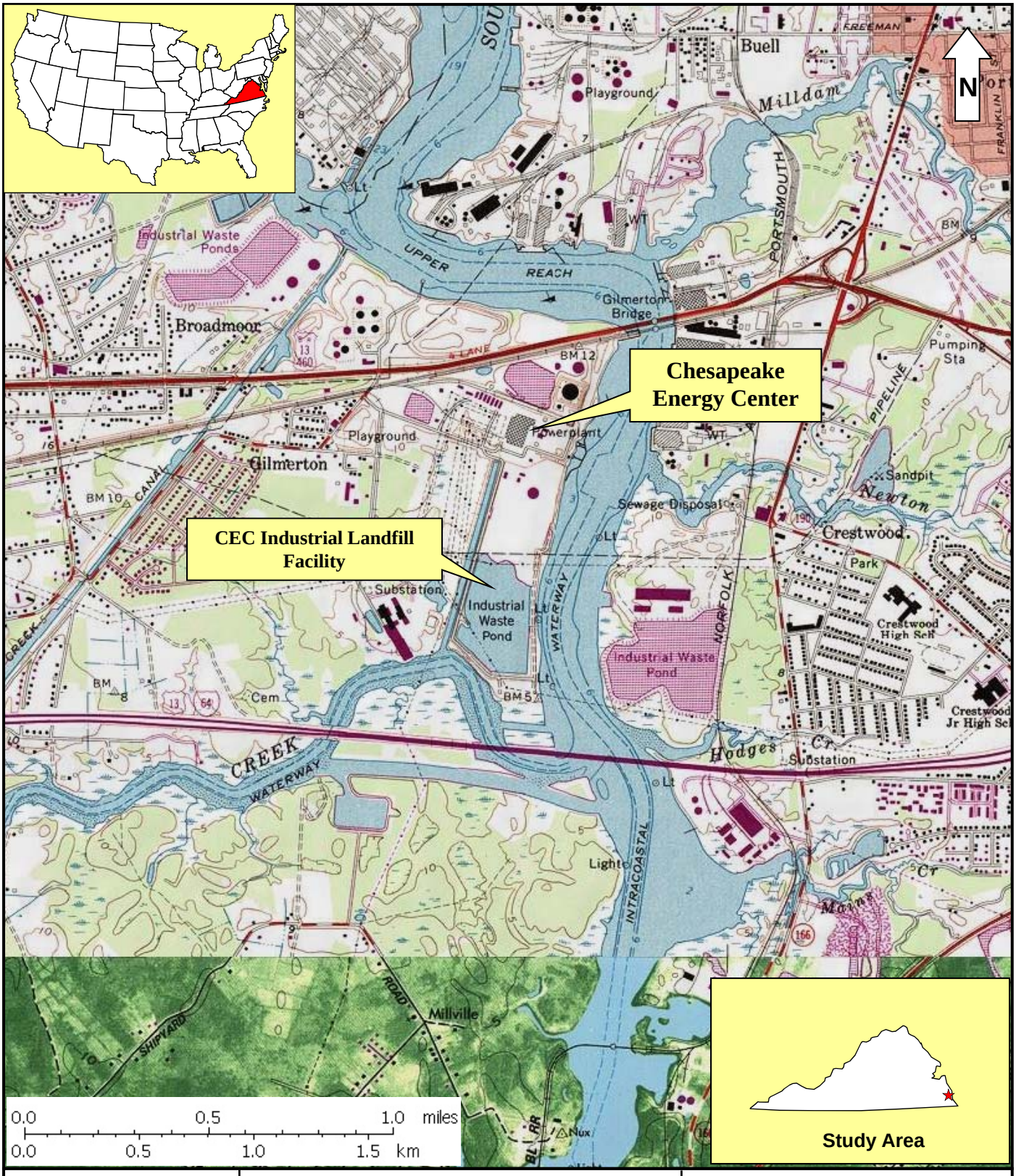
FIGURES



Source:
USGS Quads: Norfolk South, Virginia, 1986 and Deep Creek, Virginia, 1986
TOPO! ©2006 National Geographic Holdings

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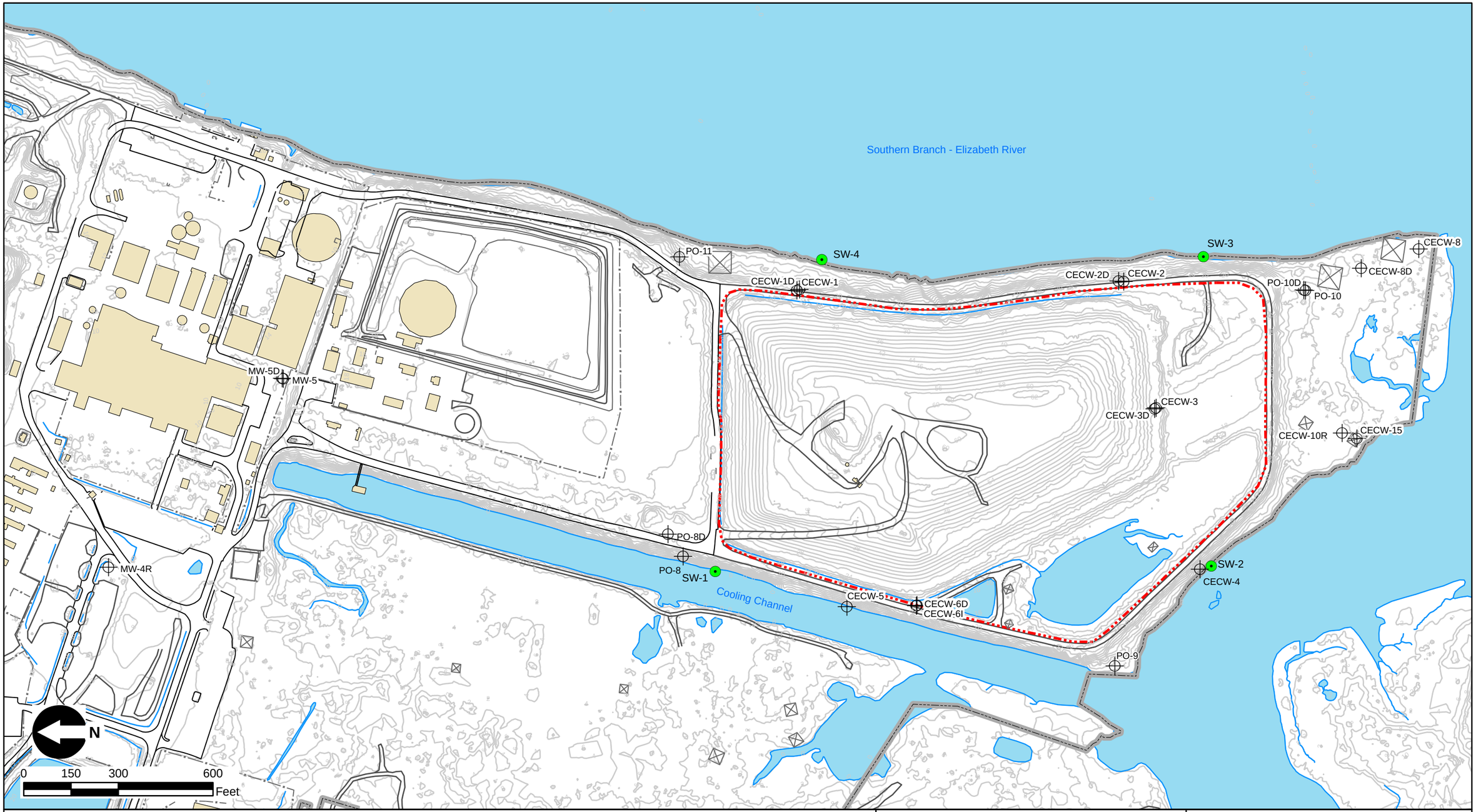
Site Location Map			**Figure 1**
Date: March 2012		URS Project No.: 11658277	**Chesapeake Energy Center Chesapeake, Virginia**
Drawn by: KAH	Checked by: KAH	Reviewed by: KAH	Approved by: JOS
Scale: *1" = 2,000'*		File name: 02_Delv/CASE/Figs	

URS

URS CORPORATION
4905 DICKENS ROAD, SUITE 106
RICHMOND, VA 23230



Legend

- Monitoring Well
- Surface Water Sampling Station
- Property Boundary
- Limits of Waste
- Structures
- Surface Water
- Topography Contour
- Paved Roads and Parking
- Unpaved Roads and Parking

Chesapeake Energy Center - Industrial Landfill
Solid Waste Permit No. 440

Date: March 9, 2012	Job Number: 11658277
Prepared By: KAH	Reviewed By: JOS
Scale: 1 inch = 300 feet	File Name: 02_Del/Figs/CAP Locs

Figure 2

Corrective Action Program
Monitoring Locations

URS Corporation
4905 Dickens Road
Suite 106
Richmond, Virginia 23230

Figure 3
Groundwater Elevations - Shallow Wells

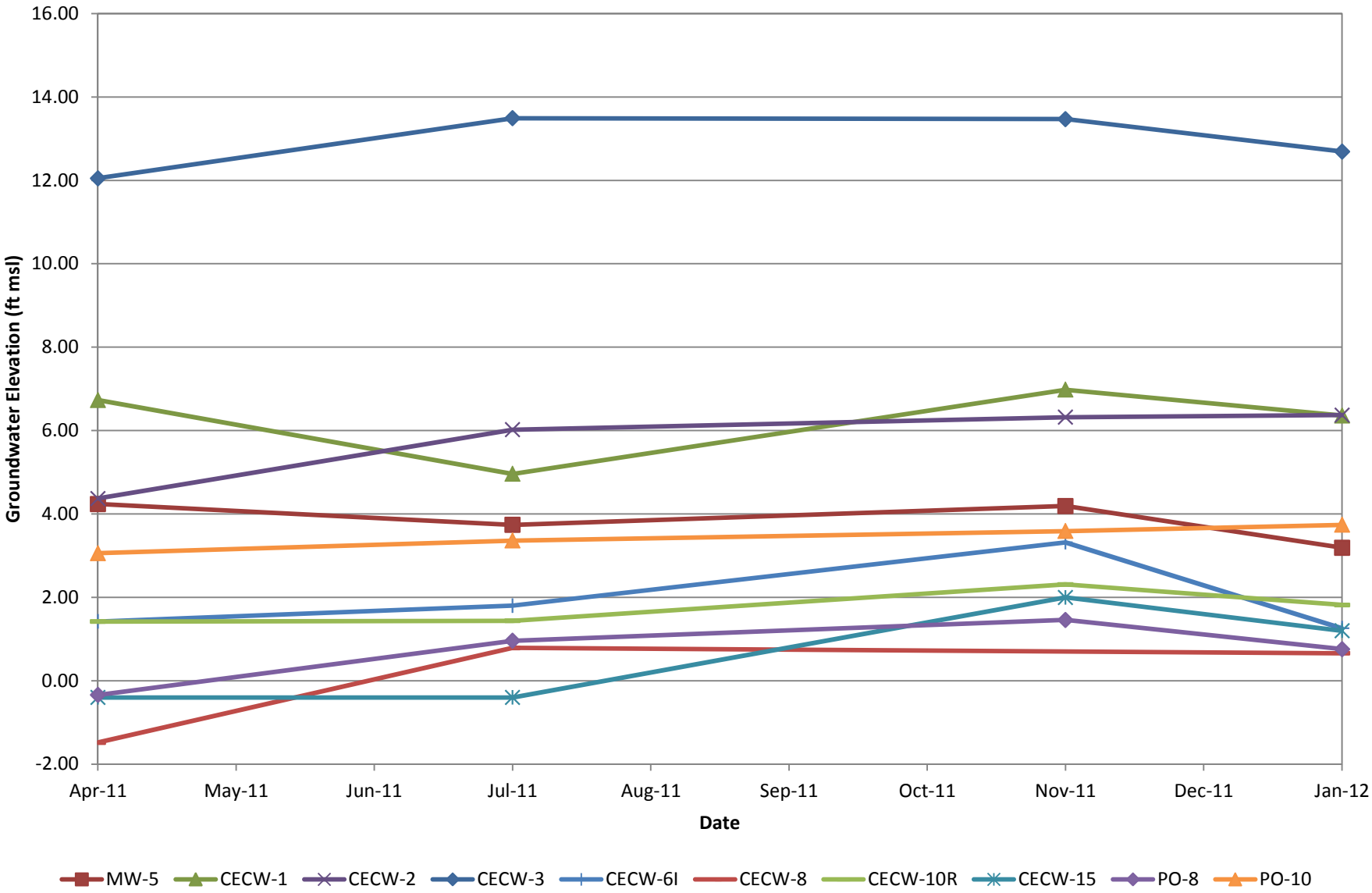
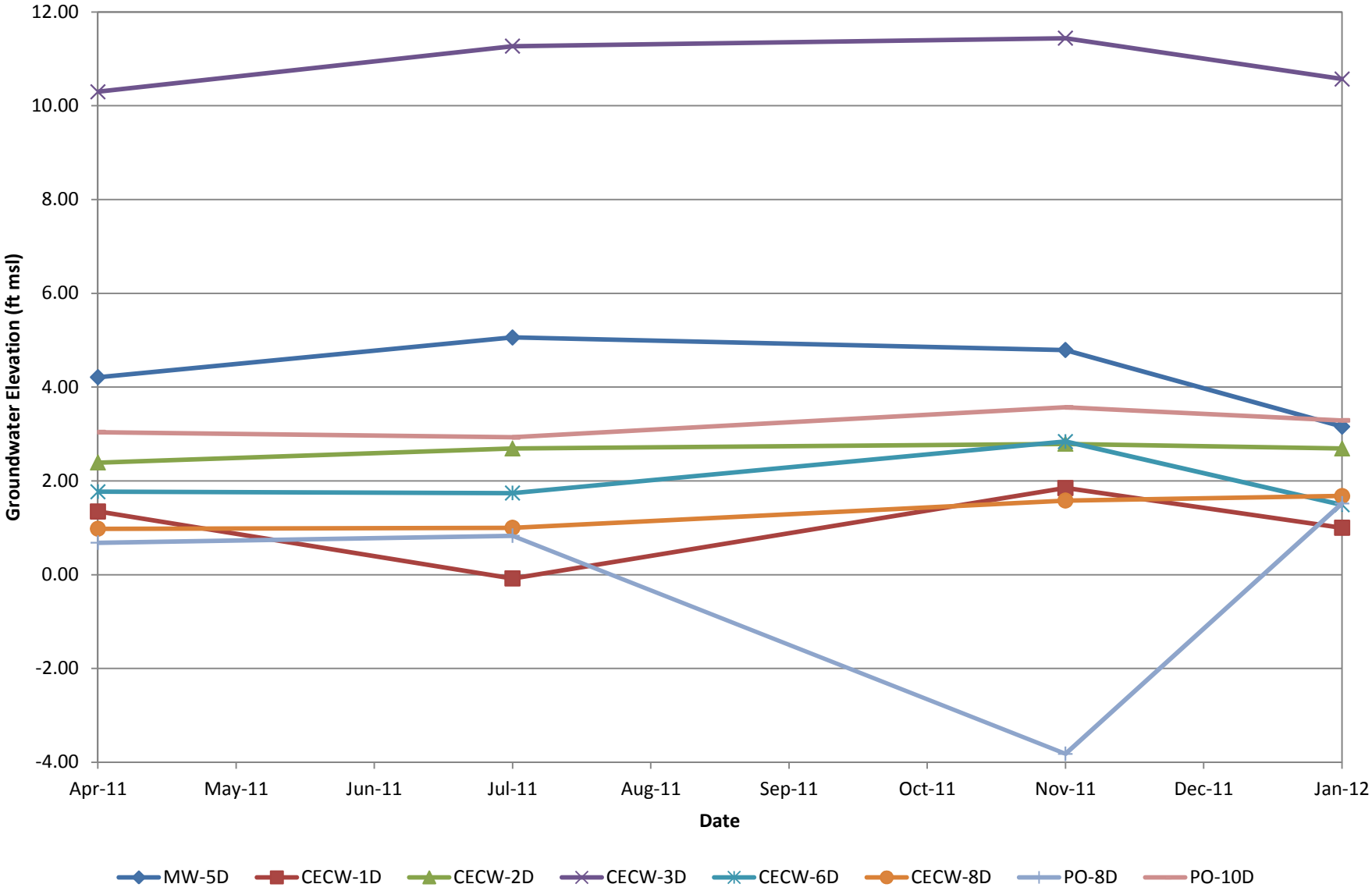
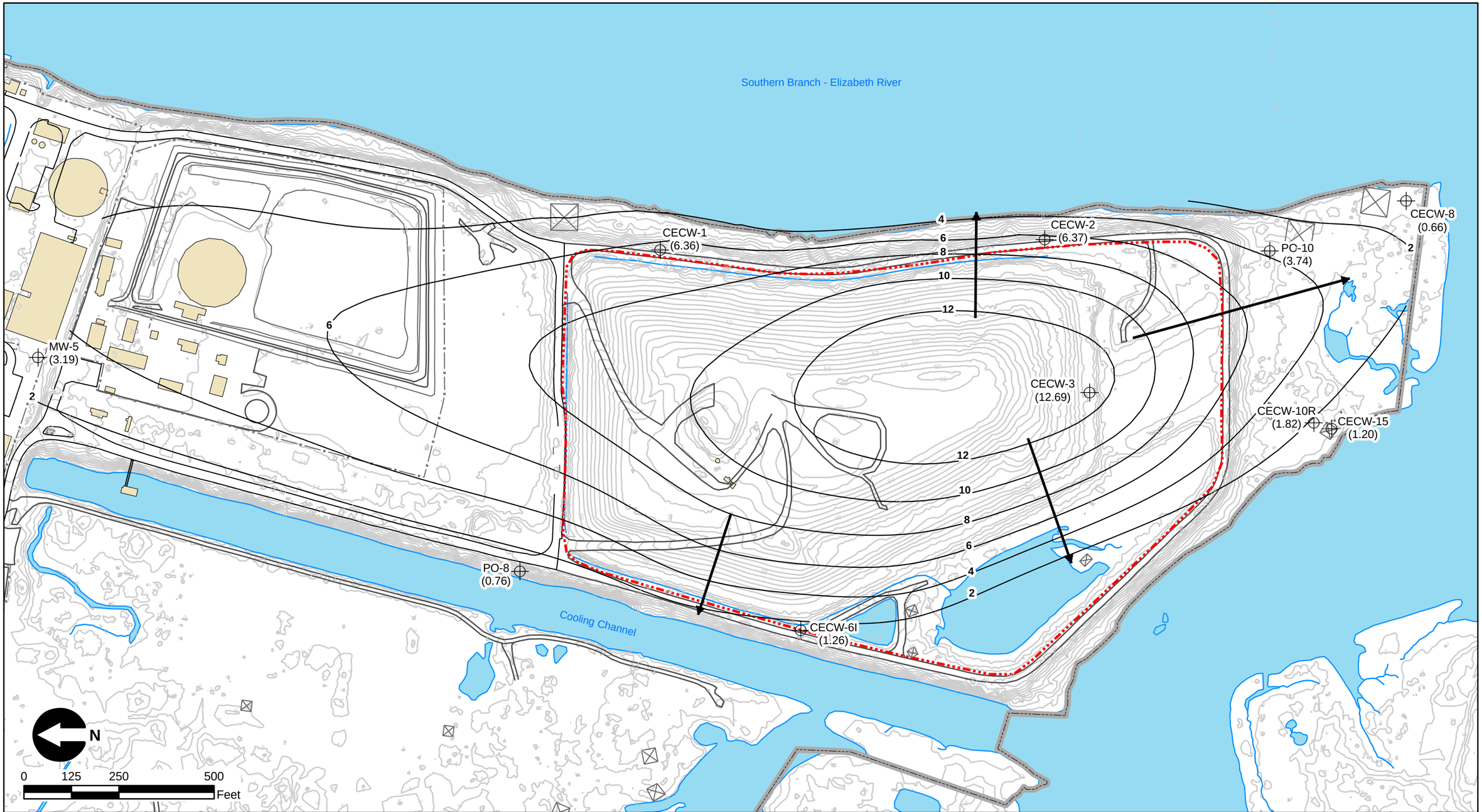


Figure 4
Groundwater Elevation - Deep Wells





Legend

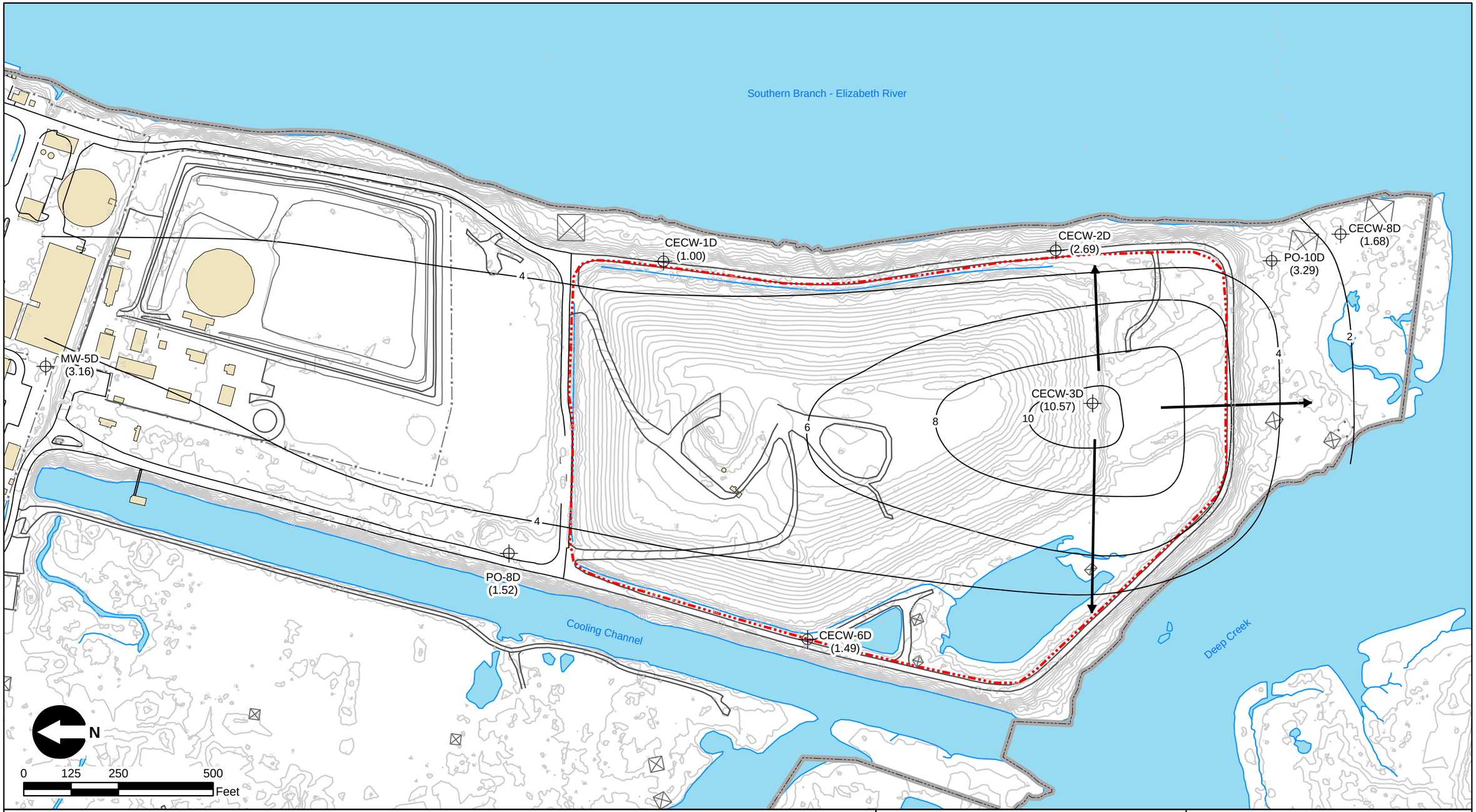
- Monitoring Well
- Property Boundary
- Limits of Waste
- Structures
- Surface Water
- Topography Contour
- Paved Roads and Parking
- Unpaved Roads and Parking
- Potentiometric Contour
- Groundwater Flow Direction
- (1.26) Groundwater Elevation (ft msl)

Chesapeake Energy Center - Industrial Landfill
Solid Waste Permit No. 440

Date: March 9, 2012	Job Number: 11658277
Prepared By: KAH	Reviewed By: JOS
Scale: 1 inch = 250 feet	File Name: 02_Del/Figs/Pot-Shallow

Figure 5
Potentiometric Surface Map
Shallow Wells
January 2012

URS Corporation
4905 Dickens Road
Suite 106
Richmond, Virginia 23230



Legend

- Monitoring Well
- Property Boundary
- Limits of Waste
- Structures
- Surface Water
- Topography Contour
- Paved Roads and Parking
- Unpaved Roads and Parking
- Potentiometric Contour
- Groundwater Flow Direction
- (1.26) Groundwater Elevation (ft msl)

Chesapeake Energy Center - Industrial Landfill
Solid Waste Permit No. 440

Date: March 13, 2012	Job Number: 11658277
Prepared By: KAH	Reviewed By: JOS
Scale: 1 inch = 250 feet	File Name: 02_Del/Figs/Pot-Shallow

Figure 6

Potentiometric Surface Map
Deep Wells
January 2012

URS Corporation
4905 Dickens Road
Suite 106
Richmond, Virginia 23230

Figure 7
Average Total Arsenic Concentrations Along Flow Path

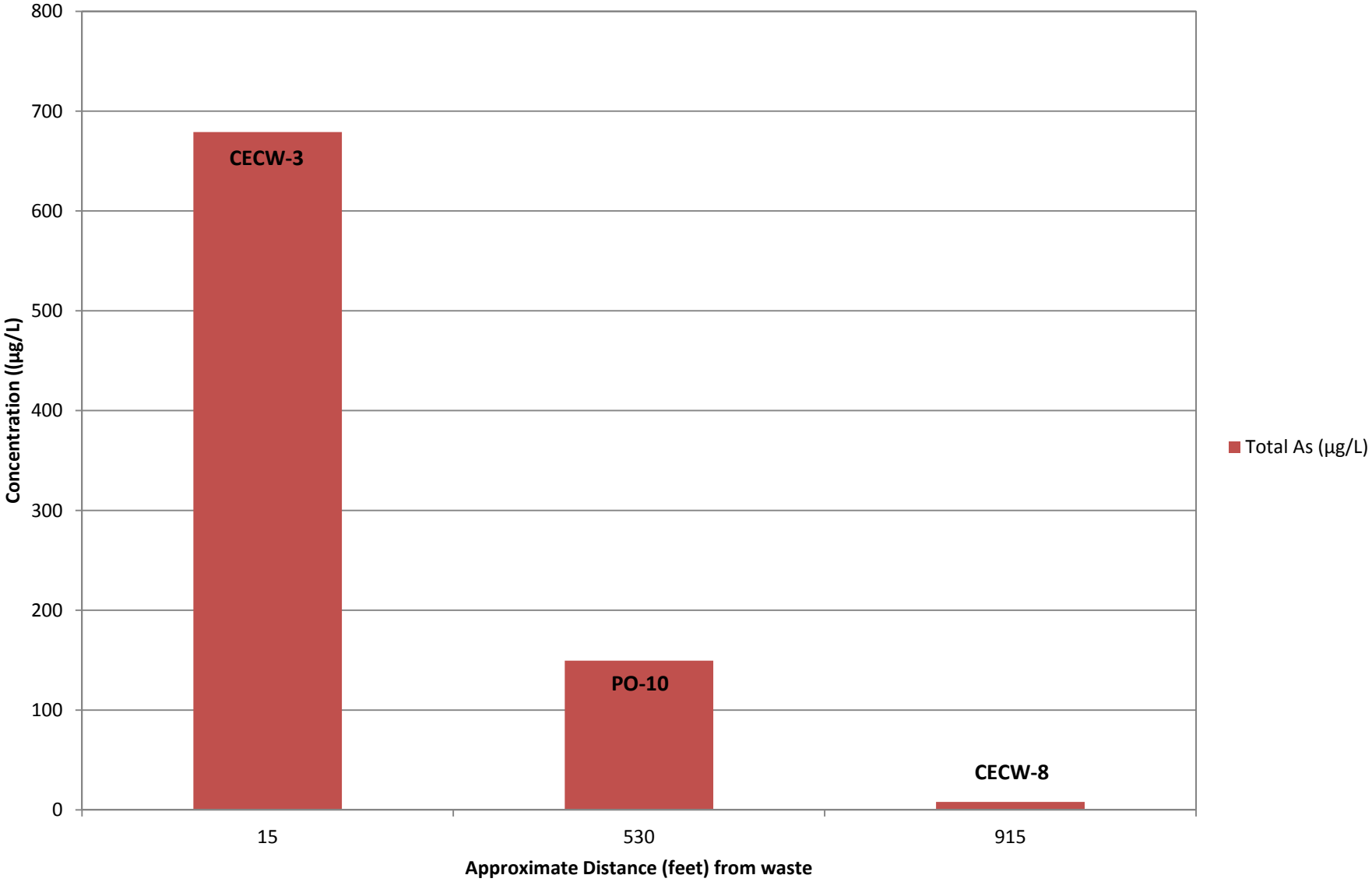


Figure 8
Average Dissolved Arsenic Concentrations - Shallow and Deep Well Clusters
Corrective Action Status Evaulation
Chesapeake Energy Center Industrial Landfill - Permit No. 440

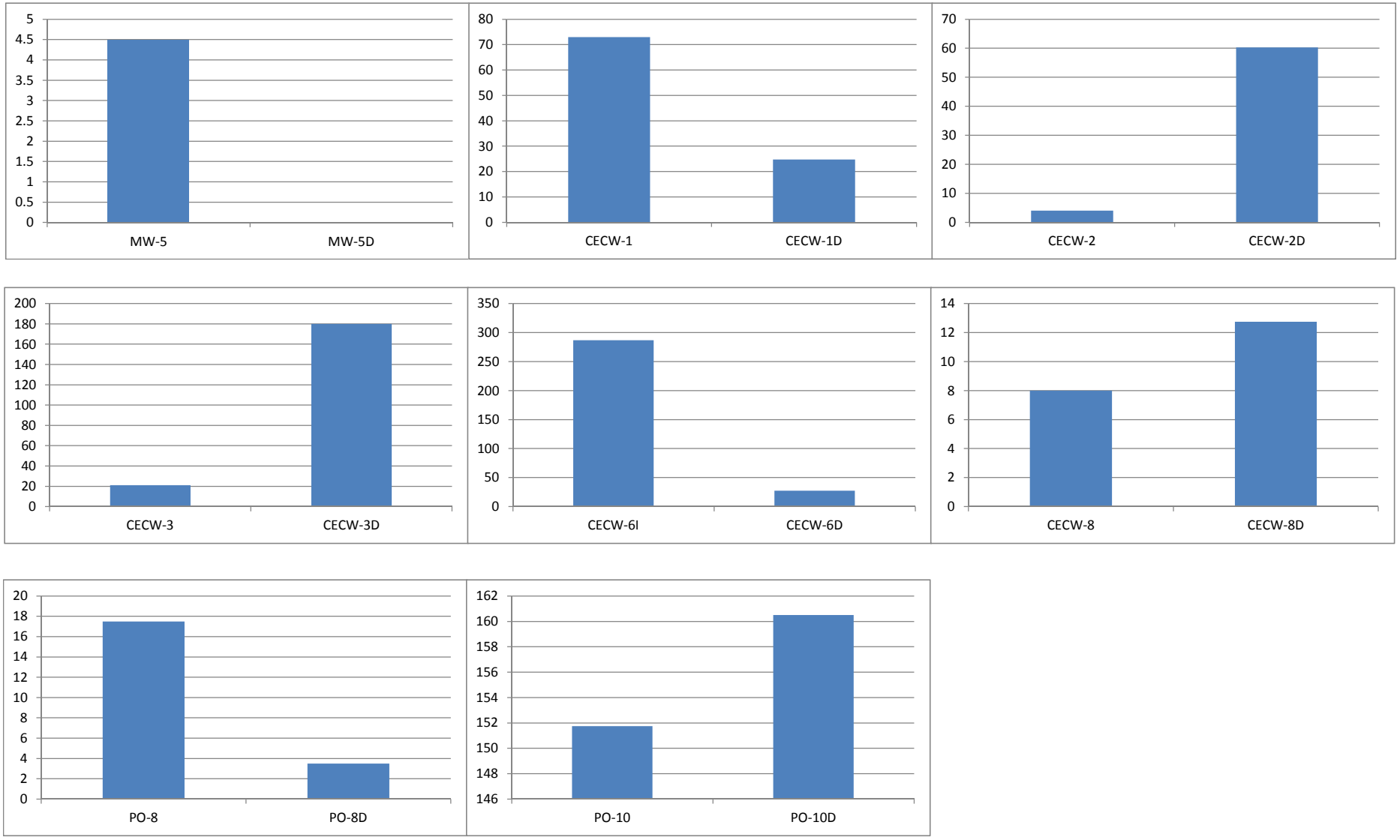


Figure 9
Average Total Iron vs. Average Dissolved Iron

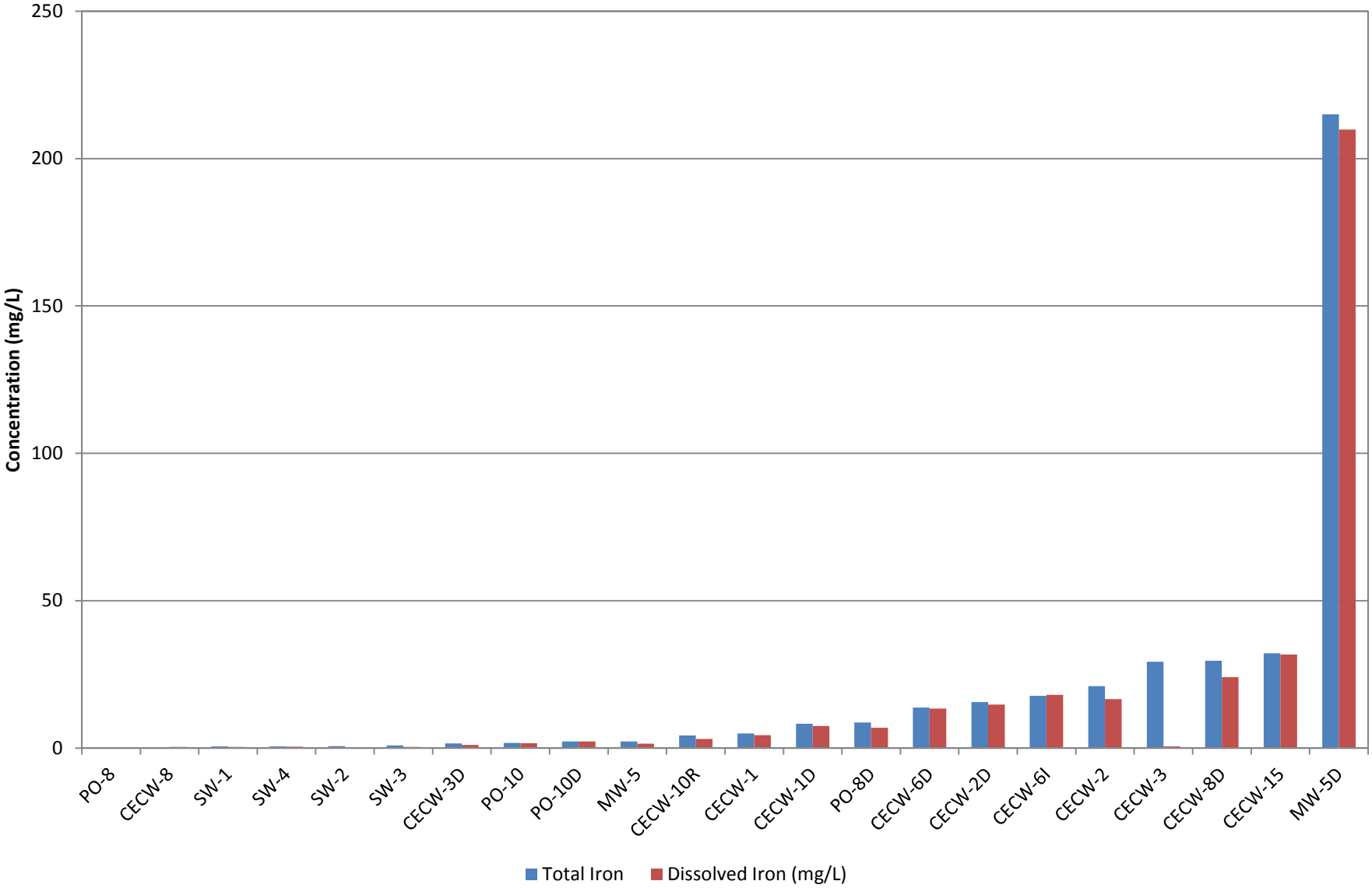


Figure 10
Average Dissolved Iron vs. Average Dissolved Arsenic

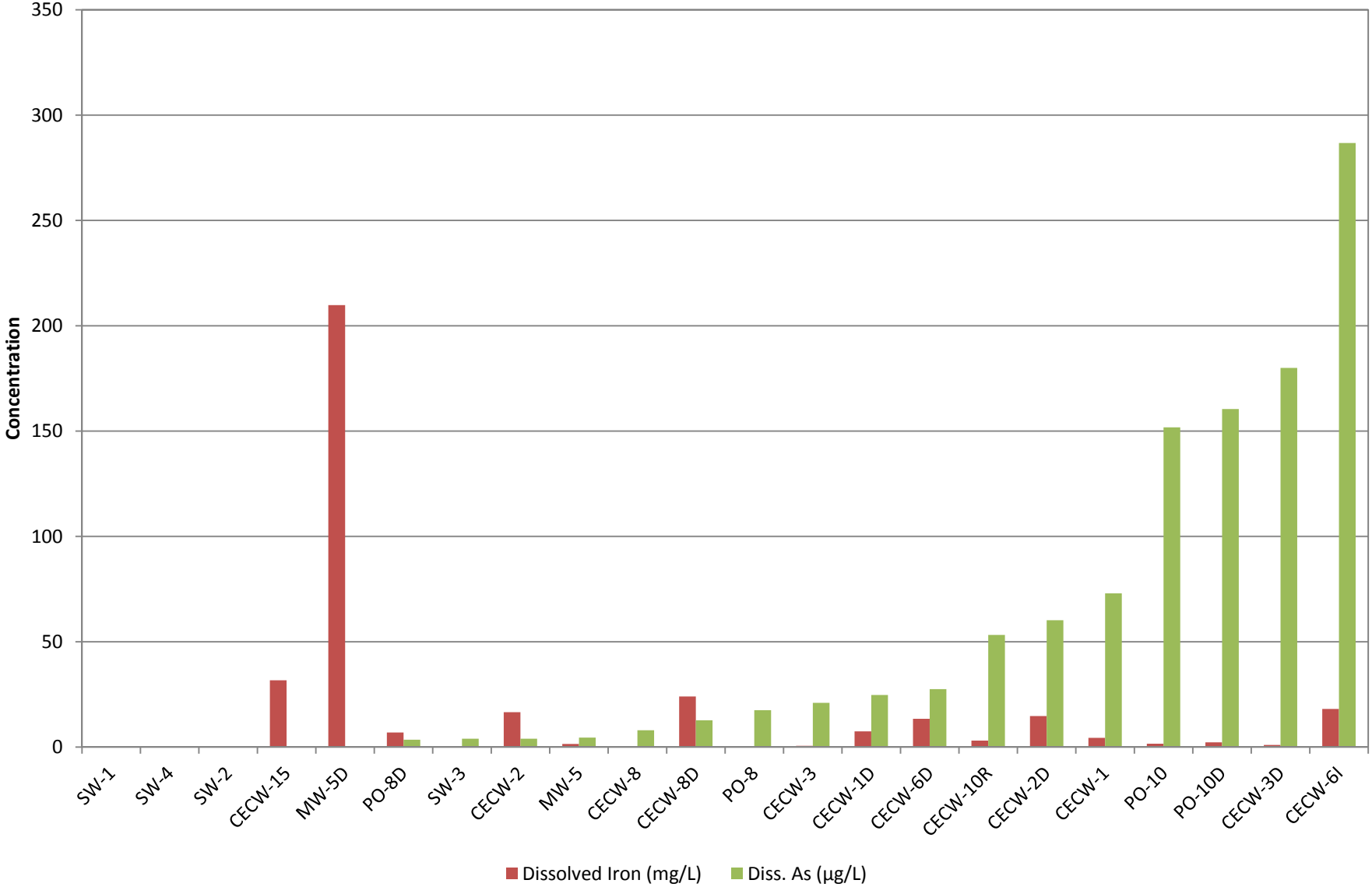


Figure 11
Average Manganese vs. Average Dissolved Arsenic

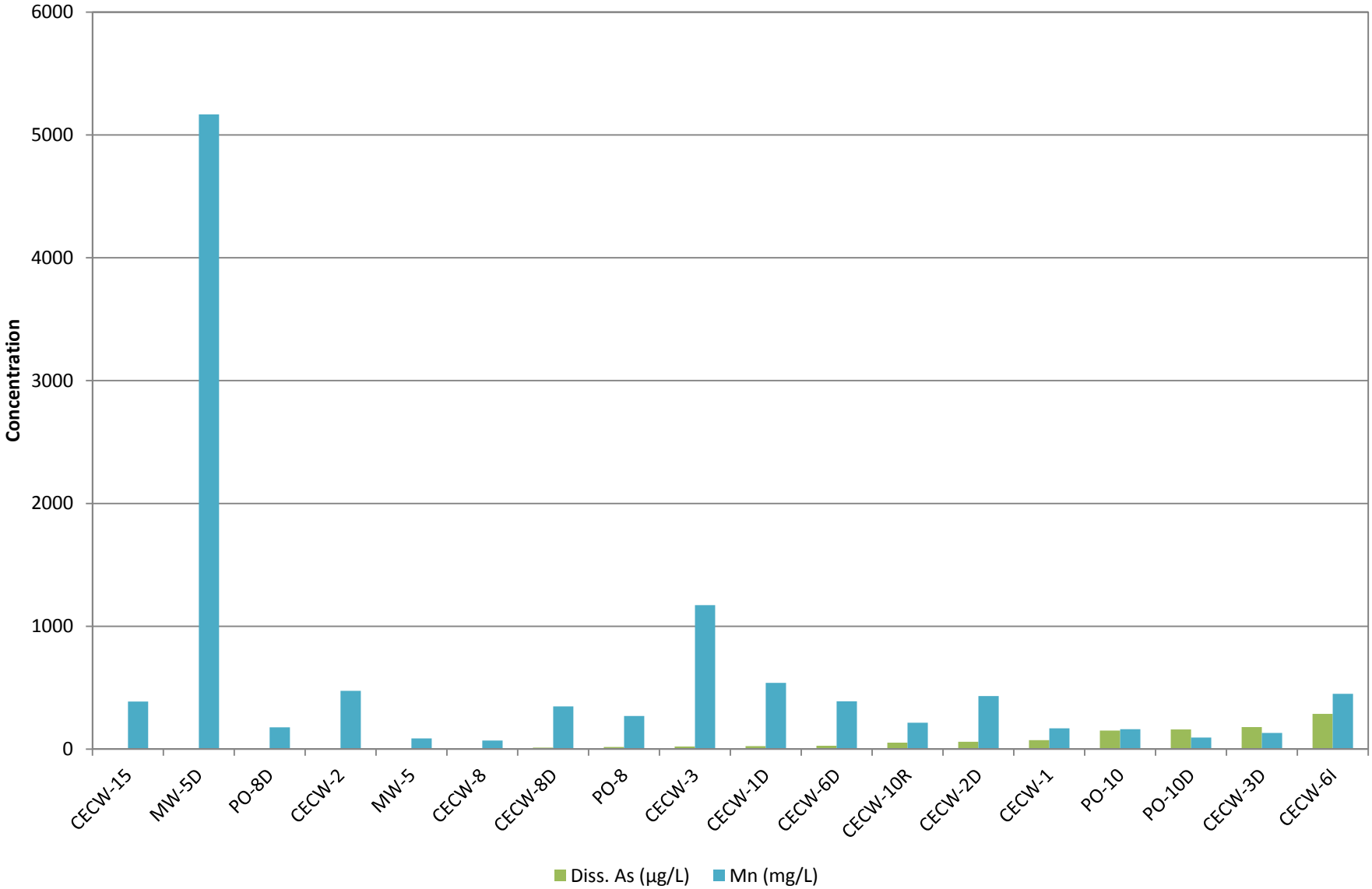


Figure 12
Average Dissolved Oxygen vs. Average Dissolved Iron and Arsenic

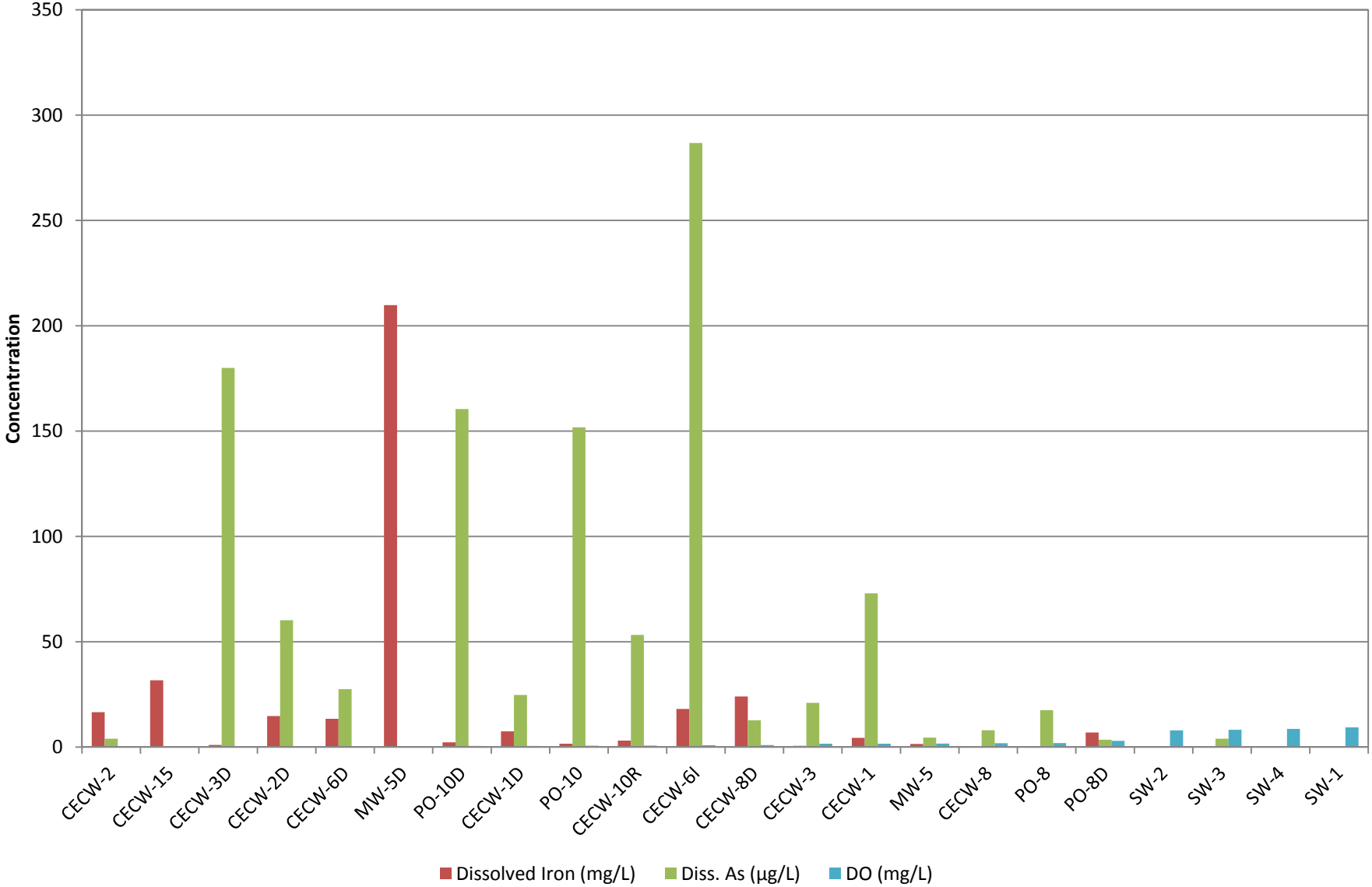
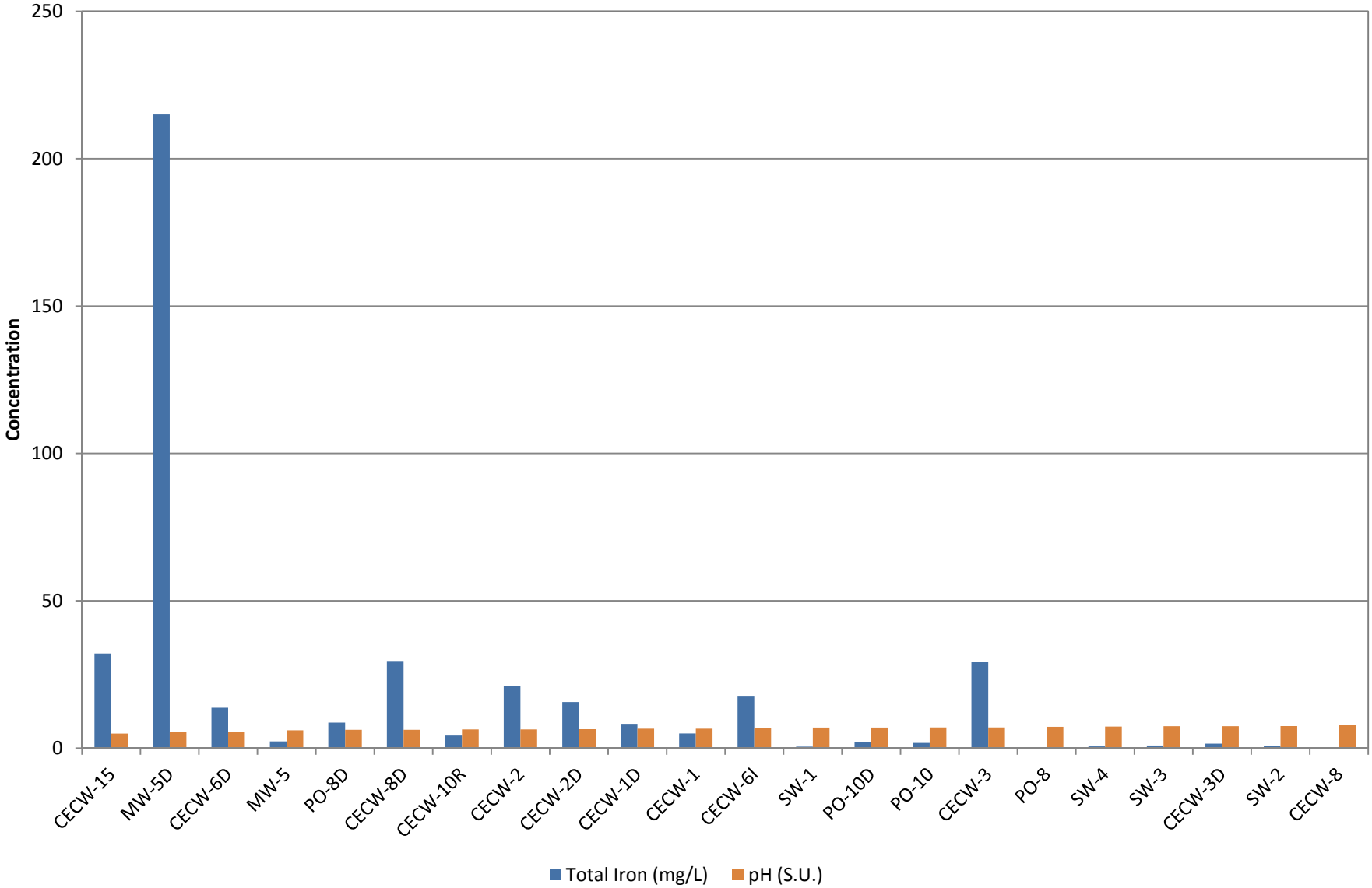
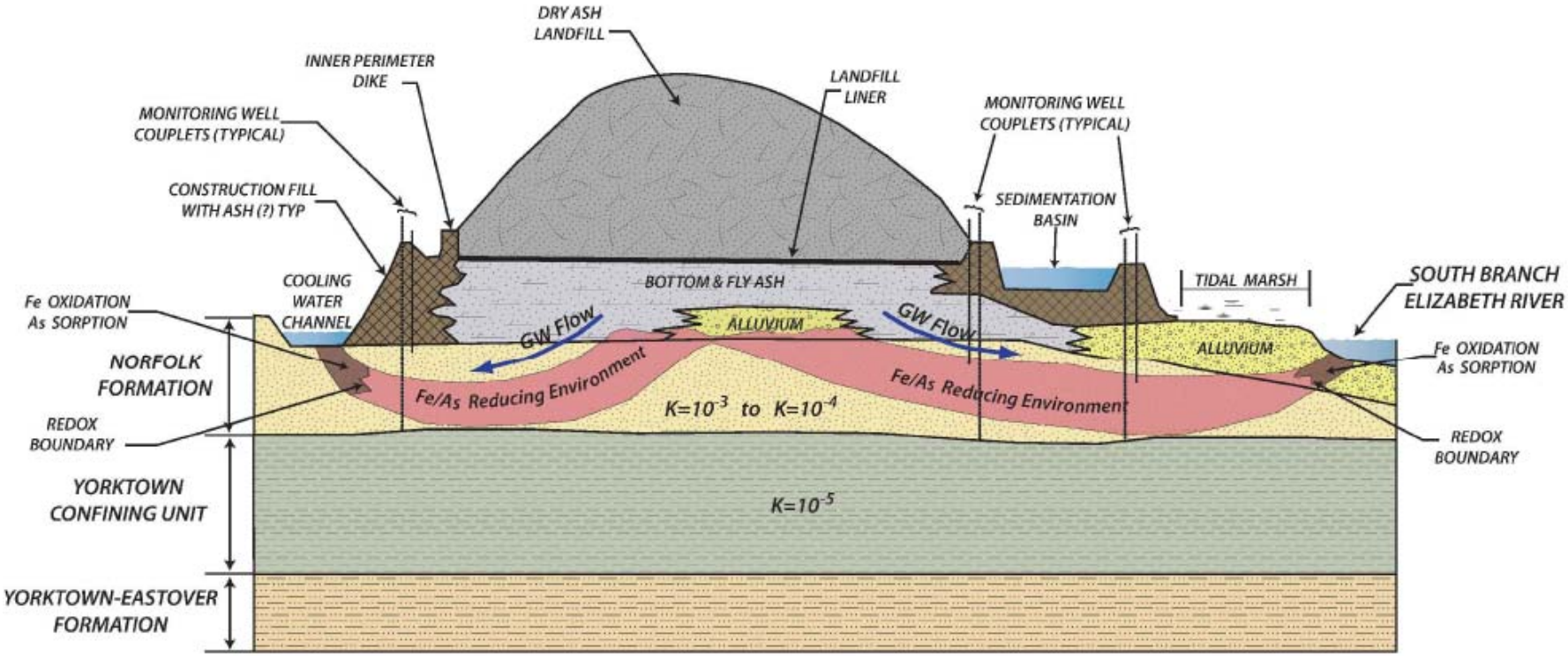


Figure 13
Average pH vs. Average Total Iron





Source: AMEC, 2011 – Corrective Action Plan, Revision 1 (Figure 4-1)

	URS Corporation 4905 Dickens Road, Suite 106 Richmond, VA 23230	**Figure 14** Conceptual Arsenic Sorption Model
Date: March 9, 2012	Project Number: 11658277	Corrective Action Status Evaluation Chesapeake Energy Center – Industrial Landfill Solid Waste Permit No. 440
Scale: Not to scale	Prepared by/Reviewed by: March 9, 2012	

TABLES

Table 1
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: MW-5
CAP Well Type: Performance
Well Location: ~ 1,390 ft upgradient (north) of waste management unit boundary

Sample Date	4/6/2011	7/19/2011	11/1/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	<3	**6** J	**6** J	**4** J
Arsenic, dissolved	<3	**5** J	**6** J	**4** J
Arsenic III	**0.46**	**3.50**	**2.81**	**2.64**
Arsenic V	**3.12**	**1.65**	**1.03**	**1.51**
Beryllium, total	<0.2	<0.2	<0.2	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	<0.6	**1.4** J	**1.2** J	**0.9** J
Cobalt, dissolved	<0.6	**0.7** J	<0.6	<0.6
Sulfide	<0.0002	<0.0002	**400**	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**0.50**	**5.46**	**1.55**	**1.61**
Iron, dissolved	**0.12** J	**2.98**	**1.37**	**1.46**
Manganese	<0.02	**0.13**	**0.11**	**0.09**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.30	3.55	1.08
Oxidation Reduction Potential (mV)	NT	159	172	110
pH (S.U.)	6.57	5.86	5.88	5.82
Specific Conductance (uS/cm)	376	802	651	1060
Temperature (Degrees Celsius)	14.55	22.23	21.79	17.80
Turbidity (NTU)	11.92	4.49	8.49	5.55

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: MW-5D
CAP Well Type: Performance
Well Location: ~ 1,392 ft upgradient (north) of waste management unit boundary

Sample Date	4/6/2011	7/19/2011	11/2/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	<3	<3	<3	**3** J
Arsenic, dissolved	<3	<3	<3	<3
Arsenic III	**0.48**	**0.66**	**0.94**	**1.15**
Arsenic V	**2.20**	**1.1**	<0.008 U	<0.006 U
Beryllium, total	**1.1**	**0.7** J	**0.5** J	**0.4** J
Beryllium, dissolved	**1.0**	**0.6** J	**0.5** J	**0.4** J
Cobalt, total	**234.6**	**141.0**	**80.2**	**104.1**
Cobalt, dissolved	**191.9**	**134.5**	**78.4**	**85.0**
Sulfide	<0.0002	<0.0002	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**294.6**	**260.7**	**152.6**	**152.1**
Iron, dissolved	**289.7**	**248.6**	**155.3**	**145.7**
Manganese	**7.69**	**5.57**	**3.74**	**3.67**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.60	0.42	0.42
Oxidation Reduction Potential (mV)	NT	283	193	51
pH (S.U.)	5.69	5.31	5.42	5.52
Specific Conductance (uS/cm)	14500	18000	16800	16000
Temperature (Degrees Celsius)	18.52	27.96	20.15	19.90
Turbidity (NTU)	10.68	6.63	3.12	0.76

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: CECW-1
CAP Well Type: Performance
Well Location: ~ 20 ft east of waste management unit boundary

Sample Date	4/6/2011	7/19/2011	11/2/2011	1/25/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**54**	**78**	**81**	**78**
Arsenic, dissolved	**57**	**76**	**74**	**85**
Arsenic III	**45.7**	**58.5**	**42.6**	**58.7**
Arsenic V	**8.03**	**9.99**	**7.38**	**3.54**
Beryllium, total	**3.3**	<0.2	**0.6** J	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	<0.6	<0.6	**0.9** J	<0.3
Cobalt, dissolved	<0.6	<0.6	<0.6	<0.6
Sulfide	<0.0002	**400**	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**3.05**	**6.80**	**5.22**	**4.89**
Iron, dissolved	**2.48**	**5.36**	**5.31**	**4.40**
Manganese	**0.15**	**0.18**	**0.17**	**0.18**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	1.98	1.01	1.87
Oxidation Reduction Potential (mV)	NT	103	-52	-110
pH (S.U.)	6.61	6.65	6.64	6.54
Specific Conductance (uS/cm)	6510	6500	5600	5620
Temperature (Degrees Celsius)	15.16	22.15	18.8	16.79
Turbidity (NTU)	7.42	4.95	8.24	4.37

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: CECW-1D
CAP Well Type: Performance
Well Location: ~ 17 ft east of waste management unit boundary

Sample Date	4/6/2011	7/19/2011	11/2/2011	1/25/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**24**	**26**	**27**	**32**
Arsenic, dissolved	**21**	**24**	**24**	**30**
Arsenic III	**23.2**	**23.8**	**18.7**	**26.5**
Arsenic V	**4.75**	**2.72**	**1.00**	**1.18**
Beryllium, total	<0.2	<0.2	<0.2	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	<0.6	<0.6	<0.6	**1.3** J
Cobalt, dissolved	<0.6	<0.6	<0.6	**0.6** J
Sulfide	<0.0002	**200**	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**9.07**	**8.15**	**7.85**	**7.99**
Iron, dissolved	**7.91**	**6.62**	**7.61**	**7.69**
Manganese	**0.59**	**0.47**	**0.57**	**0.53**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.53	0.45	0.74
Oxidation Reduction Potential (mV)	NT	208	104	-79
pH (S.U.)	7.01	6.47	6.49	6.45
Specific Conductance (uS/cm)	25700	23400	21900	21800
Temperature (Degrees Celsius)	17.56	19.87	18.19	17.06
Turbidity (NTU)	3.94	2.18	3.64	3.03

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: CECW-2
CAP Well Type: Performance
Well Location: ~ 20 ft east of waste management unit boundary

Sample Date	4/6/2011	7/19/2011	11/2/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	<3	<3	**10**	**20**
Arsenic, dissolved	<3	<3	**4** J	**6** J
Arsenic III	<0.53 U	**0.49**	**2.94**	**1.41**
Arsenic V	<1.5 U	**0.5**	<0.008 U	**0.7**
Beryllium, total	**0.4** J	**7.0**	**1.7**	**0.4** J
Beryllium, dissolved	**0.6** J	**3.8**	**0.5** J	<0.2
Cobalt, total	**3.1**	**15.3**	**5.9**	**2.9** J
Cobalt, dissolved	**2.7** J	**9.4**	**2.7** J	**1.4** J
Sulfide	**400**	<0.0002	<0.0002	**200**
Sulfide, dissolved	NT	NT	NT	**200**
Performance Parameters (mg/L)				
Iron, total	**1.06**	**14.11**	**32.73**	**36.06**
Iron, dissolved	**0.76**	**10.32**	**24.96**	**30.26**
Manganese	**0.31**	**0.64**	**0.47**	**0.48**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.40	0.26	0.34
Oxidation Reduction Potential (mV)	NT	-55	-104	-383
pH (S.U.)	7.07	6.21	6.04	6.10
Specific Conductance (uS/cm)	12450	11140	12350	14520
Temperature (Degrees Celsius)	15.4	24.28	20.59	17.77
Turbidity (NTU)	13.28	19.6	9.6	10.94

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: CECW-2D
CAP Well Type: Performance
Well Location: ~ 22 ft east of waste management unit boundary

Sample Date	4/6/2011	7/19/2011	11/2/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**48**	**55**	**69**	**119**
Arsenic, dissolved	**45**	**43**	**71**	**82**
Arsenic III	**35.6**	**39.9**	**34.1**	**46.7**
Arsenic V	**3.93**	**2.49**	**3.89**	**3.37**
Beryllium, total	<0.2	<0.2	<0.2	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	<0.6	<0.6	<0.6	<0.3
Cobalt, dissolved	<0.6	<0.6	<0.6	<0.6
Sulfide	**2000**	**400**	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**15.23**	**15.38**	**15.77**	**16.12**
Iron, dissolved	**14.06**	**13.86**	**15.05**	**16.02**
Manganese	**0.40**	**0.33**	**0.50**	**0.50**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.59	0.07	0.62
Oxidation Reduction Potential (mV)	NT	14	-13	-153
pH (S.U.)	6.40	6.47	6.51	6.37
Specific Conductance (uS/cm)	29000	28500	29000	30500
Temperature (Degrees Celsius)	17.31	19.16	18.38	17.99
Turbidity (NTU)	11.33	11.55	2.62	11.2

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: CECW-3
CAP Well Type: Performance
Well Location: ~ 15 from waste management unit boundary

Sample Date	4/7/2011	7/19/2011	11/2/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**135**	**2,304**	**167**	**110**
Arsenic, dissolved	**20**	**15**	**19**	**30**
Arsenic III	**1.98**	**7.91**	**1.78**	**1.77**
Arsenic V	**64.3**	**752**	**65.5**	**37.8**
Beryllium, total	<0.2	**3.0**	**0.2** J	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	**5.6**	**288.2**	**60.9**	**18.7**
Cobalt, dissolved	**10.4**	**6.6**	**6.2**	**5.3**
Sulfide	<0.0002	<0.0002	<0.0002	**200**
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**3.44**	**101.3**	**8.79**	**3.45**
Iron, dissolved	**0.29**	<0.05	**1.27**	**0.17** J
Manganese	**0.25**	**3.27**	**0.75**	**0.42**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	2.87	1.07	0.85
Oxidation Reduction Potential (mV)	NT	262	212	-61
pH (S.U.)	7.75	6.85	6.72	6.79
Specific Conductance (uS/cm)	21600	22800	17200	20400
Temperature (Degrees Celsius)	16.88	17.36	21.86	19.49
Turbidity (NTU)	30.1	34.8	34.2	35.9

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: CECW-3D
CAP Well Type: Performance
Well Location: Within waste management unit boundary

Sample Date	4/7/2011	7/19/2011	11/2/2011	1/25/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**192**	**182**	**171**	**185**
Arsenic, dissolved	**191**	**180**	**175**	**174**
Arsenic III	**127**	**126**	**82.4**	**118**
Arsenic V	**7.06**	**7.13**	**2.82**	**2.71**
Beryllium, total	<0.2	<0.2	<0.2	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	<0.6	**1.2** J	<0.6	**1.1** J
Cobalt, dissolved	<0.6	<0.6	<0.6	<0.6
Sulfide	<0.0002	**8,800**	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**1.72**	**1.69**	**1.18**	**1.53**
Iron, dissolved	**1.26**	**0.96**	**0.99**	**0.97**
Manganese	**0.14**	**0.06**	**0.17**	**0.16**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.17	0.59	0.44
Oxidation Reduction Potential (mV)	NT	-26	17	-272
pH (S.U.)	7.85	7.45	7.24	7.31
Specific Conductance (uS/cm)	31400	32200	29200	29600
Temperature (Degrees Celsius)	19.43	20.51	18.78	18.40
Turbidity (NTU)	18.46	20.5	40.1	9.1

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: CECW-6I
CAP Well Type: Performance
Well Location: ~ 1.5 ft west of waste management unit boundary

Sample Date	4/6/2011	7/19/2011	11/1/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**304**	**323**	**374**	**301**
Arsenic, dissolved	**274**	**257**	**341**	**275**
Arsenic III	**236**	**243**	**213**	**226**
Arsenic V	**9.92**	**10.0**	**10.9**	**5.4**
Beryllium, total	<0.2	<0.2	<0.2	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	**2.6** J	**1.7** J	**1.9** J	**4.1**
Cobalt, dissolved	**2.3** J	**0.9** J	**2.0** J	**2.7** J
Sulfide	<0.0002	**200**	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**18.00**	**18.61**	**18.90**	**15.46**
Iron, dissolved	**16.96**	**18.20**	**20.81**	**16.38**
Manganese	**0.44**	**0.41**	**0.52**	**0.43**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.62	1.0	1.1
Oxidation Reduction Potential (mV)	NT	15	-51	-105
pH (S.U.)	7.12	6.74	6.54	6.42
Specific Conductance (uS/cm)	10980	13790	13260	9680
Temperature (Degrees Celsius)	17.76	19.46	18.27	18.30
Turbidity (NTU)	1.95	0.87	1.26	0.48

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: CECW-6D
CAP Well Type: Sentinel
Well Location: ~ 0.5 ft west of waste management unit boundary

Sample Date	4/6/2011	7/19/2011	11/2/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**29**	**32**	**29**	**40**
Arsenic, dissolved	**24**	**28**	**26**	**32**
Arsenic III	**24.8**	**28.9**	**28.6**	**25**
Arsenic V	**5.23**	**2.39**	**1.86**	**3.39**
Beryllium, total	**0.8** J	**0.4** J	**0.3** J	**0.2** J
Beryllium, dissolved	**0.6** J	**0.3** J	**0.2** J	**0.2** J
Cobalt, total	**8.0**	**7.4**	**7.0**	**7.4**
Cobalt, dissolved	**7.8**	**6.0**	**5.9**	**7.4**
Sulfide	<0.0002	<0.0002	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**16.04**	**14.16**	**11.46**	**13.14**
Iron, dissolved	**15.96**	**13.81**	**11.26**	**12.63**
Manganese	**0.36**	**0.32**	**0.44**	**0.44**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.28	0.46	0.68
Oxidation Reduction Potential (mV)	NT	288	210	96
pH (S.U.)	5.41	5.72	5.60	5.67
Specific Conductance (uS/cm)	21700	20800	20500	21000
Temperature (Degrees Celsius)	17.82	19.67	18.19	18.52
Turbidity (NTU)	19.26	7.26	7.58	4.70

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: CECW-8
CAP Well Type: Sentinel
Well Location: ~ 515 ft southeast of waste management unit boundary

Sample Date	4/7/2011	7/20/2011	11/3/2011	1/25/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	NS	<3	NS	**13**
Arsenic, dissolved	NS	**3** J	NS	**13**
Arsenic III	NS	**0.71**	NS	**1.39**
Arsenic V	NS	**0.33**	NS	<0.006 U
Beryllium, total	NS	<0.2	NS	<0.2
Beryllium, dissolved	NS	<0.2	NS	<0.2
Cobalt, total	NS	<0.6	NS	<0.3
Cobalt, dissolved	NS	<0.6	NS	<0.6
Sulfide	NS	**133,000**	NS	**160,000**
Sulfide, dissolved	NS	NT	NS	**156,000**
Performance Parameters (mg/L)				
Iron, total	NS	**0.11** J	NS	**0.41**
Iron, dissolved	NS	<0.05	NS	**0.35**
Manganese	NS	<0.02	NS	**0.12**
Field Measurements				
Dissolved Oxygen (mg/L)	NS	0.05	NS	3.68
Oxidation Reduction Potential (mV)	NS	-212	NS	-320
pH (S.U.)	NS	7.89	NS	7.81
Specific Conductance (uS/cm)	NS	30700	NS	31800
Temperature (Degrees Celsius)	NS	27.42	NS	12.29
Turbidity (NTU)	NS	2.04	NS	11.2

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NS = Not sampled
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: CECW-8D
CAP Well Type: Sentinel
Well Location: ~ 325 ft southeast of waste management unit boundary

Sample Date	4/7/2011	7/20/2011	11/3/2011	1/25/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**43**	**16**	**17**	**19**
Arsenic, dissolved	**8** J	**15**	**16**	**12**
Arsenic III	**20.1**	**14.0**	**10.4**	**10.7**
Arsenic V	**19.8**	**3.64**	**0.44**	**2.52**
Beryllium, total	<0.2	<0.2	<0.2	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	**1.0** J	<0.6	<0.6	**0.6** J
Cobalt, dissolved	**1.0** J	<0.6	<0.6	<0.6
Sulfide	<0.0002	<0.0002	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**37.47**	**25.99**	**25.77**	**29.12**
Iron, dissolved	**23.59**	**24.29**	**24.56**	**23.58**
Manganese	**0.34**	**0.25**	**0.41**	**0.39**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.72	1.61	0.61
Oxidation Reduction Potential (mV)	NT	136	88	-54
pH (S.U.)	6.36	6.32	6.03	6.18
Specific Conductance (uS/cm)	29800	30100	29800	30700
Temperature (Degrees Celsius)	16.41	17.63	18.16	16.02
Turbidity (NTU)	6.41	26.3	9.24	51

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NS = Not sampled
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: CECW-10R
CAP Well Type: Sentinel
Well Location: ~ 240 ft south of waste management unit boundary

Sample Date	4/7/2011	7/20/2011	11/2/2011	1/25/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**38**	**74**	**88**	**75**
Arsenic, dissolved	**28**	**54**	**82**	**49**
Arsenic III	**14.0**	**19.1**	**15.9**	**17.0**
Arsenic V	**3.57**	**2.41**	**1.58**	**0.91**
Beryllium, total	<0.2	<0.2	<0.2	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	<0.6	<0.6	<0.6	<0.3
Cobalt, dissolved	<0.6	<0.6	<0.6	<0.6
Sulfide	<0.0002	<0.0002	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**9.09**	**3.67**	**1.57**	**2.71**
Iron, dissolved	**5.74**	**2.67**	**1.60**	**2.27**
Manganese	**0.25**	**0.11**	**0.25**	**0.25**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	1.17	0.2	0.73
Oxidation Reduction Potential (mV)	NT	-66	-123	-203
pH (S.U.)	6.10	6.38	6.45	6.40
Specific Conductance (uS/cm)	28100	29400	28900	29700
Temperature (Degrees Celsius)	13.44	22.59	18.62	13.18
Turbidity (NTU)	362	98.2	14.89	34.2

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: CECW-15
CAP Well Type: Sentinel
Well Location: ~ 285 ft south of waste management unit boundary

Sample Date	4/7/2011	7/20/2011	11/2/2011	1/25/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	<3	<3	<3	<3
Arsenic, dissolved	<3	<3	<3	<3
Arsenic III	<0.53 U	**0.40**	**0.40**	**0.49**
Arsenic V	<1.5 U	**0.28**	<0.008 U	<0.006 U
Beryllium, total	<0.2	**0.2** J	**0.2** J	**0.3** J
Beryllium, dissolved	<0.2	**0.2** J	**0.2** J	**0.2** J
Cobalt, total	**1.0** J	**1.7** J	**1.5** J	**1.8** J
Cobalt, dissolved	**0.9** J	**1.4** J	**1.4** J	**1.9** J
Sulfide	<0.0002	<0.0002	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**34.63**	**34.53**	**29.90**	**29.43**
Iron, dissolved	**32.69**	**34.28**	**29.07**	**30.84**
Manganese	**0.37**	**0.35**	**0.42**	**0.41**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.46	0.22	0.48
Oxidation Reduction Potential (mV)	NT	370	347	150
pH (S.U.)	4.93	4.97	4.94	5.02
Specific Conductance (uS/cm)	30400	29600	29300	30200
Temperature (Degrees Celsius)	15.21	19.62	18.54	16.91
Turbidity (NTU)	2.72	1.89	6.03	1.63

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: PO-8
CAP Well Type: Performance
Well Location: ~ 135 ft northwest of waste management unit boundary

Sample Date	4/7/2011	7/19/2011	11/1/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**20**	**19**	**13**	**24**
Arsenic, dissolved	**19**	**17**	**12**	**22**
Arsenic III	<0.53	**0.23**	**0.40**	**0.24**
Arsenic V	<1.5	**0.43**	**0.94**	<0.006 U
Beryllium, total	<0.2	<0.2	<0.2	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	<0.6	<0.6	<0.6	<0.3
Cobalt, dissolved	<0.6	<0.6	<0.6	<0.6
Sulfide	**400**	**400**	<0.0002	**600**
Sulfide, dissolved	NT	NT	NT	**400**
Performance Parameters (mg/L)				
Iron, total	**0.09** J	<0.05	**0.16** J	<0.05
Iron, dissolved	**0.05** J	<0.05	**0.11** J	**0.07** J
Manganese	**0.28**	**0.24**	**0.28**	**0.28**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	2.00	1.16	2.49
Oxidation Reduction Potential (mV)	NT	-86	-153	-280
pH (S.U.)	7.75	7.21	6.91	7.12
Specific Conductance (uS/cm)	4770	4410	3560	4100
Temperature (Degrees Celsius)	15.09	20.27	20.72	17.34
Turbidity (NTU)	8.13	5.93	0.79	10.43

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: PO-8D
CAP Well Type: Performance
Well Location: ~ 175 ft northwest of waste management unit boundary

Sample Date	4/6/2011	7/19/2011	11/2/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**6** J	**3** J	**3** J	**5** J
Arsenic, dissolved	**4** J	**3** J	<3	**4** J
Arsenic III	**3.36**	**2.76**	**1.81**	**3.30**
Arsenic V	**2.03**	**1.06**	<0.008 U	<0.006 U
Beryllium, total	<0.2	<0.2	**0.7** J	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	**10.8**	**10.8**	**7.0**	**7.8**
Cobalt, dissolved	**8.2**	**8.7**	**3.6**	**8.7**
Sulfide	<0.0002	**400**	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**11.53**	**10.5**	**5.76**	**6.92**
Iron, dissolved	**8.61**	**9.53**	**2.97**	**6.58**
Manganese	**0.19**	**0.22**	**0.13**	**0.17**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.4	8.01	0.53
Oxidation Reduction Potential (mV)	NT	228	66	-163
pH (S.U.)	6.16	6.33	6.21	6.15
Specific Conductance (uS/cm)	4250	4119	3390	3930
Temperature (Degrees Celsius)	17.88	20.26	18.37	18.17
Turbidity (NTU)	41	33	300	9.08

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: PO-10
CAP Well Type: Performance
Well Location: ~ 135 ft southeast of waste management unit boundary

Sample Date	4/7/2011	7/20/2011	11/2/2011	1/25/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**157**	**167**	**146**	**128**
Arsenic, dissolved	**151**	**178**	**143**	**135**
Arsenic III	**93.3**	**96.9**	**62.5**	**64.7**
Arsenic V	**13.6**	**4.81**	**3.79**	**4.69**
Beryllium, total	<0.2	<0.2	<0.2	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	<0.6	<0.6	<0.6	<0.3
Cobalt, dissolved	<0.6	<0.6	<0.6	<0.6
Sulfide	<0.0002	<0.0002	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**2.33**	**2.41**	**1.13**	**1.22**
Iron, dissolved	**2.05**	**2.13**	**1.06**	**1.23**
Manganese	**0.14**	**0.08**	**0.19**	**0.24**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.93	0.42	0.64
Oxidation Reduction Potential (mV)	NT	28	41	-262
pH (S.U.)	7.52	6.88	6.77	6.92
Specific Conductance (uS/cm)	30800	30400	29600	31400
Temperature (Degrees Celsius)	14.63	23.49	19.01	13.73
Turbidity (NTU)	7.34	3.25	1.86	3.00

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Well ID: PO-10D
CAP Well Type: Performance
Well Location: ~ 132 ft southeast of waste management unit boundary

Sample Date	4/7/2011	7/20/2011	11/2/2011	1/25/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**132**	**135**	**128**	**271**
Arsenic, dissolved	**120**	**135**	**124**	**263**
Arsenic III	**70.6**	**91.4**	**44.4**	**196**
Arsenic V	**8.03**	**4.32**	**3.30**	**3.06**
Beryllium, total	<0.2	<0.2	<0.2	<0.2
Beryllium, dissolved	<0.2	<0.2	<0.2	<0.2
Cobalt, total	<0.6	<0.6	<0.6	<0.3
Cobalt, dissolved	<0.6	<0.6	<0.6	<0.6
Sulfide	<0.0002	**400**	<0.0002	<0.0002
Sulfide, dissolved	NT	NT	NT	<0.0002
Performance Parameters (mg/L)				
Iron, total	**1.76**	**2.39**	**2.71**	**1.97**
Iron, dissolved	**1.74**	**2.30**	**2.93**	**2.06**
Manganese	**0.10**	**0.02** J	**0.13**	**0.13**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	0.67	0.38	0.65
Oxidation Reduction Potential (mV)	NT	17	18	-259
pH (S.U.)	7.56	6.74	6.62	7.01
Specific Conductance (uS/cm)	31700	28700	30500	30200
Temperature (Degrees Celsius)	18.76	21.23	18.92	16.55
Turbidity (NTU)	15.12	3.58	5.88	6.12

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Sample ID: SW-1
Location: Cooling Channel

Sample Date	4/6/2011	7/20/2011	11/1/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	<3	<3	<3	<3
Arsenic III	<0.19	**0.32**	<0.004 U	<0.004 U
Arsenic V	**1.28**	**1.38**	**0.47**	**0.43**
Beryllium, total	NT	<0.2	<0.2	<0.2
Cobalt, total	NT	**0.8** J	**0.7** J	<0.6
Sulfide	<0.0002	<0.0002	<0.0002	<0.0002
Performance Parameters (mg/L)				
Iron, total	**0.84**	**0.34**	**0.49**	**0.44**
Total Suspended Solids	**13.2**	**14**	**6** J	**4.2**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	3.73	NT	15.03
Oxidation Reduction Potential (mV)	NT	328	NT	222
pH (S.U.)	7.16	7.29	7.34	6.09
Specific Conductance (uS/cm)	21900	31150	28600	27300
Temperature (Degrees Celsius)	22	37.4	24.26	11.12
Turbidity (NTU)	13.75	2.95	3.07	3.72

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Sample ID: SW-2
Location: Deep Creek

Sample Date	4/6/2011	7/20/2011	11/1/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	<3	<3	<3	<3
Arsenic III	**0.27**	**0.31**	**0.27**	<0.004 U
Arsenic V	**2.64**	**1.58**	<0.008 U	**0.54**
Beryllium, total	NT	<0.2	<0.2	<0.2
Cobalt, total	NT	**0.8** J	<0.6	<0.6
Sulfide	<0.0002	<0.0002	<0.0002	**200**
Performance Parameters (mg/L)				
Iron, total	**1.03**	**0.36**	**0.49**	**0.80**
Total Suspended Solids	**32.4**	**12.6**	**6.0** J	**26.8**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	4.85	NT	11.05
Oxidation Reduction Potential (mV)	NT	314	NT	126
pH (S.U.)	7.48	7.40	7.60	7.46
Specific Conductance (uS/cm)	21500	31400	28200	26500
Temperature (Degrees Celsius)	20.85	38.21	23.27	12.92
Turbidity (NTU)	26.6	2.96	5.73	4.34

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Sample ID: SW-3
Location: SBER, southwest of waste management unit

Sample Date	4/6/2011	7/20/2011	11/1/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	**5** J	<3	<3	<3
Arsenic III	**2.21**	**0.32**	**0.31**	<0.004 U
Arsenic V	**2.37**	**1.31**	<0.008 U	<0.006 U
Beryllium, total	NT	<0.2	<0.2	<0.2
Cobalt, total	NT	**0.8** J	**0.8** J	<0.6
Sulfide	<0.0002	<0.0002	<0.0002	<0.0002
Performance Parameters (mg/L)				
Iron, total	**2.25**	**0.19** J	**0.62**	**0.50**
Total Suspended Solids	**67.7**	**5.8**	**5.8** J	**5.5**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	5.99	NT	10.45
Oxidation Reduction Potential (mV)	NT	354	NT	119
pH (S.U.)	7.39	7.37	7.57	7.43
Specific Conductance (uS/cm)	19300	31300	28100	26000
Temperature (Degrees Celsius)	19.39	33.59	18.77	10.94
Turbidity (NTU)	30.8	3.6	8.94	3.35

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 1 (Continued)
Summary of CAP Monitoring Results
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, VA

Sample ID: SW-4
Location: SBER, northwest of waste management unit

Sample Date	4/6/2011	7/20/2011	11/1/2011	1/24/2012
Primary Performance Parameters (µg/L)				
Arsenic, total	<3	<3	<3	<3
Arsenic III	<0.53	**0.27**	<0.004 U	<0.004 U
Arsenic V	<1.5	**1.91**	<0.008 U	**0.52**
Beryllium, total	NT	<0.2	<0.2	<0.2
Cobalt, total	NT	**0.8** J	<0.6	<0.6
Sulfide	**600**	<0.0002	<0.0002	<0.0002
Performance Parameters (mg/L)				
Iron, total	**1.04**	**0.19** J	**0.51**	**0.65**
Total Suspended Solids	**7.8** J	**34.1**	**3.6** J	**6.9**
Field Measurements				
Dissolved Oxygen (mg/L)	NT	6.66	NT	10.61
Oxidation Reduction Potential (mV)	NT	323	NT	104
pH (S.U.)	6.82	7.52	7.56	7.34
Specific Conductance (uS/cm)	15300	31700	26400	24400
Temperature (Degrees Celsius)	18.74	35.05	18.26	10.57
Turbidity (NTU)	13.39	2.87	3.55	3.36

Notes:

mg/L = Milligrams per liter
mV = Millivolts
NT = Not tested
NTU = Nephelometric Turbidity Units
S.U. = Standard units
µg/L = Micrograms per liter
uS/cm = MicroSiemens per centimeter
Bold font = Detected concentration

Data Qualifiers:
J = Concentration is between LOD and LOQ, and is considered estimated.
U = Not detected.

Table 2
Summary of Historical COC Concentrations
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, Virginia

Arsenic, total

Sample Date	MW-4R	MW-5	MW-5D	CECW-1	CECW-1D	CECW-2	CECW-2D	CECW-3	CECW-3D	CECW-4	CECW-5	CECW-6I	CECW-6D	CECW-8	CECW-8D	CECW-10R	CECW-15	PO-8	PO-8D	PO-9	PO-10	PO-10D	PO-11
November-00	--	4	--	117	--	11	--	112	--	8	15	--	--	--	--	--	--	14	--	17	115	--	8
March-01	--	3	--	38	--	6	--	622	--	8	26	--	--	--	--	--	--	20	--	19	94	--	5
May-01	--	<3	--	75	--	<3	--	428	--	<3	84	--	--	--	--	--	--	13	--	14	118	--	<3
September-01	--	5	--	89	--	4	--	192	--	4	10	--	--	--	--	--	--	17	--	19	116	--	7
December-01	--	--	--	51	--	--	--	334	--	--	--	--	--	--	--	--	--	--	--	--	83	--	--
March-02	--	<3	--	64	--	<3	--	104	--	--	14	--	--	--	--	--	--	11	--	16	76	--	15
Implementation of GPS (50 µg/L) September-02	--	3	--	268	--	10	--	34	--	14	11	--	--	--	--	--	--	36	--	23	115	--	--
March-03	--	<3	--	83	--	4	--	31	--	18	10	--	--	--	--	--	--	27	--	15	116	--	<3
September-03	--	4	--	48	--	16	--	30	--	9	8	--	--	--	--	--	--	23	--	9	88	--	11
GPS = 10 µg/L March-04	--	<3	--	47	--	111	--	10	--	20	5	--	--	--	--	--	--	24	--	12	82	--	8
September-04	--	<3	--	41	--	49	--	20	--	5	6	--	--	--	--	--	--	26	--	8	101	--	38
March-05	--	<3	--	30	--	19	--	5	--	5	5	--	--	--	--	--	--	29	--	8	77	--	5
September-05	--	4	--	23	--	62	--	20	--	6	<3	--	--	--	--	--	--	27	--	14	91	--	3
March-06	--	4	--	39	--	19	--	12	--	12	20	--	--	--	--	--	--	26	--	11	84	--	6
September-06	11	7	--	44	--	69	--	24	--	8	54	--	--	--	--	--	--	18	--	11	127	--	36
March-07	5	3	--	41	--	112	--	8	--	9	<3	--	--	--	--	--	--	19	--	10	106	--	27
September-07	10	10	--	71	--	112	--	15	--	7	6	--	--	--	--	--	--	22	--	11	104	--	3
March-08	<3	6	--	79	--	70	--	4	--	6	24	401	--	--	--	--	--	22	--	16	89	--	<3
September-08	4	<3	--	94	--	48	--	31	--	6	14	414	--	--	--	--	--	10	--	7	109	--	<3
March-09	<3	8	--	62	--	97	--	14	--	9	5	345	--	--	--	--	--	22	--	14	110	--	10
September-09	9	5	--	51	--	32	--	10	--	8	<3	317	--	--	--	--	--	18	--	18	135	--	24
March-10	6	5	--	60	--	24	--	6	--	10	3	295	--	--	--	--	--	18	--	16	112	--	32
September-10	10	7	--	97	--	15	--	170	--	13	<3	213	--	--	--	--	--	21	--	15	146	--	<3
April-11	6	<3	<3	54	24	<3	48	135	192	12	<3	304	29	--	43	38	<3	20	6	11	157	132	11
July-11	--	6	<3	78	26	<3	55	2304	182	--	--	323	32	<3	16	74	<3	19	3	--	167	135	--
November-11	8	6	<3	81	27	10	69	167	171	8	<3	374	29	--	17	88	<3	13	3	8	146	128	7
January-12	--	4	3	78	32	20	119	110	185	--	--	301	40	13	19	75	<3	24	5	--	128	271	--

Arsenic, dissolved

Sample Date	MW-5	MW-5D	CECW-1	CECW-1D	CECW-2	CECW-2D	CECW-3	CECW-3D	CECW-6I	CECW-6D	CECW-8	CECW-8D	CECW-10R	CECW-15	PO-8	PO-8D	PO-10	PO-10D
April-11	<3	<3	57	21	<3	45	20	191	274	24	--	8	28	<3	19	4	151	120
July-11	5	<3	76	24	<3	43	15	180	257	28	3	15	54	<3	17	3	178	135
November-11	6	<3	74	24	4	71	19	175	341	26	--	16	82	<3	12	<3	143	124
January-12	4	<3	85	30	6	82	30	174	275	32	13	12	49	<3	22	4	135	263

Notes:
Arsenic concentrations in micrograms per liter (µg/L)

= Concentration greater than GPS value

Table 2 (Continued)
Summary of Historical COC Concentrations
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, Virginia

Beryllium, total

Sample Date	MW-4R	MW-5	MW-5D	CECW-1	CECW-1D	CECW-2	CECW-2D	CECW-3	CECW-3D	CECW-4	CECW-5	CECW-6I	CECW-6D	CECW-8	CECW-8D	CECW-10R	CECW-15	PO-8	PO-8D	PO-9	PO-10	PO-10D	PO-11
November-00	--	<0.2	--	<0.2	--	0.2	--	<0.2	--	0.2	<0.2	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
March-01	--	<0.2	--	<0.2	--	<0.2	--	0.6	--	<0.2	<0.2	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
May-01	--	<0.2	--	<0.2	--	0.3	--	0.4	--	<0.2	0.9	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
September-01	--	<0.2	--	<0.2	--	0.3	--	1.2	--	<0.2	<0.2	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
March-02	--	<0.2	--	<0.2	--	0.4	--	12.1	--	--	0.3	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
Implementation of GPS																							
September-02	--	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	<0.2	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	--
March-03	--	<0.2	--	<0.2	--	<0.2	--	1.3	--	<0.2	<0.2	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
September-03	--	<0.2	--	0.3	--	0.4	--	2.1	--	0.4	0.2	--	--	--	--	--	--	<0.2	--	<0.2	0.3	--	0.5
March-04	--	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	<0.2	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
September-04	--	<0.2	--	<0.2	--	<0.2	--	0.5	--	<0.2	<0.2	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	0.3
March-05	--	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	<0.2	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	0.5
September-05	--	<0.2	--	<0.2	--	<0.2	--	0.4	--	<0.2	<0.2	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
March-06	--	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	<0.2	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
September-06	<0.2	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	0.3	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
March-07	0.5	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	<0.2	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	3.6
September-07	0.4	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	<0.2	--	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	0.2
March-08	1.7	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	<0.2	<0.2	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
September-08	0.8	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	<0.2	<0.2	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
March-09	1.9	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	<0.2	<0.2	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	<0.2
September-09	0.3	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	<0.2	<0.2	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	0.7
March-10	0.3	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	<0.2	<0.2	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	6.5
September-10	0.5	<0.2	--	<0.2	--	<0.2	--	<0.2	--	<0.2	<0.2	<0.2	--	--	--	--	--	<0.2	--	<0.2	<0.2	--	0.4
April-11	0.6	<0.2	1.1	3.3	<0.2	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.8	--	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	7.3
July-11	--	<0.2	0.7	<0.2	<0.2	7.0	<0.2	3.0	<0.2	--	--	<0.2	0.4	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	--	<0.2	<0.2	--
November-11	0.4	<0.2	0.5	0.6	<0.2	1.7	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	0.3	--	<0.2	<0.2	0.2	<0.2	0.7	<0.2	<0.2	<0.2	0.8
January-12	--	<0.2	0.4	<0.2	<0.2	0.4	<0.2	<0.2	<0.2	--	--	<0.2	0.2	<0.2	<0.2	<0.2	0.3	<0.2	<0.2	--	<0.2	<0.2	--

Beryllium, dissolved

Sample Date	MW-5	MW-5D	CECW-1	CECW-1D	CECW-2	CECW-2D	CECW-3	CECW-3D	CECW-6I	CECW-6D	CECW-8	CECW-8D	CECW-10R	CECW-15	PO-8	PO-8D	PO-10	PO-10D
April-11	<0.2	1	<0.2	<0.2	0.6	<0.2	<0.2	<0.2	<0.2	0.6	--	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
July-11	<0.2	0.6	<0.2	<0.2	3.8	<0.2	<0.2	<0.2	<0.2	0.3	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2
November-11	<0.2	0.5	<0.2	<0.2	0.5	<0.2	<0.2	<0.2	<0.2	0.2	--	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2
January-12	<0.2	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2

Notes:
Beryllium concentrations in micrograms per liter (µg/L)

= Concentration greater than GPS value of 4 µg/L

Table 2 (Continued)
Summary of Historical COC Concentrations
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, Virginia

Cobalt, total

	Sample Date	MW-4R	MW-5	MW-5D	CECW-1	CECW-1D	CECW-2	CECW-2D	CECW-3	CECW-3D	CECW-4	CECW-5	CECW-6I	CECW-6D	CECW-8	CECW-8D	CECW-10R	CECW-15	PO-8	PO-8D	PO-9	PO-10	PO-10D	PO-11
	November-00	--	3	--	4	--	<3	--	43	--	<3	<3	--	--	--	--	--	--	<3	--	5	8	--	4
	March-01	--	<3	--	<3	--	<3	--	28	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	<3
	May-01	--	<3	--	<3	--	<3	--	29	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	<3
	September-01	--	<3	--	<3	--	<3	--	10	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	<3
	March-02	--	<3	--	<3	--	<3	--	27	--	--	<3	--	--	--	--	--	--	<3	--	<3	<3	--	<3
Implementation of GPS (313 µg/L)	September-02	--	3	--	<3	--	<3	--	61	--	3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	--
	March-03	--	<3	--	<3	--	<3	--	11	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	29
	September-03	--	3	--	<3	--	<3	--	40	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	41
	March-04	--	<3	--	<3	--	<3	--	14	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	6
	September-04	--	<3	--	<3	--	<3	--	7	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	25
	March-05	--	<3	--	<3	--	<3	--	11	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	13
	September-05	--	<3	--	<3	--	<3	--	8	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	<3
	March-06	--	<3	--	<3	--	<3	--	3	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	<3
	September-06	<3	<3	--	<3	--	<3	--	5	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	4
GPS = 157 µg/L	March-07	4	<3	--	<3	--	<3	--	<3	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	21
	September-07	3	4	--	<3	--	<3	--	8	--	<3	<3	--	--	--	--	--	--	<3	--	<3	<3	--	<3
	March-08	18	<3	--	<3	--	<3	--	4	--	<3	<3	<3	--	--	--	--	--	<3	--	<3	<3	--	<3
	September-08	9	<3	--	<3	--	<3	--	8	--	<3	<3	<3	--	--	--	--	--	<3	--	<3	<3	--	<3
GPS = 4.7 µg/L	March-09	15	<3	--	<3	--	<3	--	4	--	<3	<3	<3	--	--	--	--	--	<3	--	<3	<3	--	4.0
	September-09	4.6	1.2	--	<0.6	--	<0.6	--	1.7	--	<0.6	<0.6	2.3	--	--	--	--	--	<0.6	--	<0.6	<0.6	--	<0.6
	March-10	6.2	<0.6	--	<0.6	--	<0.6	--	1	--	<0.6	<0.6	1.4	--	--	--	--	--	<0.6	--	<0.6	<0.6	--	9.0
	September-10	3.4	1.3	--	<0.6	--	<0.6	--	30	--	<0.6	<0.6	1.0	--	--	--	--	--	0.8	--	<0.6	<0.6	--	<0.6
	April-11	5.7	<0.6	234.6	<0.6	<0.6	3.1	<0.6	5.6	<0.6	<0.6	<0.6	2.6	8.0	--	1.0	<0.6	1.0	<0.6	10.8	<0.6	<0.6	<0.6	29.7
	July-11	--	1.4	141	<0.6	<0.6	15.3	<0.6	288.2	1.2	--	--	1.7	7.4	<0.6	<0.6	<0.6	1.7	<0.6	10.8	--	<0.6	<0.6	--
	November-11	4.6	1.2	80.2	0.9	<0.6	5.9	<0.6	60.9	<0.6	<0.6	<0.6	1.9	7.0	--	<0.6	<0.6	1.5	<0.6	7.0	<0.6	<0.6	<0.6	27
	January-12	--	0.9	104.1	<0.3	1.3	2.9	<0.3	18.7	1.1	--	--	4.1	7.4	<0.3	0.6	<0.3	1.8	<0.3	7.8	--	<0.3	<0.3	--

Cobalt, dissolved

Sample Date	MW-5	MW-5D	CECW-1	CECW-1D	CECW-2	CECW-2D	CECW-3	CECW-3D	CECW-6I	CECW-6D	CECW-8	CECW-8D	CECW-10R	CECW-15	PO-8	PO-8D	PO-10	PO-10D
April-11	<0.6	191.9	<0.6	<0.6	2.7	<0.6	10.4	<0.6	2.3	7.8	--	1	<0.6	0.9	<0.6	8.2	<0.6	<0.6
July-11	0.7	134.5	<0.6	<0.6	9.4	<0.6	6.6	<0.6	0.9	6.0	<0.6	<0.6	<0.6	1.4	<0.6	8.7	<0.6	<0.6
November-11	<0.6	78.4	<0.6	<0.6	2.7	<0.6	6.2	<0.6	2.0	5.9	--	<0.6	<0.6	1.4	<0.6	3.6	<0.6	<0.6
January-12	<0.6	85	<0.6	0.6	1.4	<0.6	5.3	<0.6	2.7	7.4	<0.6	<0.6	<0.6	1.9	<0.6	8.7	<0.6	<0.6

Notes:
Cobalt concentrations in micrograms per liter (µg/L)

= Concentration greater than GPS value

Table 2 (Continued)
Summary of Historical COC Concentrations
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Permit #440
Chesapeake, Virginia

Sulfide, total

Sample Date	MW-4R	MW-5	MW-5D	CECW-1	CECW-1D	CECW-2	CECW-2D	CECW-3	CECW-3D	CECW-4	CECW-5	CECW-6I	CECW-6D	CECW-8	CECW-8D	CECW-10R	CECW-15	PO-8	PO-8D	PO-9	PO-10	PO-10D	PO-11
November-00	--	20	--	330	--	350	--	40	--	21,500	330	--	--	--	--	--	--	8,100	--	11,100	3,000	--	70
March-01	--	30	--	210	--	250	--	30	--	130	120	--	--	--	--	--	--	2,700	--	1,150	440	--	110
May-01	--	30	--	160	--	320	--	20	--	7,380	150	--	--	--	--	--	--	2,900	--	2,930	--	--	50
September-01	--	10	--	50	--	110	--	10	--	3,510	150	--	--	--	--	--	--	1,670	--	6,270	200	--	30
March-02	--	<10	--	140	--	270	--	<10	--	--	460	--	--	--	--	--	--	10,800	--	5,040	790	--	40
Implementation of GPS (2,400 µg/L = LOQ) **September-02**	--	<183	--	<183	--	<183	--	<183	--	400	<183	--	--	--	--	--	--	400	--	<183	<183	--	--
March-03	--	<480	--	<480	--	2,600	--	<480	--	1,400	<480	--	--	--	--	--	--	<480	--	600	<480	--	<480
October-03	--	800	--	<480	--	3,600	--	1,800	--	7,000	1,400	--	--	--	--	--	--	2,600	--	6,600	<480	--	1,000
March-04	--	<480	--	<480	--	800	--	800	--	13,400	600	--	--	--	--	--	--	2,600	--	600	1,600	--	<480
September-04	--	<480	--	<480	--	800	--	800	--	2,200	2,000	--	--	--	--	--	--	5,200	--	3,810	600	--	<480
March-05	--	1800	--	1600	--	3,400	--	1,600	--	4,600	1,400	--	--	--	--	--	--	3,800	--	3,000	1,800	--	2,000
September-05	--	<480	--	600	--	5,800	--	1,600	--	2,800	1,800	--	--	--	--	--	--	7,000	--	6,600	3,000	--	<480
March-06	--	<480	--	600	--	5,800	--	1,400	--	3,000	1,600	--	--	--	--	--	--	7,000	--	6,600	3,000	--	<480
September-06	<480	<480	--	<480	--	4,800	--	<480	--	9,200	2,800	--	--	--	--	--	--	9,600	--	7,400	800	--	600
March-07	<480	<480	--	<480	--	<480	--	<480	--	4,600	1,400	--	--	--	--	--	--	7,600	--	4,000	<480	--	<480
September-07	<480	<480	--	<480	--	<480	--	<480	--	6,200	<480	--	--	--	--	--	--	7,000	--	3,000	<480	--	<480
March-08	<480	<480	--	<480	--	3,600	--	<480	--	600	<480	<480	--	--	--	--	--	4,800	--	5,000	<480	--	<480
September-08	<480	<480	--	<480	--	1,200	--	2,600	--	<480	<480	<480	--	--	--	--	--	1,600	--	1,400	<480	--	<480
March-09	<480	<480	--	<480	--	19,200	--	<480	--	<480	19,400	<480	--	--	--	--	--	18,400	--	<480	<480	--	<480
September-09	<480	<480	--	<480	--	1,400	--	<480	--	2,000	<480	<480	--	--	--	--	--	1,600	--	1,600	<480	--	<480
GPS = 200 µg/L = LOQ **March-10**	<0.0002	<0.0002	--	800	--	800	--	200	--	<0.0002	400	400	--	--	--	--	--	1,000	--	1,600	<0.0002	--	400
September-10	200	200	--	<0.0002	--	600	--	<0.0002	--	200	800	200	--	--	--	--	--	400	--	600	<0.0002	--	200
April-11	400	<0.0002	<0.0002	<0.0002	<0.0002	400	2,000	<0.0002	<0.0002	<0.0002	400	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	400	<0.0002	800	<0.0002	<0.0002	<0.0002
July-11	--	<0.0002	<0.0002	400	200	<0.0002	400	<0.0002	8,800	--	--	200	<0.0002	133,000	<0.0002	<0.0002	<0.0002	400	400	--	<0.0002	400	--
November-11	<0.0002	400	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
January-12	--	<0.0002	<0.0002	<0.0002	<0.0002	200	<0.0002	200	<0.0002	--	--	<0.0002	<0.0002	160,000	<0.0002	<0.0002	<0.0002	600	<0.0002	--	<0.0002	<0.0002	--

Sulfide, dissolved

Sample Date	MW-5	MW-5D	CECW-1	CECW-1D	CECW-2	CECW-2D	CECW-3	CECW-3D	CECW-6I	CECW-6D	CECW-8	CECW-8D	CECW-10R	CECW-15	PO-8	PO-8D	PO-10	PO-10D
January-12	<0.0002	<0.0002	<0.0002	<0.0002	200	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	156,000	<0.0002	<0.0002	<0.0002	400	<0.0002	<0.0002	<0.0002

Notes:
Total sulfide concentrations in micrograms per liter (µg/L)

= Concentration greater than GPS value

Table 3
Summary of Statistical Results - COC Parameters
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Solid Waste Permit #440

Constituent of Concern	Well ID	# Detects / # Samples	Detected Above LOQ	Min Conc (µg/L)	Max Conc (µg/L)	Mean (µg/L)	Current GPS (µg/L)	GPS Exceedances	Trend
Arsenic, total	MW-5	19 / 28	Yes	ND	10	4.54	10	No	**Upward**
	MW-5D	1 / 4	No	ND	3	3.00		No	Insufficient data
	CECW-1	29 / 29	Yes	23	268	70.3		**Yes**	**No trend detected**
	CECW-1D	4 / 4	Yes	24	32	27.3		**Yes**	Insufficient data
	CECW-2	23 / 28	Yes	ND	112	33.8		**Yes**	**No trend detected**
	CECW-2D	4 / 4	Yes	48	119	72.8		**Yes**	Insufficient data
	CECW-3	29 / 29	Yes	4	2,304	181		**Yes**	**No trend detected**
	CECW-3D	4 / 4	Yes	171	192	183		**Yes**	Insufficient data
	CECW-6I	12 / 12	Yes	213	414	330		**Yes**	**No trend detected**
	CECW-6D	4 / 4	Yes	29	40	32.5		**Yes**	Insufficient data
	CECW-8	1 / 2	Yes	ND	13	8		**Yes**	Insufficient data
	CECW-8D	4 / 4	Yes	16	43	23.8		**Yes**	Insufficient data
	CECW-10R	4 / 4	Yes	38	88	68.8		**Yes**	Insufficient data
	CECW-15	0 / 4	No	ND	ND	ND		No	Insufficient data
	PO-8	28 / 28	Yes	10	36	20.4		**Yes**	**No trend detected**
	PO-8D	4 / 4	No	3	6	4.25		No	Insufficient data
	PO-10	29 / 29	Yes	76	167	114		**Yes**	**Upward**
	PO-10D	4 / 4	Yes	128	271	167		**Yes**	Insufficient data
Arsenic, dissolved	MW-5	3 / 4	No	ND	6	4.5	10	No	Insufficient data to perform trend analyses
	MW-5D	0 / 4	No	ND	ND	ND		No	
	CECW-1	4 / 4	Yes	57	85	73.0		**Yes**	
	CECW-1D	4 / 4	Yes	24	32	24.75		**Yes**	
	CECW-2	2 / 4	No	ND	6	4		No	
	CECW-2D	4 / 4	Yes	43	82	60.3		**Yes**	
	CECW-3	4 / 4	Yes	15	30	21		**Yes**	
	CECW-3D	4 / 4	Yes	174	191	180		**Yes**	
	CECW-6I	4 / 4	Yes	257	341	287		**Yes**	
	CECW-6D	4 / 4	Yes	24	32	27.5		**Yes**	
	CECW-8	2 / 2	Yes	3	13	8		**Yes**	
	CECW-8D	4 / 4	Yes	8	16	12.75		**Yes**	
	CECW-10R	4 / 4	Yes	28	82	53.3		**Yes**	
	CECW-15	0 / 4	No	ND	ND	ND		No	
	PO-8	4 / 4	Yes	12	22	17.5		**Yes**	
	PO-8D	3 / 4	No	ND	4	3.50		No	
	PO-10	4 / 4	Yes	135	178	152		**Yes**	
	PO-10D	4 / 4	Yes	120	263	161		**Yes**	

Table 3
Summary of Statistical Results - COC Parameters
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Solid Waste Permit #440

Constituent of Concern	Well ID	# Detects / # Samples	Detected Above LOQ	Min Conc (µg/L)	Max Conc (µg/L)	Mean (µg/L)	Current GPS (µg/L)	GPS Exceedances	Trend
Beryllium, total	MW-5	0 / 28	No	ND	ND	ND	4	No	Insufficient detections
	MW-5D	4 / 4	Yes	0.4	1.1	0.68		No	Insufficient data
	CECW-1	5 / 28	Yes	ND	3.3	0.45		No	Insufficient detections
	CECW-1D	0 / 4	No	ND	ND	ND		No	Insufficient data
	CECW-2	11 / 28	Yes	ND	7	0.59		**Yes**	Insufficient detections
	CECW-2D	0 / 4	No	ND	ND	ND		No	Insufficient data
	CECW-3	11 / 28	Yes	ND	12.1	0.91		**Yes**	**Downward**
	CECW-3D	0 / 4	No	ND	ND	ND		No	Insufficient data
	CECW-6I	0 / 12	No	ND	ND	ND		No	Insufficient detections
	CECW-6D	4 / 4	No	0.2	0.8	0.43		No	Insufficient data
	CECW-8	0 / 2	No	ND	ND	ND		No	Insufficient data
	CECW-8D	0 / 4	No	ND	ND	ND		No	Insufficient data
	CECW-10R	0 / 4	No	ND	ND	ND		No	Insufficient data
	CECW-15	3 / 4	No	ND	0.3	0.23		No	Insufficient data
	PO-8	0 / 28	No	ND	ND	ND		No	Insufficient detections
	PO-8D	1 / 4	No	ND	0.7	0.33		No	Insufficient data
	PO-10	1 / 28	No	ND	0.3	0.20		No	Insufficient detections
	PO-10D	0 / 4	No	ND	ND	ND		No	Insufficient data
Beryllium, dissolved	MW-5	0 / 4	No	ND	ND	ND	4	No	Insufficient data to perform trend analyses
	MW-5D	4 / 4	Yes	0.4	1	0.63		No	
	CECW-1	0 / 4	No	ND	ND	ND		No	
	CECW-1D	0 / 4	No	ND	ND	ND		No	
	CECW-2	3 / 4	Yes	ND	3.8	1.28		No	
	CECW-2D	0 / 4	No	ND	ND	ND		No	
	CECW-3	0 / 4	No	ND	ND	ND		No	
	CECW-3D	0 / 4	No	ND	ND	ND		No	
	CECW-6I	0 / 4	No	ND	ND	ND		No	
	CECW-6D	4 / 4	No	0.2	0.6	0.33		No	
	CECW-8	0 / 2	No	ND	ND	ND		No	
	CECW-8D	0 / 4	No	ND	ND	ND		No	
	CECW-10R	0 / 4	No	ND	ND	ND		No	
	CECW-15	3 / 4	No	ND	0.2	0.20		No	
	PO-8	0 / 4	No	ND	ND	ND		No	
	PO-8D	0 / 4	No	ND	ND	ND		No	
	PO-10	0 / 4	No	ND	ND	ND		No	
	PO-10D	0 / 4	No	ND	ND	ND		No	

Table 3
Summary of Statistical Results - COC Parameters
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Solid Waste Permit #440

Constituent of Concern	Well ID	# Detects / # Samples	Detected Above LOQ	Min Conc (µg/L)	Max Conc (µg/L)	Mean (µg/L)	Current GPS (µg/L)	GPS Exceedances	Trend
Cobalt, total	MW-5	10 / 28	No	ND	4	2.39	4.7	No	Insufficient detections
	MW-5D	4 / 4	Yes	80.2	234.6	140		**Yes**	Insufficient data
	CECW-1	3 / 28	No	ND	4	2.29		No	Insufficient detections
	CECW-1D	1/ 4	No	ND	1.3	0.78		No	Insufficient data
	CECW-2	6 / 28	Yes	ND	15.3	3.39		**Yes**	Insufficient detections
	CECW-2D	0 / 4	No	ND	ND	ND		No	Insufficient data
	CECW-3	27 / 28	Yes	ND	288.2	28.5		**Yes**	**No trend detected**
	CECW-3D	2 / 4	No	ND	1.2	0.88		No	Insufficient data
	CECW-6I	9 / 12	Yes	ND	4.1	2.38		No	**No trend detected**
	CECW-6D	4 / 4	Yes	7	8	7.45		**Yes**	Insufficient data
	CECW-8	0 / 2	No	ND	ND	ND		No	Insufficient data
	CECW-8D	2 / 4	No	ND	1	0.6		No	Insufficient data
	CECW-10R	0 / 4	No	ND	ND	ND		No	Insufficient data
	CECW-15	4 / 4	No	1	1.8	1.5		No	Insufficient data
	PO-8	1 / 28	No	ND	0.8	2.24		No	Insufficient detections
	PO-8D	4 / 4	Yes	7	10.8	9.1		**Yes**	Insufficient data
	PO-10	1 / 28	No	ND	8	2.41		No	Insufficient detections
	PO-10D	0 / 4	No	ND	ND	ND		No	Insufficient data
Cobalt, dissolved	MW-5	1 / 4	No	ND	0.7	0.63	4.7	No	Insufficient data to perform trend analyses
	MW-5D	4 / 4	Yes	78.4	191.9	122		**Yes**	
	CECW-1	0 / 4	No	ND	ND	ND		No	
	CECW-1D	1/ 4	No	ND	0.6	0.60		No	
	CECW-2	4 / 4	Yes	1.4	9.4	3.39		**Yes**	
	CECW-2D	0 / 4	No	ND	ND	ND		No	
	CECW-3	4 / 4	Yes	5.3	10.4	7.13		**Yes**	
	CECW-3D	0 / 4	No	ND	ND	ND		No	
	CECW-6I	4 / 4	Yes	0.9	2.7	1.98		No	
	CECW-6D	4 / 4	Yes	5.9	7.8	6.78		**Yes**	
	CECW-8	0 / 2	No	ND	ND	ND		No	
	CECW-8D	1 / 4	No	ND	1	0.7		No	
	CECW-10R	0 / 4	No	ND	ND	ND		No	
	CECW-15	4 / 4	No	0.9	1.9	1.4		No	
	PO-8	0 / 4	No	ND	ND	ND		No	
	PO-8D	4 / 4	Yes	3.6	8.7	7.3		**Yes**	
	PO-10	0 / 4	No	ND	ND	ND		No	
	PO-10D	0 / 4	No	ND	ND	ND		No	

Table 3
Summary of Statistical Results - COC Parameters
Corrective Action Status Evaluation
Chesapeake Energy Center Industrial Landfill - Solid Waste Permit #440

Constituent of Concern	Well ID	# Detects / # Samples	Detected Above LOQ	Min Conc (µg/L)	Max Conc (µg/L)	Mean (µg/L)	Current GPS (µg/L)	GPS Exceedances	Trend
Sulfide, total	MW-5	9 / 27	Yes	ND	1,800	357	200	**Yes**	Insufficient detections
	MW-5D	0 / 4	No	ND	ND	ND		No	Insufficient data
	CECW-1	10 / 27	Yes	ND	1,600	383		**Yes**	Insufficient detections
	CECW-1D	1/ 4	Yes	ND	200	50		No	Insufficient data
	CECW-2	21 / 27	Yes	ND	19,200	2,128		**Yes**	**No trend detected**
	CECW-2D	2 / 4	Yes	ND	2,000	600		**Yes**	Insufficient data
	CECW-3	13 / 27	Yes	ND	2,600	543		**Yes**	**No trend detected**
	CECW-3D	1 / 4	Yes	ND	8,800	2,200		**Yes**	Insufficient data
	CECW-6I	3 / 11	Yes	ND	400	247		**Yes**	Insufficient detections
	CECW-6D	0 / 4	No	ND	ND	ND		No	Insufficient data
	CECW-8	2 / 2	Yes	133,000	160,000	146,500		**Yes**	Insufficient data
	CECW-8D	0 / 4	No	ND	ND	ND		No	Insufficient data
	CECW-10R	0 / 4	No	ND	ND	ND		No	Insufficient data
	CECW-15	0 / 4	No	ND	ND	ND		No	Insufficient data
	PO-8	24 / 27	Yes	ND	18,400	4,024		**Yes**	**Downward**
	PO-8D	1 / 4	Yes	ND	400	100		**Yes**	Insufficient data
	PO-10	11 / 27	Yes	ND	3,000	721		**Yes**	**Downward**
	PO-10D	1 / 4	Yes	ND	400	100		**Yes**	Insufficient data
Sulfide, dissolved	MW-5	0 / 1	No	ND	ND	ND	200	No	Insufficient data to perform trend analyses
	MW-5D	0 / 1	No	ND	ND	ND		No	
	CECW-1	0 / 1	No	ND	ND	ND		No	
	CECW-1D	0 / 1	No	ND	ND	ND		No	
	CECW-2	1 / 1	Yes	200	200	200		No	
	CECW-2D	0 / 1	No	ND	ND	ND		No	
	CECW-3	0 / 1	No	ND	ND	ND		No	
	CECW-3D	0 / 1	No	ND	ND	ND		No	
	CECW-6I	0 / 1	No	ND	ND	ND		No	
	CECW-6D	0 / 1	No	ND	ND	ND		No	
	CECW-8	1 / 1	Yes	156,000	156,000	156,000		**Yes**	
	CECW-8D	0 / 1	No	ND	ND	ND		No	
	CECW-10R	0 / 1	No	ND	ND	ND		No	
	CECW-15	0 / 1	No	ND	ND	ND		No	
	PO-8	1 / 1	Yes	400	400	400		**Yes**	
	PO-8D	0 / 1	No	ND	ND	ND		No	
	PO-10	0 / 1	No	ND	ND	ND		No	
	PO-10D	0 / 1	No	ND	ND	ND		No	

Table 4
Summary of Arsenic Speciation Results
Corrective Action Status Evaluation
Chespeake Energy Center Industrial Landfill - Permit No. 440

	MW-5				MW-5D				CECW-1				CECW-1D			
Parameter Name	**4/6/2011**	**7/19/2011**	**11/1/2011**	**1/24/2012**	**4/6/2011**	**7/19/2011**	**11/2/2011**	**1/24/2012**	**4/6/2011**	**7/19/2011**	**11/2/2011**	**1/25/2012**	**4/6/2011**	**7/19/2011**	**11/2/2011**	**1/25/2012**
Arsenic III	0.46	3.50	2.81	2.64	0.48	0.66	0.94	1.15	45.7	58.5	42.6	58.7	23.2	23.8	18.7	26.5
Arsenic V	3.12	1.65	1.03	1.51	2.2	1.1	<0.008 U	<0.006 U	8.03	9.99	7.38	3.54	4.75	2.72	1.00	1.18
AsIII/AsV Ratio	0.15	2.12	2.73	1.75	0.22	0.60	117.5	191.7	5.69	5.86	5.77	16.6	4.88	8.75	18.70	22.5

	CECW-2				CECW-2D				CECW-3				CECW-3D			
Parameter Name	**4/6/2011**	**7/19/2011**	**11/2/2011**	**1/24/2012**	**4/6/2011**	**7/19/2011**	**11/2/2011**	**1/24/2012**	**4/7/2011**	**7/19/2011**	**11/2/2011**	**1/24/2012**	**4/7/2011**	**7/19/2011**	**11/2/2011**	**1/25/2012**
Arsenic III	<0.53	0.49	2.94	1.41	35.6	39.9	34.1	46.7	1.98	7.91	1.78	1.77	127	126	82.4	118
Arsenic V	<1.5	0.50	<0.008 U	0.70	3.93	2.49	3.89	3.37	64.3	752	65.5	37.8	7.06	7.13	2.82	2.71
AsIII/AsV Ratio	--	0.98	367.50	2.01	9.06	16.02	8.77	13.86	0.03	0.01	0.03	0.05	17.99	17.67	29.22	43.54

	CECW-6I				CECW-6D				CECW-8				CECW-8D			
Parameter Name	**4/6/2011**	**7/19/2011**	**11/1/2011**	**1/24/2012**	**4/6/2011**	**7/19/2011**	**11/2/2011**	**1/24/2012**	**4/7/2011**	**7/20/2011**	**11/3/2011**	**1/25/2012**	**4/7/2011**	**7/20/2011**	**11/3/2011**	**1/25/2012**
Arsenic III	236	243	213	226	24.8	28.9	28.6	25.0	NS	0.71	NS	1.39	20.1	14	10.4	10.7
Arsenic V	9.92	10.0	10.9	5.4	5.23	2.39	1.86	3.39	NS	0.33	NS	<0.006 U	19.8	3.64	0.44	2.52
AsIII/AsV Ratio	23.79	24.30	19.54	41.85	4.74	12.09	15.38	7.37	--	2.15	--	--	1.02	3.85	23.64	4.25

	CECW-10R				CECW-15				PO-8				PO-8D			
Parameter Name	**4/7/2011**	**7/20/2011**	**11/2/2011**	**1/25/2012**	**4/7/2011**	**7/20/2011**	**11/2/2011**	**1/25/2012**	**4/7/2011**	**7/19/2011**	**11/1/2011**	**1/24/2012**	**4/6/2011**	**7/19/2011**	**11/2/2011**	**1/24/2012**
Arsenic III	14.0	19.1	15.9	17.0	<0.53	0.40	0.40	0.49	<0.53	0.23	0.4	0.24	3.36	2.76	1.81	3.30
Arsenic V	3.57	2.41	1.58	0.91	<1.5	0.28	<0.008 U	<0.006 U	<1.5	0.43	0.94	<0.006 U	2.03	1.06	<0.008 U	<0.006 U
AsIII/AsV Ratio	3.92	7.93	10.06	18.68	--	1.43	50.00	81.67	--	0.53	0.43	40.00	1.66	2.60	226.25	550.00

	PO-10				PO-10D				SW-1				SW-2			
Parameter Name	**4/7/2011**	**7/20/2011**	**11/2/2011**	**1/25/2012**	**4/7/2011**	**7/20/2011**	**11/2/2011**	**1/25/2012**	**4/6/2011**	**7/20/2011**	**11/1/2011**	**1/24/2012**	**4/6/2011**	**7/20/2011**	**11/1/2011**	**1/24/2012**
Arsenic III	93.3	96.9	62.5	64.7	70.6	91.4	44.4	196	<0.19	0.32	<0.004 U	<0.004 U	0.27	0.31	0.27	<0.004 U
Arsenic V	13.6	4.81	3.79	4.69	8.03	4.32	3.3	3.06	1.28	1.38	0.47	0.43	2.64	1.58	<0.008 U	0.54
AsIII/AsV Ratio	6.86	20.15	16.49	13.80	8.79	21.16	13.45	64.05	0.15	0.23	0.01	0.01	0.15	0.20	33.75	0.01

	SW-3				SW-4			
Parameter Name	**4/6/2011**	**7/20/2011**	**11/1/2011**	**1/24/2012**	**4/6/2011**	**7/20/2011**	**11/1/2011**	**1/24/2012**
Arsenic III	2.21	0.32	0.31	<0.004 U	<0.53	0.27	<0.004 U	<0.004 U
Arsenic V	2.37	1.31	<0.008 U	<0.006 U	<1.5	1.91	<0.008 U	0.52
AsIII/AsV Ratio	0.93	0.24	38.75	--	--	0.14	--	0.01

Notes:

>1 = Arsenic III is predominant

<1 = Arsenic V is predominant

APPENDIX A

TREND ANALYSES
CONSTITUENTS OF CONCERN

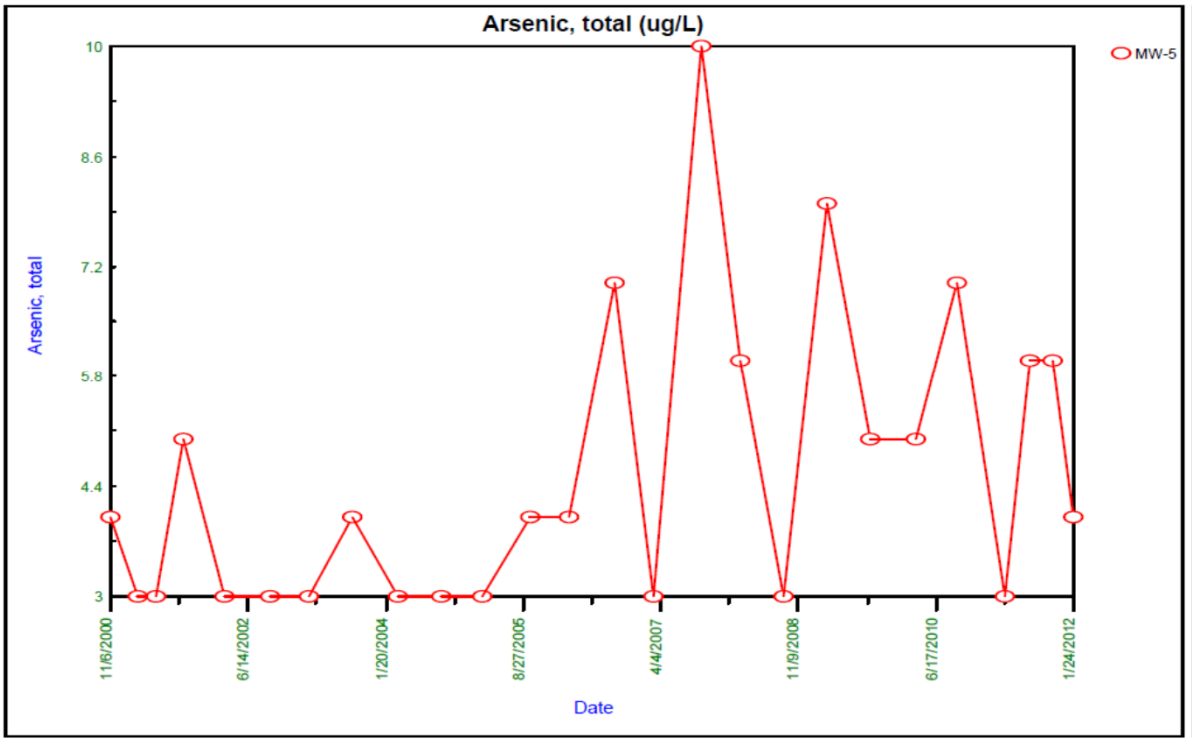
Mann-Kendall Trend Analysis
Parameter: Arsenic, total
Location: MW-5
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 198 - 94 = 104

Tied Group	Value	Members
1	4	5
2	3	12
3	5	3
4	7	2
5	6	4

A = 4368
B = 36
C = 1410
D = 0
E = 172
F = 4
a = 46116
b = 176904
c = 1512
Group Variance = 2317.79
Z-Score = 2.13944
Comparison Level at 95% confidence level = 1.65463 (upward trend)
2.13944 > 1.65463 indicating an upward trend



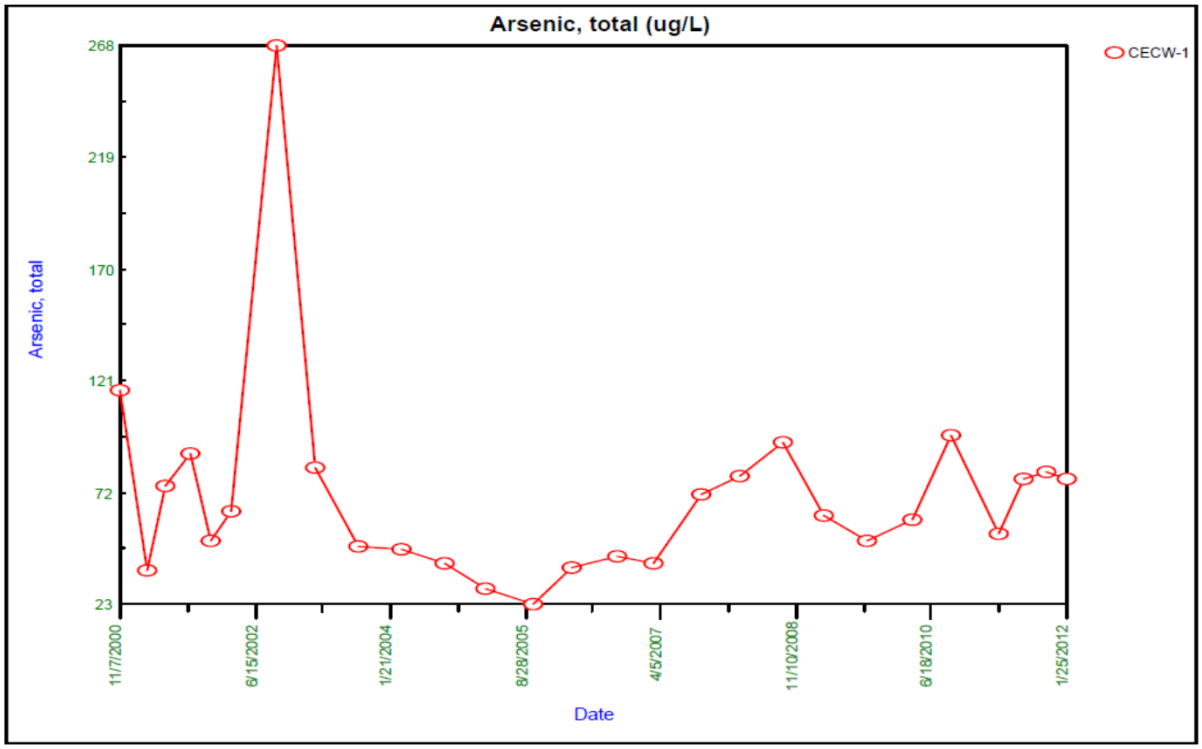
Mann-Kendall Trend Analysis
Parameter: Arsenic, total
Location: CECW-1
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 219 - 182 = 37

Tied Group	Value	Members
1	51	2
2	41	2
3	54	2
4	78	2
5	81	2

A = 90
B = 36
C = 0
D = 0
E = 10
F = 4
a = 51156
b = 197316
c = 1624
Group Variance = 2835.02
Z-Score = 0.67612
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|0.67612| <= 1.97737 indicating no evidence of a trend



Mann-Kendall Trend Analysis

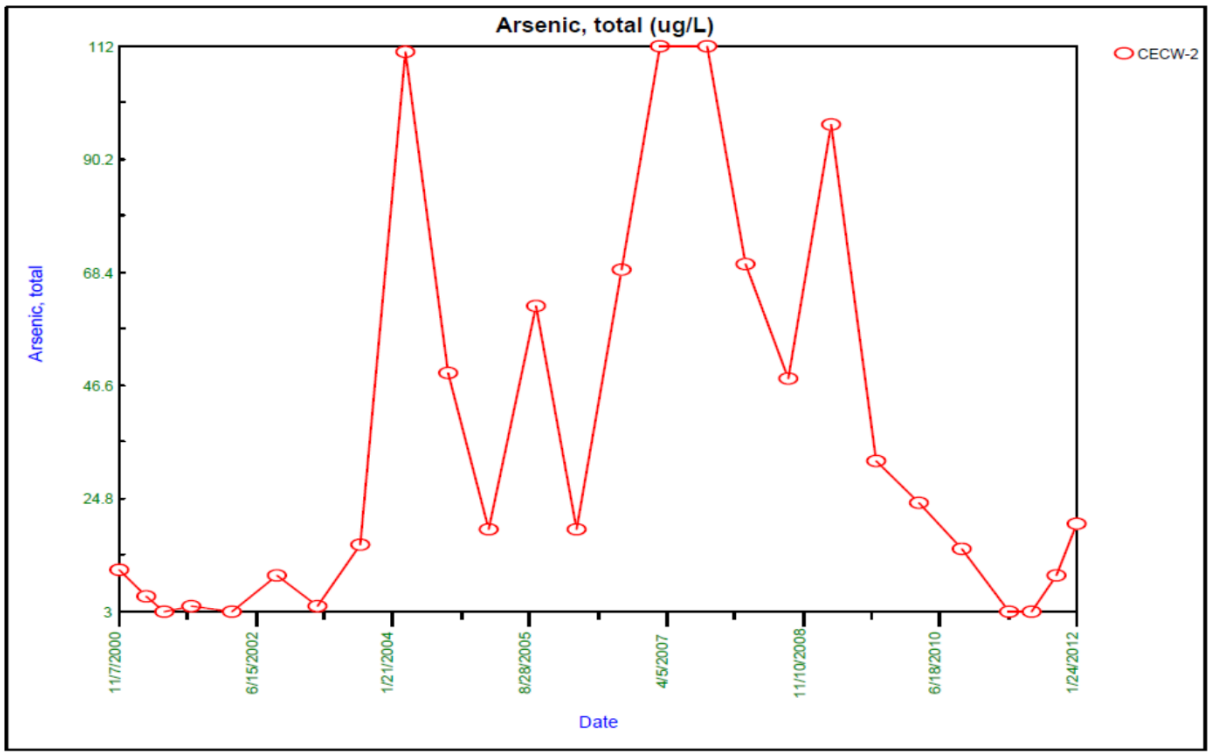
Parameter: Arsenic, total
Location: CECW-2
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 193 - 169 = 24

Tied Group	Value	Members
1	3	5
2	4	2
3	10	3
4	19	2
5	112	2

A = 420
B = 36
C = 66
D = 0
E = 32
F = 4
a = 46116
b = 176904
c = 1512
Group Variance = 2536.75
Z-Score = 0.456656
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|0.456656| <= 1.97737 indicating no evidence of a trend



Mann-Kendall Trend Analysis
Parameter: Arsenic, total

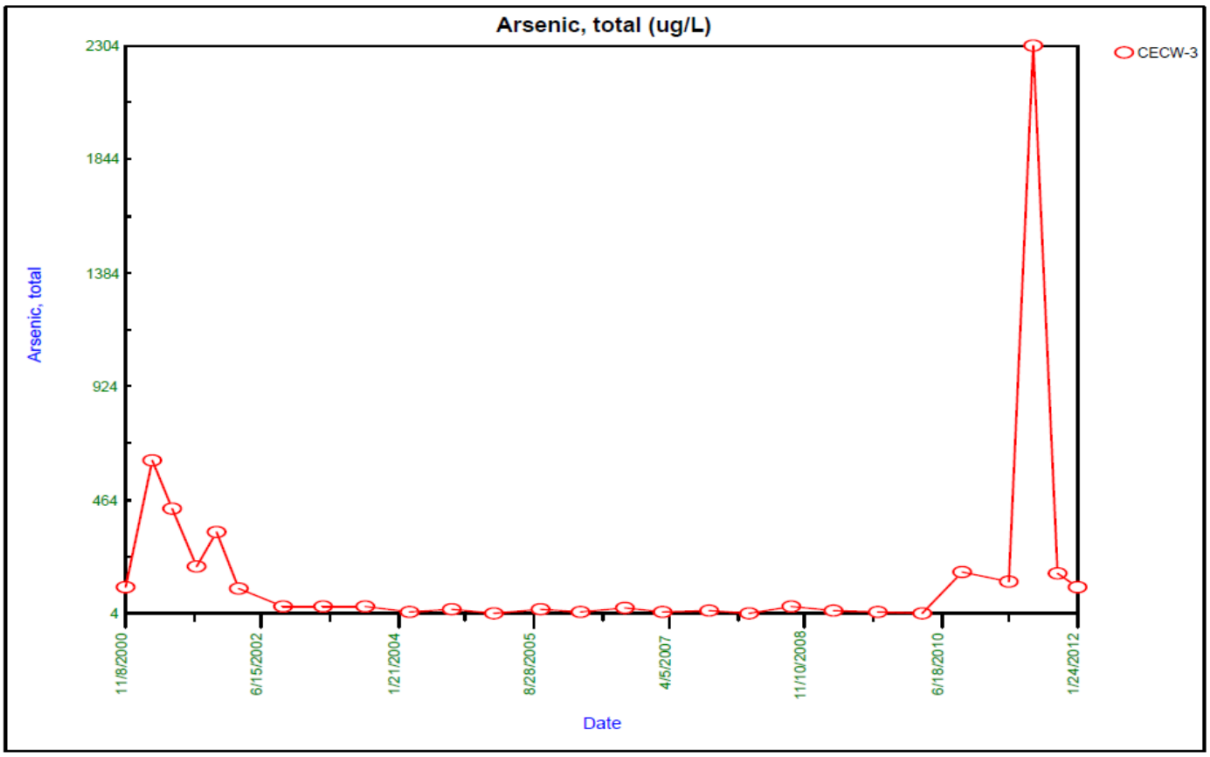
Location: CECW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 176 - 225 = -49

Tied Group	Value	Members
1	31	2
2	10	2
3	20	2
4	135	2
5	167	2

A = 90
B = 36
C = 0
D = 0
E = 10
F = 4
a = 51156
b = 197316
c = 1624
Group Variance = 2835.02
Z-Score = -0.901494
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-0.901494| <= 1.97737 indicating no evidence of a trend



Mann-Kendall Trend Analysis
Parameter: Arsenic, total
Location: CECW-6I

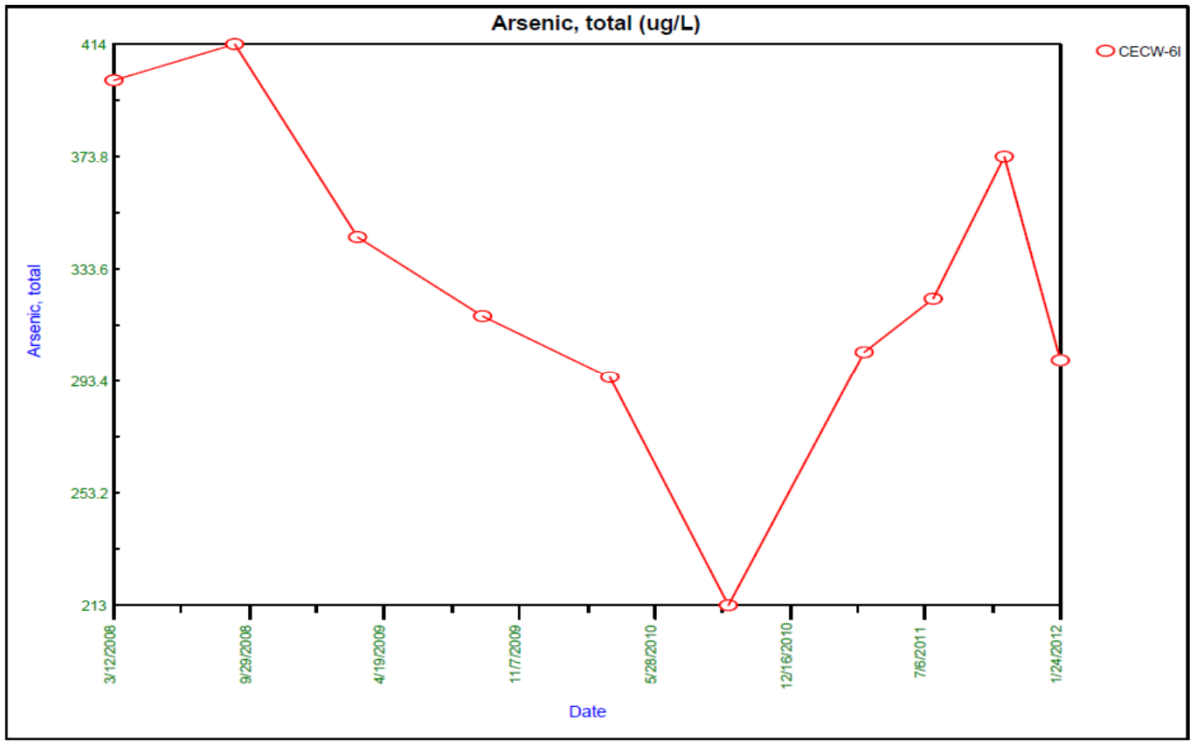
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 26 - 38 = -12

Tied Group	Value	Members
1	304	2
2	374	2

A = 36
B = 36
C = 0
D = 0
E = 4
F = 4
a = 3828
b = 11880
c = 264
Group Variance = 208.727
Z-Score = -0.761383
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-0.761383| <= 1.97737 indicating no evidence of a trend



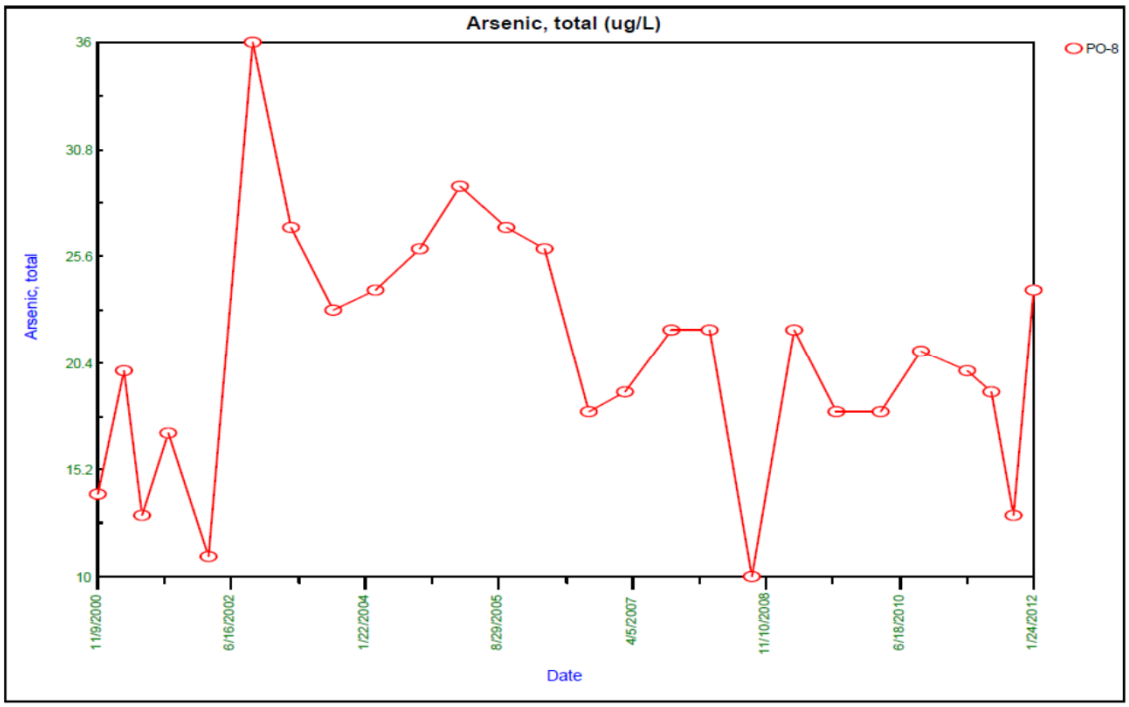
Mann-Kendall Trend Analysis
Parameter: Arsenic, total
Location: PO-8
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 156 - 206 = -50

Tied Group	Value	Members
1	20	3
2	13	3
3	27	2
4	24	2
5	26	2
6	18	3
7	19	2
8	22	3

A = 336
B = 36
C = 24
D = 0
E = 32
F = 4
a = 46116
b = 176904
c = 1512
Group Variance = 2541.42
Z-Score = -0.971982
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-0.971982| <= 1.97737 indicating no evidence of a trend



Mann-Kendall Trend Analysis

Parameter: Arsenic, total

Location: PO-10

Original Data (Not Transformed)

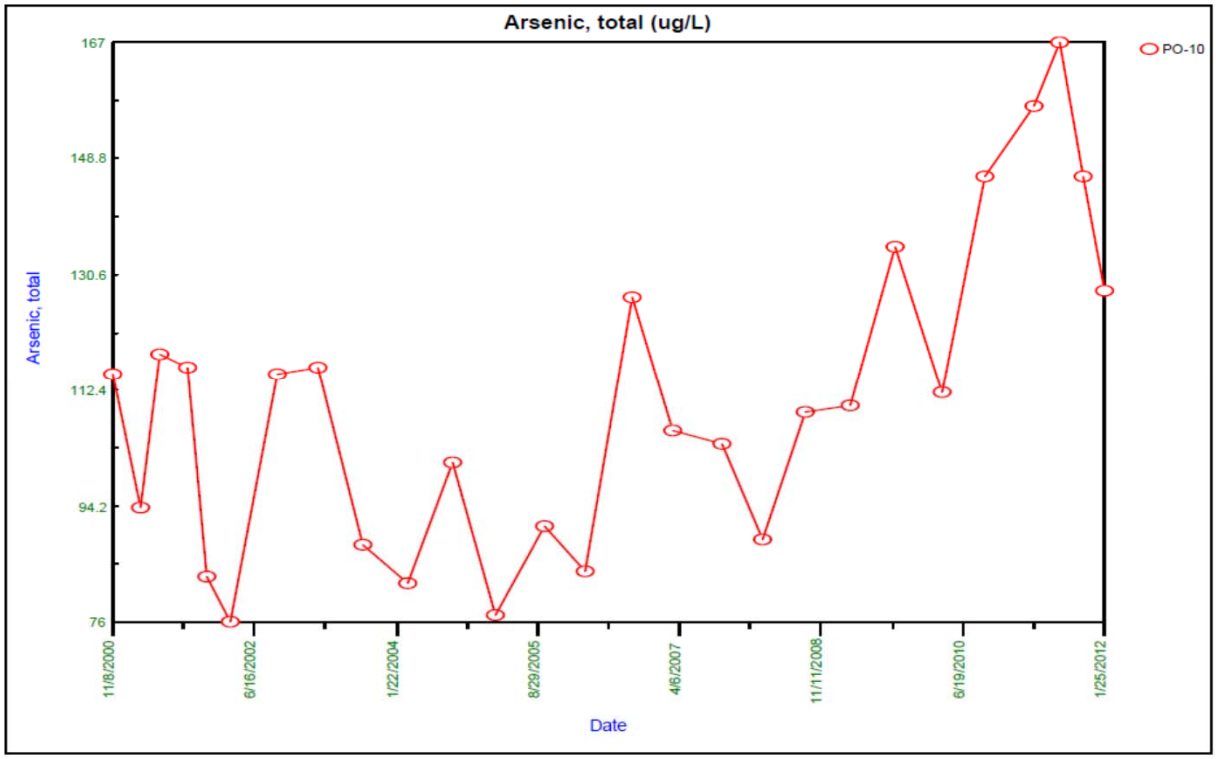
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 285 - 115 = 170

Tied Group	Value	Members
1	115	2
2	116	2
3	146	3
4	157	2

A = 120
B = 36
C = 6
D = 0
E = 12
F = 4
a = 51156
b = 197316
c = 1624
Group Variance = 2833.36
Z-Score = 3.17494
Comparison Level at 95% confidence level = 1.65463 (upward trend)
3.17494 > 1.65463 indicating an upward trend



Mann-Kendall Trend Analysis

Parameter: Beryllium, total

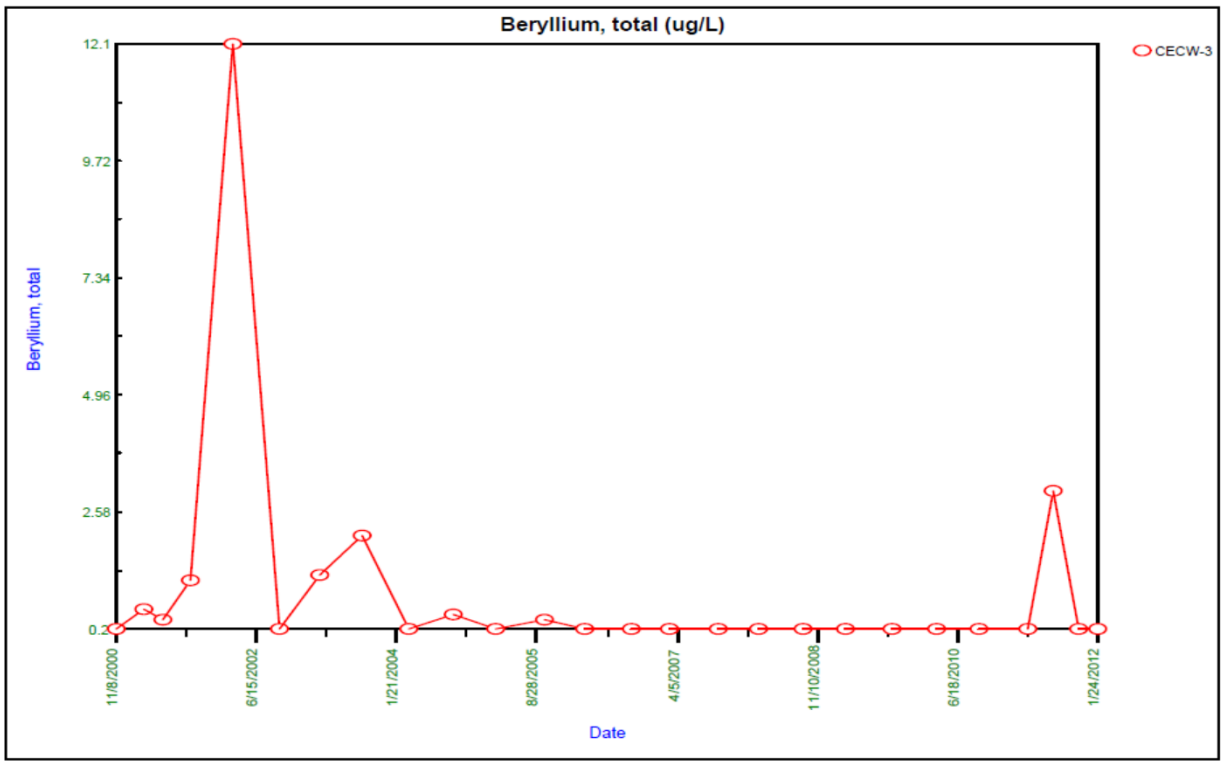
Location: CECW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 51 - 155 = -104

Tied Group	Value	Members
1	0.2	19
2	0.4	2

A = 14724
B = 36
C = 5814
D = 0
E = 344
F = 4
a = 46116
b = 176904
c = 1512
Group Variance = 1742.91
Z-Score = -2.46717
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.46717 < -1.65463 indicating a downward trend



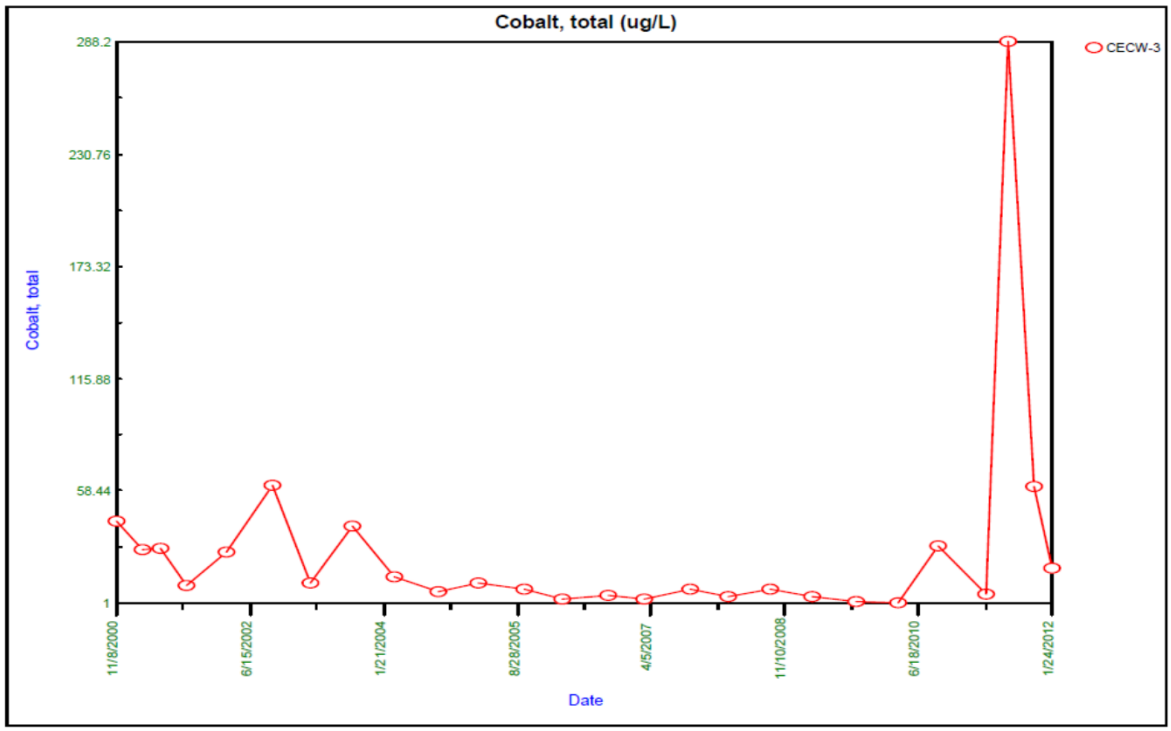
Mann-Kendall Trend Analysis
Parameter: Cobalt, total
Location: CECW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 151 - 219 = -68

Tied Group	Value	Members
1	11	2
2	8	3
3	3	2
4	4	2
5	5.6	2
6	60.9	2

A = 156
B = 36
C = 6
D = 0
E = 16
F = 4
a = 46116
b = 176904
c = 1512
Group Variance = 2551.38
Z-Score = -1.32644
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-1.32644| <= 1.97737 indicating no evidence of a trend



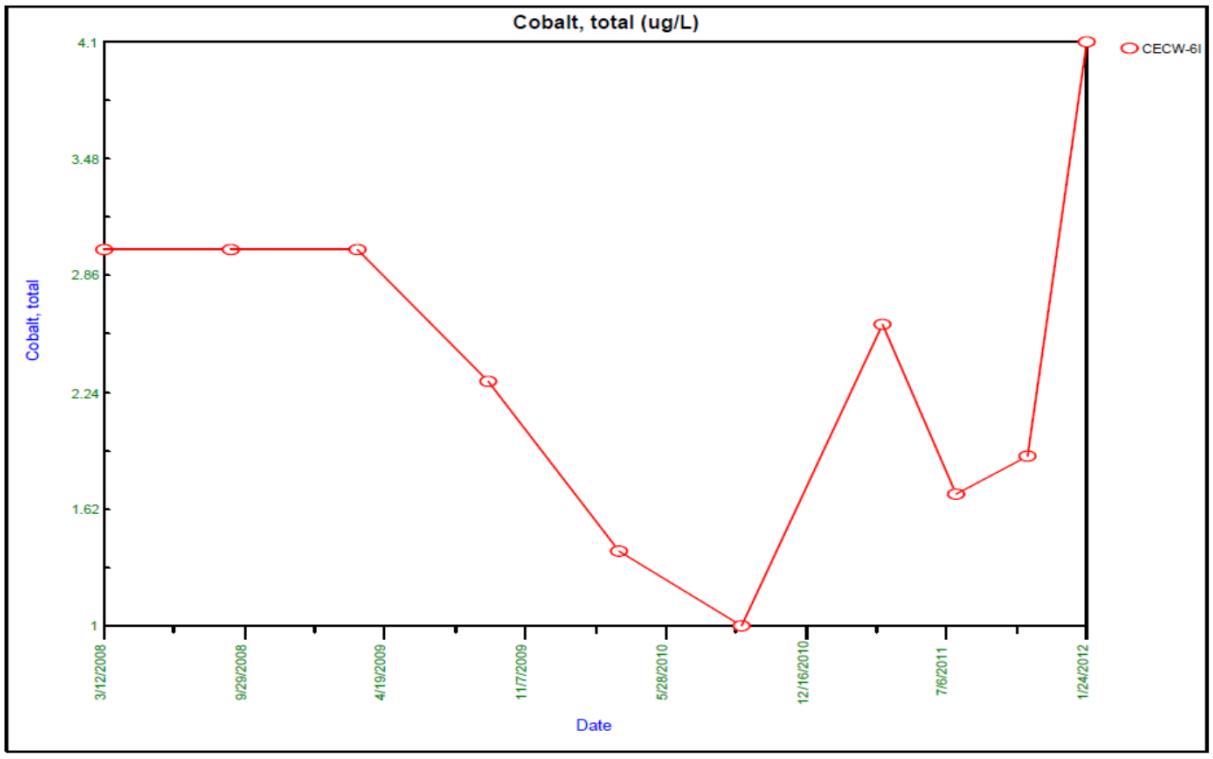
Mann-Kendall Trend Analysis
Parameter: Cobalt, total
Location: CECW-6I
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 25 - 36 = -11

Tied Group	Value	Members
1	3	3
2	2.6	2
3	1.9	2

A = 102
B = 36
C = 6
D = 0
E = 10
F = 4
a = 3828
b = 11880
c = 264
Group Variance = 205.152
Z-Score = -0.698172
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-0.698172| <= 1.97737 indicating no evidence of a trend



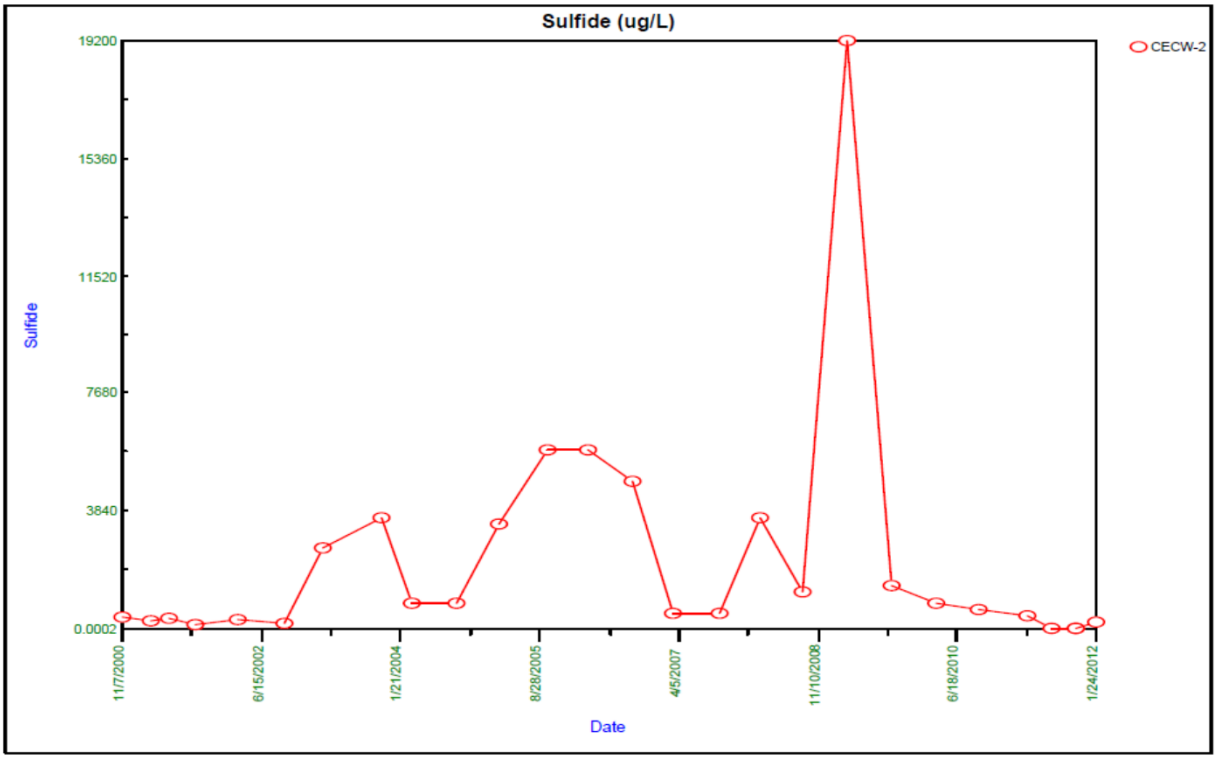
Mann-Kendall Trend Analysis
Parameter: Sulfide
Location: CECW-2
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 161 - 181 = -20

Tied Group	Value	Members
1	3600	2
2	800	3
3	5800	2
4	480	2
5	0.0002	3

A = 186
B = 18
C = 12
D = 0
E = 18
F = 2
a = 41418
b = 157950
c = 1404
Group Variance = 2289.69
Z-Score = -0.397068
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-0.397068| <= 1.97737 indicating no evidence of a trend



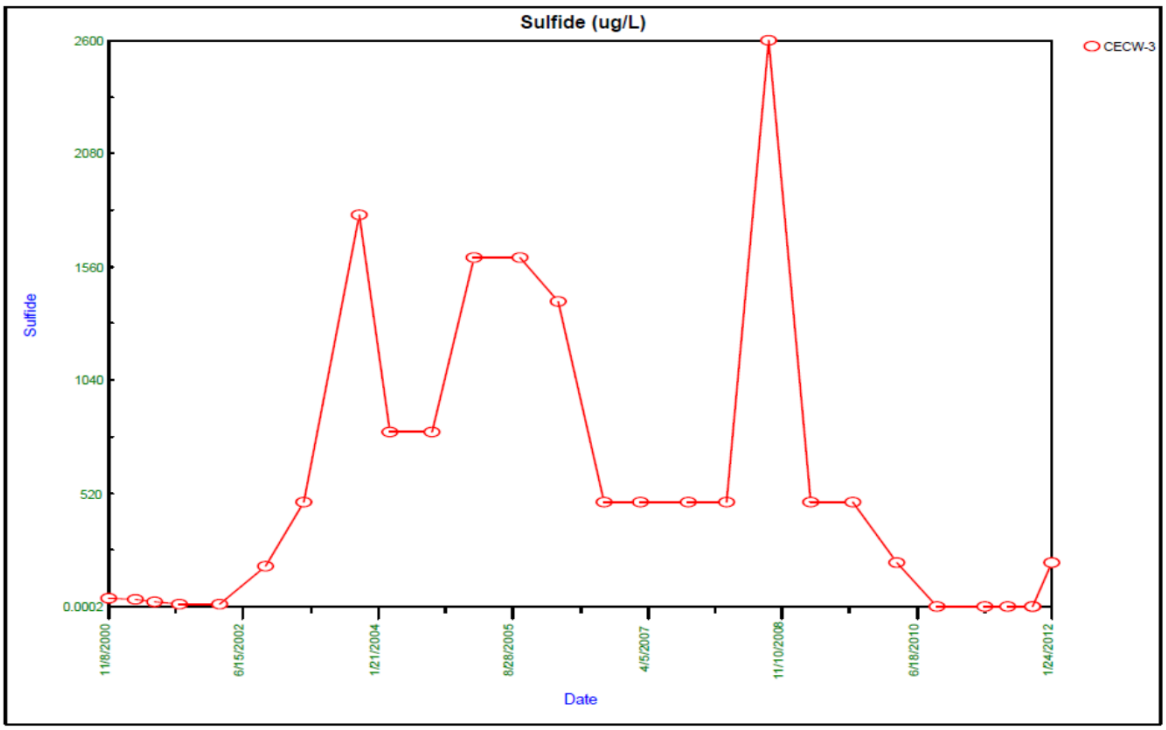
Mann-Kendall Trend Analysis
Parameter: Sulfide
Location: CECW-3
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 129 - 187 = -58

Tied Group	Value	Members
1	10	2
2	480	7
3	800	2
4	1600	2
5	200	2
6	0.0002	5

A = 1170
B = 18
C = 270
D = 0
E = 70
F = 2
a = 41418
b = 157950
c = 1404
Group Variance = 2235.1
Z-Score = -1.20566
Comparison Level at 1.0 - (0.05 / 2) = 97.5% confidence level = 1.97737 (two-tailed)
|-1.20566| <= 1.97737 indicating no evidence of a trend



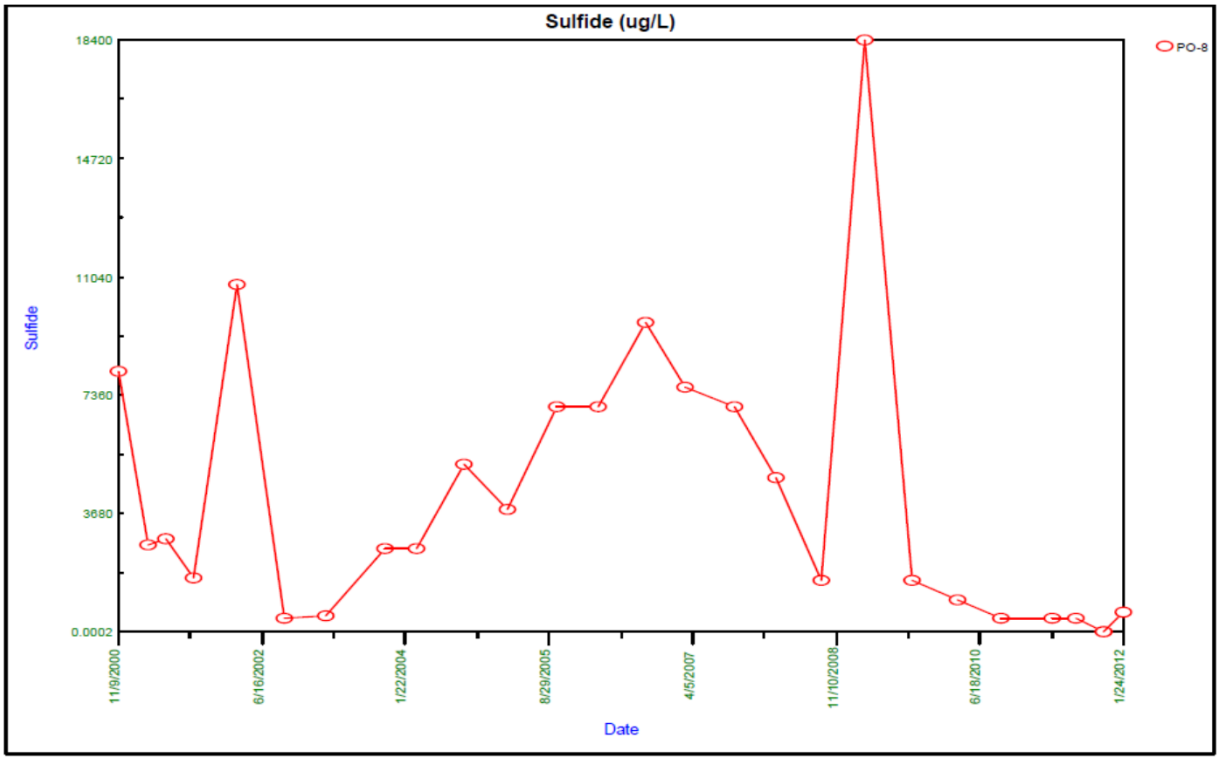
Mann-Kendall Trend Analysis
Parameter: Sulfide
Location: PO-8
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 115 - 224 = -109

Tied Group	Value	Members
1	400	4
2	2600	2
3	7000	3
4	1600	2
5	0.0002	2

A = 276
B = 18
C = 30
D = 0
E = 24
F = 2
a = 41418
b = 157950
c = 1404
Group Variance = 2284.7
Z-Score = -2.25948
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.25948 < -1.65463 indicating a downward trend



Mann-Kendall Trend Analysis
Parameter: Sulfide
Location: PO-10
Original Data (Not Transformed)
Non-Detects Replaced with Detection Limit

95% Confidence Level

S Statistic = 85 - 214 = -129

Tied Group	Value	Members
1	3000	3
2	480	8
3	0.0002	7

A = 2040
B = 18
C = 552
D = 0
E = 104
F = 2
a = 41418
b = 157950
c = 1404
Group Variance = 2186.81
Z-Score = -2.73718
Comparison Level at 95% confidence level = -1.65463 (downward trend)
-2.73718 < -1.65463 indicating a downward trend