Fourth
Five-Year Review Report

Vogel Paint and Wax Company Superfund Site
Sioux County
Maurice, Iowa

September 2014

Region 7
United States Environmental Protection Agency
Lenexa, Kansas

Approved by:

9-10-14

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Superfund Division Director
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Date:

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Superfund

Executive Summary

This is the fourth five-year review completed for the Vogel Paint and Wax Company (Vogel) Superfund site. The Vogel Superfund site is located about 2 miles south and 1 mile west of the city of Maurice in northwestern Iowa. From 1971 to 1979, Vogel used 2 acres of an 80-acre property for the disposal of liquid and solid wastes from manufacturing paint and varnish at their plant in nearby Orange City.

In 1986, the site was placed on the Superfund National Priorities List (NPL) due to contamination of soil and groundwater that was a result of the disposal of the paint and varnish manufacturing wastes. A series of investigations led to the development of a cleanup plan which was included in the 1989 Record of Decision (ROD). The cleanup plan called for: excavation and bioremediation of the volatile organic compound (VOC) contaminated soil from the 2-acre disposal area; stabilization and on-site disposal of soils with heavy metals that were not amenable to land treatment; continued recovery of floating free product; and pumping and treating the contaminated groundwater. The groundwater and soil remedial alternatives which were selected in the ROD were not formally labeled as operable units (OU), however the soil portion of the remedy is often referred to as OU-01 while the groundwater portion of the remedy is referred to as OU-02.

Cleanup activities at Vogel were initiated in 1991, the remedy was modified in the July 1994 Explanation of Significant Differences (ESD), and again in the October 2000 ESD. The October 2000 ESD selected remedial activities to enhance removal of free product and residual soils contamination to facilitate groundwater cleanup. Activities included soil vapor extraction and bioventing. These activities were partially implemented. The cleanup of soils and solid waste are ongoing. The cleanup of the groundwater and free product in OU-02 is ongoing. Both OUs are subject to this five-year review.

A site visit was conducted on December 11, 2013 as part of this five-year review. The groundwater treatment plant was found to be inoperable in its current condition due to mineral fouling of the air stripper media. Monitoring wells along the southern fence line of the site, as well as monitoring wells on the neighboring property to the south, show contamination has migrated off-site.

A phytoremediation pilot study was initiated in 2007 at the original source area, with additional trees planted in 2008. The trees were observed to be in good health during the site visit. Contaminant levels in nearby monitoring wells have been generally stable during the five-year review period.

Based on the review, the following actions are recommended in this five-year review:

- Restart or reconstruct the existing groundwater treatment plant.
- Ensure the property deed reflects the status of the site on the Iowa State Registry for Hazardous Waste or Hazardous Substance Disposal Sites and that land use controls are recorded consistent with Iowa's Uniform Environmental Covenants Act (UECA). In regards to this item, Vogel is currently pursuing environmental covenants as institutional controls for both the source area property and the adjacent impacted property. At the

completion of this Five-Year Review, Iowa Department of Natural Resources (IDNR) legal staff also determined that the 1984 intent to list on the state registry and the 2003 intent to reclassify were not recorded against the Vogel property deed. Per IDNR, those documents will be recorded to ensure their effectiveness as interim institutional controls until the environmental covenants in accordance with state UECA are in place and enforceable.

- Evaluate if the creek is being impacted by site contaminants through an assessment of the groundwater/surface water interaction, surface water sampling, and sediment sampling.
- Implement the following changes to the monitoring program:
    - Collect core samples from phytoremediation trees in the metals soils disposal area to evaluate uptake of contaminants in that area.
    - Collect groundwater metals samples from at least one well in the metals soils disposal area and one well near the creek to evaluate if metals are leaching to groundwater.
    - Discontinue bailing as a sampling method in favor of low-flow purging or passive diffusion bag sampling in order to minimize anthropogenic causes of sample variability.
    - Add at least one additional existing monitoring well in the metals soils disposal area and one in the 2000 excavation area to the groundwater sampling monitoring network in order to improve the area-by-area and whole plume statistical analysis. This cost may be offset by removing downgradient on-site monitoring wells from the program which are located in close proximity to each other.

In addition to the recommendations above, the five-year review team identified the following cost-saving options for amending the current sampling plan without affecting the protectiveness of the remedy:

- Eliminate off-site upgradient private wells (Bos and Neiss) from the monitoring program.
- Change the free product removal schedule from monthly to semi-annual, concurrent with groundwater sampling, using either hand bailing or sorbent material.

Based on the evaluation conducted in the five-year review, it was determined that:

The OU-01 remedy is protective in the short term because there is no unacceptable exposure to human or ecological receptors to residually contaminated soils. However, in order to be protective in the long term, it is recommended that soil samples be collected in the bioventing area to evaluate the progress of source remediation.

The OU-02 remedy is protective in the short term because there is no unacceptable exposure to human or ecological receptors. However, in order to be protective in the long term, it is recommended that additional creek samples be collected to assure sediment and surface water samples remain at acceptable levels and the groundwater plume needs to be effectively remediated and contained.

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List of Acronyms

ACGIH	American Conference of Industrial Hygienists
ARARs	Applicable or Relevant and Appropriate Requirements
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
cy	cubic yards
EPA	Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
IAC	Iowa Administrative Code
IDNR	Iowa Department of Natural Resources
IEUBK	Integrated Exposure Uptake Biokinetic Model for Lead in Children
LDL	Laboratory Lowest Detection Limit
MCL	maximum contaminant level
MEK	Methyl Ethyl Ketone
mg/kg	milligram per kilogram
mg/L	milligram per liter
MNA	Monitored Natural Attenuation
NA	not applicable
NCP	National Contingency Plan
NPL	National Priorities List
NS	not sampled
O&M	operation and maintenance
PRP	Potentially Responsible Party
PVC	polyvinyl chloride
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RA	Remedial Action
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act
TCLP	Toxicity Characteristic Leaching Potential
TLV	Threshold Limit Value
UECA	Uniform Environmental Covenants Act
µg/L	micrograms per liter
VOCs	Volatile Organic Compounds

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Vogel Paint and Wax Company Superfund Site		
EPA ID: IAD980630487		
Region: 7	**State:** IA	**City/County:** Maurice/Sioux County

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: IDNR
Author name (Remedial Project Manager): Bradley Vann
Author affiliation: U.S. EPA Region 7
Review period: 08/01/2013 – 09/24/2014
Date of site inspection: 12/11/2013
Type of review: Statutory
Review number: 4
Triggering action date: 09/24/2009
Due date *(five years after triggering action date)*: 09/24/2014

Issues/Recommendations
Issues and Recommendations Identified in the Five-Year Review:

Issue Category: Remedy Performance				
Issue: Groundwater has migrated off-site.				
Recommendation: Restart or reconstruct the existing groundwater treatment plant.				
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	Vogel	IDNR/EPA	March 2015

Issue Category: Monitoring				
Issue: Lack of plan to assess uptake of contaminants in trees planted as part of the phytoremediation pilot study, particularly in the metal soils disposal area.				
Recommendation: Develop a plan to assess the bioaccumulation/uptake of contaminants in phytoremediation trees, particularly those in the metal soils disposal area.				
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	Vogel	IDNR	Sept. 2018

Issue Category: Monitoring				
Issue: Current groundwater monitoring program is not providing data to completely and accurately evaluate the levels of contamination and transport of metals from the metal soils disposal area.				
Recommendation: Update the Groundwater Monitoring Plan to include collection of groundwater metals samples within the metals soils disposal area, collection of groundwater metals samples near the creek, collection of additional groundwater samples in the excavated soils areas, and changing sampling procedures to a more current sampling method.				
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	Vogel	IDNR/EPA	Sept. 2018

Issue Category: Monitoring				
Issue: Assess whether groundwater contamination is adversely impacting the intermittent stream that flows through the northern portion of the site.				
Recommendation: Evaluate if the creek is being impacted by site contaminants through an assessment of the groundwater/surface water interaction, surface water sampling, and sediment sampling.				
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	Vogel	IDNR/EPA	Sept. 2018

Issue Category: Institutional Controls
Issue: Property deed does not reference the status of the site on the Iowa State Registry for Hazardous Waste or Hazardous Substance Disposal Sites and needs to be documented in accordance with Iowa's Uniform Environmental Covenants Act

Recommendation: Ensure the property deed contains reference to the site being on the Iowa State Registry for Hazardous Waste or Hazardous Substance Disposal Sites.

Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	Vogel	IDNR/EPA	Sept. 2018

Sitewide Protectiveness Statement

Protectiveness Determination:
Short-term Protective

Protectiveness Statement:
The OU-01 remedy is protective in the short term because there is no unacceptable exposure to human or ecological receptors to residually contaminated soils. However, in order to be protective in the long term, it is recommended that soil samples be collected in the bioventing area to evaluate the progress of source remediation.

The OU-02 remedy is protective in the short term because there is no unacceptable exposure to human or ecological receptors. However, in order to be protective in the long term, it is recommended that additional creek samples be collected to assure sediment and surface water samples remain at acceptable levels, and the groundwater plume needs to be effectively remediated and contained.

1.0 Introduction

The purpose of the five-year review is to confirm that the remedy at a site continues to be protective of human health and the environment. The conclusions of the review are documented in the Five-Year Review report. The Five-Year Review report identifies issues found during the review, if any, and gives recommendations.

This Five-Year Review report is prepared pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) § 121 and the National Contingency Plan (NCP). CERCLA § 121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after initiation of remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such a site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to Congress a list of facilities for which such review is required, the results of such reviews, and any actions taken as a result of such reviews.*

The U.S. EPA has interpreted this requirement further in the National Contingency Plan (NCP); 40 Code of Federal Regulations (CFR) §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

EPA Region 7 has conducted a five-year review of the remedial actions implemented at the Vogel Paint and Wax Company site (Vogel) near the city of Maurice in Sioux County, Iowa. The review was conducted by personnel from the U.S. Army Corps of Engineers in cooperation with the regional office of EPA (Region 7) and the Iowa Department of Natural Resources (IDNR) from August 2013 through September 2014. This report documents the results of the review.

This is the fourth five-year review for the site. The first five-year review was completed in September 1998, the second in September 2004, and the third in September 2009. The triggering action for this fourth five-year review is the completion of the previous five-year review. The five-year review is required because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

The site is addressed as two operable units. OU-01 addresses soil contamination and OU-02 addresses groundwater contamination. Both the OU-01 and OU-02 remedies are ongoing and will be addressed in this report.

2.0 Site Chronology

A chronology of significant site events and dates is included in Table 1.

Table 1: Chronology of Site Events

EVENT	DATE
Site discovery by the state following concerns expressed by nearby residents about rural water wells in the vicinity of the waste disposal area	Spring 1979
Site proposed for the National Priorities List (NPL).	10/15/1984
Final listing on the NPL.	06/10/1986
An Iowa DNR Consent Order (No. 87-SW-16) was signed by the IDNR and potentially responsible party (i.e., Vogel) requiring completion of a remedial investigation/feasibility study (RI/FS).	06/08/1987
RI/FS completed and Record of Decision (ROD) issued.	09/20/1989
The Iowa DNR RI/FS Consent Order was amended (Iowa DNR Amended Consent Order No. 90-HC-10) to implement the remedial design and remedial action as prescribed in the ROD.	07/23/1990
Groundwater remediation was begun with start-up of groundwater recovery and treatment system.	Spring 1991
Soil remediation was begun with treatment of first batch of contaminated soils in soil treatment cell.	Fall 1991
Remedial Action Report for Groundwater indicating the groundwater actions to be operational and functional.	10/28/1992
An Explanation of Significant Differences (ESD) was issued that increased the scope of cleanup actions with more recovery wells, a larger estimate on free product removal, a larger excavation and treatment volume of soil, higher maximum concentration of contaminants in soils based on testing results, use of an open system for bioremediation of contaminated soils, additional soil treatment beds, as well as removal of Iowa proposed Air Toxics Rules as an ARAR and removal of a carbon adsorption unit to treat the air discharge from the air stripper design.	07/20/1994
Preliminary Close-Out Report	08/19/1994
First Five-Year Review completed	10/1/1998
Remedial Action Report for Soil Remediation Operable Unit indicating completion of soil remediation activities	9/28/2000
A second ESD was issued which prescribed additional efforts to enhance free product removal to expedite groundwater remediation. The ESD described the efforts which included excavation and repositioning of contaminated soil, with subsequent operation of an SVE/bioventing system. The ESD also clarified the criteria to determine if, and when, discontinuation of active groundwater remediation was warranted.	10/2000
Enhanced free-product excavation, repositioning of contaminated soil, and installation of bioventing pipes completed.	01/2001

An Iowa DNR Consent Order (No. 2003-HC-02) between the IDNR and Vogel replaced prior Consent Order No. 90-HC-10 and clarified remaining actions necessary to complete remedial measures prescribed in the ROD and ESDs.	05/23/2003
In accordance with the 2003 Consent Order, groundwater remediation system was placed in standby mode (i.e., not reactivated in spring 2003 following winter shutdown) pending groundwater monitoring results.	Spring 2003
Off-site groundwater contamination discovered and, in accordance with the 2003 Consent Order, the groundwater remediation system was re-activated.	08/2003
Second Five-Year Review completed	09/24/2004
Normal seasonal shutdown of pumping to the air stripping tower.	12/2004
With stable or declining concentrations in the southern monitoring wells, pumping to the air stripping tower was not reactivated in spring 2005 following winter shutdown.	Spring 2005
Phytoremediation/irrigation pilot study approved by IDNR and initiated in a 1 acre area.	6/2007
Phytoremediation area expanded to include an additional 2.5 acres north of the 2007 planting, including over the original disposal area where metals contaminated soils were placed.	5/2008
Third Five-Year Review completed	09/24/2009
Fourth Five-Year Review completed	*09/23/2014*

3.0 Background

3.1 Physical Characteristics

The Vogel site is located on land generally described as the W ½ of the NW ¼ of Section 29, T94N, R45W, Sioux County, Iowa (Attachment A, Figure 1). The Vogel Paint and Wax Company is the owner of record. The site is approximately two miles south and one mile west of Maurice, Iowa, and is accessible from a gravel road on the west side of the site. Remedial activities at the site have been concentrated in the southern half of the 80-acre property. The site is located in a rural, agricultural area that is characterized by scattered farmsteads. The two nearest private residences are located about a quarter of a mile northwest and southwest of the active portion of the site.

The Vogel site lies in the Dissected Till Plains Region of the Central Lowland Physiographic Province. The region is characterized by gently rolling topography originating from the weathering of glacial till materials which overlay bedrock of Cretaceous age. A small, unnamed tributary runs from west to east through the north side of the site. The West Branch of the Floyd River is located approximately a half mile east of the site. Two sand formations underlie the site separated by a low permeability glacial till. Groundwater in the thin upper sand unit generally flows to the north following the topography. Groundwater in the lower sand unit generally flows to the south. The two sand formations merge in the subsurface area near the old disposal trenches and groundwater from the upper sand unit reverses flow as it drains into the lower aquifer.

3.2 Land and Resource Use

Land in the vicinity of the Vogel site is primarily used for agricultural purposes. All residences within a mile of the site are connected to the rural water supply. As stated above, two residences are located about a quarter mile northwest and southwest of the site. These residences are served by the rural water district and no longer use private wells to supply water for domestic use. These private wells are currently being used for non-household purposes and analytical results indicate that they are not being impacted by the site. The rural water district obtains water from shallow and deep wells located approximately a mile and a half southeast of the site (Attachment A, Figure 1).

Portions of the Vogel property are planted in row crops; however, this does not include the area where remedial activities have been concentrated. Areas of the site where soil remediation activities have occurred have a grass cover. In 2007 and 2008, approximately 3.5 acres were planted with 250 willow trees and 2300 poplar trees as part of a phytoremediation pilot study (Attachment A, Figure 2). The pilot study included an irrigation system which pumped groundwater from recovery wells to control groundwater migration along the southern property boundary. The spray irrigation system extracted groundwater which was then used to irrigate the trees. The irrigation system has not been used since a limited irrigation of two days in 2010; the last full use of the system was during the 2009 irrigation season. No other significant change in land use in the area is anticipated in the foreseeable future.

3.3 History of Contamination

The Vogel Paint & Wax plant in nearby Orange City, Iowa generated waste that was disposed at the site from 1971 to 1979. Waste consisted of paint sludge, resins, solvents and other solid wastes. Prior to using the site for waste disposal, a gravel pit encompassing about 2 acres was located in the west-central portion of the 80-acre property. The remainder of the site was tilled for agricultural purposes. Waste disposal trenches were first excavated in the area just south of the abandoned gravel pit and consisted of slot-dozed trenches to a depth of 8 to 12 feet. Waste liquids were poured into the trenches from 55-gallon drums. Miscellaneous plant debris was used to top off the trenches. When the level of the waste approached the original ground surface, the trench was covered. The cover material was one to two feet of the clayey silt loess soils which had been excavated from the trenches. Several feet of clayey silt soil were placed on the floor of the former gravel pit with solid waste (e.g., pallets and packing materials) disposed on top. Soils in the disposal area were contaminated with volatile organic compounds (VOCs) and metals, including chromium and lead. Groundwater is contaminated with VOCs, including benzene, toluene, ethylbenzene, and xylene (i.e., BTEX compounds) and methyl ethyl ketone (MEK). Metals associated with the waste material have also been detected in groundwater.

3.4 Initial Response

In the spring of 1979, the IDNR conducted initial investigations at the site in response to concerns regarding a proposed rural water district well field about 1.5 miles southeast of the Vogel site. Vogel conducted hydrogeological investigations at the site that same year. Investigations revealed a plume of contaminated groundwater extending about 1,000 feet south of the disposal area and evidence of VOCs floating on the water table in the lower sand and gravel aquifer. In 1984, Vogel placed a 2-foot thick clay soil cap over the entire disposal area and the IDNR ordered Vogel to remove the floating VOCs from the water table.

3.5 Basis for Response Action

The site was proposed as a candidate site for the National Priorities List (NPL) in October of 1984 and became a final NPL site in June of 1986. The Vogel site scored for NPL eligibility based solely on the threat to groundwater. About 3,500 people, including the towns of Maurice and Struble and the Southern Sioux County Rural Water District have groundwater sources within a four-mile radius of the Vogel site. Maurice is now connected to rural water.

In June of 1987 Vogel entered into a consent order with IDNR for conducting a Remedial Investigation (RI) and Feasibility Study (FS) of the site in accordance with the federal Superfund program. As a part of the RI/FS, the U.S. Public Health Service Agency for Toxic Substances and Disease Registry (ATSDR) conducted a health assessment for the Vogel site. They concluded that although the site does not pose an immediate public health threat, the potential for off-site migration of contaminants into the groundwater may lead to a future public health threat. Therefore, the 1989 ROD, and amendment in 1990 included a remedial design/remedial action (RD/RA) to address the possible risk. The selected response action addressed two affected media: (1) solid waste/soil in the disposal area and (2) groundwater. The IDNR has been the lead agency for the Superfund action at the Vogel site.

4.0 Remedial Actions

4.1 Remedy Selection

The RI/FS was completed and a ROD signed by EPA for the site in September 1989. The ROD selected a response action consisting of treatment of the contaminated soils by excavation, on-site aboveground bioremediation, and on-site disposal of treated soil. The ROD also addressed the treatment of the contaminated groundwater by pumping, air stripping, and discharge to surface water. The ROD also provided a contingency to solidify soils with high levels of metals and placement after treatment into the excavated area. The groundwater cleanup standards in the ROD were based on Iowa Groundwater Action Levels and EPA Maximum Contaminant Levels (MCLs) as provided for in the Federal Safe Drinking Water Act. In addition, the state registry of Hazardous Waste or Hazardous Substance Disposal Sites was the form of institutional control prescribed in the ROD. Listing on the state registry requires that sale or significant change in use of the property must be approved by the IDNR. The Vogel site has been on the state registry since 1984; however, a review of the property deed at the Sioux County Recorder's Office during this fourth five-year review showed no reference to the property being on the state registry. The 1984 Intent to List and the 2003 Intent to Reclassify need to be correctly referenced within the deed on file to ensure their effectiveness as institutional controls.

The ROD prescribed RAOs for soils/solid waste and groundwater. The ROD was modified twice with ESDs.

- The ROD identified the RAO for soils/solid waste to reduce migration of contaminants to groundwater by removal and/or treatment of the source.
- The ROD identified the RAO for groundwater to reduce contaminants in groundwater to established health-based standards for drinking water.
- The July 1994 ESD described the differences in scope, performance, and cost between the original remedy described in the ROD and the modified remedy. The original remedy was modified to include:
    - Additional groundwater recovery wells
    - No treatment of the air stripper discharge
    - Increased free product removal
    - Increased excavation and treatment of contaminated soils volume
    - Increased average and maximum concentration of contaminants in soils.
    - Clarified air standards
    - Clarified that one-fourth of the organic contaminants in soil would be treated by bioremediation with the remainder being lost to volatilization, based on the results of a treatability study.
- The October 2000 ESD prescribed the following changes to the original remedy:
    - Enhanced free-product recovery actions
    - Clarified criteria for compliance with groundwater standards
    - Allowed for the use of an environmental protection easement as another form of institutional control in place of being listed on the state registry of Hazardous Waste or Hazardous Substance Disposal Sites
    - Allowed for the pumping of treated groundwater back into the aquifer to facilitate free product removal in lieu of discharge to the unnamed stream.

4.2 Remedy Implementation

Although groundwater and soil remedial actions were not formally labeled operable units in the ROD, the soil and groundwater remedial alternatives were evaluated separately and the remedy selected in the ROD consisted of both soil and groundwater cleanup activities.

Excavation and treatment of soils began in October of 1991. An August 1994 preliminary closeout report certified that the soils remediation was operational and functional. Soil remedial actions involved: excavation of wastes from the waste disposal cells; separation of solid and liquid waste for off-site disposal as hazardous or non-hazardous waste, as appropriate; treatment of soils by land farming/bioremediation; chemical stabilization and special placement of metals-contaminated soils; and backfilling the excavation with treated soils. The excavated area encompassed about two acres in the west-central portion of the site. Soils were excavated to a depth of about 20 feet. Soil remediation was completed in May of 1999.

The soil remedial action resulted in land farming/bioremediation of approximately 65,000 cubic yards of contaminated soil. The treatment of the contaminated soils resulted in the removal of approximately 71,000 gallons of product. Approximately 3,500 cubic yards of solid waste material was separated from the excavated soils and disposed of at a sanitary landfill. Also, approximately 220 barrels of paint sludge and liquid solvents were disposed of at an EPA permitted disposal facility. The treated soils were placed back into the original disposal area in the summer of 1999 and the excavation was covered with three feet of clean soil and one foot of topsoil. Treated soils were required to meet the soils placement standards prescribed in the ROD (i.e., acceptable Toxicity Characteristic Leaching Procedure (TCLP) test results for individual metals and organic compounds, as well as concentrations of total organic hydrocarbons of less than 100 mg/kg). The treated soils included approximately 2,200 cubic yards that were isolated and treated separately because they failed to meet acceptable TCLP levels for lead. These lead contaminated soils were stabilized/solidified by adding and mixing agricultural lime until acceptable TCLP results were obtained. The lime-treated, lead contaminated soil was covered with five feet of clean soil after being placed in the eastern half of the original disposal area at an elevation greater than five feet above the highest groundwater level of record. Site work related to the soil actions was completed in the spring of 2000. A Remedial Action Report certifying the completion of soil remediation was issued in September of 2000.

As groundwater remedial activities, discussed below, progressed, it became apparent that a large volume of free product was present in subsurface soils in an area located to the south of the original disposal area. To address this source of groundwater contamination, excavation of an area about 500 ft. by 200 ft. by 35 ft. deep was conducted between October 2000 and January of 2001. The non-contaminated shallow soils were placed at the bottom of the excavation and the contaminated soils from depth were placed on top. A system of ventilation pipes was placed through the repositioned contaminated soils to provide air in order to facilitate natural aerobic breakdown of contaminants (i.e., bioventing). The bioventing remediation is ongoing.

Construction of the groundwater remediation system began in the spring of 1991. Normal operation of the groundwater remediation system started in the spring of 1992. A Groundwater Remedial Action Report was issued in October of 1994, which certified the groundwater

remediation system as operational and functional. The groundwater remediation system originally consisted of five recovery wells with treatment provided by an air stripper tower. Discharge of treated water flowed overland to an infiltration basin located upgradient of the original disposal cell. The system was not operated during the winter months as seasonal shutdown was necessary due to freezing problems.

From startup in March of 1992 through shutdown in December of 2004, approximately 280 million gallons of groundwater were pumped by the recovery wells and treated via the air stripper tower. The 2012 Annual Groundwater Monitoring Report estimated that a total of approximately 28,800 gallons of aqueous phase product and free product were removed from the subsurface from operation of the groundwater pump and treat system. In December 2005, monitoring well MW-4R was retrofitted with a free product recovery pump but due to limited product thickness the system was removed in late 2011 and bailing of the free product is performed instead. Since 2005, approximately 36 gallons of free product have been recovered by the system or by bailing. Finally, as a result of the pumping/irrigation component of the phytoremediation pilot study in 2007 and 2008, an estimated 127 gallons of dissolved phase contamination were removed from the groundwater.

The October 2000 ESD also clarified the criteria to determine if, and when, discontinuation of active groundwater remediation was warranted. The criteria included no exceedance of groundwater cleanup standards at the property boundaries, no expansion of groundwater contamination as demonstrated by stable or decreasing groundwater contaminant levels throughout the site, and no other evidence that would suggest the potential for migration of groundwater from the site at levels in excess of cleanup standards. The groundwater cleanup standards are health-based standards for drinking water as prescribed in the 1989 ROD, and as modified in the October 2000 ESD and Consent Order No. 2003-HC-02 in 2003, see Attachment B for a summation of the changes to the standards. The groundwater cleanup standards for the Vogel site are the Iowa groundwater ARARs as defined in the Iowa statewide standards. The statewide standards per Chapter 567 Iowa Administrative Code (IAC) 137 are based on the following hierarchy: (1) MCLs established under the Safe Drinking Water Act; (2) EPA lifetime Health Advisory Levels (HALs) and (3) risk-based values calculated in accordance with the methodology described in sub-rule 567 IAC 137.5(4)(a) for statewide standards for groundwater in a protected groundwater source. The groundwater cleanup standards are listed in Attachment B.

Following a reduction in contaminant levels after the OU-01 soil remedial action in 2000, IDNR allowed the groundwater treatment system to be shutoff in 2001. In July of 2003, data from additional monitoring wells revealed contaminated groundwater had migrated to the southern site boundary. In accordance with the 2003 consent order, the groundwater remedial system (i.e., the air stripper tower) was reactivated in August of 2003. Additional monitoring wells were installed at the southern boundary and in off-site areas to the south to better define the groundwater plume and determine the need for additional remedial action. Operation of the groundwater remediation system appeared to improve off-site groundwater conditions and use of the air stripper tower was again suspended after the seasonal shut-down in December of 2004. However, an area of contamination in excess of the ARARs remained on the southern end of the property. The groundwater pump and treat system remains inactive.

In 2007, Vogel conducted a study to evaluate potential measures to enhance groundwater remediation on-site and prevent further off-site impacts. In July of 2007, an irrigation/phytoremediation pilot study was initiated that included the planting of 1-acre of trees over the area that was excavated in late 2000. In 2008, an additional 2.5-acres of trees were planted, expanding the phytoremediation system over the original disposal area where the stabilized metals contaminated soils were placed. The original pump and treat system using the air stripper was modified to water the young trees using a pump and spray irrigation system. Two of the original recovery wells and a boundary recovery well were pumped for irrigation. The irrigation was intended to be short-term to help the trees to establish and was discontinued following the 2009 irrigation season, with the exception of a brief irrigation period of 2 days in 2010. The site currently relies on phytoremediation and natural attenuation to remediate groundwater contamination and prevent off-site migration of contaminated groundwater in accordance with Iowa's UECA.

The state registry of Hazardous Waste or Hazardous Substance Disposal Sites was the form of institutional control prescribed in the ROD. Listing on the state registry requires that sale or significant change in use of the property must be approved by the IDNR. On-site use of groundwater is prevented by listing on the state registry of Hazardous Waste or Hazardous Substance Disposal Sites. The Vogel site has been on the state registry since 1984. The 2000 ESD indicated that IDNR would accept an environmental protection easement pursuant to Iowa Code 455H.206 as an institutional control that could be used in addition to, or in lieu of, the state registry listing. Environmental protection easements have since been replaced by uniform environmental covenants pursuant to Iowa Code 455I as the preferred instrument for placing activity and use limitations on properties. The EPA and IDNR are currently working with the property owner to establish an environmental covenant on the property.

During the five-year review, the IDNR verified the property is correctly listed in the state registry, however the deed on file did not reference the listing in accordance with Iowa's UECA. Vogel will need to confirm with the IDNR to ensure the "Intent to List" notification was correctly recorded.

4.3 System Operations/Operation and Maintenance

Current operation and maintenance at the site involves an ongoing groundwater monitoring program and free product recovery by bailing monitoring well MW-4R. A phytoremediation and bioventing system are also in use, but these are currently passive systems which do not require active management. The current groundwater monitoring schedule is included in Table 2 below.

The phytoremediation pilot study consists of 1-acre of trees planted at the southern end of the area which was excavated in late 2000, as well as an additional 2.5-acre area north of the 2007 planting, including the original disposal area where metals contaminated soil was placed. A portion of the area containing the treated soils has a grass cover which is mowed periodically. The site is inspected regularly for damage by erosion and to verify the trees are healthy; repairs are made as necessary.

Table 2: GROUNDWATER MONITORING SCHEDULE

Location	Semi-Annual	Annual	Parameters
North of Source Areas			
GMW-3		X	BTEX
TC-7		X	BTEX
Source Area (metals soils disposal area)			
GMW-13		X	BTEX
Source Area (2000 excavation area)			
GMW-9R	X	X	BTEX (Metals annually)
South of Source Areas, On-Site			
GMW-15	X	X	BTEX (Metals annually)
GMW-16		X	BTEX
GMW-17	X		BTEX
GMW-18R		X	BTEX
GMW-34	X		BTEX
TC-6S		X	BTEX
TC-6D	X	X	BTEX (Metals annually)
Side Gradient, On-Site			
MW-1		X	BTEX
GMW-8		X	BTEX
South of Source Areas, On-Site along Fence Line			
MW-5	X		BTEX
GMW-7R	X	X	BTEX (Metals annually)
GMW-19	X		BTEX
GMW-20	X		BTEX
GMW-33	X		BTEX
TC-23		X	BTEX
South of Source Areas, Off-Site			
GMW-21	X		BTEX
GMW-25	X		BTEX
GMW-30	X		BTEX
Upgradient Off-Site Private Wells			
Bos		X	BTEX
Neiss		X	BTEX

Notes

1. Annual metals analysis includes the following elements: arsenic, cadmium, chromium, lead, and mercury.
2. BTEX parameters consist of: benzene, toluene, ethylbenzene, and xylene.
3. Wells GMW-7R, GMW-19, GMW-20, GMW-21, GMW-25, GMW-30, and GMW-33 were sampled monthly during the summer of 2013 to monitor BTEX concentrations along the southern property boundary and off-site.

5.0 Progress Since Last Review

The protectiveness statement from the 2009 Third Five-Year Review was:

"The remedy at Vogel site is protective of human health and the environment because there is no evidence of current exposure. However, in order for the remedy to be protective in the long-term, the following actions are recommended:

- *Continue monitoring of on-site and off-site groundwater.*
- *Evaluate risks associated with the potential uptake and accumulation of contaminants in phytoremediation trees planted over the area where treated soils were placed.*
- *Verify that groundwater contamination is still not adversely impacting the intermittent stream that flows through the northern portion of the site.*
- *Continue to evaluate if the phytoremediation irrigation activities are mobilizing metals from the area where the treated soils were placed.*
- *Continue to collect and evaluate air monitoring data obtained during the phytoremediation irrigation activities, as necessary to ensure protectiveness.*
- *Place an Environmental Covenant on the Vogel site property.*
- *Evaluate the effectiveness of irrigation, phytoremediation, and/or natural attenuation processes to remediate groundwater and prevent off-site migration of contaminated groundwater. Modify remedy as appropriate."*

The issues identified in the 2009 Third Five-Year Review, the recommendations made to address each issue, and their current status is listed below.

Issue 1: Continue groundwater sampling because the groundwater remedial action objective is currently not being met.

The groundwater annual monitoring reports from 2009 through 2013 have been reviewed as part of this five-year review to verify monitoring has occurred. Groundwater monitoring on-site and off-site should continue due to the presence of off-site contamination above the groundwater ARARs. On-site groundwater is expected to remain above the ARARs, therefore monitoring should also continue on-site. This is not considered an issue for the purposes of the five-year review, but is necessary to determine the effectiveness of the remedy as well as potential future issues.

Issue 2: Develop a plan and evaluate risks associated with the potential uptake and accumulation of contaminants in phytoremediation trees planted over the area where treated soils were placed.

In 2013, eight core samples were collected from phytoremediation trees located within the area excavated in 2000. These samples were analyzed for arsenic, cadmium, and chromium. However, as of this five-year review report, tree core data has not been evaluated and there is no plan describing how such an evaluation will be completed. Furthermore, due to the undersized trees, tree core samples were unable to be collected from trees located within the metals soils disposal area, where uptake of metals is more likely. Finally, tree core samples were not analyzed for lead, mercury, or BTEX compounds which are site contaminants of concern

(COCs). This issue will carry forward as a result of this five-year review due to a lack of information on the bioaccumulation potentially occurring in the trees located within the metals contaminated soil area.

Issue 3: Determine if groundwater conditions are adversely impacting the intermittent stream that flows through the northern portion of the site.

Surface water samples from the stream were collected in February 2011 and reported in the 2010 Annual Report dated March 2011. In a letter dated April 25, 2012 (Attachment G), IDNR concluded that sampling has sufficiently demonstrated no adverse impact on the stream has occurred. However, the evaluation presented in section 6.4 of this report recommends that additional data be collected in order to confirm the conclusions made in 2012. Therefore, this issue will be carried forward.

Issue 4: Determine if the phytoremediation irrigation activities are mobilizing metals from the area that the treated soils were placed.

Dissolved metals in groundwater have been analyzed from four monitoring wells on an annual basis since the last five-year review. The area of metals contaminated groundwater is not as extensive as BTEX contaminated groundwater and is located beneath the phytoremediation study area. There is some indication that phytoremediation irrigation may have mobilized arsenic to a limited extent; therefore, metals in groundwater should continue to be evaluated. It was also noted during the five-year review that wells located within the metals soils disposal area, which were sampled prior to 2009 and contained metals above the MCLs, are no longer being sampled for metals analysis. In addition, wells located on the north portion of the site, where groundwater flows north from the metals soils disposal area, are not sampled for metals analysis. Although irrigation activities have ceased, the potential for metals to leach to groundwater exists; therefore, at least one monitoring well in the metals soils disposal area and one monitoring well located to the north should be included in the groundwater monitoring program for metals analysis. This issue will not carry forward in its current context since irrigation activities have ceased, however, the recommended changes to the monitoring program to provide for a more robust metals sampling and analysis is being raised as an issue in this five-year review.

Issue 5: Continue to collect and evaluate air monitoring data obtained during the phytoremediation irrigation activities.

Irrigation activities have not occurred regularly since 2009, should irrigation activities resume in the future, periodic air monitoring may be necessary to ensure compliance with air quality standards. If irrigation activities due not resume, this issue is considered resolved.

Issue 6: Place an environmental covenant on the Vogel site property.

The EPA and IDNR are in the process of drafting an environmental covenant but are awaiting final details with discussions occurring between nearby property owners and Vogel. Further institutional controls, like environmental covenants, are of value in order to prevent future exposure pathways from developing; however, this is not considered an issue for the purposes of

the five-year review. An environmental covenant will add a further layer of protection at the site and should be considered.

Issue 7: Determine the effectiveness of phytoremediation and natural attenuation as components of a modified groundwater remedy.

Although, natural attenuation was evaluated in the 2012 Annual Report, the effectiveness of phytoremediation has not been evaluated prior to this five-year review. The data review and trend analysis conducted for this five-year review indicates increasing trends in downgradient wells and no trends or stable trends in the majority of the remaining wells within the BTEX plume. In addition, the RAO to prevent migration beyond the property boundary is not being met. Therefore, phytoremediation and natural attenuation have not been effective at meeting the RAO and there is no statistical evidence they will be effective. Furthermore, the potential effectiveness of natural attenuation via biological processes is limited by the anaerobic conditions observed in the source area and on-site plume. While anaerobic degradation of BTEX is possible, aerobic processes are generally much faster. Until such time that concentration trends begin to decrease or it can be shown the plume will not expand or migrate an unacceptable distance away from the site, natural attenuation should not be considered as a primary component of a groundwater remedy.

Groundwater concentrations are increasing in off-site wells and as a result, EPA is recommending the groundwater treatment system be restarted or reconstructed to contain the groundwater plume. If the PRP intends to use phytoremediation as a component of the groundwater cleanup, data should be collected to evaluate if the technology is an effective means of addressing the groundwater contamination at the site.

Issue 8: Document any changes to groundwater remedy with post-ROD decision document.

This is not considered an issue for the purposes of the five-year review. In the event that the pump and treat system is replaced with phytoremediation, a decision document modification is recommended.

6.0 Five-Year Review Process

6.1 Administrative Components

The five-year review process was conducted by Bradley Vann, the EPA Region VII Remedial Project Manager (RPM) for the site, supported by the U.S. Army Corps of Engineers (USACE), Kansas City District (NWK).

6.2 Community Involvement

A notice of the five-year review was posted on February 6, 2014 for one week in the Sioux County Capital-Democrat. This fourth five-year review, as well as the rest of the administrative record, will be available to the public at the Orange City Public Library.

6.3 Document Review

The following documents were reviewed as part of the current five-year review:

- Remedial Investigation Report, April 1989.
- Feasibility Study, August 1989.
- Record of Decision, September, 1989.
- Explanation of Significant Differences, July 20, 1994.
- Explanation of Significant Differences, October, 2000.
- Remedial Action Report, September, 2000.
- Consent Order, No. 2003-HC-02, May, 2003.
- Groundwater Assessment Report, 2004.
- Groundwater Monitoring Plan, 2005.
- Third Five-Year Review, September 23, 2009.
- Groundwater Monitoring Report, 2009.
- Groundwater Monitoring Report, 2010.
- Groundwater Monitoring Report, 2011.
- Groundwater Monitoring Report, 2012.

6.4 Data Review

Analytical data from groundwater, surface water, and tree core samples were reviewed for this report in order to evaluate the progress of the remedy and the status of recommendations made as a result of the 2009 five-year review. Data collected during the current five-year review period, 2009 through 2013, were primarily used for this review although historical data was also considered. Focusing on the current five-year review period is appropriate for the Vogel site because there have been no active remediation activities or removals since the end of the 2009 irrigation season. This enables a thorough review of the fate of contaminants under natural conditions and phytoremediation, as recommended in the last review.

Annual groundwater monitoring reports submitted through 2012 by Vogel were the primary sources of data for this review. However, data collected during the 2013 monitoring period was

provided via e-mail transmittal prior to completion of the 2013 annual report. Attachment D contains the following data tables used for the evaluations below: historical groundwater monitoring data for BTEX compounds, historical groundwater monitoring data for metals, historical surface water metals results, historical MNA geochemical analytical results, and 2013 tree core locations and metals results. Trends and overall results with respect to the remediation goals for each data set are discussed.

Free Product Recovery:
Well MW-4R was the only location with continued free product removal during the review period (it should be noted that though the figures show this well as MW-4, MW-4 was removed during the 2000 excavation and replaced with MW-4R). The free product removal system in use was discontinued at the end of 2011 and removal has been conducted by monthly hand bailing since then. In 2008, approximately 11 gallons of free product were removed, while only 3-4 gallons per year were removed between 2010 and 2012. It is recommended to continue hand bailing or use a sorbent material as long as there is a measurable thickness of free product; however, due to recent limited recovery, it is recommended to consider changing the free product recovery effort from monthly to the semi-annual sampling events.

Tree Core Samples:
In 2013, eight core samples were collected from phytoremediation trees located within the 2000 excavation area. The samples were analyzed for arsenic, cadmium, and chromium. These metals were detected in each sample. As of this five-year review report, tree core data has not been evaluated and there is no plan describing how such an evaluation will be completed. There is no historical data, background tree core data, or screening values currently available to evaluate the results. Furthermore, due to their small size, tree core samples were unable to be collected from trees located within the metals soils disposal area where uptake of metals is more likely. Also, samples were not analyzed for lead or mercury, which are site COCs.

Surface Water:
In both 2009 and 2011, three surface water samples were collected from the intermittent stream running along the north of the site: one upstream, one on-site near well TC-7, and one downstream. The 2011 samples were collected twice, in January and February, and were reported in the 2010 annual report dated March 2011. The 2010 annual report states that BTEX compounds and metals were analyzed, although only metals samples were presented in comparison to their screening values. BTEX results are found in the appendices of the 2010 annual report: only ethyl-benzene was detected at a concentration of 1.01 micrograms per liter, in the on-site sample. Based on these results, BTEX compounds do not appear to be discharging into the creek.

One or more site metals COCs have been detected at all three sample locations. In 2011, cadmium, chromium, and lead exceeded the Iowa Ambient Water Quality Criteria (WQC) in the January sample collected on site, although there were no detections in the February sample. Mercury exceeded the Iowa WQC in the February 2011 samples from all three locations. Based on these results, metals from the Vogel site may be discharging into the creek. Although treated water from the remediation system is no longer being discharged into the creek, groundwater may be discharging into the creek. However, groundwater elevations and creek bottom

elevations were not available during the review to evaluate this possibility. Therefore, further investigation to determine if the creek is being impacted by site contaminants is required. This includes an evaluation of the groundwater/surface water interaction, and further surface water sampling. In addition, since metals may oxidize and precipitate once groundwater enters the creek, creek sediments should be sampled and evaluated.

Groundwater:

BTEX Compounds

Figures showing the extent of BTEX contamination in groundwater, generated from sample results collected in 2012, are presented in Attachment A, Figures 4 through 7, for reference; however, these figures do not represent the 2013 results, which contain detections of benzene and ethyl-benzene above their respective MCLs in well GMW-30, the furthest downgradient well. Focusing on groundwater results from the current five-year review period, statistical trend analysis was performed on monitoring wells included in the current monitoring schedule presented on Table 2. For wells containing four or more detections of any compound, two types of statistical trend analysis were performed for individual BTEX compounds and total BTEX: Mann-Kendall analysis and linear regression. The Mann-Kendall test is a non-parametric procedure useful for analyzing trends in data based on three statistical measures: the Mann-Kendall 'S' statistic, a calculated Confidence Factor, and the Coefficient of Variation. Linear regression analysis is a parametric procedure useful for analyzing trends over time. For this analysis the Microsoft® Excel functions LINEST and CORREL were used. For wells with fewer than four BTEX compound detections, or where trends were apparent, only visual trend analysis was performed.

The data, calculations, and figures related to the Mann-Kendall and linear regression analysis are contained in Attachment C. The results of the trend analyses are summarized on Table 3, page 19, and further technical information regarding the analyses is presented in the notes. Results for individual wells are broken down by their location relative to the metals soils disposal area or the 2000 excavation area (i.e. the source areas) and with respect to groundwater flow (e.g. side gradient, upgradient, or downgradient). Based on the results, trends are categorized as follows: decreasing (D), probably decreasing (PD), no trend (NT) or stable (ST), probably increasing (PI), or increasing (I).

North of Source Areas: Network wells located north of the source areas include GMW-3 and TC-7. Based on visual trend analysis, these wells exhibit NT and ST trends, respectively. There have been no exceedances of the MCLs in these wells, indicating the BTEX plume is not migrating in groundwater to the north of the site.

Side Gradient, On-Site: Two network wells, MW-1 and GMW-8, are located side gradient relative to the BTEX plume. Neither of these wells has had detections of BTEX compounds. These results indicate that groundwater is not flowing in the directions of these wells nor is the plume expanding transversely on-site.

Upgradient Off-Site Private Wells: Two off-site private wells, designated Bos and Neiss, located upgradient of the Vogel site have been sampled at least annually. There have been no detections of BTEX compounds in these wells. Since there have been no detections and these wells are

located hydraulically upgradient and unlikely to be affected by contaminated groundwater emanating from the Vogel site, consideration should be given to stop sampling these wells.

Source Areas: Source area wells include GMW-13, located within the metals soils disposal area, and GMW-9R, located within the 2000 excavation area. Based on visual inspection, well GMW-13 exhibits a ST to PI trend. BTEX compounds have been historically detected above their remediation goals in well GMW-13. Since 2009, toluene and ethyl-benzene concentrations have increased slightly, while xylenes have been relatively stable. GMW-9R trends range from NT to PI for both Mann-Kendall and linear regression results. The trends exhibited by the source area wells indicate the phytoremediation pilot study to date has not been effective at reducing BTEX concentrations in the source areas. Continued groundwater sampling will be required to evaluate the effectiveness of phytoremediation and bioventing in the source areas and the effect on downgradient concentrations.

South of the Source Areas, On-site: Seven network wells are used to monitor BTEX concentrations in the downgradient plume at the southern end of the Vogel property but north of the fence line. Based on visual inspection, three of these wells exhibit ST trends, while the trend in well GMW-18R is PD. For the three wells analyzed using Mann-Kendall and linear regression, ST or NT trends resulted. Overall, based on a visual inspection of the BTEX results, there is some indication that irrigation of the phytoremediation trees may have mobilized and flushed contamination downgradient in a "pulse"; increasing concentrations of some compounds appears to occur in wells further and further downgradient over time. However, this observation may also be a result of naturally fluctuating concentrations, compounded with an expanding plume, and there was no information on groundwater velocity estimates available during this review to further verify it.

South of the Source Areas, On-Site along the Fence Line: Six network wells monitor BTEX concentrations along the southern fence line, which is also the compliance point outlined in the 2000 ESD. Two of these wells, MW-5 and TW-23, are essentially side-gradient sentry wells, and they have not had detections of BTEX compounds. Based on visual inspection, well GMW-33 exhibits an I trend. Mann-Kendall and linear regression results indicate: I trends for well GMW-20, NT to PI trends for well GMW-7R, and PD to D trends for well GMW-19. Concentrations in well GMW-19 briefly increased in 2010, followed by decreasing concentrations through 2013. Again, this observation could be a result of mobilization caused by irrigation of the phytoremediation trees, or it could simply be the result of naturally fluctuating concentrations and plume expansion.

South of the Source Areas, Off-Site: Three network wells monitor BTEX concentrations downgradient south, off-site. Based on visual inspection, well GMW-30 exhibits I trends. For the other two wells, Mann-Kendall and linear regression analysis resulted in trends ranging from NT to I. Well GMW-30 is the furthest downgradient monitoring well, and benzene and ethyl-benzene have been detected at concentrations above their MCLs. In addition, benzene and ethy-benzene concentrations in well GMW-30 have been increasing since the spring of 2013. The increasing concentrations in these off-site wells could be a result of mobilization caused by irrigation of the phytoremediation trees or plume expansion.

Table 3: BTEX Concentration Trends in Groundwater Wells

Location	Number of Samples 2009-2013	All Samples Non-Detect?	Ethyl-Benzene		Xylenes		Total BTEX[3]		BTEX Visual Trend (see notes)
			Mann-Kendall [4]	Linear Regression[5]	Mann-Kendall	Linear Regression	Mann-Kendall	Linear Regression	
North of Source Areas									
GMW-3	5	no	-	-	-	-	-	-	[a]NT
TC-7	7	no	-	-	-	-	-	-	[b]ST
Source Area (metals soils disposal area)									
GMW-13	7	no	-	-	-	-	-	-	[c]ST or PI
Source Area (2000 excavation area)									
GMW-9R	18	no	NT	PI	PI	PI	NT	PI	-
South of Source Areas, On-Site									
GMW-15	21	no	NT	NT	NT	NT	NT	NT	-
GMW-16	5	no	ST	NT	ST	NT	ST	NT	-
GMW-17	16	no	-	-	-	-	-	-	[d]ST
GMW-18R	7	no	-	-	-	-	-	-	[e]PD
GMW-34	12	no	-	-	-	-	-	-	[f]ST
TC-6S	3	no	-	-	-	-	-	-	[g]ST
TC-6D	16	no	NT	ST	ST	NT	ST	NT	-
Side Gradient, On-Site									
MW-1	8	yes	-	-	-	-	-	-	-
GMW-8	5	yes	-	-	-	-	-	-	-
South of Source Areas, On-Site along Fence Line									
MW-5	6	yes	-	-	-	-	-	-	-
GMW-7R	20	no	NT	PI	NT	PI	NT	PI	-
GMW-19	19	no	PD	PD	D	PD	D	PD	-
GMW-20	20	no	I	I	I	I	I	I	-
GMW-33	20	no	-	-	-	-	-	-	[h]I
TC-23	5	yes	-	-	-	-	-	-	-
South of Source Areas, Off-Site									
GMW-21	22	no	I	PI	NT	PI	I	PI	-
GMW-25	21	no	I	PI	NT	NT	PI	PI	-
GMW-30	24	no	-	-	-	-	-	-	[i]I
Upgradient Off-Site Private Wells									
Bos	5	yes	-	-	-	-	-	-	-
Neiss	5	yes	-	-	-	-	-	-	-

Notes

1 A "-" indicates either no BTEX compounds were detected or statistical analysis was not performed.

2 Trends: I = increasing, PI = probably increasing, NT = no trend, ST = stable, PD = probably decreasing, D = Decreasing.

3 BTEX parameters consist of: benzene, toluene, ethylbenzene, and xylene.

4 The GSI Mann-Kendall Tool Kit (GSI, Environmental, 2012) evaluates trends based on three statistical measures: the Mann-Kendall 'S' statistic, a calculated Confidence Factor, and the Coefficient of Variation. For technical information see the GSI Mann-Kendall Toolkit Version 1.0 Software User's Manual found at www.gsi-net.com.

5 Linear regression analysis was performed using Microsoft® Excel to plot, ethyl-benzene, xylenes, and total BTEX concentrations vs. time and evaluating the functions LINEST and CORREL. Roughly, positive and negative slopes represent increasing or decreasing trends, respectively. Trends are then modified based on the Correlation Coefficient, the uncertainty in the slope, and through visual inspection. The Correlation Coefficient varies between -1, representing a perfect negative correlation to concentrations vs. time, to +1, representing a perfect positive correlation to concentrations vs. time. Correlation Coefficient values close to zero (approximately

-0.30 to +0.30 for this report) represent little to no correlation between concentrations vs. time. Such values result in NT or ST trends, depending on the uncertainty in the slope (i.e. whether the uncertainly has a greater magnitude than the slope) and visual inspection.

[a] In 2012, benzene and xylenes were detected below the remediation goals in well GMW-3 for the first time; however, values for both analytes dropped significantly again in 2013.

[b] BTEX compounds were detected well TC-7 below their remediation goals in 2011/2012. There were no detections of BTEX compounds in the most recent two samples.

[c] BTEX compounds have been historically detected above their remediation goals in well GMW-13. Since 2009, toluene and ethyl-benzene concentrations have increased slightly, while xylenes have been relatively stable.

[d] Ethyl-benzene and xylenes have been periodically detected at levels below the remediation goals in well GMW-17; however, there have been no concentrations of these compounds since 2011.

[e] Ethyl-benzene and xylenes have been regularly detected at levels below the remediation goals in well GMW-18R. Concentrations of these compounds have been variable but appear to have a downward trend. Toluene was detected at levels below the remediation goal in 2011 but has not been detected in the most recent three samples.

[f] In 2010/2011, ethyl-benzene and xylenes were detected above their remediation goals in well GMW-34. Since 2011, detected BTEX concentrations have been below their remediation goals.

[g] Between 2009-2011, there was only one detection of xylenes in well TC-6S, which was well below the remediation goal. There have been no other BTEX compounds detected in this well.

[h] BTEX compound concentrations in well GMW-33 were low to non-detect prior to 2013. Benzene, ethyl-benzene, and xylenes all show increasing trends over six samples collected in 2013, with ethyl-benzene and xylenes exceeding the remediation goals over the last two rounds. Toluene has been detected below the remediation goal and there is no clear trend.

[i] BTEX compound concentrations in well GMW-30 were low to non-detect prior to 2013. Benzene, ethyl-benzene, and xylenes all show increasing trends over six samples collected in 2013, with benzene and xylenes exceeding the remediation goals. Toluene has been detected below the remediation goal and appears to be stable in the last six samples.

Metals

Dissolved metals in groundwater have been analyzed from four monitoring wells on an annual basis since the last five-year review. The area of metals contaminated groundwater is not as extensive or as concentrated as VOC contaminated groundwater. The wells sampled for metals analysis are all located to the south and hydraulically downgradient of the metals soils disposal area. Well GMW-9R contains arsenic at levels two to three times the MCL which have been increasing slightly since 2009 when arsenic was not detected. Further downgradient, wells TC-6D and GMW-15 also show levels of arsenic increased after the 2009 sampling, but levels have been relatively stable since then. The furthest downgradient well, GMW-7R, has had arsenic detections just below the MCL, and this well also showed an increase after 2009 prior to leveling off. There have been no other significant detections of metals in these wells. There is some indication based on these results that phytoremediation irrigation may have mobilized arsenic to a limited extent; therefore, metals in groundwater should continue to be evaluated.

It was also noted during this five-year review that wells located within the metals soils disposal area, which were sampled prior to 2009 and contained metals above the MCLs, are no longer being sampled for metals analysis. In addition, wells located on the north portion of the site, where groundwater flows north from the metals soils disposal area, are not sampled for metals analysis. In order to determine if the phytoremediation irrigation activities mobilized metals from the metals soils disposal area, and to what extent, at least one monitoring well in both these areas should be included in the groundwater monitoring program for metals analysis. See Attachment A, Figure 8 for the layout of phytoremediation trees in relation to the metals area and well locations.

Natural Attenuation

From 2009 through 2011, geochemical data and water quality data were collected at eight monitoring well locations in order to evaluate the effectiveness of natural attenuation,

specifically biological degradation of BTEX compounds, at the site. Natural attenuation evaluations rely primarily on lines of evidence, i.e. decreasing contaminant concentrations, and secondary lines of evidence, i.e. favorable chemistry conditions for biological degradation. The potential timeframe for natural attenuation to eventually halt the plume from expanding and begin to shrink cannot be determined at this time due to the observed BTEX concentration trends; namely, concentrations are increasing in downgradient wells and there are either no trends or stable trends for the majority of the remaining wells within the plume.

Degradation of BTEX compounds via biological processes may occur under aerobic or anaerobic conditions, although aerobic processes are generally faster and preferable, particularly for enhance biodegradation remedies. Though there is some variability, the analytical results show that conditions within the on-site plume are generally anaerobic, while conditions elsewhere are generally aerobic. There is also evidence that groundwater recharge in the spring timeframe, due to snow melt and rain, results in an influx of oxygenated water to the system, as evidenced by the May and June 2010, and June 2011 results. The evidence for these conclusions is outlined in the following evaluation of geochemical conditions, which is based on the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents In Ground Water, EPA, 1998*:

- With the exception of the spring 2010 and 2011 results, oxidation-reduction potential values have been generally strongly negative within the source area, indicating anaerobic conditions, somewhat negative up gradient and side gradient, and positive downgradient, indicating aerobic conditions.
- For oxygen, levels less than 0.5 milligrams per liter (mg/L) represent anaerobic conditions, levels between 0.5 to 5 mg/L represent oxygen-deficient environments, and levels greater than 5 mg/L are aerobic. With the exception of the spring 2010 and 2011 results, oxygen values have generally been between 0.5 and 5 mg/L within the source area, indicating oxygen-deficient conditions, greater than 5 mg/L outside of the source area, indicating aerobic conditions. It was also noted during the review that a number of oxygen values were reported above 10 mg/L which, assuming a groundwater temperature of 15 degrees Celsius, is not possible, indicating the meter was not operating properly.
- Sulfate levels less than 20 mg/L are generally indicative of anaerobic conditions. While results have been highly variable, though generally greater than 20 mg/L, sulfate levels appear to be generally higher outside the source area than within, indicating a change in geochemical conditions.
- Nitrate levels less than 1 mg/L are generally indicative of anaerobic conditions. While results have been generally low, often less than 1 mg/L, nitrate does not appear to differentiate in geochemical conditions inside and outside the source area.
- Ferrous iron levels greater than 1 mg/L are generally indicative of anaerobic conditions. With the few exceptions, ferrous iron values have generally been between greater than 1 mg/L within the source area and less than 1 mg/L outside of the source area, which is strong supporting evidence for the conclusions given.
- Methane gas is typically generated under anaerobic conditions. Although methane was only measured during the June 2009 and July 2012 events, results show some methane present within the source area, with little to no methane outside the source area.

The geochemical results compare well with other BTEX contaminated sites with shallow groundwater occurrence, such that high contaminant concentrations in the source area and plume likely result in the utilization and depletion of the available oxygen and nutrients by microbes. In addition, the phytoremediation trees may impact the microorganisms and the geochemistry of the groundwater near the roots, causing an increase in anaerobic bacteria populations. Even though natural attenuation parameters indicate conditions may favor natural attenuation (secondary evidence), concentration trends (primary evidence) show that natural attenuation has not been effective in containing the plume on-site.

Recommended Changes to Monitoring Program:
In addition to those provided in the above data discussion, the following changes to the current monitoring program are recommended. The current groundwater sampling method of bailing is not the current industry standard because of its potential to introduce significant variability in datasets. It is recommended that consideration be made to using low-flow purging methods or passive diffusion bags for future sampling. Also, currently only one monitoring well is sampled in each identified source area, while downgradient on-site there are a number of wells sampled which are located in close proximity. In order to improve the statistical trend analysis, on an area-by-area and whole plume basis, it is recommended that at least one more monitoring well be sampled in each source area. The cost of sampling these additional wells may be offset by eliminating sampling from select downgradient and upgradient on-site monitoring wells.

6.5 Site Inspection

A site inspection was held on December 11, 2013. The site inspection report is located in Attachment E with the site inspection photo log located in Attachment F. The site visit included a tour of the site by Vogel's representatives. The groundwater treatment plant, phytoremediation trees, and several of the monitoring wells were inspected; photos of the condition of monitoring wells, trees, and the air stripper are shown in Attachment F. Participants discussed the site conditions and current activities at the site, particularly treatment options to encourage natural attenuation and the ongoing communication with nearby property owners. Participants in the site visit for this fourth five-year review were:

Bradley Vann, Remedial Project Manager, Superfund Division, U.S. EPA Region VII
Bob Drustrup, Project Manager, Contaminated Sites Section, IDNR
Cal Lundberg, Supervisor, Contaminated Sites Section, IDNR
Scott Heemstra, Corporate Director of Manufacturing, Diamond Vogel Paints
Tom Chap, Senior Project Manager, GeoTek Engineering & Testing Services, Inc.
Keith DeLange, Senior Project Manager, GeoTek Engineering & Testing Services, Inc.
Kenneth Kamp, Civil Engineer, Environmental Engineering Branch, U.S. Army Corps of Engineers
Matthew Ward, Project Manager, Environmental Engineering Branch, U.S. Army Corps of Engineers

During the site inspection the wells on-site were observed to be in good condition and, as evidenced in the 2012 Groundwater Monitoring Report and 2013 groundwater sampling events, all wells are functional. Visual inspection of off-site wells and some on-site wells was not

performed during the site visit due to inclement weather. The cover soils appear to be in good condition with healthy vegetation, no ongoing issues with vermin or burrowing animals was identified during the interviews with site personnel. The phytoremediation trees appeared to be in good health with no visual signs of disease or damage to the trunks. However, because the site visit was conducted during the winter season, no foliage could be observed to fully evaluate the health of the trees. It was noted during the site walk that a row of the phytoremediation trees has begun to approach an overhead power line supplying power to the groundwater treatment plant building.

6.6 Interviews

Interviews were conducted during the site inspection and shortly after; a formal interview form was not filled out due to the minimal comments. The IDNR personnel made comments regarding recommendations of the site which included an interest in having the groundwater treatment plant removed if it is unable to be operated or no longer required. Also, removal of sampling requirements for the off-site Bos and Neiss wells due to the historical non-detects at the wells and locations relative to the known site hydrogeology (i.e. the wells are located upgradient) was recommended. Should the groundwater treatment plant be removed, the overhead power lines noted during the site inspection may be removed and therefore no longer a safety concern at the site. No other comments have been received as part of this five-year review.

7.0 Technical Assessment

7.1 Question A

Is the remedy functioning as intended by the decision documents?

The remedy for contaminated groundwater is not functioning as intended by the decision documents. The remedy for contaminated soil selected in the 1989 ROD is complete and is functioning as intended. The bioventing of the soils selected in the 2000 ESD is ongoing.

Remedial Action Performance

The RAO of the soil remediation was to reduce migration of contaminants into groundwater by removal and/or treatment of the source. The soil remedial action selected in the 1989 ROD was completed in 1999 and removed approximately 71,000 gallons of solvent-related contamination by landfarming/bioremediation. An additional 5,500 gallons of paint sludge and liquid solvents were removed directly. Between October 2000 and January of 2001, another area approximately 500 ft. by 200 ft. by 35 ft. deep was excavated to remove free product that was acting as a source to groundwater BTEX contamination. The bioventing of this area is ongoing. It is recommended that samples be collected to evaluate contaminant reduction.

The free product recovery system (i.e., Xitech® pump) that was installed in MW-4R (previously MW-4) was discontinued after 2011 and replaced with monthly hand bailing in response to a decrease in free product thickness. The ongoing free product recovery component of the groundwater remedy is functioning as intended.

The original groundwater remediation system (i.e., air stripper) was in operation off and on through December of 2004, when it was suspended after the seasonal shutdown. The decision to officially end use of the air stripper was made in the spring of 2005 due to stable groundwater contamination concentrations at that time. Operating costs and maintenance issues with the air stripper (e.g., mineral fouling of the air stripper media) also factored into the decision to suspend use of the air stripper. In 2007 a phytoremediation pilot study was initiated. Through 2009 and for two days in 2010, the pilot study included a modified groundwater remediation system with irrigation of the phytoremediation trees and treatment by aeration through the irrigation sprinkler heads instead of the air stripper tower. Since 2010, groundwater remediation has only been conducted through phytoremediation and natural attenuation.

Data trends were evaluated for this five-year review, and trends show that phytoremediation and natural attenuation have not been effective at reducing groundwater contaminant concentrations or in meeting the RAO to prevent off-site migration. Groundwater contamination continues to migrate downgradient and is present above health-based standards for ethyl-benzene (monitoring wells GMW-20 and GMW-7R) and xylenes (monitoring well GMW-7R) at the southern site boundary. In the furthest downgradient off-site well, GMW-30, benzene and ethyl-benzene are present above the health-based standards. Therefore, the groundwater remedy is not currently

functioning as intended in the decision documents. It is recommended that the pump and treat system be restarted or reconstructed to contain and remediate the plume.

Continued groundwater sampling for BTEX compounds and metals is necessary as long as the MCLs are exceeded. The current sampling frequency is appropriate. However, several changes to the monitoring program are recommended. In order to determine if metals are leaching to groundwater from stabilized soils, at least one monitoring well located within the metals soils disposal area and one monitoring well located near the creek to the north should be sampled for metals. In order to improve the statistical analysis of the plume, at least one additional monitoring well in the metals soils disposal area and one monitoring well in the 2000 excavation area should be included in the monitoring program. The cost of sampling these additional wells may be offset by removing one or more downgradient on-site monitoring wells located in close proximity to one another from the monitoring program.

Lastly, the first sampling of the phytoremediation trees was performed in late 2013 by taking tree core samples. There is not enough data (e.g. multiple samples, background information, or screening levels) available to evaluate the uptake of metals by phytoremediation trees and there is no plan in place; therefore, a plan should be developed to conduct an evaluation of metals uptake by phytoremediation trees.

System Operations and Maintenance

There are no operations and maintenance requirements for stabilized soil left on-site. Groundwater remediation via pumping and treatment through an air stripper was discontinued after 2004; therefore, the response action chosen by the decision documents is not operational. Since that time, groundwater remediation has been conducted through phytoremediation and natural attenuation. The response actions as currently implemented are not effective because the RAO to prevent off-site migration of contaminated groundwater is not being met, which warrants consideration for restarting or reconstructing the groundwater treatment system if these conditions persist. Furthermore, the practice of collecting samples via hand bailing should be discontinued in lieu of low-flow purging or passive diffusion bag sampling because hand bailing may introduce considerable data variability and is not the industry standard practice. Reducing data variability by changing sampling procedures will improve evaluations regarding the effectiveness of response actions for groundwater.

Opportunities for Optimization

There are limited opportunities to optimize the monitoring network, however, the following are recommended. Over a long monitoring period, site-related contamination has not been detected in the off-site private residential wells (Bos and Neiss wells). In addition, these wells are located upgradient and unlikely to be affected by site contamination. Therefore, it is recommended that the off-site private residential wells be removed from the monitoring program. Also, due to decreased free product thickness observed at well MW-4R, recovery may be optimized by semi-annual hand bailing concurrent with groundwater monitoring, or use of a sorbent material, in lieu of monthly hand bailing.

Early Indicators of Potential Issues

The RAO to prevent off-site migration of contaminated groundwater is not being met. The response action outlined in the decision documents, groundwater remediation via pumping and treatment through an air stripper, has not occurred since 2004. The current approaches to groundwater remediation using phytoremediation and natural attenuation have not been effective at meeting the RAO.

Implementation of Institutional Controls and other Measures

The state registry of Hazardous Waste or Hazardous Substance Disposal Sites was the form of institutional control prescribed in the ROD. Listing on the state registry requires that sale or significant change in use of the property must be approved by the IDNR. On-site use of groundwater is prevented by listing on the state registry of Hazardous Waste or Hazardous Substance Disposal Sites. The Vogel site has been on the state registry since 1984. The 2000 ESD indicated that IDNR would accept an environmental protection easement pursuant to Iowa Code 455H.206 as an institutional control that could be used in addition to, or in lieu of, the state registry listing. Environmental protection easements have since been replaced by uniform environmental covenants pursuant to Iowa Code 455I as the preferred instrument for placing activity and use limitations on properties. However, the state registry listing has proven to be an effective control and, therefore, an environmental covenant (or an environmental protection easement) with more specific restrictions on land use has not yet been placed on the property. Therefore, the institutional control portion of the remedy is functioning as intended; however, an environmental covenant would provide an additional layer of institutional controls and a mechanism to specify activity and use limitations.

7.2 Question B

Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy still valid?

As described below there have been some changes to exposure assumptions and toxicity data; however, this will not impact the cleanup levels agreed to in the ROD.

Changes in Cleanup Standards and TBCs

Have there been changes to risk-based cleanup levels or standards identified as Applicable or Relevant and Appropriate Requirements (ARARs) in the Record of Decision (ROD) that call into question the protectiveness of the remedy?

Iowa statewide standards are considered ARARs for determining compliance with groundwater cleanup. For the Vogel site, these statewide standards per Chapter 567 Iowa Administrative Code (IAC) 137 are based on the following hierarchy: (1) MCLs established under the Safe Drinking Water Act; (2) EPA lifetime Health Advisory Levels (HALs); and, (3) risk-based values calculated in accordance with the methodology described in subrule 567 IAC 137.5(4)(a) for

statewide standards for groundwater in a protected groundwater source. Additionally, Iowa WQC are considered ARARs for determining compliance with discharge to surface water.

In the case of Vogel, there are MCLs for each of the monitored chemicals as specified in the ROD and Consent Order. These cleanup standards are listed in Attachment B. Changes in the IAC risk calculation methodology will not impact the ARARs. The groundwater cleanup standards listed in Attachment B are considered to be protective and have not changed since the previous five-year review.

Are there newly promulgated standards that call into question the protectiveness of the remedy?

No. None of the MCLs for the contaminants in the ROD and decision documents have changed.

Have to-be-considered (TBCs) values used in selecting cleanup levels at the site changed in a way that could affect the protectiveness of the remedy?

The Iowa WQC have changed since the ROD was completed. The ROD included Iowa Chronic Water Quality Criteria as groundwater treatment plant discharge limits. Since there is no groundwater treatment plant discharge, it cannot be stated that there has been a change to ARARs. However, in the long term monitoring reports, 2009 and 2011, surface water samples from the stream were compared to the Iowa Water Quality criteria as a screening tool, and it was stated that some samples exceed the WQC (See section 6.4 for further discussion). Therefore, a comparison of the inorganic values listed in the ROD and the Current Iowa WQC (6/2014) are included here.

Table 4: Comparison of Iowa WQC in ROD and Current Value

Comparison of Iowa WQC in ROD and Current Value (µg/L)		
	Previous	Current
Arsenic	200	150
Cadmium	15	0.45
Chromium	40	11
Lead	30	7.7
• Mercury	NA	0.9
• Mercury was not listed in the ROD ARARs, but is discussed in the long term monitoring reports.		

Changes in Exposure Pathways

Has land use or expected land use on or near the site changed (e.g., industrial to residential, commercial to residential)?

No. The site is located in a rural area. Adjacent land uses are primarily for non-irrigated farmland. Placement of new drinking water wells on adjacent properties is unlikely as the area is supplied by rural water. Land use has not changed at or near the site. It is anticipated that the area will remain rural. However, approximately 2,500 trees were planted on 3.5 acres of an open

area of the site as part of the irrigation/phytoremediation pilot study. This is further addressed in subsequent paragraphs.

Have any human health or ecological routes of exposure or receptors changed or been newly identified (e.g., dermal contact where none previously existed, new populations or species identified on site or near the site) that could affect the protectiveness of the remedy?

Vapor intrusion is a potential future exposure pathway that has not been evaluated for this site. The vapor intrusion pathway was not considered in the 1980s for the original Remedial Investigation or in the Endangerment Assessment. Under current conditions, there is no potential exposure from subsurface vapor intrusion because no occupied buildings are located on the site, or above the off-site portion of the plume. However, institutional controls are necessary to ensure that the remedy remains protective of human health.

The irrigation/phytoremediation pilot study involves the establishment of trees on 3.5 acres of the site. This remediation strategy presents a new ecological exposure route. Trees planted over the area where the treated soil was placed, including the metals-contaminated soil, have the potential to accumulate COCs as a result of uptake of contaminated groundwater. Metals are the primary concern, since they may begin to accumulate in trees and plant tissue over time. There are potential ecological risks from phytoremediation to flora and / or fauna with small home ranges which were not addressed in the risk assessment at the site.

Are there newly identified contaminants, contaminant sources, or unanticipated toxic byproducts of the remedy not previously addressed by the decision documents?

The available data does not demonstrate new groundwater contaminants or contaminant sources.

Have physical site conditions or the understanding of these conditions changed in a way that could affect the protectiveness of the remedy?

Trees were planted in the area where soils contaminated with VOCs and metals were excavated, treated, and replaced. As discussed above, this change may present an unaddressed pathway of uptake and accumulation of contaminants in trees.

The 1989 Endangerment Assessment Report identified completed groundwater exposure pathways in the two nearby private wells, i.e., the Bos and Neiss wells. Subsequent monitoring over the last 20 years has demonstrated a lack of contamination of these private wells. The Endangerment Assessment also mentioned the Southern Sioux County Rural Water System and the town of Maurice as having shallow wells in the vicinity. Maurice is now connected to the Southern Sioux County Rural Water System. The groundwater contamination plume from the Vogel site is over 4,000 feet from the recently delineated 10-year capture zone for the Southern Sioux County Rural Water alluvial wells. In addition, the West Branch Floyd River is expected to be a hydraulic boundary preventing significant water from being drawn into the alluvial rural water wells from the west side of the West Branch Floyd River. Based on this new information and 20 additional years of information from site activities, contamination from the Vogel site does not appear to pose a threat to the Southern Sioux County Rural Water System.

The Vogel site is located in a rural area with low population density and no likelihood of substantial development. Water is currently available from the Southern Sioux County Rural Water System in the vicinity of the Vogel site. The impacted groundwater resource does not have the capacity to sustain large withdrawals. Therefore, it is unlikely that new private wells will be installed near the Vogel site.

Changes in Toxicity and Other Contaminant Characteristics

Have toxicity factors or other contaminant characteristics for contaminants of concern at the site changed in a way that could affect the protectiveness of the remedy?

Several non-carcinogenic and carcinogenic toxicity values have been revised since the ROD was signed in 1989. The changes in toxicity of contaminants that are still being monitored at the site are summarized in Attachment B. However, the changes in toxicity values do not significantly change potential short term risks because there are no current receptors and thus, do not impact the protectiveness of the remedy.

The toxicity assessment of chromium has changed; however, the MCL is still 0.1 parts per million as stated in the ROD. The new toxicity assessment has taken into account the different relative toxicity between chromium III and chromium VI. The groundwater monitoring is currently only analyzing for total chromium. It may be beneficial to analyze for chromium VI in future groundwater monitoring in case the MCL does change to reflect the two valence states.

Ethylbenzene was previously designated as a carcinogen but now has been assigned a slope factor by CalEPA.

The changes in toxicity factors would not call into question the protectiveness of the remedy because the target groundwater cleanup goal for the COCs are based on the MCLs, which are not risk-based criteria, but are instead ARARs. Since the ARARs have not changed, they would not be affected by any changes in toxicity values.

Changes in Risk Assessment Methods

Have standardized risk assessment methodologies changed in a way that could affect the protectiveness of the remedy?

The EPA has significantly revised human health risk assessment methodologies since the ROD was signed in 1989. For example, the endangerment assessment focused on potential health risks to current receptors and did not quantify potential risks to future receptors as is currently required by EPA. Also, the endangerment assessment considered only the potential health risks associated with ingestion of contaminated groundwater and did not include the potential health risks associated with inhalation of VOCs that may occur during household use of contaminated groundwater (e.g., bathing, showering, cooking). Finally, the endangerment assessment did not evaluate potential health effects of vapors from the volatile contaminants in soil and groundwater potentially seeping into basements of building that may be constructed on the site.

Current risk assessment guidance includes methods to evaluate all complete pathways that a current or future receptor may be exposed to site related contaminants. Several exposure assessment input parameters are different than values currently used. However, groundwater in the area is not being used for household purposes and there are no buildings with basements that have been built onsite or near the off-site portion of the plume. Therefore, these changes do not have a significant impact on the conclusions of the endangerment assessment and do not affect the protectiveness of the remedy.

Ecological risk assessment guidance has been updated such as the methodology in *Ecological Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments – Interim Final* (EPA, 1997). There is some evidence that metals from the Vogel site might be discharging into the creek, although the limited sampling is not adequate to make a determination. Also, metals may begin to accumulate in trees and plant tissue over time. Since there are potential ecological risks from phytoremediation to flora and / or fauna with small home ranges which were not addressed in the risk assessment at the site, the ecological impacts of these exposure pathways should further be evaluated at this site.

The ROD established air quality standards to equal a one-in-a-million excess lifetime cancer risk for benzene and one hundredth of the American Conference of Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) for remaining contaminants of concern. It is not current practice to use occupational standards, such as ACGIH TLVs, as air quality standards at Superfund sites. It is unlikely there are detectable levels of site related contaminants in ambient air at the site, but if a new treatment system becomes operational, different air action levels will need to be calculated.

Progress towards meeting Remedial Action Objectives

The cleanup of soils/solid waste from the original disposal area has been successfully completed. Bioventing of residual source material is ongoing.

Ongoing monitoring has indicated that the groundwater RAO is not being met. Since concentrations are stable or increasing, or there is no trend, it is also unknown when health-based standards may be met under the current remedial activities of phytoremediation and natural attenuation.

7.3 Question C

Has other information come to light that could call into question the protectiveness of the remedy?

No additional information has come to light that could call into question whether the remedy is protective in the short-term. There have been no impacts from natural disasters to the site. As addressed above, the irrigation/phytoremediation pilot study may introduce additional factors to be considered. Additionally, if the future use of the property includes residential receptors, the

risk assessment would have to be updated with current toxicity values, and current risk assessment methodology.

7.4 Summary of Technical Assessment

The remedy selected in the ROD consisted of both soil and groundwater cleanup activities. A technical assessment of the work performed at the site to date as part of this five-year review concludes the soils/solid waste remedial actions in the original source area have been successfully completed. The NAPL excavation and bioventing remedy is ongoing. It is recommended that soil samples be collected in this area to evaluate remaining contamination. The groundwater remedial action is currently not functioning as intended in the ROD and ESDs as off-site migration of groundwater contamination above health based standards has occurred. Also, the groundwater treatment system is inoperable under its current condition.

Evaluation of the phytoremediation pilot system is ongoing. Groundwater plume concentrations evaluated in this five-year review indicate that phytoremedition, coupled with natural attenuation, are not effectively containing and remediating the plume. More data is required to evaluate whether phytoremediation will be effective at reducing on-site contaminant concentrations and whether bioaccumulation of contaminants is occurring. Changes to the groundwater sampling and development of a plan for evaluating metals uptake by phytoremediation trees at the site will aid in addressing these concerns without significant added costs.

A current assessment of potential site risks from site contaminants, especially potential exposure to contaminants in groundwater, suggests the likelihood of future exposures is minimal. However, with the residual contamination remaining at the site and off-site migration of groundwater contamination, the necessity remains for institutional controls and continued groundwater monitoring to ensure long-term protectiveness. The addition of an environmental covenant will further reduce the potential of future exposure and eliminate the possibility of vapor intrusion at the site in the future by providing specific activity and land use limitations.

8.0 Issues

Table 5: Issues

Issue #	Issue	Affects Protectiveness (Y/N)	
		Current	Future
1	Groundwater has migrated off-site.	N	Y
2	Lack of plan to assess uptake of contaminants in trees planted as part of the phytoremediation pilot study, particularly in the metal soils disposal area.	N	Y
3	Current groundwater monitoring program is not providing data to completely and accurately evaluate the levels of contamination and transport of metals from the metal soils disposal area.	N	Y
4	Assess whether groundwater contamination is adversely impacting the intermittent stream that flows through the northern portion of the site.	N	Y
5	Property deed does not reference the status of the site on the Iowa State Registry for Hazardous Waste or Hazardous Substance Disposal Sites.	N	Y

9.0 Recommendations and Follow-Up Actions

Below is a list of recommended actions to address the issues identified in section 8.0 above.

Table 6: Recommendations and Follow-Up Actions

Issue #	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
1	Restart or reconstruct the existing groundwater treatment plant.	Vogel	IDNR/EPA	03/2015	N	Y
2	Develop a plan to assess the bioaccumulation / uptake of contaminants in phytoremediation trees, particularly those in the metal soils disposal area.	Vogel	IDNR	09/2018	N	Y
3	Update the Groundwater Monitoring Plan to include collection of groundwater metals samples within the metals soils disposal area, collection of groundwater metals samples near the creek, collection of additional groundwater samples in the excavated soils areas, and changing sampling procedures to a more current sampling method.	Vogel	IDNR/EPA	09/2018	N	Y
4	Evaluate if the creek is being impacted by site contaminants through an assessment of the groundwater/surface water interaction, surface water sampling, and sediment sampling.	Vogel	IDNR/EPA	09/2018	N	Y
5	Ensure the property deed contains reference to the site being on the Iowa State Registry for Hazardous Waste or Hazardous Substance Disposal Sites and in accordance with Iowa's UECA.	IDNR	IDNR/EPA	09/2018	N	Y

10.0 Protectiveness Statement

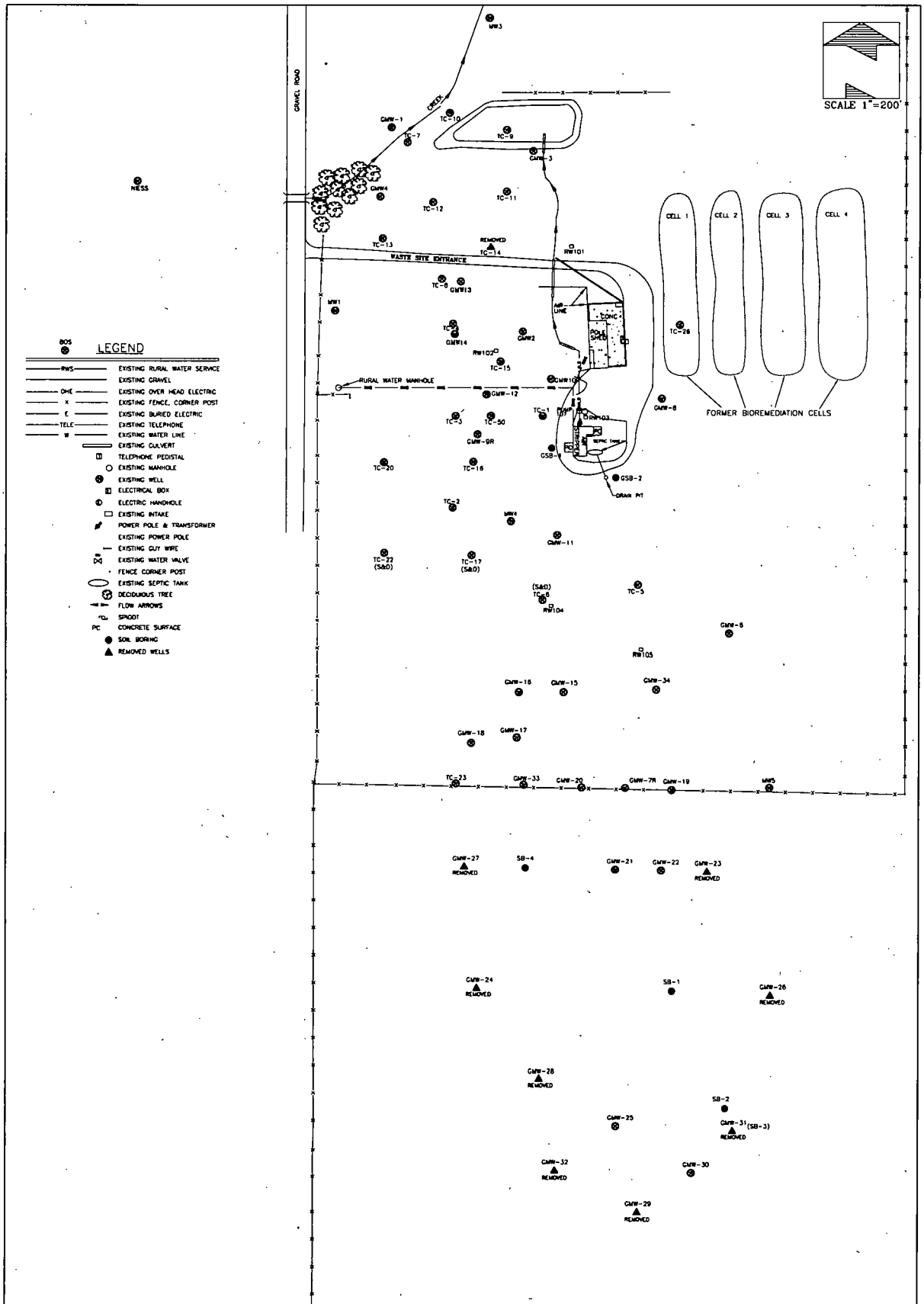
The OU-01 remedy is protective in the short term because there is no unacceptable exposure to human or ecological receptors from residually contaminated soils. However, in order to be protective in the long term, it is recommended that soil samples be collected in the bioventing area to evaluate progress of source remediation.

The OU-02 remedy is protective in the short term because there is no unacceptable exposure to human or ecological receptors. However, in order to be protective in the long term, it is recommended that additional creek samples be collected to assure sediment and surface water samples remain at acceptable levels, and the groundwater plume needs to be effectively remediated and contained.

11.0 Next Review

The next five-year review for the Vogel Paint and Wax Company Superfund Site is required by September 24, 2019, five years from the date of this review.

ATTACHMENT A



ORIGINAL DRAWING FURNISHED BY DGR & ASSOCIATES CO.

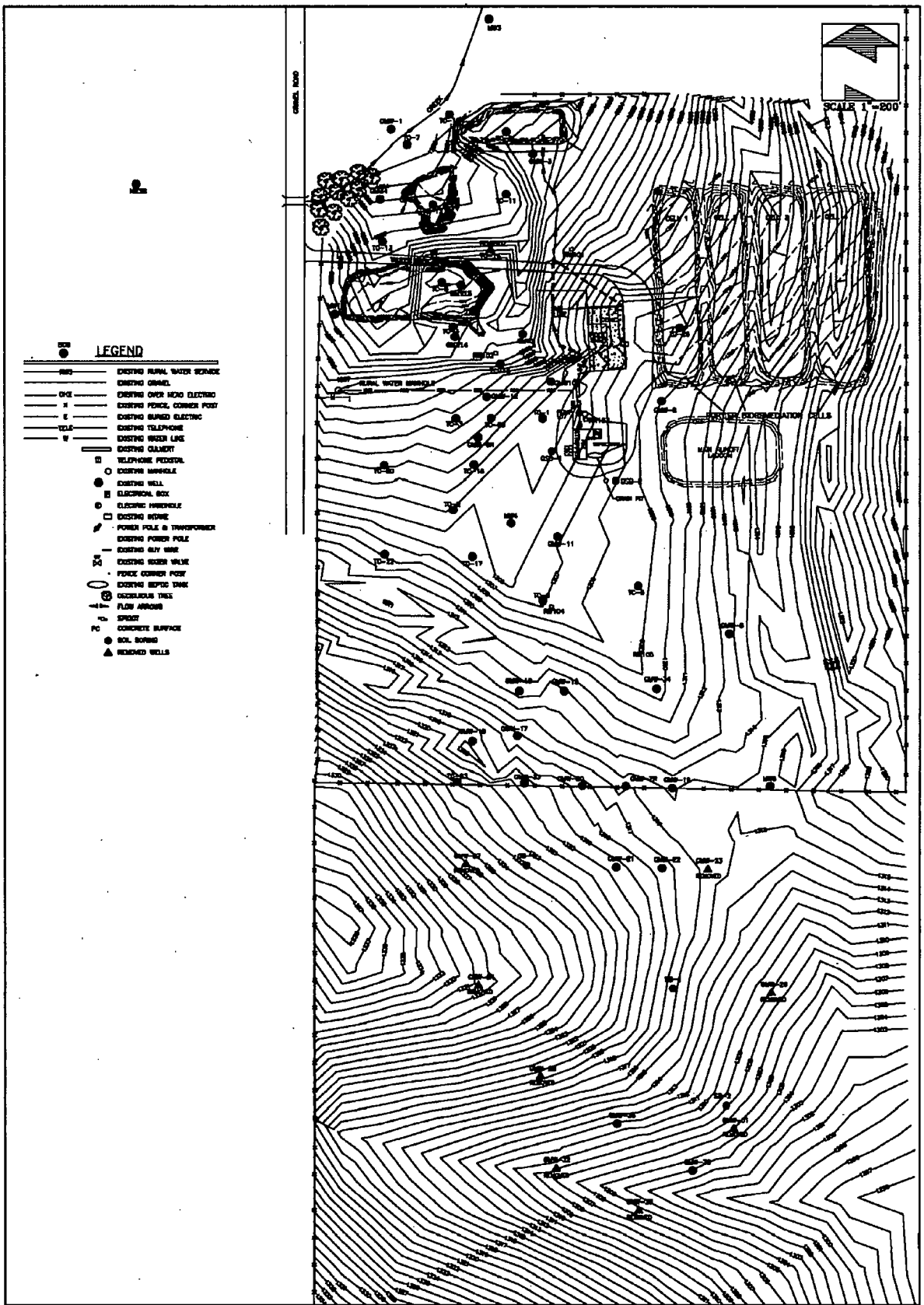
FIGURE 1
SITE MAP
VOGEL PAINT WASTE SITE
MAURICE, IOWA

ACAD\GEOTEK\KEITH\91-400

PROJECT #: 91-400 DATE: 7/20/2011

DRAWN BY: TAB CHECKED BY:

GEOTEK ENGINEERING & TESTING SERVICES, INC.



ORIGINAL DRAWING FURNISHED BY DGR & ASSOCIATES CO.

ACAD\GEOTEK\FIGS\91-400-8005

FIGURE 2
TOPOGRAPHIC SURVEY
VOGEL PAINT WASTE SITE
MAURICE, IOWA

PROJECT #: 91-400	DATE: 7/21/08
DRAWN BY: RDS	CHECKED BY:

GEOTEK ENGINEERING & TESTING SERVICES, INC.

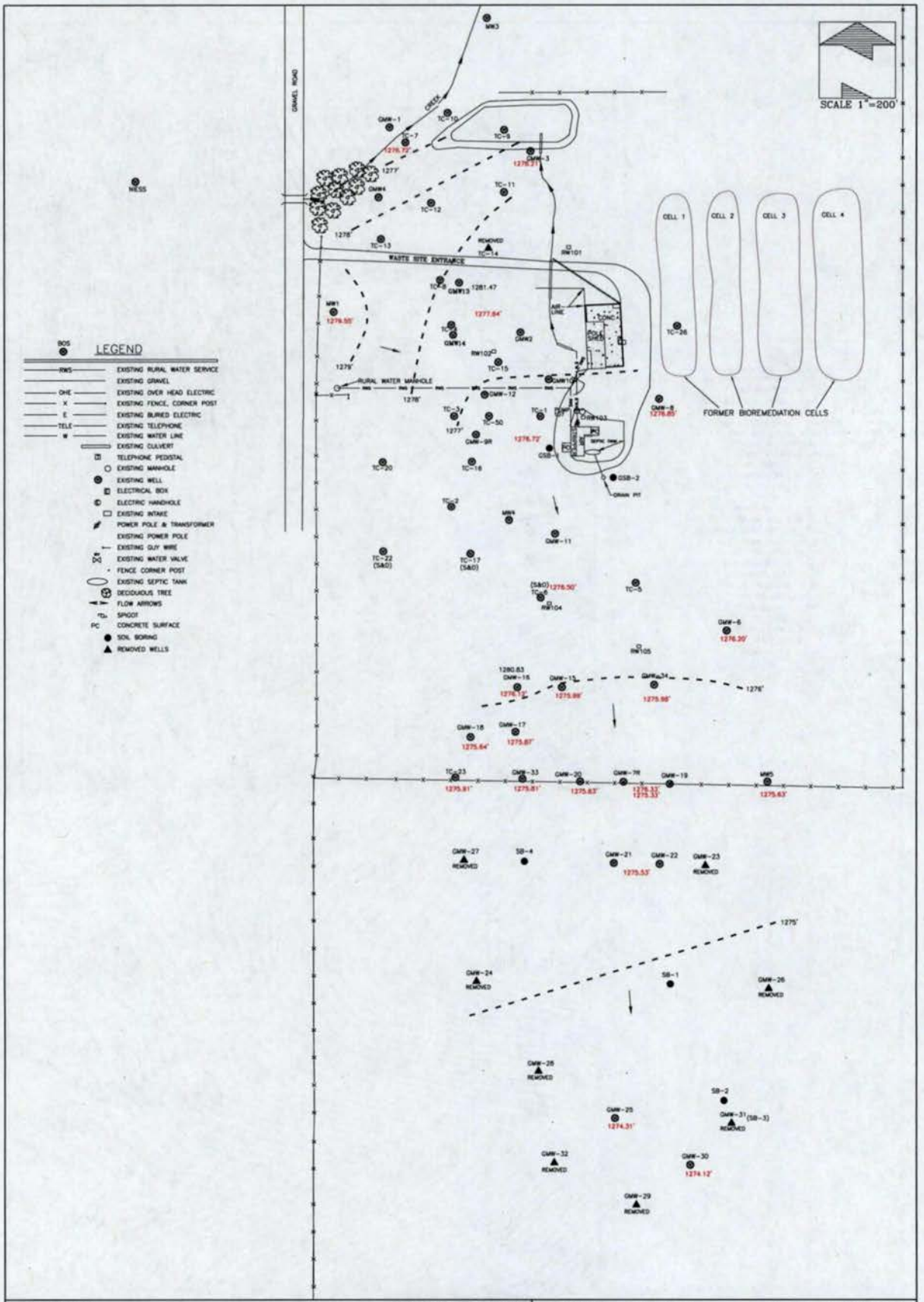


FIGURE 3 GROUNDWATER COUNTOUR MAP BASED ON 9-26-12 WATER LEVELS VOGEL PAINT WASTE SITE MAURICE, IOWA	ORIGINAL DRAWING FURNISHED BY DGR & ASSOCIATES CO. ACAD\GEOTEK\KEITH\91-400	PROJECT #: 91-400 DATE: 11/30/2012 DRAWN BY: PAC CHECKED BY: GEOTEK ENGINEERING & TESTING SERVICES, INC.

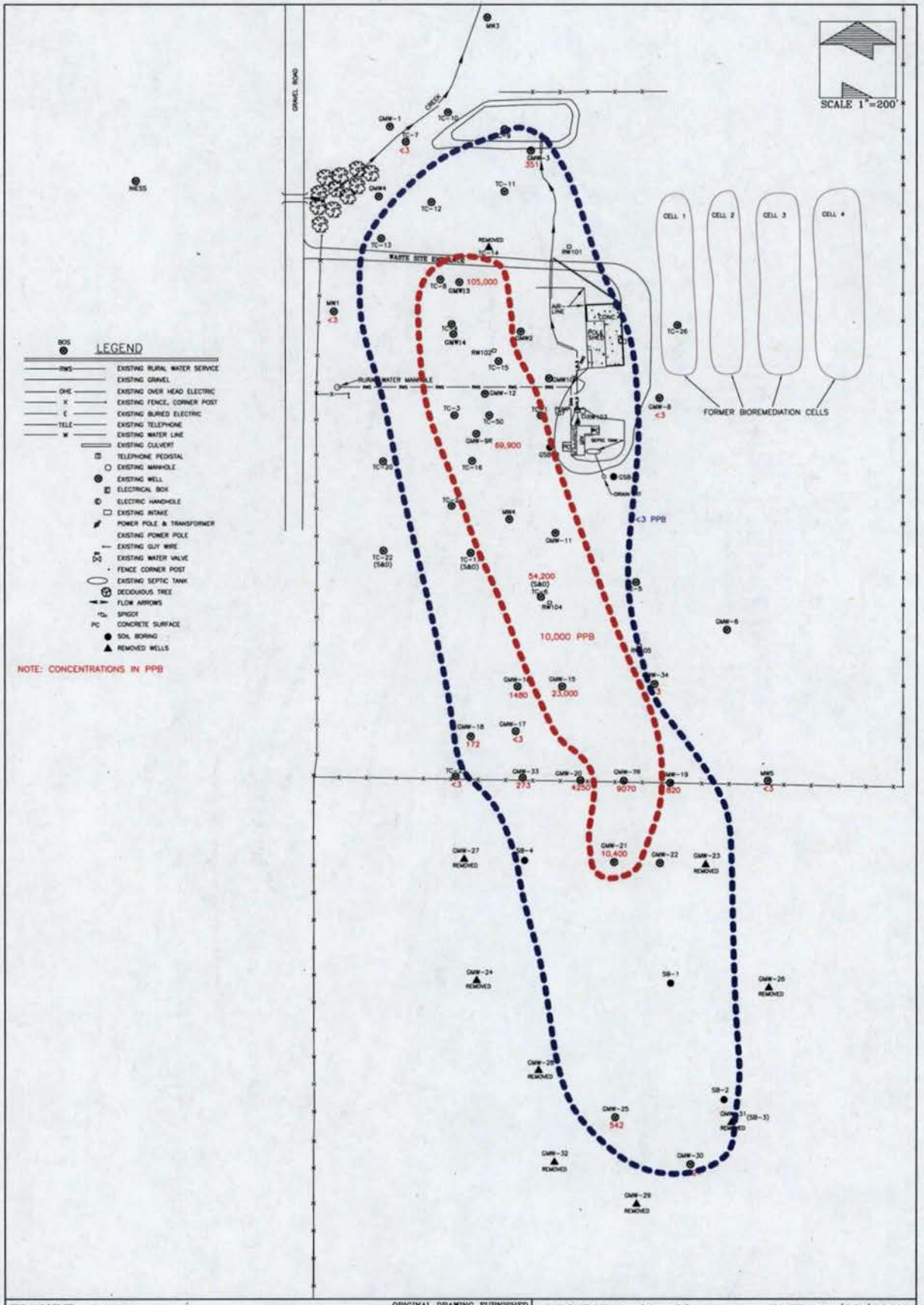


FIGURE 4
XYLENE PLUME MAP
9-26-12 DATA
VOGEL PAINT WASTE SITE
MAURICE, IOWA

ORIGINAL DRAWING FURNISHED BY DGR & ASSOCIATES CO.

ACAD\GEOTEK\KEITH\91-400

PROJECT #: 91-400 DATE: 11/30/2012

DRAWN BY: TAB CHECKED BY:

GEOTEK ENGINEERING & TESTING SERVICES, INC.

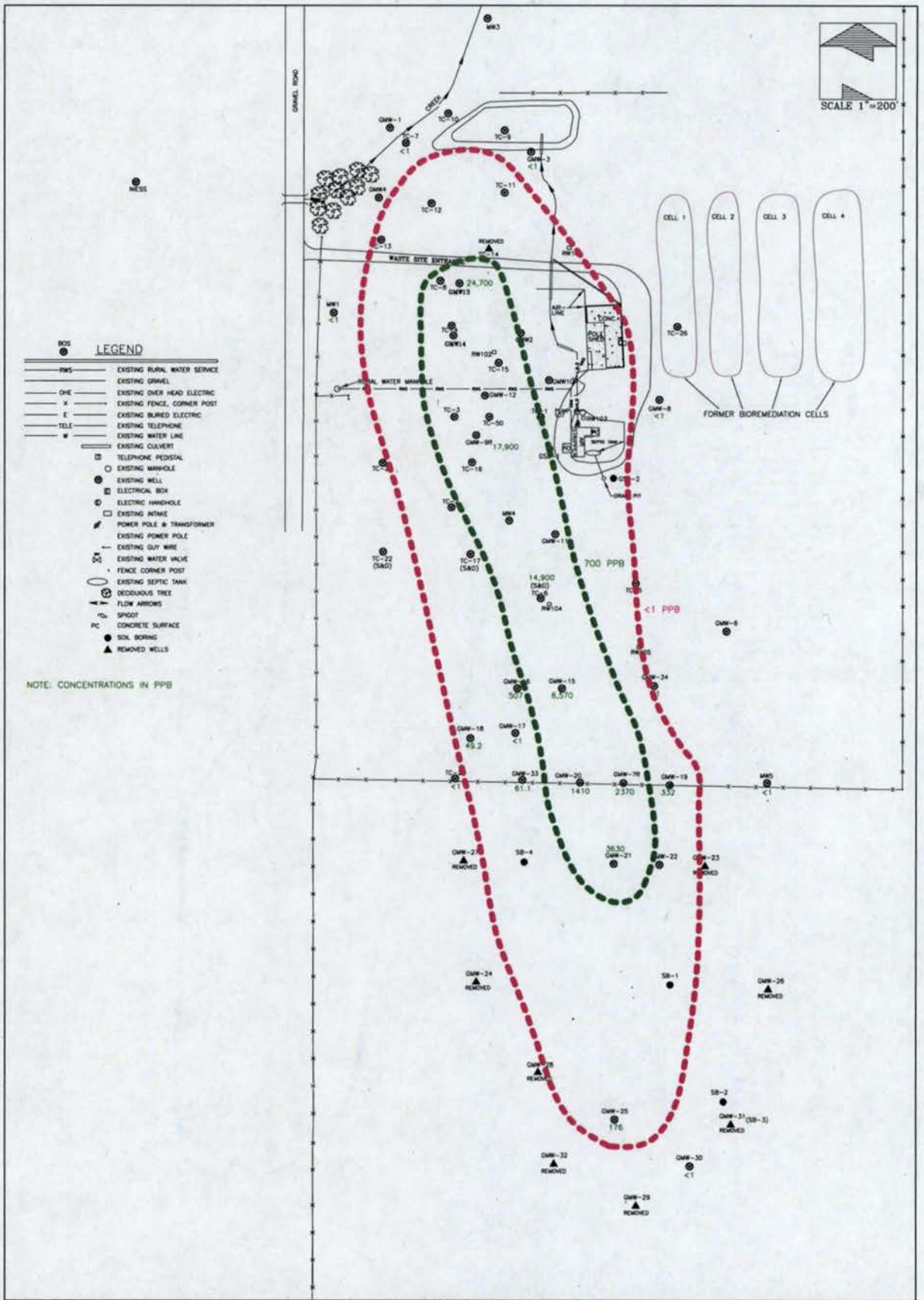


FIGURE 5
ETHYLBENZENE PLUME MAP
9-26-12 DATA
VOGEL PAINT WASTE SITE
MAURICE, IOWA

ORIGINAL DRAWING FURNISHED BY DGR & ASSOCIATES CO.

ACAD\GEOTEK\KEITH\91-400

PROJECT #: 91-400 DATE: 11/30/2012

DRAWN BY: TAB CHECKED BY:

GEOTEK ENGINEERING & TESTING SERVICES, INC.

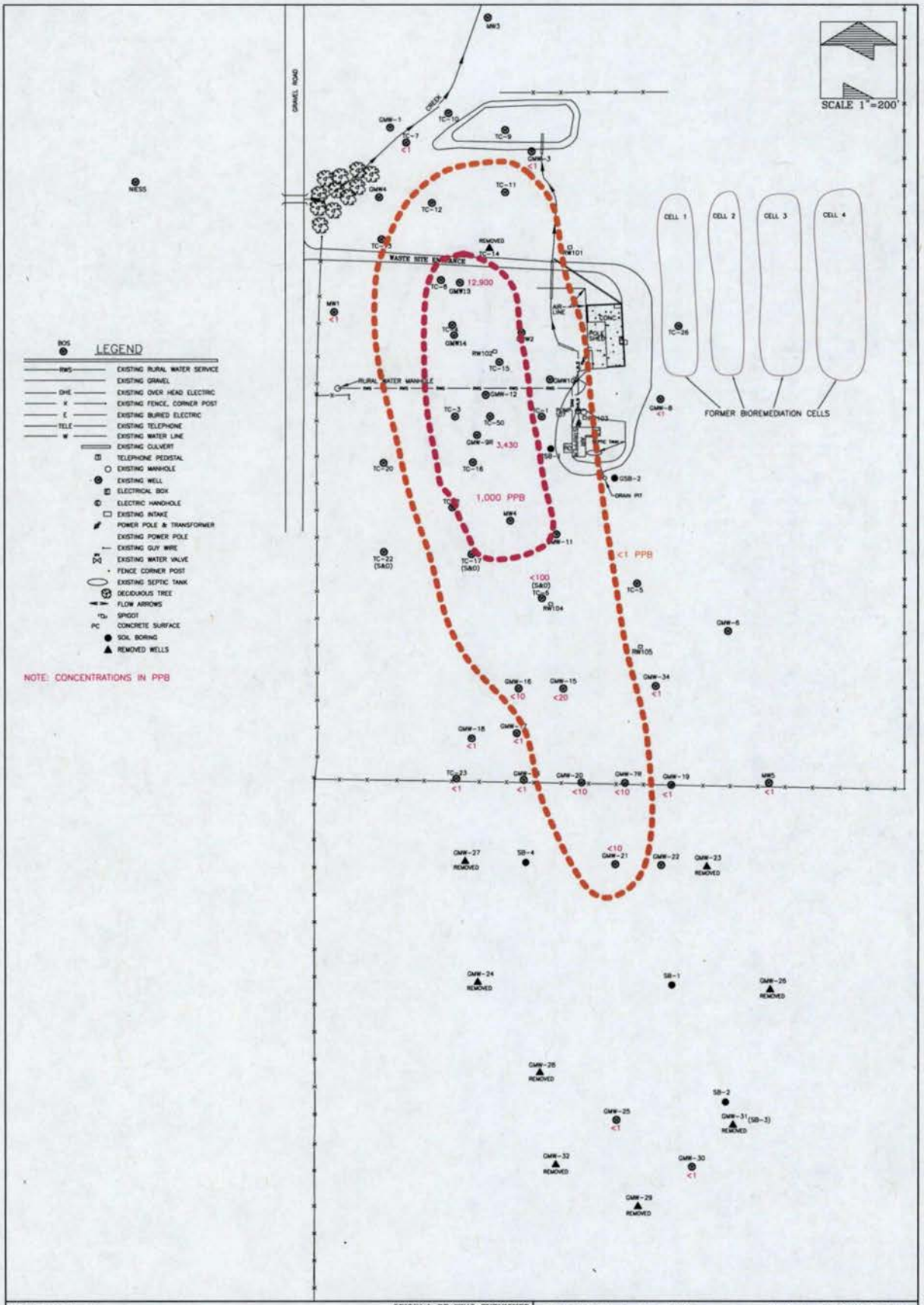


FIGURE 6 TOLUENE PLUME MAP 9-26-12 DATA VOGEL PAINT WASTE SITE MAURICE, IOWA	ORIGINAL DRAWING FURNISHED BY DGR & ASSOCIATES CO. ACAD\GEOTEK\KEITH\91-400	PROJECT #: 91-400 DATE: 11/30/2012 DRAWN BY: PAC CHECKED BY: GEOTEK ENGINEERING & TESTING SERVICES, INC.

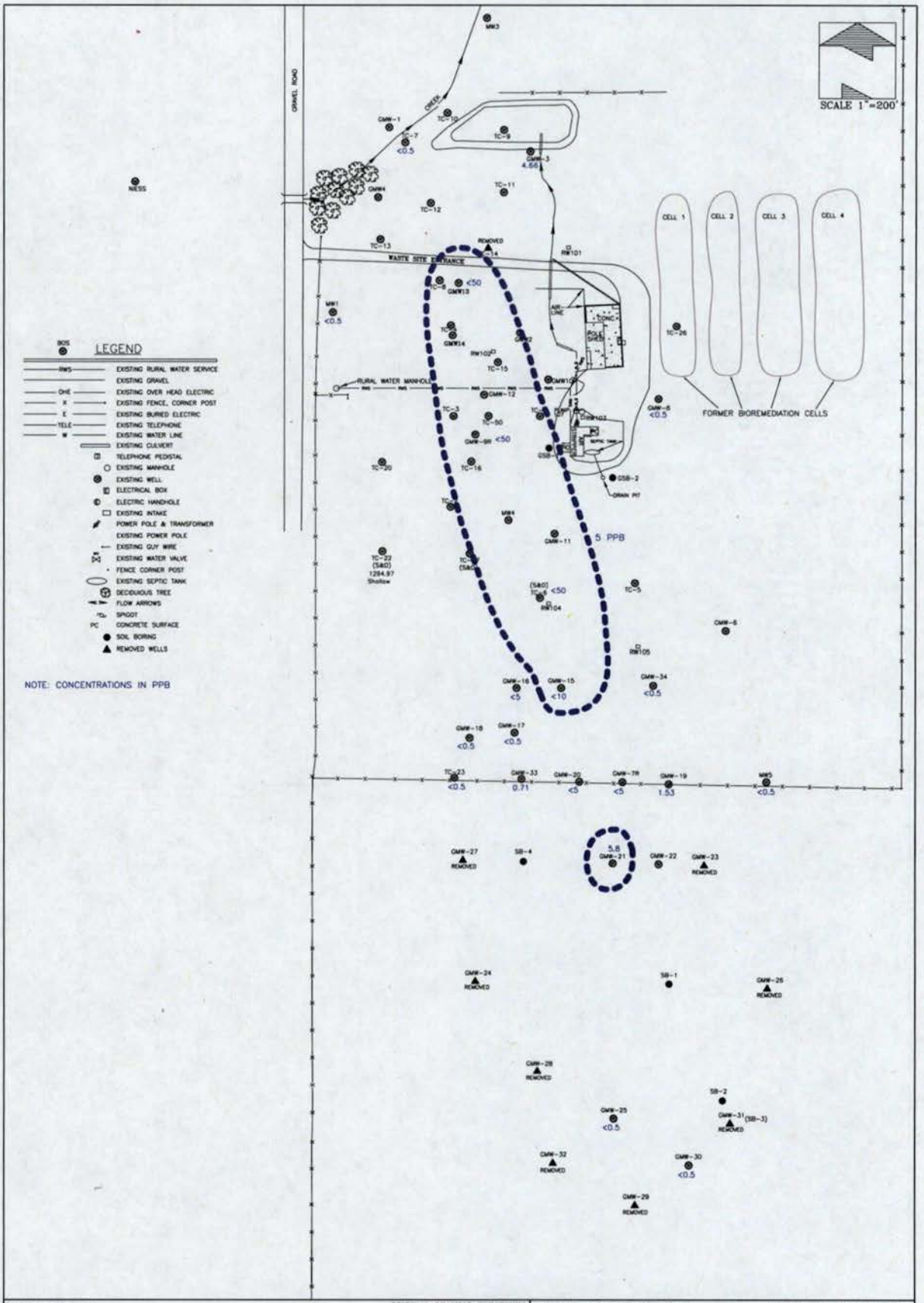


FIGURE 7 BENZENE PLUME MAP 9-26-12 DATA VOGEL PAINT WASTE SITE MAURICE, IOWA	ORIGINAL DRAWING FURNISHED BY DGR & ASSOCIATES CO. ACAD\GEOTEK\KEITH\91-400	PROJECT #: 91-400 DATE: 11/30/2012 DRAWN BY: PAC CHECKED BY: GEOTEK ENGINEERING & TESTING SERVICES, INC.

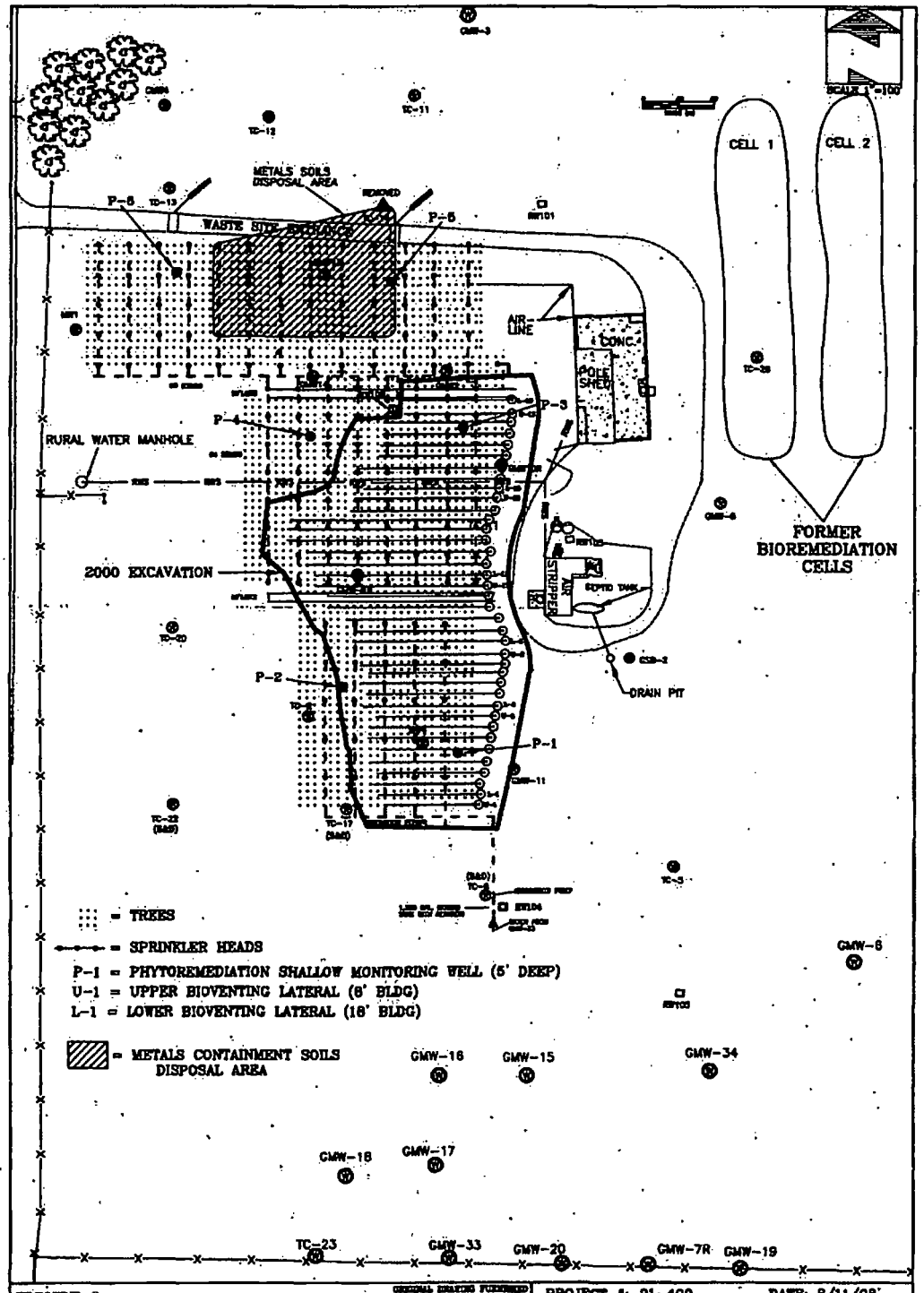


FIGURE 8
IRRIGATION SYSTEMS & PHYTOREMEDIATION TREES
VOGEL PAINT WASTE SITE
MAURICE, IOWA

ORIGINAL DRAWING FURNISHED BY DGR & ASSOCIATES CO.

PROJECT #: 91-400 DATE: 8/11/08

DRAWN BY: ELM CHECKED BY:

GEOTEK ENGINEERING & TESTING SERVICES, INC.

ATTACHMENT B

Vogel Paint and Wax Cleanup Standards					
Contaminant	**Groundwater Cleanup Standard (mg/l) from ESD**		**Groundwater Cleanup Standard (mg/l) statewide standards from consent order**	**Current MCLs -2012 [2]**	
Arsenic	0.05	IGAL	0.01	0.01	MCL
Chromium (total)	0.1	IGAL & Proposed MCL / MCLG	0.1	0.1	MCL
Cadmium	0.005	Proposed MCL/MCLG	0.005	0.005	MCL
Lead	0.005	Proposed MCL	0.015	0.015	MCL
				zero	MCLG
Benzene	0.001	IGAL	0.005	0.005	MCL
Ethylbenzene	0.7	IGAL & Proposed MCL / MCLG	0.7	0.7	MCL
MEK	0.17	IGAL	4.0 [1]	4.0 [1]	HAL
Toluene	2	IGAL & Proposed MCL / MCLG	1	1	MCL
Xylenes	10	IGAL & Proposed MCL / MCLG	10	10	MCL
1,2-Dichloropropane	0.0006	IGAL	0.005[1]	0.005 [1]	MCL
Methylene Chloride	0.05	IGAL	0.005[1]	0.005[1]	MCL

[1] Analyses no longer conducted due to lack of contaminant detections.
[2] EPA Safe Drinking Water Standard
2012 Edition of the Drinking Water Standards and Health Advisories EPA 822-S-12-001 Office of Water
Groundwater cleanup standards are to be achieved at the property boundary.
IGAL - Iowa Groundwater Action Levels
MCL - Maximum Contaminant Level
MCLG - Maximum Contaminant Level Goal

Vogel Paint and Wax Superfund Site Toxicity Values						
Chemical	Previous RfD	Current RfD	Change	Previous Risk Assessment	Current	Change
Chromium (total)		3.0E-3 Cr VI	More Toxic		5.0E-1 (Cr VI only)	Cr VI More Toxic
	1.00E+00	1.5 Cr III	Less Toxic			No Change
Cadmium	2.90E-04	1.00E-03	Less Toxic			No Change
Lead	1.40E-03	NA	Different evaluation		Use IEUBK model	Different evaluation
Benzene		4.00E-03	More Toxic	5.20E-02	5.50E-02	No Change
Ethylbenzene	5.00E-02	1.00E-01	Less Toxic		1.10E-02	More Toxic
Toluene	3.00E-01	8.00E-02	More Toxic			No Change
Xylenes	1.00E-02	2.00E-01	Less Toxic			No Change

mg/kg-day = milligrams per kilogram per day

If a cell is blank that number is not available.

Obtained from the EPA Regional Screening Level (RSL) Summary Table, Nov, 2013

ATTACHMENT C

Linear Regression Analysis

Well Number: GMW-7R **Date:** **10/4/2013**

Date	Benzene	Toluene	Ethyl-Benzene	Xylenes	total BTEX	Benzene MCL	Toluene MCL	Ethyl-Benzene MCL	Xylenes MCL
6/25/2009	4	0	2260	6770	9034	5	1000	700	10000
9/17/2009	5	0	2750	9700	12455	5	1000	700	10000
11/6/2009	4	0	3350	12400	15754	5	1000	700	10000
3/18/2010	2	0	2600	10100	12702	5	1000	700	10000
6/17/2010	0	0	1570	5420	6990	5	1000	700	10000
10/5/2010	0	0	2500	8850	11350	5	1000	700	10000
12/7/2010	0	0	2480	8150	10630	5	1000	700	10000
3/2/2011	0	0	2000	6970	8970	5	1000	700	10000
6/9/2011	0	0	1100	4160	5260	5	1000	700	10000
9/27/2011	0	0	3090	11600	14690	5	1000	700	10000
12/9/2011	0	0	1850	6670	8520	5	1000	700	10000
3/19/2012	0	0	1580	6040	7620	5	1000	700	10000
9/26/2012	0	0	2370	9070	11440	5	1000	700	10000
3/26/2013	0	0	2710	9280	11990	5	1000	700	10000
6/26/2013	2.77	0	2100	7480	9582.77	5	1000	700	10000
7/24/2013	5.35	0	4970	17300	22275.35	5	1000	700	10000
8/28/2013	5.23	0	5830	22000	27835.23	5	1000	700	10000
9/25/2013	0	0	4690	15400	20090	5	1000	700	10000

all values in micrograms per liter

Linest Ethyl-Benzene

slope	1.10539332	-42325.827	intercept
+/-	0.51557163	21033.497	+/-
r-squared	0.22318031	1133.68358	s(y)
F	4.59680036	16	degrees of freedom
regression ss	5907984.62	20563815.4	residual ss

Linest BTEX

slope	5.122881441	-196356.9815	intercept
+/-	2.380045733	97097.43806	+/-
r-squared	0.224541486	5233.450789	s(y)
F	4.63295419	16	degrees of freedom
regression ss	126892015.5	438224114.5	residual ss

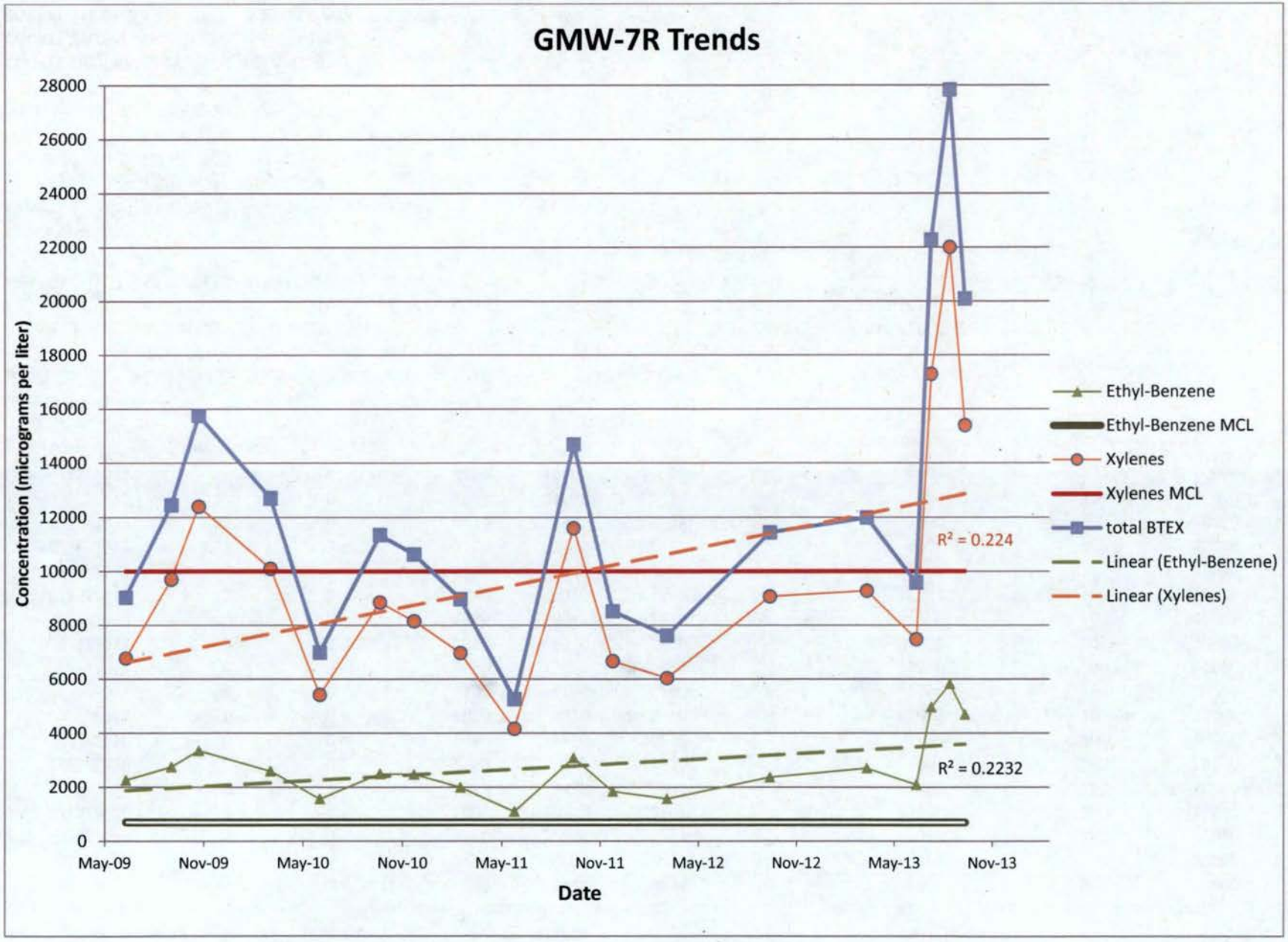
Linest Xylenes

slope	4.01775971	-154043.81	intercept
+/-	1.86948756	76268.4727	+/-
r-squared	0.22400659	4110.79125	s(y)
F	4.61873193	16	degrees of freedom
regression ss	78050125	270377675	residual ss

CORREL Ethyl-Benzene 0.47241964

CORREL XYLENES 0.47329335

CORREL BTEX 0.47385809


GMW-7R Trends
Concentration (micrograms per liter)
28000
26000
24000
22000
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
Date
R² = 0.224
R² = 0.2232
Ethyl-Benzene
Ethyl-Benzene MCL
Xylenes
Xylenes MCL
total BTEX
Linear (Ethyl-Benzene)
Linear (Xylenes)

Well Number: GMW-9R **Date: 10/4/2013**

Date	Benzene	Toluene	Ethyl-Benzene	Xylenes	total BTEX	Benzene MCL	Toluene MCL	Ethyl-Benzene MCL	Xylenes MCL
6/25/2009	6	1280	5200	16200	22686	5	1000	700	10000
9/17/2009	16	4150	12200	43600	59966	5	1000	700	10000
11/6/2009	10	2300	11900	45600	59810	5	1000	700	10000
3/18/2010	13	4270	8910	35600	48793	5	1000	700	10000
6/17/2010	0	3020	11600	40400	55020	5	1000	700	10000
10/5/2010	0	1400	9650	33200	44250	5	1000	700	10000
12/7/2010	7	574	4850	18300	23731	5	1000	700	10000
3/2/2011	0	3830	13200	50400	67430	5	1000	700	10000
6/9/2011	0	2350	9240	32500	44090	5	1000	700	10000
9/27/2011	60	2630	14700	58400	75790	5	1000	700	10000
12/9/2011	0	3580	17900	66800	88280	5	1000	700	10000
3/19/2012	0	2870	10400	41700	54970	5	1000	700	10000
9/26/2012	0	3430	17900	69900	91230	5	1000	700	10000
3/26/2013	15.3	3610	19000	67600	90225.3	5	1000	700	10000
7/24/2013	0	1680	8740	31200	41620	5	1000	700	10000
9/25/2013	0	1950	12000	42500	56450	5	1000	700	10000

all values in micrograms per liter

Linest Ethyl-Benzene

slope	3.69213345	-138583.8	intercept
+/-	1.98752362	80911.8669	+/-
r-squared	0.19774831	3855.98126	s(y)
F	3.45088257	14	degrees of freedom
regression ss	51309763.1	208160281	residual ss

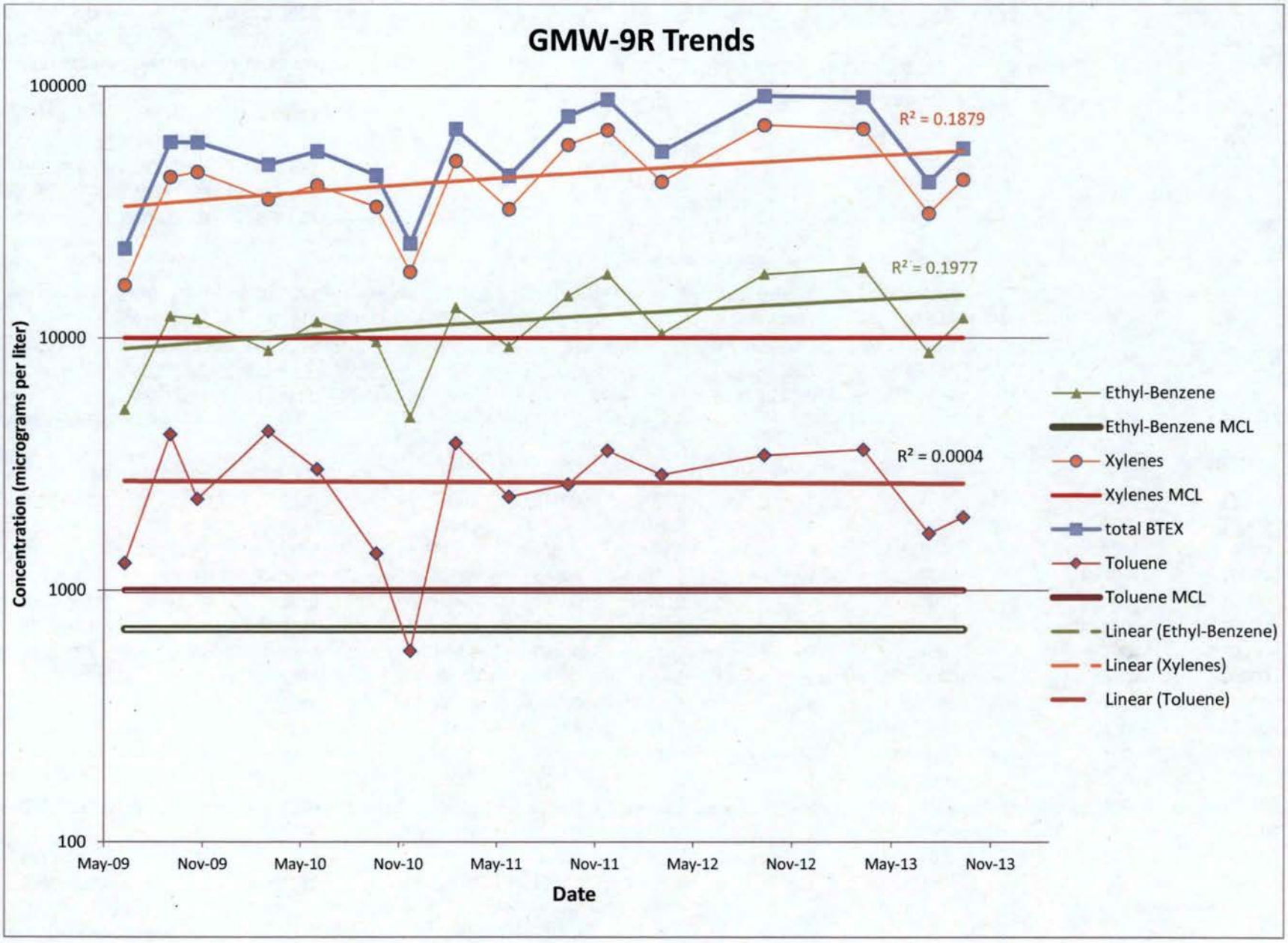
Linest BTEX

slope	17.65362126	-660854.6295	intercept
+/-	10.19381103	414988.9197	+/-
r-squared	0.176428161	19776.94444	s(y)
F	2.999124216	14	degrees of freedom
regression ss	1173040051	5475785441	residual ss

Linest Xylenes

slope	14.0067301	-526803.21	intercept
+/-	7.78167798	316791.25	+/-
r-squared	0.18792871	15097.1813	s(y)
F	3.23986574	14	degrees of freedom
regression ss	738446018	3190948357	residual ss

CORREL Ethyl-Benzene	0.44468901
CORREL XYLENES	0.43350745
CORREL BTEX	0.42003352


GMW-9R Trends
100000
10000
1000
100
Concentration (micrograms per liter)
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
Date
R² = 0.1879
R² = 0.1977
R² = 0.0004
Ethyl-Benzene
Ethyl-Benzene MCL
Xylenes
Xylenes MCL
total BTEX
Toluene
Toluene MCL
Linear (Ethyl-Benzene)
Linear (Xylenes)
Linear (Toluene)

Well Number: GMW-15 **Date:** **10/4/2013**

Date	Benzene	Toluene	Ethyl-Benzene	Xylenes	total BTEX	Benzene MCL	Toluene MCL	Ethyl-Benzene MCL	Xylenes MCL
6/25/2009	5	2	1540	6210	7757	5	1000	700	10000
9/17/2009	9	0	1360	7540	8909	5	1000	700	10000
11/6/2009	8	0	1280	7570	8858	5	1000	700	10000
3/18/2010	2	0	701	3150	3853	5	1000	700	10000
6/17/2010	6	0	1650	6410	8066	5	1000	700	10000
10/5/2010	8	0	2640	13600	16248	5	1000	700	10000
12/7/2010	6	0	1090	8870	9966	5	1000	700	10000
3/2/2011	6	0	1190	4890	6086	5	1000	700	10000
6/9/2011	9	0	3860	16300	20169	5	1000	700	10000
9/27/2011	11.1	0	6890	25800	32701.1	5	1000	700	10000
12/9/2011	14	0	10200	32600	42814	5	1000	700	10000
3/19/2012	0	0	6940	24700	31640	5	1000	700	10000
9/26/2012	0	0	6570	23000	29570	5	1000	700	10000
3/26/2013	1.48	0	284	983	1268.48	5	1000	700	10000
5/3/2013	3	0	2060	6680	8743	5	1000	700	10000
6/26/2013	4.72	1.6	2820	10900	13726.32	5	1000	700	10000
7/24/2013	4.01	0	156	107	267.01	5	1000	700	10000
9/25/2013	0	0	2820	12400	15220	5	1000	700	10000

all values in micrograms per liter

Linest Ethyl-Benzene

slope	1.03304279	-39131.539	intercept
+/-	1.31436247	53612.6523	+/-
r-squared	0.03717358	2843.20512	s(y)
F	0.61774086	16	degrees of freedom
regression ss	4993703.04	129341045	residual ss

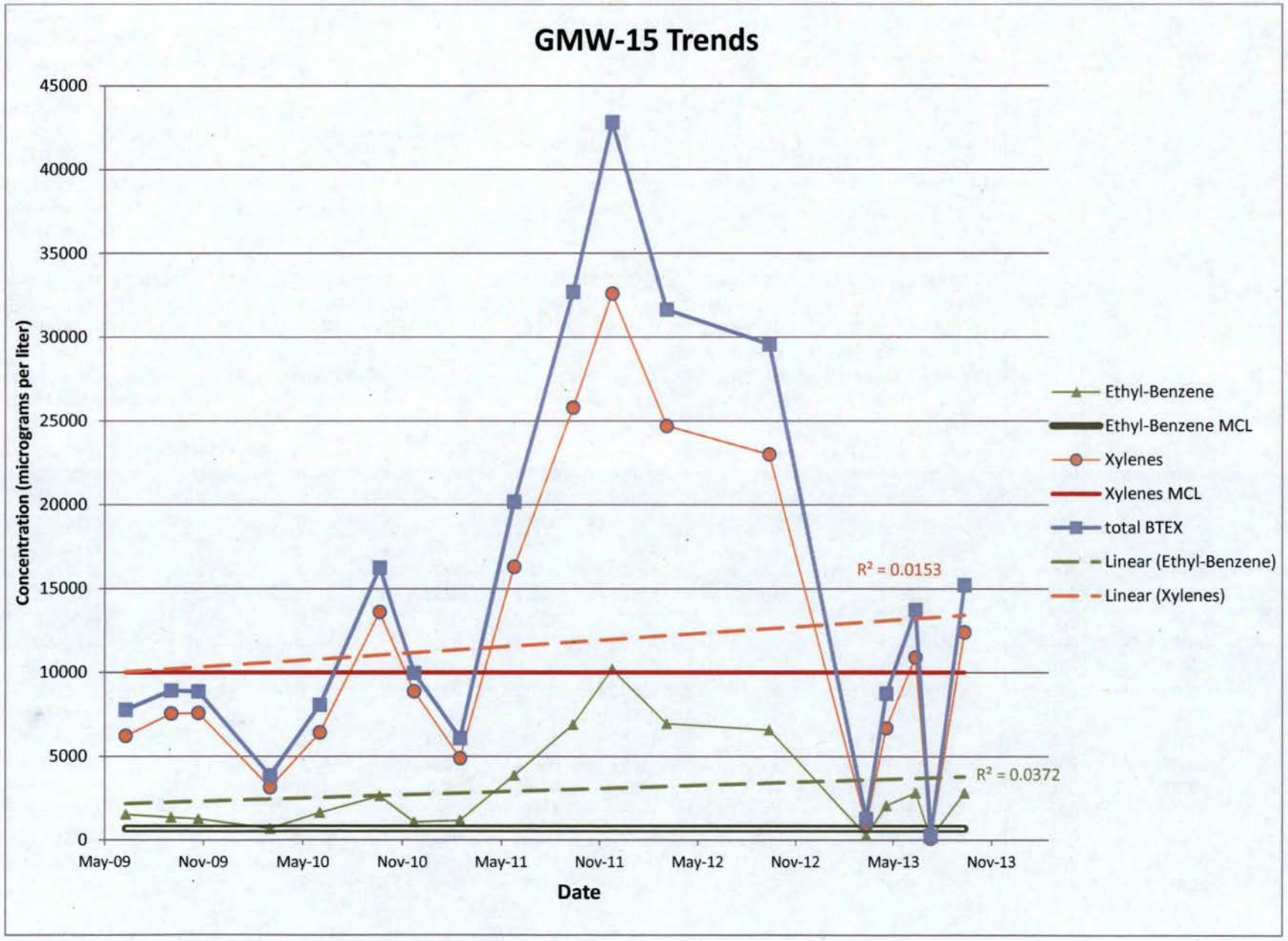
Linest BTEX

slope	3.209761599	-116145.3703	intercept
+/-	5.668960329	231236.0609	+/-
r-squared	0.019642786	12262.99246	s(y)
F	0.320581693	16	degrees of freedom
regression ss	48209390.51	2406095747	residual ss

Linest Xylenes

slope	2.18009273	-77157.049	intercept
+/-	4.37083849	178285.861	+/-
r-squared	0.01531086	9454.91877	s(y)
F	0.24878284	16	degrees of freedom
regression ss	22240063.4	1430327825	residual ss

CORREL Ethyl-Benzene	0.1928045
CORREL XYLENES	0.12373706
CORREL BTEX	0.14015272


GMW-15 Trends
Concentration (micrograms per liter)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
Date
Ethyl-Benzene
Ethyl-Benzene MCL
Xylenes
Xylenes MCL
total BTEX
Linear (Ethyl-Benzene)
Linear (Xylenes)
R² = 0.0153
R² = 0.0372

Well Number: GMW-16 **Date:** **10/4/2013**

Date	Benzene	Toluene	Ethyl-Benzene	Xylenes	total BTEX	Benzene MCL	Toluene MCL	Ethyl-Benzene MCL	Xylenes MCL
11/6/2009	5	37	5940	20200	26182	5	1000	700	10000
10/5/2010	0	0	4020	11500	15520	5	1000	700	10000
9/27/2011	0	19.3	1080	3060	4159.3	5	1000	700	10000
9/26/2012	0	0	507	1480	1987	5	1000	700	10000
9/25/2013	0	111	4310	13700	18121	5	1000	700	10000

all values in micrograms per liter

Linest Ethyl-Benzene

slope	-1.85818	79026.7671	intercept
+/-	2.10028862	85745.3446	+/-
r-squared	0.20692411	2364.82911	s(y)
F	0.78274013	3	degrees of freedom
regression ss	4377409.01	16777250.2	residual ss

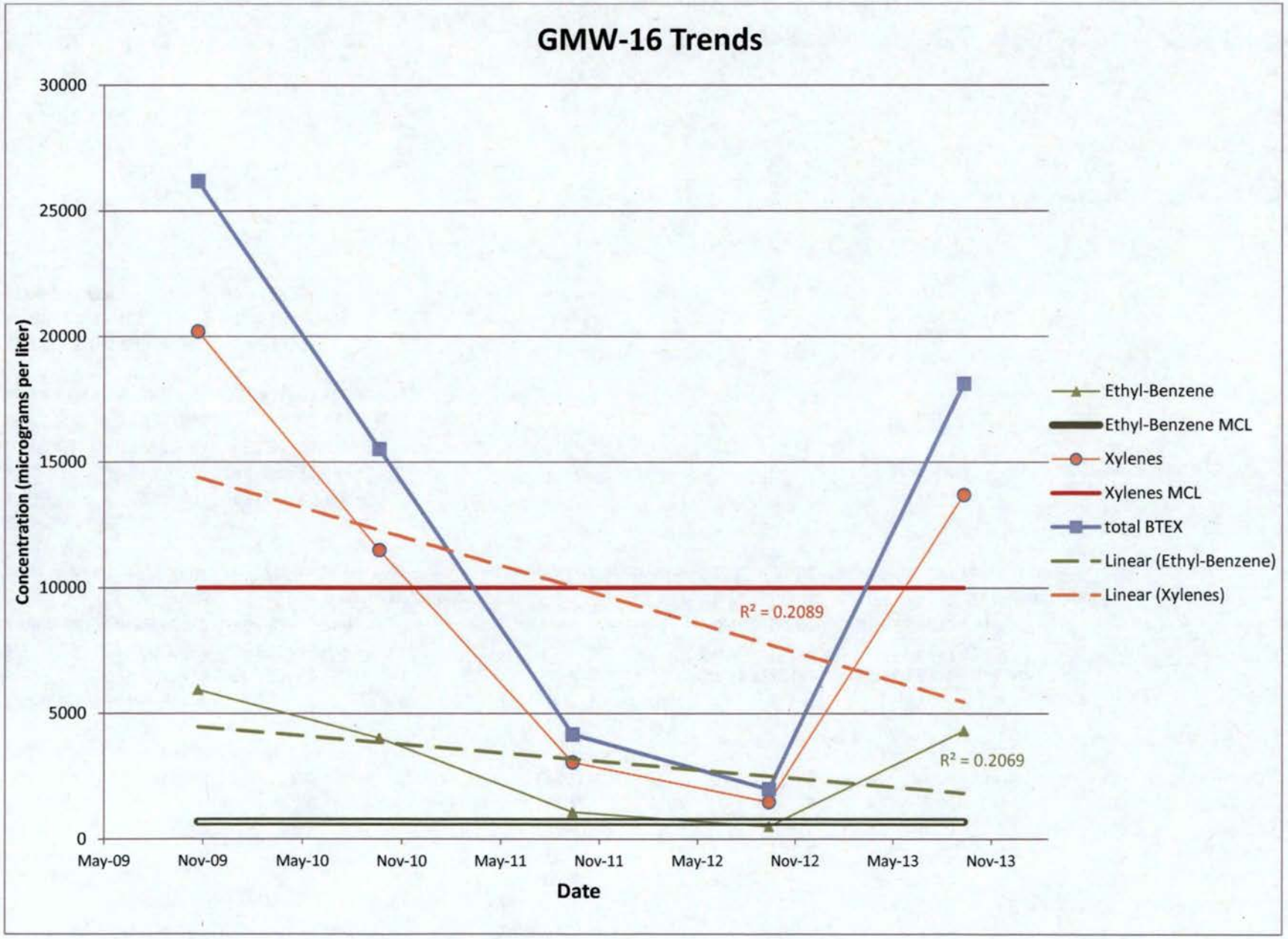
Linest BTEX

slope	-8.117277933	344560.6267	intercept
+/-	9.202137473	375681.9137	+/-
r-squared	0.205953087	10361.18672	s(y)
F	0.778114303	3	degrees of freedom
regression ss	83533831.02	322062571	residual ss

Linest Xylenes

slope	-6.2987891	267119.688	intercept
+/-	7.0760621	288883.812	+/-
r-squared	0.20893903	7967.32291	s(y)
F	0.79237518	3	degrees of freedom
regression ss	50298577.2	190434703	residual ss

CORREL Ethyl-Benzene -0.4548891
CORREL XYLENES -0.4570985
CORREL BTEX -0.4538205


GMW-16 Trends
30000
25000
20000
15000
10000
5000
0
Concentration (micrograms per liter)
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
Date
R² = 0.2089
R² = 0.2069
Ethyl-Benzene
Ethyl-Benzene MCL
Xylenes
Xylenes MCL
total BTEX
Linear (Ethyl-Benzene)
Linear (Xylenes)

Well Number: GMW-19 **Date:** **10/4/2013**

Date	Benzene	Toluene	Ethyl-Benzene	Xylenes	total BTEX	Benzene MCL	Toluene MCL	Ethyl-Benzene MCL	Xylenes MCL
6/25/2009	0	0	0	160	160	5	1000	700	10000
9/17/2009	0	0	233	810	1043	5	1000	700	10000
11/6/2009	1	0	42	1120	1163	5	1000	700	10000
3/18/2010	3	0	572	4280	4855	5	1000	700	10000
6/17/2010	0	0	984	3900	4884	5	1000	700	10000
10/5/2010	0	0	403	1120	1523	5	1000	700	10000
12/7/2010	0	0	574	2320	2894	5	1000	700	10000
3/2/2011	0	0	92	362	454	5	1000	700	10000
6/9/2011	0	0	286	844	1130	5	1000	700	10000
9/27/2011	0	0	137	477	614	5	1000	700	10000
12/9/2011	1	0	25	247	273	5	1000	700	10000
3/19/2012	1	0	158	680	839	5	1000	700	10000
9/26/2012	1.53	0	332	1820	2153.53	5	1000	700	10000
3/26/2013	0	0	0	0	0	5	1000	700	10000
5/3/2013	0	0	0	4.1	4.1	5	1000	700	10000
6/26/2013	0.838	0	61.8	366	428.638	5	1000	700	10000
7/24/2013	1.29	0	269	775	1045.29	5	1000	700	10000
9/25/2013	0	0	0	61.5	61.5	5	1000	700	10000

all values in micrograms per liter

Linest Ethyl-Benzene

slope	-0.1847607	7767.37404	intercept
+/-	0.11781215	4805.54053	+/-
r-squared	0.13323558	254.849123	s(y)
F	2.45945629	16	degrees of freedom
regression ss	159736.953	1039169.21	residual ss

Linest BTEX

slope	-1.222705063	51177.0115	intercept
+/-	0.647606199	26415.76192	+/-
r-squared	0.182200061	1400.890018	s(y)
F	3.564687201	16	degrees of freedom
regression ss	6995673.114	31399885.46	residual ss

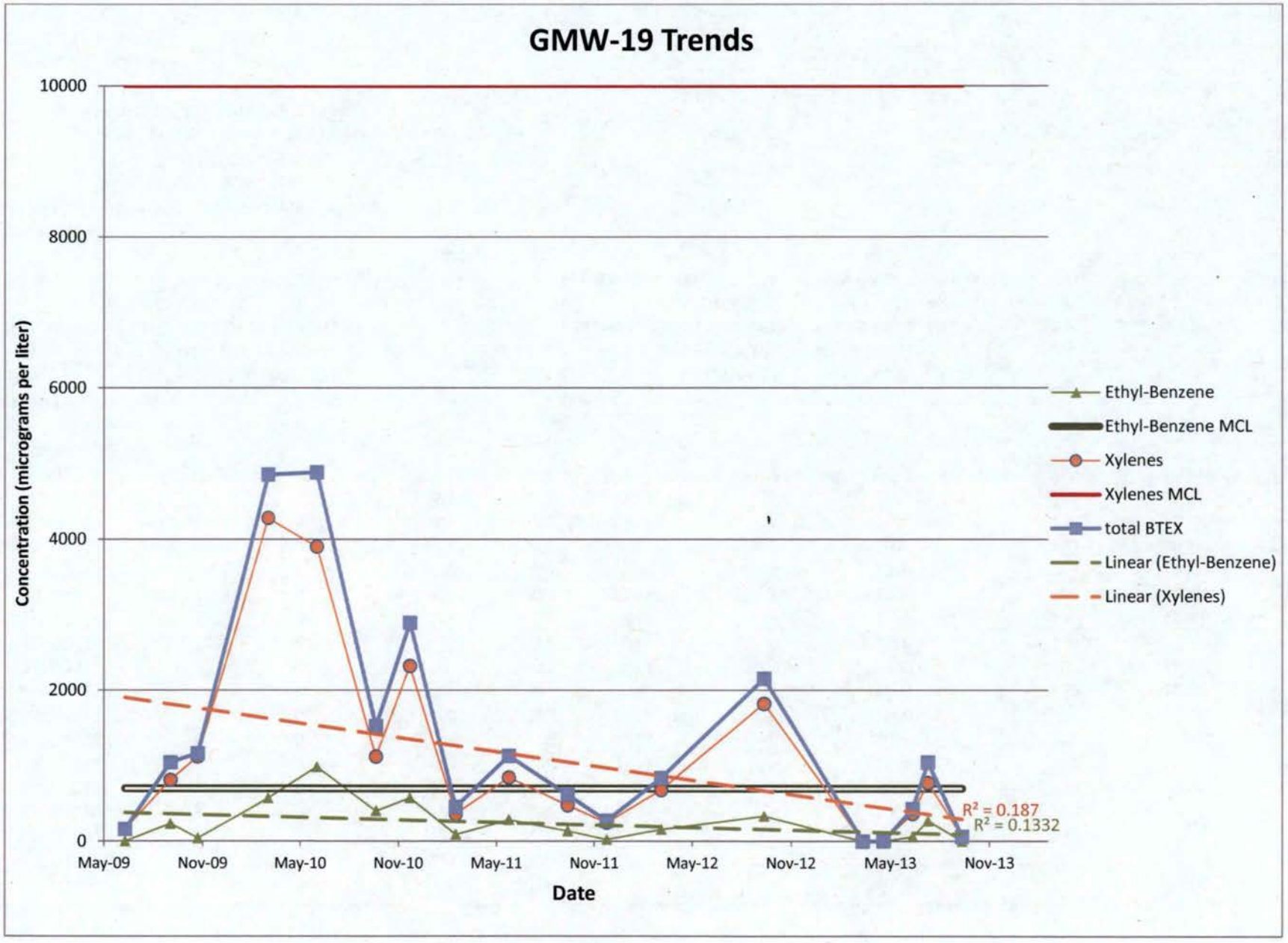
Linest Xylenes

slope	-1.0379635	43409.8815	intercept
+/-	0.54097692	22066.3694	+/-
r-squared	0.18704748	1170.2315	s(y)
F	3.68134624	16	degrees of freedom
regression ss	5041389.27	21911068.1	residual ss

CORREL Ethyl-Benzene -0.3650145

CORREL XYLENES -0.4324899

CORREL BTEX -0.426849


GMW-19 Trends
10000
8000
6000
4000
2000
0
Concentration (micrograms per liter)
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
Date
Ethyl-Benzene
Ethyl-Benzene MCL
Xylenes
Xylenes MCL
total BTEX
Linear (Ethyl-Benzene)
Linear (Xylenes)
R² = 0.187
R² = 0.1332

Well Number: GMW-20 **Date:** **10/4/2013**

Date	Benzene	Toluene	Ethyl-Benzene	Xylenes	total BTEX	Benzene MCL	Toluene MCL	Ethyl-Benzene MCL	Xylenes MCL
6/25/2009	0	0	220	628	848	5	1000	700	10000
9/17/2009	0	6	506	1480	1992	5	1000	700	10000
11/6/2009	2	1	751	2820	3574	5	1000	700	10000
3/18/2010	0	0	3	6	9	5	1000	700	10000
6/17/2010	1	0	398	1170	1569	5	1000	700	10000
10/5/2010	0	0	29	75	104	5	1000	700	10000
12/7/2010	0	0	21	58	79	5	1000	700	10000
3/2/2011	2	0	1050	2950	4002	5	1000	700	10000
6/9/2011	0	0	6	14	20	5	1000	700	10000
9/27/2011	0	0	36.3	184	220.3	5	1000	700	10000
12/9/2011	1	0	356	1160	1517	5	1000	700	10000
3/19/2012	0	5	1000	3190	4195	5	1000	700	10000
9/26/2012	0	0	1410	4250	5660	5	1000	700	10000
3/26/2013	0	0	4030	10200	14230	5	1000	700	10000
5/3/2013	0	0	1850	4620	6470	5	1000	700	10000
6/26/2013	0	0	963	2710	3673	5	1000	700	10000
7/24/2013	1.09	0	752	3920	4673.09	5	1000	700	10000
9/25/2013	0	0	1300	4290	5590	5	1000	700	10000

all values in micrograms per liter

Linest Ethyl-Benzene

slope	1.05716782	-42302.724	intercept
+/-	0.38136428	15555.7933	+/-
r-squared	0.32444877	824.960324	s(y)
F	7.68436226	16	degrees of freedom
regression ss	5229666.01	10888952.6	residual ss
FDIST	0.01360226		

Linest Xylenes

slope	3.0574032	-122272.12	intercept
+/-	0.9444186	38522.6963	+/-
r-squared	0.3957787	2042.94924	s(y)
F	10.480364	16	degrees of freedom
regression ss	43741283.1	66778265.4	residual ss

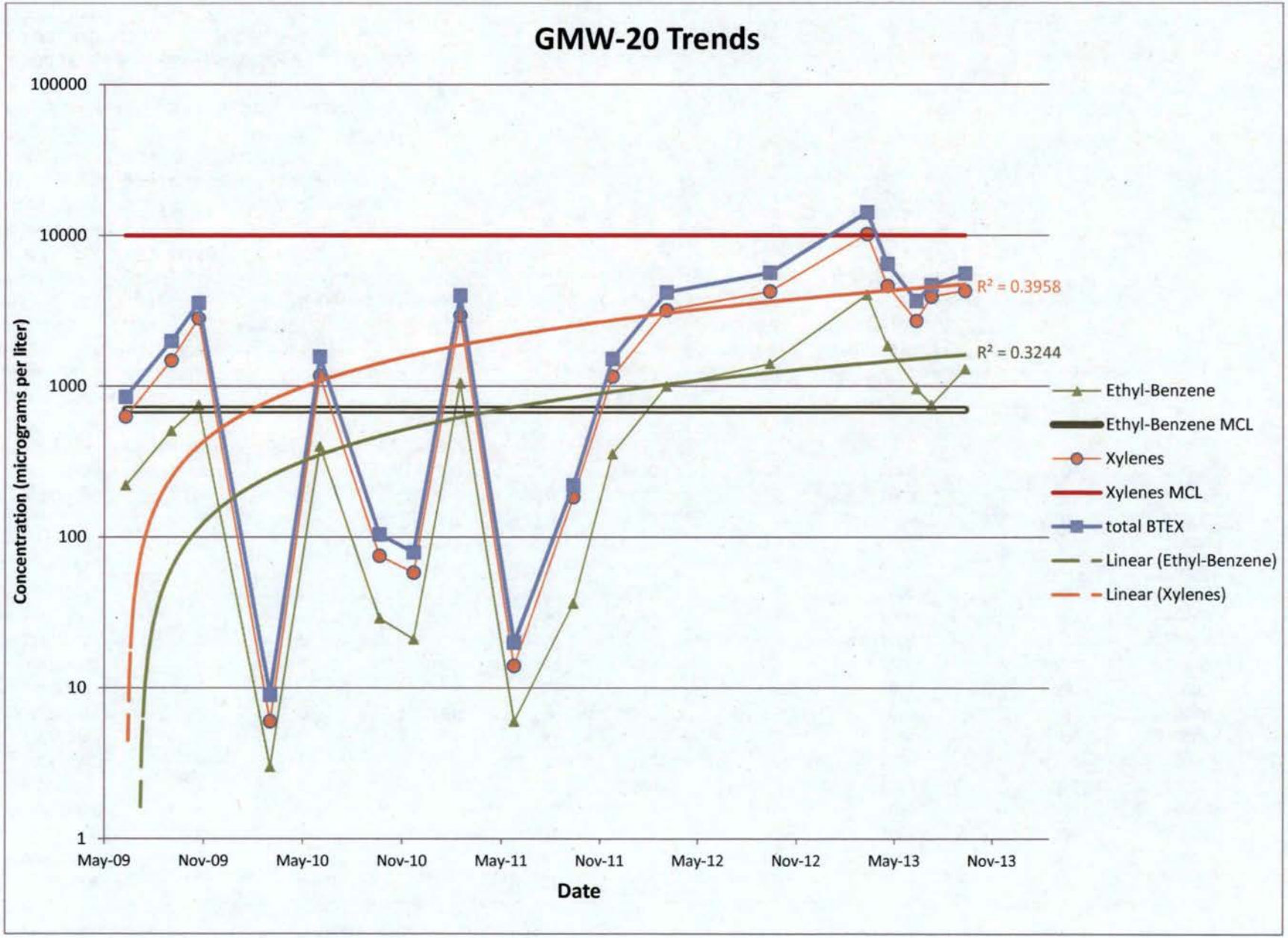
Linest BTEX

slope	4.11345476	-164528.2531	intercept
+/-	1.317972698	53759.91318	+/-
r-squared	0.378421945	2851.014707	s(y)
F	9.740934485	16	degrees of freedom
regression ss	79177090.27	130052557.7	residual ss

CORREL Ethyl-Benzene 0.56960405

CORREL XYLENES 0.62910945

CORREL BTEX 0.6151601


GMW-20 Trends
100000
10000
1000
100
10
1
Concentration (micrograms per liter)
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
Date
R² = 0.3958
R² = 0.3244
Ethyl-Benzene
Ethyl-Benzene MCL
Xylenes
Xylenes MCL
total BTEX
Linear (Ethyl-Benzene)
Linear (Xylenes)

Well Number: GMW-21 **Date:** **10/4/2013**

Date	Benzene	Toluene	Ethyl-Benzene	Xylenes	total BTEX	Benzene MCL	Toluene MCL	Ethyl-Benzene MCL	Xylenes MCL
6/25/2009	3	0	1680	4880	6563	5	1000	700	10000
9/17/2009	7	0	3100	8680	11787	5	1000	700	10000
11/6/2009	4	0	3230	10100	13334	5	1000	700	10000
3/18/2010	0	0	968	3600	4568	5	1000	700	10000
6/17/2010	3	0	443	1840	2286	5	1000	700	10000
10/5/2010	0	0	578	2300	2878	5	1000	700	10000
12/7/2010	0	0	1120	4470	5590	5	1000	700	10000
3/2/2011	0	0	617	2630	3247	5	1000	700	10000
6/9/2011	23	23	774	3040	3860	5	1000	700	10000
9/27/2011	0	0	411	1730	2141	5	1000	700	10000
12/9/2011	0	0	1030	3560	4590	5	1000	700	10000
3/19/2012	4	0	1870	5100	6974	5	1000	700	10000
9/26/2012	5.8	0	3630	10400	14035.8	5	1000	700	10000
3/26/2013	5.6	0	4720	11500	16225.6	5	1000	700	10000
5/3/2013	7.3	0	5180	14300	19487.3	5	1000	700	10000
6/26/2013	6.88	0	4730	10600	15336.88	5	1000	700	10000
7/24/2013	0	0	1240	5500	6740	5	1000	700	10000
8/28/2013	4.89	0	3170	12900	16074.89	5	1000	700	10000
9/25/2013	0	0	2990	9570	12560	5	1000	700	10000

all values in micrograms per liter

Linest Ethyl-Benzene

slope	1.48129086	-58290.411	intercept
+/-	0.62635946	25573.1837	+/-
r-squared	0.24754965	1425.64243	s(y)
F	5.5928529	17	degrees of freedom
regression ss	11367229.4	34551757.8	residual ss

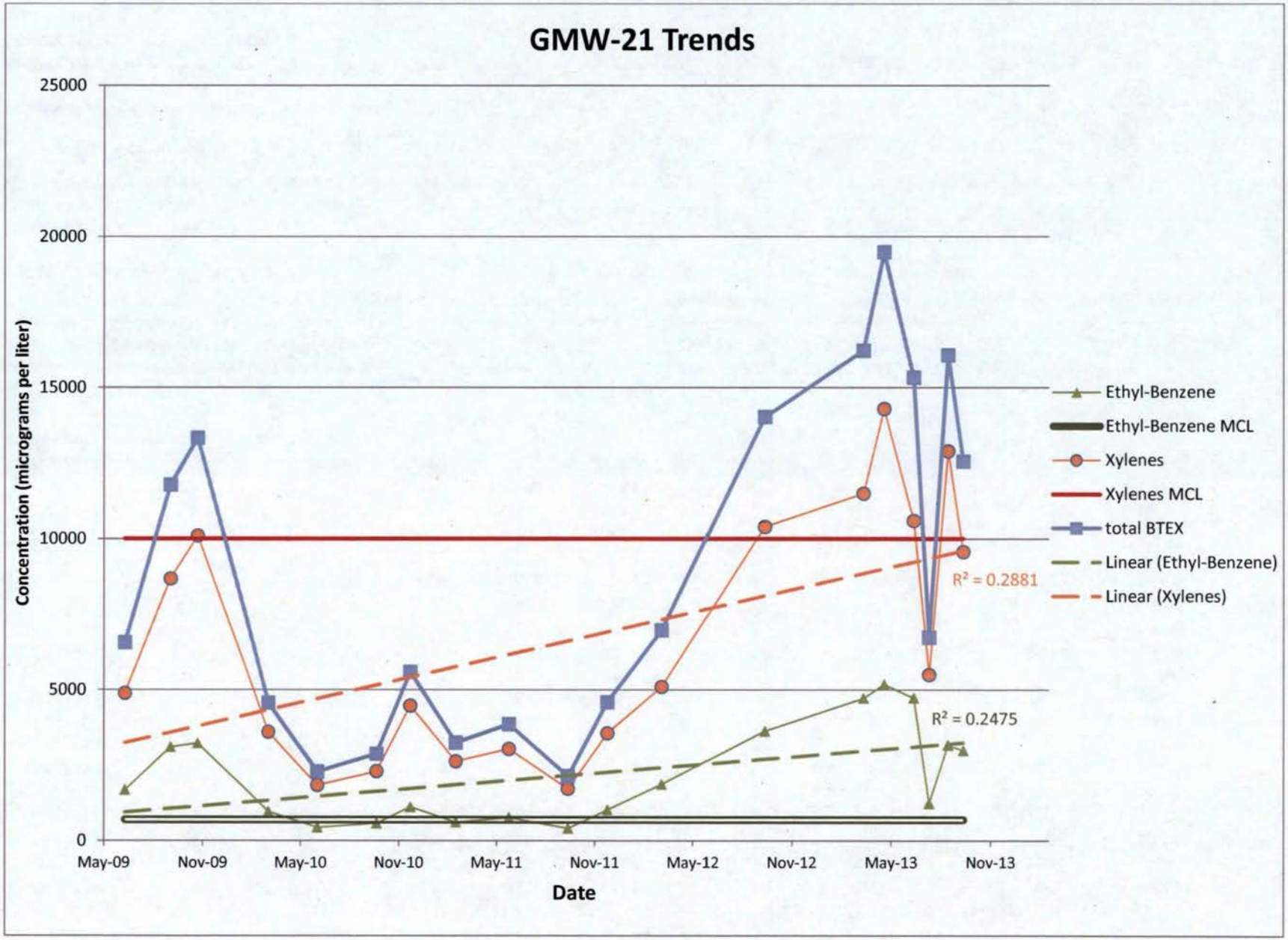
Linest BTEX

slope	5.574338199	-218715.302	intercept
+/-	2.159252798	88158.59209	+/-
r-squared	0.281629999	4914.625838	s(y)
F	6.664685282	17	degrees of freedom
regression ss	160975790.1	410610301.2	residual ss

Linest Xylenes

slope	4.09306401	-160430.7	intercept
+/-	1.56043437	63709.8619	+/-
r-squared	0.28811552	3551.66894	s(y)
F	6.88027911	17	degrees of freedom
regression ss	86790264.3	214443988	residual ss

CORREL Ethyl-Benzene	0.49754362	
CORREL XYLENES	0.53676394	
CORREL BTEX	0.53068823	0.731584138


GMW-21 Trends
25000
20000
15000
10000
5000
0
Concentration (micrograms per liter)
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
Date
Ethyl-Benzene
Ethyl-Benzene MCL
Xylenes
Xylenes MCL
total BTEX
Linear (Ethyl-Benzene)
Linear (Xylenes)
R² = 0.2881
R² = 0.2475

Well Number: GMW-25 **Date:** **10/4/2013**

Date	Benzene	Toluene	Ethyl-Benzene	Xylenes	total BTEX	Benzene MCL	Toluene MCL	Ethyl-Benzene MCL	Xylenes MCL
6/25/2009	0	7	26	128	161	5	1000	700	10000
9/17/2009	0	2	18	346	366	5	1000	700	10000
11/6/2009	1	0	2	98	101	5	1000	700	10000
3/18/2010	1	0	15	306	322	5	1000	700	10000
6/17/2010	0	0	164	388	552	5	1000	700	10000
10/5/2010	0	0	27	264	291	5	1000	700	10000
12/7/2010	0	0	10	56	66	5	1000	700	10000
3/2/2011	0	2	242	715	959	5	1000	700	10000
6/9/2011	0	0	91	215	306	5	1000	700	10000
9/27/2011	0	0	123	367	490	5	1000	700	10000
12/9/2011	0	0	38.9	150	188.9	5	1000	700	10000
3/19/2012	4	0	27.3	44	75.3	5	1000	700	10000
9/26/2012	0	0	176	542	718	5	1000	700	10000
3/26/2013	0	0	247	657	904	5	1000	700	10000
5/3/2013	0	0	101	263	364	5	1000	700	10000
6/26/2013	0	0	106	239	345	5	1000	700	10000
7/24/2013	0.806	1.1	100	250	351.906	5	1000	700	10000
8/28/2013	0	0	152	410	562	5	1000	700	10000
9/25/2013	0	0	146	381	527	5	1000	700	10000

all values in micrograms per liter

Linest Ethyl-Benzene

slope	0.07663118	-3033.0848	intercept
+/-	0.02971457	1213.19485	+/-
r-squared	0.28120745	67.6326452	s(y)
F	6.65077393	17	degrees of freedom
regression ss	30421.8018	77760.9698	residual ss

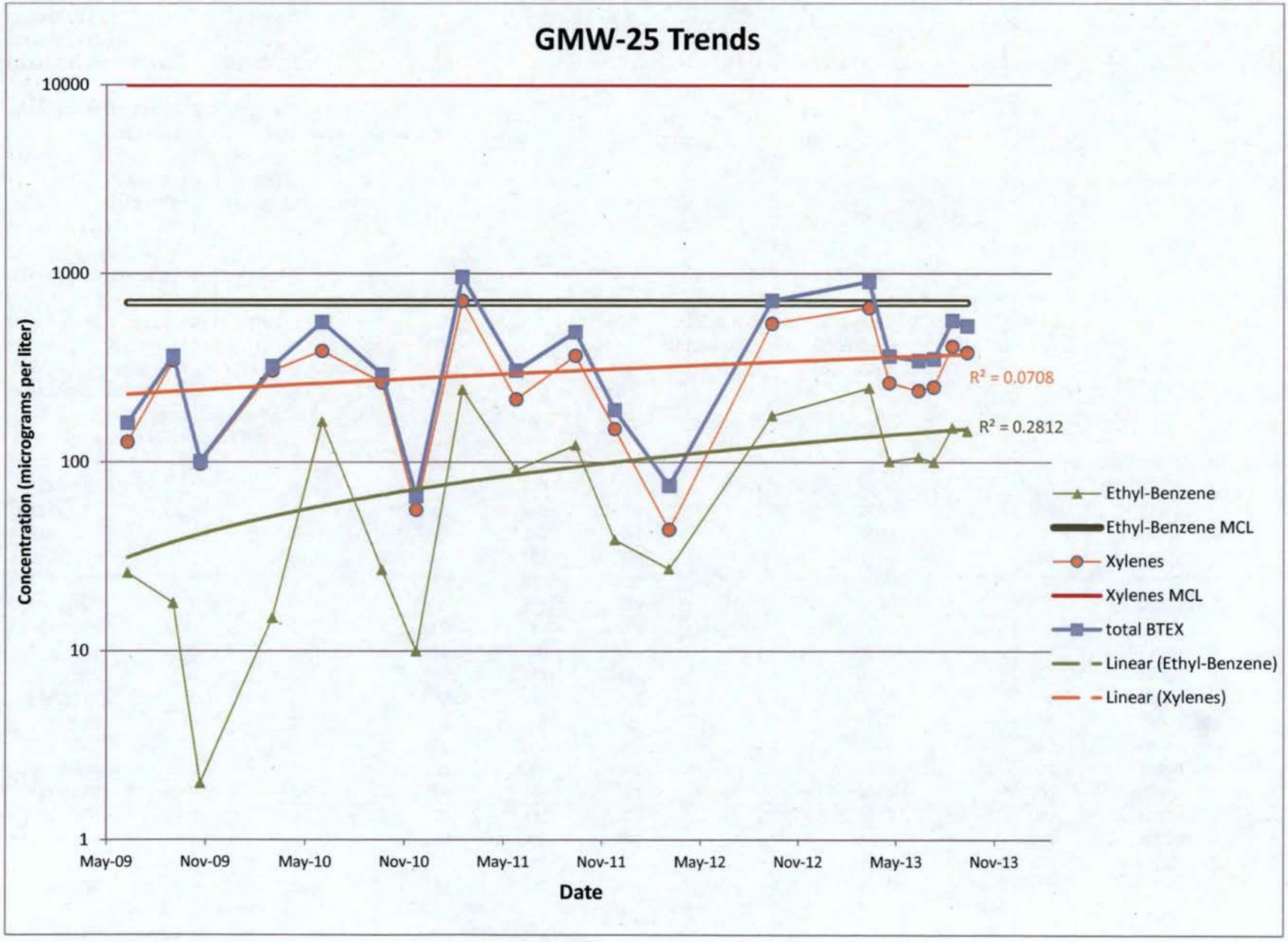
Linest BTEX

slope	0.167610683	-6440.060163	intercept
+/-	0.108574282	4432.901916	+/-
r-squared	0.122949095	247.1234372	s(y)
F	2.383139462	17	degrees of freedom
regression ss	145538.3108	1038189.885	residual ss

Linest Xylenes

slope	0.0923644	-3464.5086	intercept
+/-	0.08118156	3314.50394	+/-
r-squared	0.07075782	184.775486	s(y)
F	1.29447735	17	degrees of freedom
regression ss	44196.0202	580413.664	residual ss

CORREL Ethyl-Benzene	0.53028997	
CORREL XYLENES	0.26600342	
CORREL BTEX	0.35064098	0.812812313


GMW-25 Trends
10000
1000
100
10
1
Concentration (micrograms per liter)
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
Date
R² = 0.0708
R² = 0.2812
Ethyl-Benzene
Ethyl-Benzene MCL
Xylenes
Xylenes MCL
total BTEX
Linear (Ethyl-Benzene)
Linear (Xylenes)

Well Number: TC-6D **Date:** **10/4/2013**

Date	Benzene	Toluene	Ethyl-Benzene	Xylenes	total BTEX	Benzene MCL	Toluene MCL	Ethyl-Benzene MCL	Xylenes MCL
6/25/2009	18	292	11800	32100	44210	5	1000	700	10000
9/17/2009	17	186	14700	56500	71403	5	1000	700	10000
11/6/2009	18	131	18700	75200	94049	5	1000	700	10000
3/18/2010	16	26	17700	60900	78642	5	1000	700	10000
6/17/2010	0	0	16900	58400	75300	5	1000	700	10000
10/5/2010	0	0	22300	79800	102100	5	1000	700	10000
12/7/2010	17	63	19200	74100	93380	5	1000	700	10000
3/2/2011	0	2	17100	67300	84402	5	1000	700	10000
6/9/2011	0	0	16800	61800	78600	5	1000	700	10000
9/27/2011	0	0	13500	54200	67700	5	1000	700	10000
12/9/2011	0	0	16200	55000	71200	5	1000	700	10000
3/19/2012	0	0	15700	54300	70000	5	1000	700	10000
9/26/2012	0	0	14900	54200	69100	5	1000	700	10000
3/26/2013	22.1	30.5	19500	71500	91052.6	5	1000	700	10000
9/25/2013	0	0	17800	57200	75000	5	1000	700	10000

all values in micrograms per liter

Linest Ethyl-Benzene

slope	0.79366314	-15413.465	intercept
+/-	1.50642599	61248.4156	+/-
r-squared	0.02090538	2664.39267	s(y)
F	0.27757275	13	degrees of freedom
regression ss	1970485.68	92286847.7	residual ss

Linest BTEX

slope	2.307662003	-16076.65613	intercept
+/-	8.247918737	335344.689	+/-
r-squared	0.005985563	14587.96806	s(y)
F	0.078280871	13	degrees of freedom
regression ss	16658859.26	2766514558	residual ss

Linest Xylenes

slope	1.640291	-5853.5722	intercept
+/-	6.868409	279256.447	+/-
r-squared	0.00436802	12148.0502	s(y)
F	0.05703343	13	degrees of freedom
regression ss	8416715.87	1918476617	residual ss

CORREL Ethyl-Benzene 0.14458694

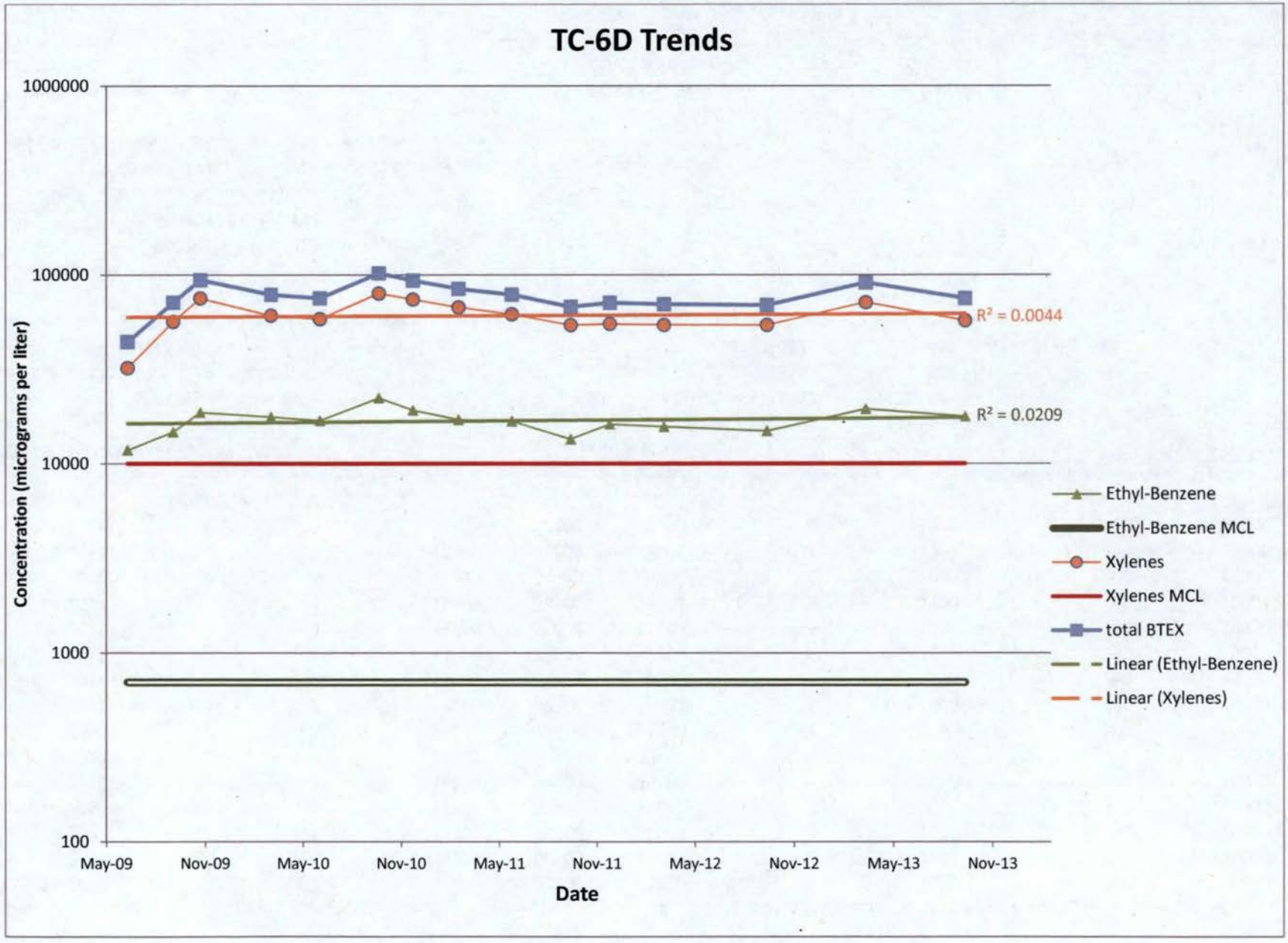
CORREL XYLENES 0.06609103

CORREL BTEX 0.07736642

COV Ethyl-Benzene 0.153959945

COV Xylenes

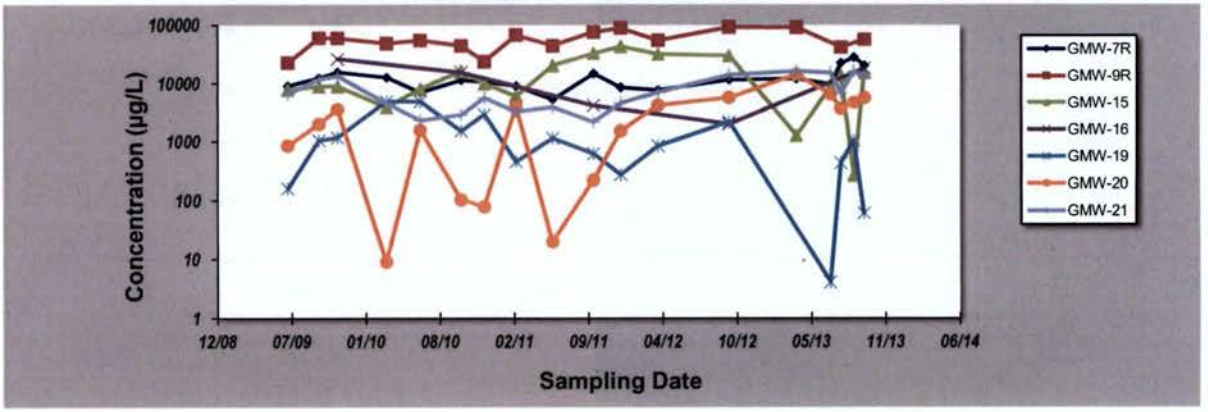
*COV =- Coefficient of Variation


TC-6D Trends
1000000
100000
10000
1000
100
Concentration (micrograms per liter)
May-09
Nov-09
May-10
Nov-10
May-11
Nov-11
May-12
Nov-12
May-13
Nov-13
Date
R² = 0.0044
R² = 0.0209
Ethyl-Benzene
Ethyl-Benzene MCL
Xylenes
Xylenes MCL
total BTEX
Linear (Ethyl-Benzene)
Linear (Xylenes)

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	17-Oct-13	**Job ID:**	980630487
Facility Name:	Vogel Paint and Wax Company	**Constituent:**	BTEX
Conducted By:	James Lyons - CENWK	**Concentration Units:**	µg/L

Sampling Point ID:		GMW-7R	GMW-9R	GMW-15	GMW-16	GMW-19	GMW-20	GMW-21
Sampling Event	Sampling Date	BTEX CONCENTRATION (µg/L)						
1	25-Jun-09	9034	22686	7757		160	848	6563
2	17-Sep-09	12455	59966	8909		1043	1992	11787
3	6-Nov-09	15754	59810	8858	26185	1163	3574	13334
4	18-Mar-10	12702	48793	3853		4855	9	4568
5	17-Jun-10	6990	55020	8066		4884	1569	2286
6	5-Oct-10	11350	44250	16248	15520	1523	104	2878
7	7-Dec-10	10630	23731	9966		2894	79	5590
8	2-Mar-11	8970	67430	6086		454	4002	3247
9	9-Jun-11	5260	44090	20169		1130	20	3860
10	27-Sep-11	14690	75790	32701	4159.3	614	220	2141
11	9-Dec-11	8520	88280	42814		273	1517	4590
12	19-Mar-12	7620	54970	31640		839	4195	6974
13	26-Sep-12	11440	91230	29570	1987	2154	5660	14036
14	26-Mar-13	11990	90225.3	1268.48		0	14230	16226
15	26-Jun-13	9582.77		8743		4.1	6470	15337
16	24-Jul-13	22275.35	41620	13726.32		428.64	3673	6740
17	28-Aug-13	27835.23		267.01		1045.29	4673.09	16075
18	25-Sep-13	20090	56450	15220	18121	61.5	5590	12560
19								
20								
Coefficient of Variation:		0.46	0.36	0.81	0.76	1.15	1.08	0.62
Mann-Kendall Statistic (S):		29	28	17	-4	-47	69	49
Confidence Factor:		85.3%	88.6%	72.5%	75.8%	95.9%	99.6%	96.6%
Concentration Trend:		No Trend	No Trend	No Trend	Stable	Decreasing	Increasing	Increasing



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

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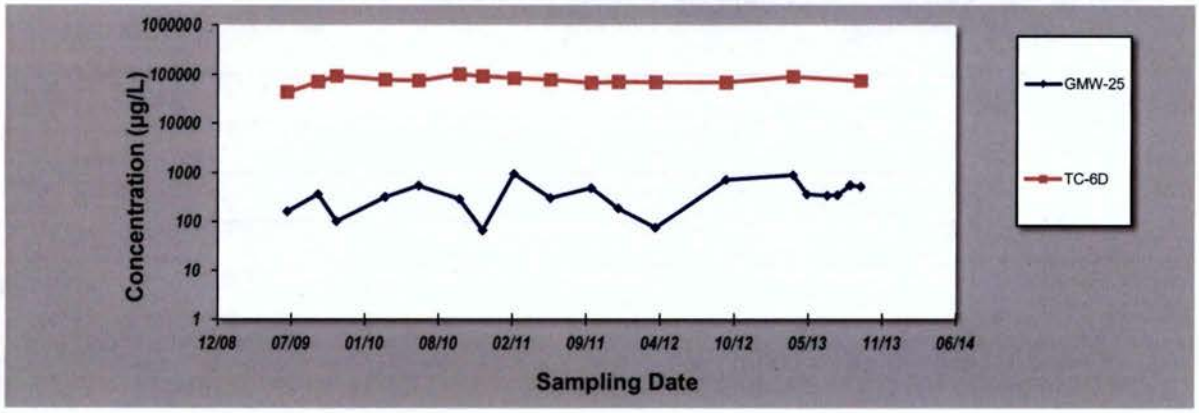
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	17-Oct-13	Job ID:	980630487
Facility Name:	Vogel Paint and Wax Company	Constituent:	BTEX
Conducted By:	James Lyons - CENWK	Concentration Units:	µg/L

Sampling Point ID:	GMW-25	TC-6D					
Sampling Event	Sampling Date	BTEX CONCENTRATION (µg/L)					
1	25-Jun-09	161	44210				
2	17-Sep-09	366	71403				
3	6-Nov-09	101	94049				
4	18-Mar-10	322	78642				
5	17-Jun-10	552	75300				
6	5-Oct-10	291	102100				
7	7-Dec-10	66	93380				
8	2-Mar-11	959	84402				
9	9-Jun-11	306	78600				
10	27-Sep-11	490	67700				
11	9-Dec-11	189	71200				
12	19-Mar-12	75	70000				
13	26-Sep-12	718	69100				
14	26-Mar-13	904	91053				
15	3-May-13	364					
16	26-Jun-13	345					
17	24-Jul-13	352					
18	28-Aug-13	562					
19	25-Sep-13	527	75000				
20							
Coefficient of Variation:		0.64	0.18				
Mann-Kendall Statistic (S):		41	-13				
Confidence Factor:		91.8%	72.1%				
Concentration Trend:		Prob. Increasing	Stable				



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

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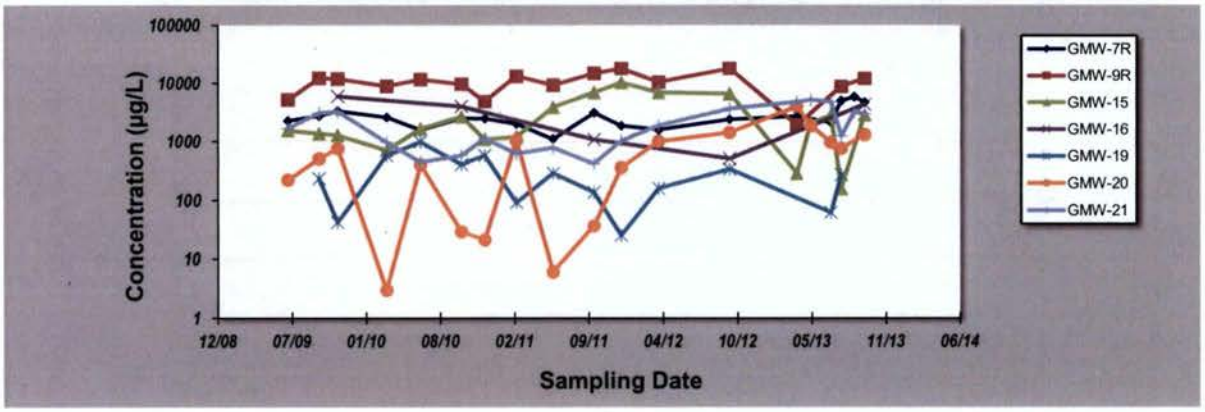
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	17-Oct-13	Job ID:	980630487
Facility Name:	Vogel Paint and Wax Company	Constituent:	Ethyl-Benzene
Conducted By:	James Lyons - CENWK	Concentration Units:	µg/L

Sampling Point ID:		GMW-7R	GMW-9R	GMW-15	GMW-16	GMW-19	GMW-20	GMW-21
Sampling Event	Sampling Date	ETHYL-BENZENE CONCENTRATION (µg/L)						
1	25-Jun-09	2260	5200	1540		0	220	1680
2	17-Sep-09	2750	12200	1360		233	506	3100
3	6-Nov-09	3350	11900	1280	5940	42	751	3230
4	18-Mar-10	2600	8910	701		572	3	968
5	17-Jun-10	1570	11600	1650		984	398	443
6	5-Oct-10	2500	9650	2640	4020	403	29	578
7	7-Dec-10	2480	4850	1090		574	21	1120
8	2-Mar-11	2000	13200	1190		92	1050	617
9	9-Jun-11	1100	9240	3860		286	6	774
10	27-Sep-11	3090	14700	6890	1080	137	36.3	411
11	9-Dec-11	1850	17900	10200		25	356	1030
12	19-Mar-12	1580	10400	6940		158	1000	1870
13	26-Sep-12	2370	17900	6570	507	332	1410	3630
14	26-Mar-13	2710	1900	284		0	4030	4720
15	3-May-13			2060		0	1850	5180
16	26-Jun-13	2100		2820		62	963	4730
17	24-Jul-13	4970	8740	156		269	752	1240
18	28-Aug-13	5830						3170
19	25-Sep-13	4690	12000	2820	4310	0	1300	2990
20								
Coefficient of Variation:		0.45	0.41	0.94	0.73	1.15	1.19	0.73
Mann-Kendall Statistic (S):		23	11	22	-4	-37	61	51
Confidence Factor:		79.5%	67.1%	78.4%	75.8%	91.2%	98.9%	96.0%
Concentration Trend:		No Trend	No Trend	No Trend	Stable	Prob. Decreasing	Increasing	Increasing



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

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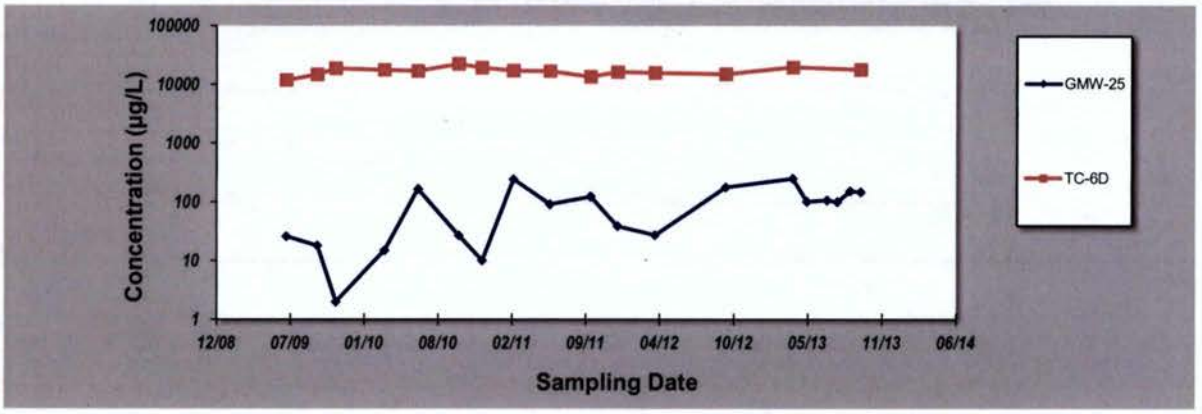
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	17-Oct-13	**Job ID:**	980630487
Facility Name:	Vogel Paint and Wax Company	**Constituent:**	Ethyl-Benzene
Conducted By:	James Lyons - CENWK	**Concentration Units:**	µg/L

Sampling Point ID:	GMW-25	TC-6D					
Sampling Event	Sampling Date	ETHYL-BENZENE CONCENTRATION (µg/L)						
1	25-Jun-09	26	11800					
2	17-Sep-09	18	14700					
3	6-Nov-09	2	18700					
4	18-Mar-10	15	17700					
5	17-Jun-10	164	16900					
6	5-Oct-10	27	22300					
7	7-Dec-10	10	19200					
8	2-Mar-11	242	17100					
9	9-Jun-11	91	16800					
10	27-Sep-11	123	13500					
11	9-Dec-11	38.9	16200					
12	19-Mar-12	27.3	15700					
13	26-Sep-12	176	14900					
14	26-Mar-13	247	19500					
15	3-May-13	101						
16	26-Jun-13	106						
17	24-Jul-13	100						
18	28-Aug-13	152						
19	25-Sep-13	146	17800					
20								
Coefficient of Variation:		0.81	0.15					
Mann-Kendall Statistic (S):		69	3					
Confidence Factor:		99.2%	53.9%					
Concentration Trend:		Increasing	No Trend					



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

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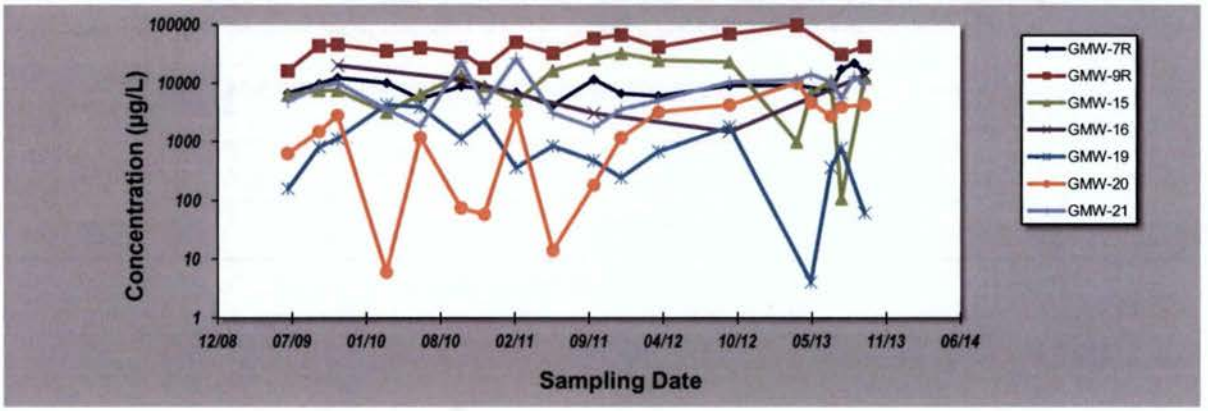
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	17-Oct-13	Job ID:	980630487
Facility Name:	Vogel Paint and Wax Company	Constituent:	Xylenes
Conducted By:	James Lyons - CENWK	Concentration Units:	µg/L

Sampling Point ID:	GMW-7R	GMW-9R	GMW-15	GMW-16	GMW-19	GMW-20	GMW-21
Sampling Event	Sampling Date	XYLENES CONCENTRATION (µg/L)						
1	25-Jun-09	6770	16200	6210		160	628	4880
2	17-Sep-09	9700	43600	7540		810	1480	8680
3	6-Nov-09	12400	45600	7570	20200	1120	2820	10100
4	18-Mar-10	10100	35600	3150		4280	6	3600
5	17-Jun-10	5420	40400	6410		3900	1170	1840
6	5-Oct-10	8850	33200	13600	11500	1120	75	23000
7	7-Dec-10	8150	18300	8870		2320	58	4470
8	2-Mar-11	6970	50400	4890		362	2950	26300
9	9-Jun-11	4160	32500	16300		844	14	3040
10	27-Sep-11	11600	58400	25800	3060	477	184	1730
11	9-Dec-11	6670	66800	32600		247	1160	3560
12	19-Mar-12	6040	41700	24700		680	3190	5100
13	26-Sep-12	9070	69900	23000	1480	1820	4250	10400
14	26-Mar-13	9280	97600	983		0	10200	11500
15	3-May-13			6680		4.1	4620	14300
16	26-Jun-13	7480		10900		366	2710	10600
17	24-Jul-13	17300	31200	107		775	3920	5500
18	28-Aug-13	22000						12900
19	25-Sep-13	15400	42500	12400	13700	61.5	4290	9570
20								
Coefficient of Variation:		0.46	0.45	0.79	0.78	1.17	1.05	0.75
Mann-Kendall Statistic (S):		31	34	19	-4	-50	69	37
Confidence Factor:		87.0%	93.0%	75.0%	75.8%	96.9%	99.6%	89.5%
Concentration Trend:		No Trend	Prob. Increasing	No Trend	Stable	Decreasing	Increasing	No Trend



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

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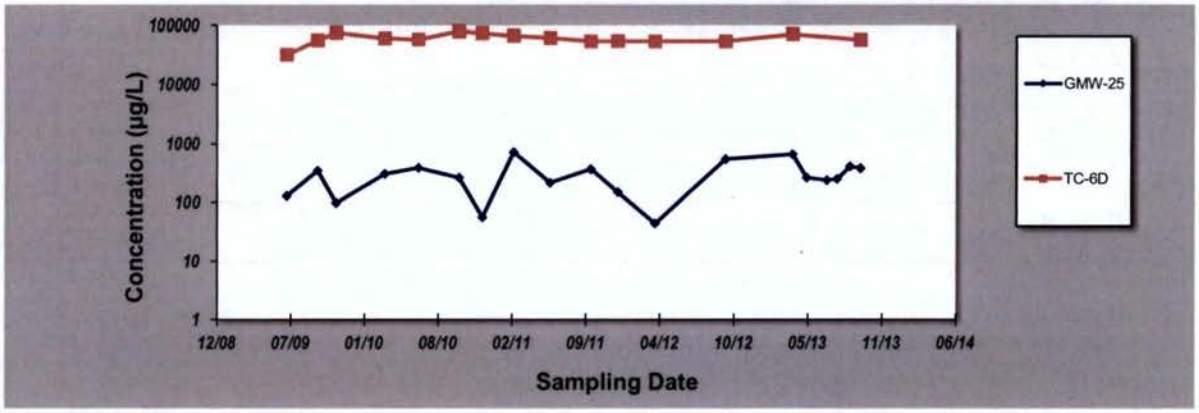
GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	17-Oct-13	Job ID:	980630487
Facility Name:	Vogel Paint and Wax Company	Constituent:	Xylenes
Conducted By:	James Lyons - CENWK	Concentration Units:	µg/L

Sampling Point ID:	GMW-25	TC-6D					
Sampling Event	Sampling Date	XYLENES CONCENTRATION (µg/L)						
1	25-Jun-09	128	32100					
2	17-Sep-09	346	56500					
3	6-Nov-09	98	75200					
4	18-Mar-10	306	60900					
5	17-Jun-10	388	58400					
6	5-Oct-10	264	79800					
7	7-Dec-10	56	74100					
8	2-Mar-11	715	67300					
9	9-Jun-11	215	61800					
10	27-Sep-11	367	54200					
11	9-Dec-11	150	55000					
12	19-Mar-12	44	54300					
13	26-Sep-12	542	54200					
14	26-Mar-13	657	71500					
15	3-May-13	263						
16	26-Jun-13	239						
17	24-Jul-13	250						
18	28-Aug-13	410						
19	25-Sep-13	381	57200					
20								
Coefficient of Variation:		0.61	0.19					
Mann-Kendall Statistic (S):		25	-12					
Confidence Factor:		79.7%	70.4%					
Concentration Trend:		No Trend	Stable					



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
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ATTACHMENT D

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
3/24/2004	BOS	<2	<2	<2	<5	<5	<5	<5
6/25/2004	BOS	<2	<2	<2	<5	<5	<5	<5
9/27/2004	BOS	<2	<2		<5	<5	<5	<5
12/14/2004	BOS	<2	<2	<2	<5	<5	<5	<5
3/16/2005	BOS	<2	<2	<2	<5	<5	<5	<5
6/20/2005	BOS	<2	<2	<2	<5	<5		
12/22/2005	BOS	<2	<2	<2	<5	<5		
11/13/2006	BOS	<2	<2	<2	<5	<5		
11/19/2007	BOS	<2	<2	<2	<5	<5		
11/20/2008	BOS	<2	<2	<2	<5	<5		
11/6/2009	BOS	1	<1	<1	<4	<10		
10/5/2010	BOS	<0.195	<0.196	<0.211	<0.407	<0.722		
9/27/2011	BOS	<0.5	<1	<1	<3	<10		
9/26/2012	BOS	<0.5	<1	<1	<3	<10		
9/25/2013	BOS	<0.5	<1	<1	<3			
3/24/2004	NIESS	<2	<2	<2	<5	<5	<5	<5
6/25/2004	NIESS	<2	<2	<2	<5	<5	<5	<5
9/27/2004	NIESS	<2	<2	<2	<5	<5	<5	<5
12/14/2004	NIESS	<2	<2	<2	<5	<5	<5	<5
3/16/2005	NIESS	<2	<2	<2	<5	<5		
6/20/2005	NIESS	<2	<2	<2	<5	<5		
12/22/2005	NIESS	<2	<2	<2	<5	<5		
11/13/2006	NIESS	<2	<2	<2	<5	<5		
11/19/2007	NIESS	<2	<2	<2	<5	<5		
11/20/2008	NIESS	<2	<2	<2	<5	<5		
12/6/2009	NIESS	<0.5	<1	<1	<4	<10		
10/5/2010	NIESS	<0.195	<0.196	<0.211	<0.407	<0.722		
9/27/2011	NIESS	<0.5	<1	<1	<3	<10		
9/26/2012	NIESS	<0.5	<1	<1	<3	<10		
9/25/2013	NIESS	<0.5	<1	<1	<3			
3/24/2004	GMW-1	<2	<2	<2	<5	<5	<5	<5
6/25/2004	GMW-1	<2	<2	<2	<5	<5	<5	<5
9/27/2004	GMW-1	<2	<2	<2	<5	<5	<5	<5
12/14/2004	GMW-1	<2	<2	<2	<5	<5		
3/16/2005	GMW-1	<2	<2	<2	<5	<5	<5	<5
6/20/2005	GMW-1	<2	<2	<2	<5	<5		
12/22/2005	GMW-1	<2	<2	<2	<5	<5		
11/19/2007	GMW-1	<2	<2	<2	<5	<5		
2/28/1996	GMW-2	19	3090	15000	33200	2250		
9/30/1996	GMW-2	<20	290	2330	9280	<5		
8/27/1997	GMW-2	<20	2360	15200	42200	53		
8/27/1997	GMW-2	<20	1930	10600	26400	<50		
3/20/1998	GMW-2	12	7380	10900	26800	15		
3/27/2001	GMW-2	<2	76	1420	16900	<5		
10/4/2001	GMW-2	<20	170	1090	9260	<50		
12/14/2001	GMW-2	<20	106	298	3580	<50		
3/29/2002	GMW-2	<2	144	920	4990	<50		
6/27/2002	GMW-2	<20	114	960	4610	<50		
9/26/2002	GMW-2	<20	160	1350	7130	<50		
12/11/2002	GMW-2	<20	504	2370	11920	<50		
5/14/2008	GMW-2	<2	<2	<2	<5	<10		
8/7/2008	GMW-2	<2	<2	<2	<5	<10		
8/27/2008	GMW-2	<2	<2	<2	<5	<10		
10/27/2008	GMW-2	<2	<2	<2	<5	<10		
5/12/2009	GMW-2	<2	<2	<2	<3			
7/8/2009	GMW-2	<2	<2	<2	<3			
9/17/2009	GMW-2	<2	5	19	87			
3/24/2004	GMW-3	<2	<2	<2	<5	<5		
6/25/2004	GMW-3		<2	<2	<5	<5		
9/27/2004	GMW-3	<2	<2	<2	<5	<5		
12/14/2004	GMW-3	<2	<2	<2	<5	<5		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	**WELL #**	**BENZENE**	**TOLUENE**	**E-BENZENE**	**XYLENES**	**MEK**	**CH2CL2**	**1,2-DCP**
Limits		**5**	**1000**	**700**	**10000**	**400**		
3/16/2005	GMW-3	<2	<2	<2	<5	<5	<5	<5
6/20/2005	GMW-3	<2	<2	<2	<5	<5	<5	<5
12/22/2005	GMW-3	<2	<2	<2	<5	<5	<5	<5
11/13/2006	GMW-3	<2	<2	<2	<5	<5	<5	<5
11/19/2007	GMW-3	<2	<2	<2	<5	<5		
11/20/2008	GMW-3	<2	<2	<2	<5	<5		
11/6/2009	GMW-3	<0.5	<1	<1	<4	<10		
10/5/2010	GMW-3	<0.195	<0.196	<0.211	<0.407	<0.722		
9/27/2011	GMW-3	<0.5	<1	<1	<3	<10		
9/26/2012	GMW-3	4.66	<1	<1	351	<10		
9/25/2013	GMW-3	<0.5	<1	<1	3.67			
3/27/2001	GMW-6	<2	<2	<2	<5	<5		
8/15/2003	GMW-6	<2	<2	<2	<5	<5		
6/25/2004	GMW-6	<2	<2	<2	<5	<5		
3/2/2011	GMW-6	<0.5	<1	<1	<3	<10		
6/9/2011	GMW-6	<0.5	<1	<1	<3	<10		
9/27/2011	GMW-6	<0.5	<1	<1	<3	<10		
12/9/2011	GMW-6	<0.5	<1	<1	<3	<10		
7/17/2003	REPLACED							
7/24/2003	GMW-7R	12	16	**5470**	**15800**	<5		
7/28/2003	GMW-7R	36	58	**7770**	**22400**	<50		
8/1/2003	GMW-7R	<20	<20	**5130**	**14500**	<50		
8/14/2003	GMW-7R	<20	<20	**3090**	8550	<50	<5	<5
8/29/2003	GMW-7R	<2	<2	210	550	<5	<50	<50
9/26/2003	GMW-7R	5	<5	**2480**	5660	<5	<50	<50
10/15/2003	GMW-7R	<2	3	**3330**	5940	<5	<50	<50
11/21/2003	GMW-7R	7	33	**4660**	9360	<5	<5	<5
12/2/2003	GMW-7R	<2	21	**4410**	1740	<5	<5	<5
1/13/2004	GMW-7R	<2	160	**4880**	9920	<5	<5	<5
2/4/2004	GMW-7R	5	84	**3440**	7210	<5	<5	<5
3/24/2004	GMW-7R	4	24	**2620**	6270	<5	<5	<5
4/30/2004	GMW-7R	<2	<2	**1280**	3400	<5	<5	<5
5/27/2004	GMW-7R	<2	<2	**1430**	3780	<5	<5	<5
6/23/2004	GMW-7R	<2	<2	**1770**	4230	<5	<5	<5
7/19/2004	GMW-7R	<2	<2	95	204	<5	<5	<5
9/27/2004	GMW-7R	<2	<2	<2	<5	<5	<5	<5
10/27/2004	GMW-7R	<2	<2	26	51	<5	<5	<5
12/14/2004	GMW-7R	<2	<2	314	1010	<5	<5	<5
1/18/2005	GMW-7R	<2	<2	500	1350	<5	<5	<5
2/28/2005	GMW-7R	<2	<2	**835**	2470	<5	<5	<5
3/16/2005	GMW-7R	<2	<2	439	1030	<5	<5	<5
4/7/2005	GMW-7R	62	460	690	1840	<5	<5	<5
5/24/2005	GMW-7R	<20	<20	**749**	2650	<50	<5	<5
6/20/2005	GMW-7R	<2	<2	**930**	2720	<5	<5	<5
8/12/2005	GMW-7R	<2	<2	**3720**	9060	<5	<5	<5
9/29/2005	GMW-7R	<2	<2	**3150**	7970	<5	<50	<50
10/24/2005	GMW-7R	<2	<2	**2270**	6190	<5	<5	<5
12/2/2005	GMW-7R	<2	<2	**1810**	5520	<5	<5	<5
12/22/2005	GMW-7R	<2	<2	**1770**	5340	<5	<5	<5
1/31/2006	GMW-7R	<2	<2	**2070**	6330	<5	<5	<5
2/22/2006	GMW-7R	<20	<20	**981**	3550	<50	<5	<5
3/20/2006	GMW-7R	<20	<20	**1230**	4030	<50	<5	<5
4/19/2006	GMW-7R	<20	<20	**1880**	6220	<50	<5	<5
5/16/2006	GMW-7R	<20	<20	**1220**	4050	<50	<50	<50
6/19/2006	GMW-7R	<20	<20	**2180**	7200	<50		
7/17/2006	GMW-7R	<2	<2	**896**	3040	<5		
8/21/2006	GMW-7R	<20	<20	**2100**	6970	<50		
9/18/2006	GMW-7R	<20	<20	**2200**	7470	<5		
10/16/2006	GMW-7R	<20	<20	**2420**	7400	<50		
11/13/2006	GMW-7R	<20	<20	**2820**	8910	<50		
12/14/2006	GMW-7R	<20	<20	**1350**	4480	<50		
1/15/2007	GMW-7R	<20	<20	**1620**	5090	<50		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	**WELL #**	**BENZENE**	**TOLUENE**	**E-BENZENE**	**XYLENES**	**MEK**	**CH2CL2**	**1,2-DCP**
Limits		**5**	**1000**	**700**	**10000**	**400**		
2/15/2007	GMW-7R	2	<2	**1640**	5890	<50		
3/6/2007	GMW-7R	<2	<2	**2310**	7270	<50		
4/16/2007	GMW-7R	<2	<2	**2750**	7540	<5		
5/16/2007	GMW-7R	<2	<2	**2940**	8570	<5		
6/20/2007	GMW-7R	<2	<2	**2180**	6411	<5		
7/16/2007	GMW-7R	<2	<2	**2070**	6090	<5		
8/17/2007	GMW-7R	<2	<2	**1240**	4370	<5		
9/17/2007	GMW-7R	<2	<2	**1360**	4850	<5		
10/22/2007	GMW-7R	<2	<2	**1790**	6580	<10		
11/19/2007	GMW-7R	4	<2	**2270**	7230	<10		
12/14/2007	GMW-7R	4	<2	**2020**	6940	<10		
1/17/2008	GMW-7R	3	<2	**1320**	4610	<10		
2/22/2008	GMW-7R	3	<2	**2320**	7700	<10		
3/24/2008	GMW-7R	4	<2	**2370**	7500	<10		
4/22/2008	GMW-7R	5	<2	**2700**	8800	<10		
5/14/2008	GMW-7R	3	<2	**1280**	4090	<10		
6/23/2008	GMW-7R	3	2	**1800**	5720	<10		
7/18/2008	GMW-7R	3	4	**938**	3300	<10		
8/18/2008	GMW-7R	3	4	**1060**	3320	<10		
9/30/2008	GMW-7R	<2	<2	642	2180	<10		
10/27/2008	GMW-7R	3	<2	**1300**	4910	<10		
11/20/2008	GMW-7R	3	<2	**2070**	6290	<10		
12/18/2008	GMW-7R	4	<2	**1980**	5830	<10		
1/19/2009	GMW-7R	3	<2	**1460**	4670	<10		
3/11/2009	GMW-7R	<25	<25	**2450**	8000			
6/25/2009	GMW-7R	4	<2	**2260**	6770			
9/17/2009	GMW-7R	5	<2	**2750**	9700			
11/6/2009	GMW-7R	4	<1	**3350**	**12400**	<10		
3/18/2010	GMW-7R	2	<1.0	**2600**	**10100**	<10		
6/17/2010	GMW-7R	<10	<20	**1570**	5420	<200		
10/5/2010	GMW-7R	<19.5	<19.6	**2500**	8850	<72.2		
12/7/2010	GMW-7R	<10	<20	**2480**	8150	<200		
3/2/2011	GMW-7R	<10	<20	**2000**	6970	<200		
6/9/2011	GMW-7R	<10	<20	**1100**	4160	<200		
9/27/2011	GMW-7R	<10	<20	**3090**	**11600**	<200		
12/9/2011	GMW-7R	<10	<20	**1850**	6670	<200		
3/19/2012	GMW-7R	<5	<10	**1580**	6040	<100		
9/26/2012	GMW-7R	<5	<10	**2370**	9070	<100		
3/26/2013	GMW-7R	<5	<10	**2710**	9280			
6/26/2013	GMW-7R	2.77	<1	**2100**	7480			
7/24/2013	GMW-7R	**5.35**	<1	**4970**	**17300**			
8/28/2013	GMW-7R	**5.23**	<1	**5830**	**22000**			
9/25/2013	GMW-7R	<2.2	<3	**4690**	**15400**			
			Average	2215	6676			
3/24/2004	GMW-8	<2	<2	<2	<5	<5		
6/25/2004	GMW-8	<2	<2	<2	<5	<5		
9/27/2004	GMW-8	<2	<2	<2	<5	<5		
12/14/2004	GMW-8	<2	<2	<2	<5	<5	<5	<5
3/16/2005	GMW-8	<2	<2	<2	<5	<5	<5	<5
6/20/2005	GMW-8	<2	<2	<2	<5	<5	<5	<5
12/22/2005	GMW-8	<2	<2	<2	<5	<5	<5	<5
11/13/2006	GMW-8	<2	<2	<2	<5	<5	<5	<5
11/19/2007	GMW-8	<2	<2	<2	<5	<10		
11/20/2008	GMW-8	<2	<2	<2	<5	<10		
11/6/2009	GMW-8	<0.5	<1	<1	<4	<10		
10/5/2010	GMW-8	<0.195	<0.196	<0.211	<0.407	<0.722		
9/27/2011	GMW-8	<0.5	<1	<1	<3	<10		
9/26/2012	GMW-8	<0.5	<1	<1	<3	<10		
9/25/2013	GMW-8	<0.5	<1	<1	<3			
3/29/2002	GMW-9R	<20	**14300**	**23400**	**80400**	<50		
6/27/2002	GMW-9R	<20	**4710**	**12500**	**48900**	<50		
9/26/2002	GMW-9R	84	**8670**	**13100**	**50500**	<50		
12/11/2002	GMW-9R	48	**32200**	**33440**	**115000**	<5		
3/26/2003	GMW-9R	<20	**7400**	**16100**	**53600**	<5		
6/12/2003	GMW-9R	<20	**5610**	**12700**	**44700**	<50		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	**WELL #**	**BENZENE**	**TOLUENE**	**E-BENZENE**	**XYLENES**	**MEK**	**CH2CL2**	**1,2-DCP**
Limits		**5**	**1000**	**700**	**10000**	**400**		
8/15/2003	GMW-9R	5	**3100**	**3200**	**24700**	<50	<5	<5
12/2/2003	GMW-9R	<20	**4540**	**10900**	**24100**	<50	<50	<50
3/24/2004	GMW-9R	11	**3750**	**10100**	**23100**	<50	<50	<50
6/25/2004	GMW-9R	<20	**7420**	**15200**	**54300**	<50	<50	<50
9/27/2004	GMW-9R	<20	**7850**	**2300**	**76500**	<50	<50	<50
12/14/2004	GMW-9R	<20	**9970**	**15500**	**55700**	<50	<50	<50
3/16/2005	GMW-9R	<20	**3530**	**8310**	**29300**	<50	<50	<50
6/20/2005	GMW-9R	<20	**4250**	**8790**	**32000**	<50	<50	<50
12/22/2005	GMW-9R	<20	**5390**	**17000**	**55100**	<50	<50	<50
3/20/2006	GMW-9R	<20	**1110**	**4380**	**14800**	<50	<50	<50
6/19/2006	GMW-9R	<20	**3670**	**13600**	**42800**	<50	<50	<50
9/18/2006	GMW-9R	<20	**2720**	**7900**	**23300**	<50		
11/13/2006	GMW-9R	<20	**2980**	**7880**	**24100**	<50		
3/6/2007	GMW-9R	<20	**2910**	**6250**	**19300**	<50		
6/20/2007	GMW-9R	<20	**1930**	**4210**	**12100**	<50		
11/19/2007	GMW-9R	<20	**1740**	**5750**	**18300**	<50		
3/24/2008	GMW-9R	21	**1810**	**6620**	**23200**	<100		
6/23/2008	GMW-9R	6	**1110**	**4640**	9230	<10		
8/7/2008	GMW-9R	<20	340	**1430**	4630	<100		
8/27/2008	GMW-9R	53	245	**1600**	5220	<100		
9/19/2008	GMW-9R	<2	8	407	1410	<10		
10/27/2008	GMW-9R	7	**1180**	**3550**	**12800**	<10		
11/20/2008	GMW-9R	11	**2370**	**8720**	**27400**	<10		
3/11/2009	GMW-9R	<25	**6960**	**17400**	**66400**			
5/12/2009	GMW-9R	12	**2780**	**9660**	**34700**			
6/25/2009	GMW-9R	6	**1280**	**5200**	**16200**			
9/17/2009	GMW-9R	16	**4150**	**12200**	**43600**			
11/6/2009	GMW-9R	10	**2300**	**11900**	**45600**	<100		
3/18/2010	GMW-9R	13	**4270**	**8910**	**35600**	15		
6/17/2010	GMW-9R	<50	**3020**	**11600**	**40400**	<1000		
10/5/2010	GMW-9R	<19.5	**1400**	**9650**	**33200**	<72.2		
12/7/2010	GMW-9R	7	574	**4850**	**18300**	<100		
3/2/2011	GMW-9R	<50	**3830**	**13200**	**50400**	<1000		
6/9/2011	GMW-9R	<50	**2350**	**9240**	**32500**	<1000		
9/27/2011	GMW-9R	60	**2630**	**14700**	**58400**	<1000		
12/9/2011	GMW-9R	<50	**3580**	**17900**	**66800**	<1000		
3/19/2012	GMW-9R	<50	**2870**	**10400**	**41700**	<1000		
9/26/2012	GMW-9R	<50	**3430**	**17900**	**69900**	<1000		
3/26/2013	GMW-9R	15.3	**3610**	**19000**	**67600**			
7/24/2013	GMW-9R	<5.5	**1680**	**8740**	**31200**			
9/25/2013	GMW-9R	<50	**1950**	**12000**	**42500**			
9/30/1996	GMW-10	97	8260	17900	45900	<50		
3/26/1997	GMW-10	<24	480	14100	18900	63		
6/17/1997	GMW-10	79	8230	28900	129000	96		
8/28/1997	GMW-10	43	5600	13000	371000	<50		
11/12/1997	GMW-10	15	1480	6380	25100	<5		
3/20/1998	GMW-10	<2	<2	<2	<5	<5		
3/20/1998	GMW-10	<2	8	520	1220	8		
6/19/1998	GMW-10	17	1800	4510	19500	110		
9/17/1998	GMW-10	49	1930	5950	27300	56		
12/15/1998	GMW-10	31	2200	7070	37800	45		
3/26/1999	GMW-10	26	2010	5320	23600	<5		
6/23/1999	GMW-10	<2	28	190	540	<5		
9/29/1999	GMW-10	<2	<2	2	12	<5		
3/29/2000	GMW-10	<5	6	210	320	<5		
6/29/2000	GMW-10	<2	<2	53	39	16		
7/21/2000	GMW-10	2	250	540	2570			
12/1/2000	**REMOVED**							
9/25/2001	**REPLACED**					<50		
3/29/2002	GMW-10	<20	230	7940	29900	<50		
6/27/2002	GMW-10	<20	565	7030	29900	<50		
9/26/2002	GMW-10	7	630	8720	30100	<5		
12/11/2002	GMW-10	<2	336	10520	42600	<50		
6/15/2003	GMW-10	<20	460	4780	20000	<10		
8/7/2008	GMW-10	<2	10	85	346	<100		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
8/27/2008	GMW-10	<20	<20	201	644	<100		
10/27/2008	GMW-10	3	191	3630	14500			
5/12/2009	GMW-10	11	890	6940	23500			
7/8/2009	GMW-10	10	378	6440	20900			
9/17/2009	GMW-10	3	72	875	3060			
9/29/2001	INSTALLED					<5		
3/29/2002	GMW-13	115	4220	24900	93200	<50		
6/27/2002	GMW-13	<20	4700	16900	63600	<50		
9/26/2002	GMW-13	14	6800	22800	78800	<5		
12/11/2002	GMW-13	16	11600	25300	96000	<50		
3/26/2003	GMW-13	<20	10100	24600	73500	<50		
6/12/2003	GMW-13	<20	6150	23100	90400	<50	<50	<50
8/15/2003	GMW-13	10	5410	17300	69400	<50	<50	<50
12/2/2003	GMW-13	<20	10500	23500	87200	<50	<50	<50
3/24/2004	GMW-13	<20	4760	15500	77100	<50	<50	<50
6/25/2004	GMW-13	<20	6650	24400	100000	<50	<50	<50
9/27/2004	GMW-13	<20	13200	37800	135000	<50	<50	<50
12/14/2004	GMW-13	<20	4660	16000	73500	<50	<50	<50
3/16/2005	GMW-13	<20	5280	18400	75900	<50	<50	<50
6/20/2005	GMW-13	<20	6930	20000	78400	<50	<50	<50
12/22/2005	GMW-13	<20	6970	20400	88200	<50		
11/13/2006	GMW-13	<20	8370	20700	87600	<100		
11/19/2007	GMW-13	<20	4350	10300	55800	<100		
11/20/2008	GMW-13	<20	6160	13400	60400			
6/25/2009	GMW-13	6	9180	16300	68300			
11/6/2009	GMW-13	<50	8330	19900	112000	<1000		
10/5/2010	GMW-13	<19.5	11200	25100	109000	<72.2		
9/27/2011	GMW-13	<50	5430	16900	77400	<1000		
9/26/2012	GMW-13	<50	12900	24700	105000	<1000		
7/24/2013	GMW-13	<11	12700	25800	116000			
9/25/2013	GMW-13	<50	15100	27900	110000			
	GMW-15					<50		
7/18/2003	TW-2	2	30	1350	1690	<50		
7/28/2003	TW-2	<20	48	2190	3250	<5		
8/1/2003	TW-2	<20	<20	5130	14500	<5		
8/14/2003	TW-2	<2	50	566	1400	<5	<5	<5
9/29/2003	GMW-15	<2	<2	640	1980	<5	<5	<5
12/2/2003	GMW-15	<2	11	1970	4580	<5	<5	<5
1/13/2004	GMW-15	<2	24	2340	4440	<5	<5	<5
3/24/2004	GMW-15	3	20	2020	4800	<5	<5	<5
6/25/2004	GMW-15	<2	<2	294	673	<5	<5	<5
9/27/2004	GMW-15	<2	<2	<2	6	<5	<5	<5
12/14/2004	GMW-15	<2	<2	<2	<5	<5	<5	<5
1/18/2005	GMW-15	<2	<2	2	20	<5	<5	<5
2/28/2005	GMW-15	<2	<2	<2	7	<5	<5	<5
3/16/2005	GMW-15	<2	<2	<2	7	<5	<5	<5
4/7/2005	GMW-15	<2	<2	8	19	<5	<5	<5
5/24/2005	GMW-15	<2	<2	79	243	<5	<5	<5
6/20/2005	GMW-15	<2	<2	913	2360	<5	<5	<5
8/12/2005	GMW-15	<2	<2	2860	6470	<5	<5	<5
9/29/2005	GMW-15	<2	<2	4880	7630	<5	<5	<5
10/24/2005	GMW-15	<2	<2	2790	5260	<5	<5	<5
12/2/2005	GMW-15	<2	<2	3040	8230	<5	<5	<5
12/22/2005	GMW-15	<2	61	2550	5920	<50	<5	<5
1/31/2006	GMW-15	<2	61	2880	7430	<50	<5	<5
2/22/2006	GMW-15	<20	<20	2530	5664	<50	<50	<50
3/20/2006	GMW-15	<20	<20	2610	6140	<5		
4/19/2006	GMW-15	<20	<20	2170	4070	<5		
5/16/2006	GMW-15	<5	4	1370	2300	<5		
6/19/2006	GMW-15	7	<2	3800	6200	<50		
7/17/2006	GMW-15	6	<2	2020	3760	<50		
8/21/2006	GMW-15	<20	<20	4400	10100	<50		
9/18/2006	GMW-15	<20	<20	4870	11000	<50		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
10/16/2006	GMW-15	<20	<20	5630	12400	<50		
11/13/2006	GMW-15	<20	<20	6010	13100	<50		
12/14/2006	GMW-15	<20	<20	3350	9090	<50		
1/15/2007	GMW-15	<20	<20	4590	9540	<50		
2/15/2007	GMW-15	5	<2	3550	7360	<50		
3/6/2007	GMW-15	<20	<20	3080	6500	<50		
4/16/2007	GMW-15	<20	<20	1870	3380	<50		
5/16/2007	GMW-15	<20	<20	1900	3790	<50		
6/20/2007	GMW-15	<20	<20	4320	7640	<50		
7/16/2007	GMW-15	<20	<20	4380	10400	<100		
8/17/2007	GMW-15	<20	<20	4330	7550	<100		
9/17/2007	GMW-15	<20	<20	3510	7770	<10		
10/22/2007	GMW-15	<20	<20	1140	2660	<100		
11/19/2007	GMW-15	<2	<2	2610	5500	<100		
12/14/2007	GMW-15	<20	<20	4020	9720	<100		
1/17/2008	GMW-15	<20	25	5120	13800	<100		
2/22/2008	GMW-15	<20	<20	3480	9060	<100		
3/24/2008	GMW-15	<20	<20	1910	5750	<100		
4/22/2008	GMW-15	<20	<20	1770	5680	<100		
5/14/2008	GMW-15	<20	<20	1440	6460	<100		
6/23/2008	GMW-15	<20	<20	2190	9870	<100		
7/18/2008	GMW-15	<20	<20	1600	5840	<100		
8/18/2008	GMW-15	<20	<20	985	4770	<100		
09-19-08	GMW-15	<20	<20	1450	5880	<10		
10/27/2008	GMW-15	<20	<20	491	1560	<100		
11/20/2008	GMW-15	7	<2	699	2000	<100		
12/18/2008	GMW-15	<20	<20	1150	3840			
1/19/2009	GMW-15	<20	<20	1780	6050			
3/11/2009	GMW-15	<25	<25	1550	10650			
6/25/2009	GMW-15	5	2	1540	6210			
9/17/2009	GMW-15	9	<20	1360	7540			
11/6/2009	GMW-15	8	<1	1280	7570	<10		
11/6/2009	GMW-15	<100	<100	380	2400		IDNR Split sample	
3/18/2010	GMW-15	2	5	701	3150	<10		
6/17/2010	GMW-15	6	<10	1650	6410	<100		
10/5/2010	GMW-15	8	2	2640	13600	<7.22		
12/7/2010	GMW-15	6	<10	1090	8870	<100		
3/2/2011	GMW-15	6	<10	1190	4890	<100		
6/9/2011	GMW-15	9	<10	3860	16300	<100		
9/27/2011	GMW-15	11.1	<10	6890	25800	<100		
12/9/2011	GMW-15	14	<10	10200	32600	<100		
3/19/2012	GMW-15	<50	<100	6940	24700	<1000		
9/26/2012	GMW-15	<10	<20	6570	23000	<200		
3/26/2013	GMW-15	1.48	<15	284	983			
5/3/2013	GMW-15	3.0	<25	2060	6680			
6/26/2013	GMW-15	4.72	1.60	2820	10900			
7/24/2013	GMW-15	4.01	<1	156	107			
9/25/2013	GMW-15	<5.50	<7.50	2820	12400			
	GMW-16					<50		
7/18/2003	TW-1	6	1110	5400	12700	<5		
7/28/2003	TW-1	<20	155	2600	8360	<5		
8/1/2003	TW-1	<20	322	3670	12600	<5	<5	<5
8/14/2003	TW-1	2	25	334	883	<5	<5	<5
9/29/2003	GMW-16	<2	56	189	715	<5	<5	<5
12/2/2003	GMW-16	<2	<2	159	470	<5	<5	<5
1/13/2004	GMW-16	<2	<2	142	324	<5	<5	<5
3/24/2004	GMW-16	<2	<2	635	2220	<5	<5	<5
6/25/2004	GMW-16	<2	<2	113	399	<5	<5	<5
9/27/2004	GMW-16	<2	5	159	397	<5	<5	<5
12/14/2004	GMW-16	<2	<5	75	227	<5	<5	<5
3/16/2005	GMW-16	<2	<5	73	155	<5		
6/20/2005	GMW-16	<2	<5	316	902	<5		
12/22/2005	GMW-16	<2	10	2450	8260	<100		
11/13/2006	GMW-16	<2	27	3720	11100			
11/19/2007	GMW-16	6	33	2870	8940	<50		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
11/20/2008	GMW-16	<20	<20	1700	4460	<50		
11/6/2009	GMW-16	5	37	5940	20200	<10	<50	<50
10/5/2010	GMW-16	<19.5	<19.6	4020	11500	<72.2		
9/27/2011	GMW-16	<5	19.3	1080	3060	<100		
9/26/2012	GMW-16	<5	<10	507	1480	<100		
9/25/2013	GMW-16	<5	111.0	4310	13700			
7/28/2003	TW-3	29	3310	15400	58800	<5	<50	<50
8/1/2003	TW-3	<20	400	1700	7480	<5	<5	<5
8/14/2003	TW-3	<20	206	1140	4480	<5	<5	<5
9/29/2003	GMW-17	<2	32	42	202	<5	<5	<5
12/2/2003	GMW-17	<2	<2	6	20	<5	<5	<5
3/24/2004	GMW-17	<2	<2	2	10	<5	<5	<5
6/25/2004	GMW-17	<2	<2	19	425	<5	<5	<5
9/27/2004	GMW-17	<2	123	274	1180	<5	<5	<5
12/14/2004	GMW-17	<2	<2	330	1320	<5	<5	<5
1/18/2005	GMW-17	<2	103	305	1550	<5	<5	<5
2/28/2005	GMW-17	<2	136	250	999	<5	<5	<5
3/16/2005	GMW-17	<2	155	261	996	<5	<5	<5
4/7/2005	GMW-17	<2	56	79	420	<5	<5	<5
5/24/2005	GMW-17	<2	<2	47	519	<5	<5	<5
6/20/2005	GMW-17	<2	<2	40	128	<5		
12/22/2005	GMW-17	<2	<2	109	535	<5		
3/20/2006	GMW-17	<2	<2	<5	<5	<5		
6/19/2006	GMW-17	<2	<2	5	6	<5		
9/18/2006	GMW-17	<2	<2	8	21	<5		
11/13/2006	GMW-17	<2	<2	<2	15	<10		
3/6/2007	GMW-17	<2	<2	<2	<5	<10		
6/20/2007	GMW-17	<2	<2	800	361	<10		
11/19/2007	GMW-17	<2	<2	9	10	<10		
3/24/2008	GMW-17	<2	<2	14	23	<10		
6/23/2008	GMW-17	<2	<2	133	230			
09-19-08	GMW-17	<2	<2	<2	<5			
11/20/2008	GMW-17	<2	<2	<2	<5			
3/11/2009	GMW-17	<1	<1	2	6			
6/25/2009	GMW-17	<2	<2	<2	4	<5		
9/17/2009	GMW-17	5	23	70	325	<5		
11/6/2009	GMW-17	<0.5	<1	2	6	<10		
3/18/2010	GMW-17	<0.5	<1	<1	<3	<10		
6/17/2010	GMW-17	<0.5	<1	20	32	<10		
10/5/2010	GMW-17	<0.195	<0.196	32	57	<0.722		
12/7/2010	GMW-17	<0.5	<1.0	<1.0	<3.0	<10.0		
3/2/2011	GMW-17	<0.5	<1.0	122	327	<10.0		
6/9/2011	GMW-17	<0.5	<1.0	<1.0	<3	<10.0		
9/27/2011	GMW-17	<0.5	<1	5.36	17	<10		
12/9/2011	GMW-17	<0.5	<1	4.68	11	<10		
3/19/2012	GMW-17	<0.5	<1	<1	<3	<10		
9/26/2012	GMW-17	<0.5	<1	<1	<3	<10		
3/26/2013	GMW-17	<0.5	<1	<1	<3			
9/25/2013	GMW-17	<0.5	<1	<1	<3			
8/15/2003	TW-6	<2	21	109	341	<5	<5	<5
9/29/2003	GMW-18	<2	<2	120	229	<5	<5	<5
12/2/2003	GMW-18	<2	14	188	522	<5	<5	<5
3/24/2004	GMW-18	<2	9	150	367	<5	<5	<5
6/25/2004	GMW-18	<2	23	220	594	<5	<5	<5
9/27/2004	GMW-18	<2	5	104	243	<5		
12/14/2004	GMW-18	<2	<2	60	174	<5		
3/16/2005	GMW-18	<2	48	393	847	<5		
6/20/2005	GMW-18	<2	6	100	313	<5		
12/22/2005	GMW-18	<2	31	574	1380	<5		
11/13/2006	GMW-18	<2	21	474	1030			
11/19/2007	GMW-18	<2	<2	8	27	<5		
11/20/2008	GMW-18	<2	47	210	677	<5		
11/6/2009	GMW-18	<0.500	36	195	565	<10	<5	<5

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	**WELL #**	**BENZENE**	**TOLUENE**	**E-BENZENE**	**XYLENES**	**MEK**	**CH2CL2**	**1,2-DCP**
Limits		**5**	**1000**	**700**	**10000**	**400**		
10/5/2010	GMW-18	WELL SEAL FAILED						
1/26/2011	GMW-18R	WELL REPLACE WITH GMW-18R						
2/4/2011	GMW-18R	<0.5	64.10	241	737	31		
9/27/2011	GMW-18R	<0.5	<1	6.85	35.8	<10		
9/26/2012	GMW-18R	<0.5	<1	49.2	172	<10		
9/25/2013	GMW-18R	<0.5	<1	104	284			
8/15/2003	TW-4	<2	<2	8	21	<5	<5	<5
9/29/2003	GMW-19	<2	<2	<2	<5	<5	<5	<5
10/15/2003	GMW-19	<2	<2	<2	<5	<5	<5	<5
11/21/2003	GMW-19	<2	<2	<2	<5	<5	<5	<5
12/2/2003	GMW-19	<2	<2	<2	<5	<5	<5	<5
1/13/2004	GMW-19	<2	<2	<2	<5	<5	<5	<5
2/4/2004	GMW-19	<2	<2	<2	<5	<5	<5	<5
3/24/2004	GMW-19	<2	<2	104	120	<5	<5	<5
4/30/2004	GMW-19	<2	<2	<2	7	<5	<5	<5
5/27/2004	GMW-19	<2	<2	<2	<5	<5	<5	<5
6/23/2004	GMW-19	<2	<2	240	397	<5	<5	<5
7/19/2004	GMW-19	<2	<2	121	140	<5	<5	<5
9/27/2004	GMW-19	<2	<2	3	13	<5	<5	<5
10/27/2004	GMW-19	<2	<2	13	143	<5		
12/14/2004	GMW-19	<2	<2	8	48	<5		
3/16/2005	GMW-19	<2	<2	637	1050	<5		
12/22/2005	GMW-19	<2	<2	21	73	<5		
3/20/2006	GMW-19	<2	<2	<2	<2	<5		
6/19/2006	GMW-19	<2	<2	11	71	<5		
9/18/2006	GMW-19	<2	<2	<2	<2	<5		
11/13/2006	GMW-19	<2	<2	<2	<2	<10		
3/6/2007	GMW-19	<2	<2	<2	6	<10		
6/20/2007	GMW-19	<2	<2	408	1610	<10		
11/19/2007	GMW-19	<2	<2	376	1850	<10		
3/24/2008	GMW-19	<2	<2	4	704	<10		
6/23/2008	GMW-19	2	<2	608	3040			
09-19-08	GMW-19	<2	<2	207	702			
11/20/2008	GMW-19	<2	<2	97	732			
3/11/2009	GMW-19	<1	<1	17	536			
6/25/2009	GMW-19	<2	<2	<2	160			
9/17/2009	GMW-19	<2	<2	233	810	<50		
11/6/2009	GMW-19	1	<1	42	1120	<10		
3/18/2010	GMW-19	3	<1	572	4280	<10		
6/17/2010	GMW-19	<5	<10	**984**	3900	<100		
10/5/2010	GMW-19	<0.975	<0.980	403	1120	<3.61		
12/7/2010	GMW-19	<2.5	<5	574	2320	<50		
3/2/2011	GMW-19	<2.5	<5	92	362	<50		
6/9/2011	GMW-19	<2.5	<5	286	844	<50		
9/27/2011	GMW-19	<2.5	<5	137	477	<50		
12/9/2011	GMW-19	1	<1	25	247	<10		
3/19/2012	GMW-19	1	<1	158	680	<10		
9/26/2012	GMW-19	1.53	<1	332	1820	<10		
3/26/2013	GMW-19	<5	<10	<10	<30			
5/3/2013	GMW-19	<0.5	<1	<1	4.1			
6/26/2013	GMW-19	0.838	<1	61.8	366			
7/24/2013	GMW-19	1.29	<1	269	775			
9/25/2013	GMW-19	<0.5	<1	<1	61.5			
			Average	227	850			
8/15/2003	TW-5	<20	<20	**1020**	2990	<5	<5	<5
9/29/2003	GMW-20	<2	<2	66	176	<5	<5	<5
10/15/2003	GMW-20	<2	<2	420	1530	<5	<5	<5
11/21/2003	GMW-20	<2	7	**1320**	4640	<5	<5	<5
12/2/2003	GMW-20	<2	<2	**743**	2520	<5	<5	<5
1/13/2004	GMW-20	<2	<2	560	2060	<5	<5	<5
2/4/2004	GMW-20	<2	<2	2	10	<5	<5	<5
3/24/2004	GMW-20	<2	<2	134	483	<5	<5	<5
4/30/2004	GMW-20	<2	<2	<2	<5	<5	<5	<5
5/27/2004	GMW-20	<2	<2	447	1280	<5	<5	<5
6/23/2004	GMW-20	<2	<2	18	41	<5	<5	<5

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
7/19/2004	GMW-20	<2	<2	250	794	<5	<5	<5
9/27/2004	GMW-20	<2	<2	11	30	<5	<5	<5
10/27/2004	GMW-20	<2	<2	<2	<5	<5		
12/14/2004	GMW-20	<2	<2	29	94	<5		
3/16/2005	GMW-20	<2	<2	32	117	<5		
12/22/2005	GMW-20	<2	<2	94	319	<50		
3/20/2006	GMW-20	<2	<2	239	643	<5		
6/19/2006	GMW-20	<2	<2	8	17	<5		
9/18/2006	GMW-20	<20	<20	352	861	<5		
11/13/2006	GMW-20	<2	<2	493	1040	<10		
3/6/2007	GMW-20	<2	<2	**896**	2290	<10		
6/20/2007	GMW-20	<2	<2	398	900	<10		
11/19/2007	GMW-20	<2	3	**820**	2460	<10		
3/24/2008	GMW-20	<2	3	343	1050	<10		
6/23/2008	GMW-20	<2	<2	124	336			
09-19-08	GMW-20	<2	<2	109	287			
11/20/2008	GMW-20	<2	<2	324	801			
3/11/2009	GMW-20	<1	<1	280	960			
6/25/2009	GMW-20	<2	<2	220	628			
9/17/2009	GMW-20	<2	6	506	1480			
11/6/2009	GMW-20	2	1	**751**	2820	<10		
3/18/2010	GMW-20	<0.5	<1	3	6	<10		
6/17/2010	GMW-20	1	<1	398	1170	<10		
10/5/2010	GMW-20	<0.195	<0.196	29	75	<0.722		
12/7/2010	GMW-20	<0.5	<1	21	58	<10.0		
3/2/2011	GMW-20	2	<1	**1050**	2950	<10.0		
6/9/2011	GMW-20	<0.5	<1	6	14	<10.0		
9/27/2011	GMW-20	<0.5	<1	63.3	184	<10		
12/9/2011	GMW-20	1	<1	356	1160	<10		
3/19/2012	GMW-20	<2.5	5	**1000**	3190	<50		
9/26/2012	GMW-20	<5	<10	**1410**	4250	<100		
3/26/2013	GMW-20	<5	<10	**4030**	**10200**			
5/3/2013	GMW-20	<5	<10	**1850**	4620			
6/26/2013	GMW-20	<2.5	<5	**963**	2710			
7/24/2013	GMW-20	1.09	<1	**752**	3920			
9/25/2013	GMW-20	<5	<10	**1300**	4290			
			Average	539	1610			
4/5/2004	GMW-21	<2	<2	**4580**	**10800**	<5	<5	<5
4/7/2004	GMW-21	8	13	**5300**	**12200**	<5	<5	<5
4/30/2004	GMW-21	<2	<2	**1070**	2940	<5	<5	<5
5/27/2004	GMW-21	<2	<2	**2460**	6740	<5	<5	<5
6/23/2004	GMW-21	<2	<2	**2510**	6860	<5	<5	<5
7/19/2004	GMW-21	<2	<2	**2890**	9410	<5	<5	<5
9/27/2004	GMW-21	<2	15	**2870**	9610	<5	<50	<50
10/27/2004	GMW-21	<2	<20	**6760**	**27200**	<50	<50	<50
12/14/2004	GMW-21	<2	<20	**2380**	**12600**	<50	<50	<50
1/18/2005	GMW-21	<2	49	**3670**	**10100**	<50	<5	<5
2/28/2005	GMW-21	<20	<20	**2330**	7300	<5	<5	<5
3/16/2005	GMW-21	<20	<20	**2740**	8220	<5	<5	<5
4/7/2005	GMW-21	5	36	**2450**	6710	<5	<5	<5
5/24/2005	GMW-21	<2	24	**1890**	4900	<5	<5	<5
6/20/2005	GMW-21	<2	<20	**1020**	3310	<5	<5	<5
8/30/2005	GMW-21	<2	3	367	778	<5	<5	<5
9/29/2005	GMW-21	<2	<2	**1240**	2920	<5	<5	<5
10/24/2005	GMW-21	<2	<2	**1890**	6010	<5	<5	<5
12/2/2005	GMW-21	<2	<2	**1580**	4080	<5		
12/22/2005	GMW-21	<2	211	**2880**	**12800**	<5		
1/31/2006	GMW-21	<2	<2	**1680**	3990	<5		
2/22/2006	GMW-21	<2	<2	**1230**	2710	<5		
3/20/2006	GMW-21	<2	<2	**1020**	2190	<5		
4/19/2006	GMW-21	<2	<2	**1430**	3130	<75		
5/16/2006	GMW-21	<2	<2	**1250**	3010	<50		
6/19/2006	GMW-21	4	<2	**1902**	4950	<50		
7/17/2006	GMW-21	<30	<30	**2590**	6410	<50		
8/21/2006	GMW-21	<20	<20	**3590**	8520	<50		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	**WELL #**	**BENZENE**	**TOLUENE**	**E-BENZENE**	**XYLENES**	**MEK**	**CH2CL2**	**1,2-DCP**
Limits		**5**	**1000**	**700**	**10000**	**400**		
9/18/2006	GMW-21	<20	<20	**4330**	**10100**	<50		
10/16/2006	GMW-21	6	<2	**4440**	9330	<50		
11/13/2006	GMW-21	<20	<20	**4190**	8890	<50		
12/14/2006	GMW-21	<20	<20	**3170**	7020	<50		
1/15/2007	GMW-21	<20	<20	**3210**	6930	<50		
2/15/2007	GMW-21	5	<2	**2570**	6660	<50		
3/6/2007	GMW-21	<20	<20	**2960**	7630	<50		
4/16/2007	GMW-21	<20	<20	**3820**	8050	<50		
5/16/2007	GMW-21	<20	<20	**3270**	7930	<50		
6/20/2007	GMW-21	<20	<20	**3670**	9530	<100		
7/16/2007	GMW-21	<20	<20	**3800**	**10300**	<100		
8/17/2007	GMW-21	<20	<20	**4020**	**12400**	<10		
9/17/2007	GMW-21	<20	<20	**4190**	**12300**	<100		
10/22/2007	GMW-21	<20	<20	**3800**	**13400**	<100		
11/19/2007	GMW-21	**7**	12	**2670**	7730	<100		
12/14/2007	GMW-21	<20	<20	**3110**	9310	<100		
1/17/2008	GMW-21	<20	<20	**3450**	**10200**	<100		
2/22/2008	GMW-21	<20	<20	**4040**	**11700**	<100		
3/24/2008	GMW-21	<20	<20	**2430**	7030	<100		
4/22/2008	GMW-21	<20	<20	**4240**	**12000**			
5/14/2008	GMW-21	<20	<20	**2500**	6830			
6/23/2008	GMW-21	<20	<20	**2580**	6750	<100		
8/18/2008	GMW-21	**11**	<2	**3340**	9240	<100		
9/19/2008	GMW-21	<20	<20	**2820**	8500	<100		
10/27/2008	GMW-21	<20	<20	**3160**	9150	<100		
11/20/2008	GMW-21	<20	<20	**4890**	**11800**			
12/18/2008	GMW-21	3	<2	**1440**	3510			
1/19/2009	GMW-21	<20	<20	**1830**	5360			
3/11/2009	GMW-21	<25	<25	**2800**	6640			
6/25/2009	GMW-21	3	<2	**1680**	4880			
9/17/2009	GMW-21	**7**	<2	**3100**	8680			
11/6/2009	GMW-21	4	<1	**3230**	**10100**	<10		
11/6/2009	GMW-21	<100	<100	**2400**	7300		IDNR Split Sample	
3/18/2010	GMW-21	3	<100	**968**	3600	<10		
6/17/2010	GMW-21	<5	<10	443	1840	<100		
10/5/2010	GMW-21	<3.90	<3.92	578	2300	<14.4		
12/7/2010	GMW-21	<10.0	<20.0	**1120**	4470	<200		
3/2/2011	GMW-21	<10.0	<20.0	617	2630	<200		
6/9/2011	GMW-21	**23**	23	**774**	3040	<200		
9/27/2011	GMW-21	<10	<20	411	1730	<200		
12/9/2011	GMW-21	<5	<10	**1030**	3560	<100		
3/19/2012	GMW-21	4	<5	**1870**	5100	<50		
9/26/2012	GMW-21	**5.8**	<10	**3630**	**10400**			
3/26/2013	GMW-21	**5.6**	<10	**4720**	**11500**			
5/3/2013	GMW-21	**7.3**	<10	**5180**	**14300**			
6/26/2013	GMW-21	**6.88**	<10	**4730**	**10600**			
7/24/2013	GMW-21	<5	<10	**1240**	5500			
8/28/2013	GMW-21	4.89	<1	**3170**	**12900**			
9/25/2013	GMW-21	<5.5	<7.5	**2990**	9570			
			Average	2704	7670			
4/5/2004	GMW-22	<2	<2	3270	6220	<5	<5	<5
4/7/2004	GMW-22	5	<2	2230	4710	<5	<5	<5
4/30/2004	GMW-22	<2	<2	<2	5	<5	<5	<5
5/27/2004	GMW-22	<2	<2	1410	2440	<5	<5	<5
6/23/2004	GMW-22	<2	<2	3470	5400	<5	<5	<5
7/19/2004	GMW-22	<2	<2	2910	3890	<5	<5	<5
9/27/2004	GMW-22	<20	<20	2070	3440	<5		
10/27/2004	GMW-22	<20	<20	2080	3090	<5		
12/14/2004	GMW-22	<2	<2	635	1200		<5	<5
3/16/2005	GMW-22	<2	<2	641	1220	<5	<5	<5
11/20/2008	GMW-22	4	<2	151	2990	<5	<5	<5
4/5/2004	GMW-23	<2	<2	26	67	<5	<5	<5
4/7/2004	GMW-23	<2	<2	<2	<5	<5	<5	<5
4/30/2004	GMW-23	<2	<2	<2	<5	<5	<5	<5
5/27/2004	GMW-23	<2	<2	<2	<5	<5	<5	<5

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GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
6/23/2004	GMW-23	<2	<2	<2	<5	<5	<5	<5
7/19/2004	GMW-23	<2	<2	<2	<5	<5		
9/27/2004	GMW-23	<2	<2	6	38	<5		
10/27/2004	GMW-23	<2	<2	<2	<5	<5		
12/14/2004	GMW-23	<2	<2	3	40	<5	<5	<5
3/16/2005	GMW-23	<2	<2	<2	<5			
4/12/2006	GMW-23	<2	<2	<2	<5	<5	<5	<5
11/17/2004	SB-1	8	11	3790	9630	<5	<5	<5
11/17/2004	SB-2	<2	<2	<2	<5	<50	<50	<50
11/18/2004	SB-3	<2	<2	<2	<5	<5	<5	<5
11/18/2004	SB-4	<20	7890	23800	96900	<5	<5	<5
11/22/2004	GMW-24	<2	<2	<2	<5	<5		
12/14/2004	GMW-24	<2	<2	<2	<5		<5	<5
3/16/2005	GMW-24	<2	<2	<2	<5	<5	<5	<5
4/12/2006	GMW-24	<2	<2	<2	<5	<5	<5	<5
						<5	<5	<5
11/23/2004	GMW-25	<2	413	653	3680	<5	<5	<5
12/14/2004	GMW-25	<2	234	506	2030	<5	<5	<5
1/18/2005	GMW-25	<2	318	744	2860	<5	<5	<5
2/28/2005	GMW-25	<2	177	613	2060	<5	<5	<5
3/16/2005	GMW-25	<2	226	638	2260	<5	<5	<5
4/7/2005	GMW-25	<2	163	498	1760	<5	<5	<5
5/24/2005	GMW-25	<2	107	338	1030	<5	<5	<5
6/20/2005	GMW-25	<2	59	191	648	<5	<5	<5
8/30/2005	GMW-25	<2	<2	88	189	<5	<5	<5
9/29/2005	GMW-25	<2	<2	57	123	<5	<5	<5
10/24/2005	GMW-25	<2	<2	68	141	<5	<5	<5
12/2/2005	GMW-25	<2	<2	22	<5	<5		
12/22/2005	GMW-25	<2	<2	50	29	<5		
1/31/2006	GMW-25	<2	<2	<2	<5	<5		
2/22/2006	GMW-25	<2	<2	17	<5	<5		
3/20/2006	GMW-25	<2	<2	29	51	<5		
4/19/2006	GMW-25	<2	<2	16	54	<5		
5/16/2006	GMW-25	<2	<2	10	31	<5		
6/19/2006	GMW-25	<2	<2	<2	6	<5		
7/17/2006	GMW-25	<2	3	18	63	<5		
8/21/2006	GMW-25	<2	9	87	254	<5		
9/18/2006	GMW-25	<2	9	83	250	<5		
10/16/2006	GMW-25	<2	10	95	262	<5		
11/13/2006	GMW-25	<2	10	79	231	<5		
12/14/2006	GMW-25	<2	<2	<2	25	<5		
1/15/2007	GMW-25	<2	<2	7	29	<5		
2/15/2007	GMW-25	<2	<2	9	35	<5		
3/6/2007	GMW-25	<2	<2	<2	<2	<5		
4/16/2007	GMW-25	<2	3	11	50	<5		
5/16/2007	GMW-25	<2	9	33	128	<5		
6/20/2007	GMW-25	<2	6	23	87	<10		
7/16/2007	GMW-25	<2	6	23	85	<10		
8/17/2007	GMW-25	<2	7	30	110	<10		
9/17/2007	GMW-25	<2	10	38	165	<10		
10/22/2007	GMW-25	<2	<2	26	91	<10		
11/19/2007	GMW-25	<2	<2	26	113	<10		
12/14/2007	GMW-25	<2	<2	35	238	<10		
1/17/2008	GMW-25	<2	<2	33	164	<10		
2/22/2008	GMW-25	<2	<2	63	272	<10		
3/24/2008	GMW-25	<2	<2	66	247	<10		
4/22/2008	GMW-25	<2	<2	16	51	<10		
5/14/2008	GMW-25	<2	<2	10	32	<10		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
6/23/2008	GMW-25	<2	<2	13	76	<10		
7/18/2008	GMW-25	<2	<2	28	330	<10		
8/18/2008	GMW-25	<2	<2	74	365	<10		
9/19/2008	GMW-25	<2	<2	72	273	<10		
10/27/2008	GMW-25	<2	<2	<2	<5	<10		
11/20/2008	GMW-25	<2	<2	18	75			
12/18/2008	GMW-25	<2	<2	<2	18			
1/19/2009	GMW-25	<2	<2	<2	13			
3/11/2009	GMW-25	<1	<1	2	9			
6/25/2009	GMW-25	<2	7	26	128	<5		
9/17/2009	GMW-25	<2	2	18	346			
11/6/2009	GMW-25	1	<1	2	98	<10		
3/18/2010	GMW-25	1	<1	15	306	<10		
6/17/2010	GMW-25	<0.5	<1	164	388	<10		
10/5/2010	GMW-25	<0.195	<0.195	27	264	<0.722		
12/7/2010	GMW-25	<0.5	<1	10	56	<10		
3/2/2011	GMW-25	<0.5	2	242	715	<10		
6/9/2011	GMW-25	<0.5	<1	91	215	<10		
9/27/2011	GMW-25	<0.5	<1	123	367	<10		
12/9/2011	GMW-25	<0.5	<1	38.9	150	<10		
3/19/2012	GMW-25	<0.5	<1	27.3	44	<10		
9/26/2012	GMW-25	<0.5	<1	176	542	<10		
3/26/2013	GMW-25	<0.5	<1	247	657			
5/3/2013	GMW-25	<0.5	<1	101	263			
6/26/2013	GMW-25	<0.5	<1	106	239			
7/24/2013	GMW-25	0.806	1.1	100	250			
8/28/2013	GMW-25	<0.5	<1	152	410			
9/25/2013	GMW-25	<0.5	<1	146	381			
			average	117	414			
11/23/2004	GMW-26	<2	<2	<2	<5	<5	<5	<5
12/14/2004	GMW-26	<2	<2	<2	<5	<5	<5	<5
1/18/2005	GMW-26	<2	<2	<2	<5	<5	<5	<5
2/28/2005	GMW-26	<2	<2	<2	<5	<5	<5	<5
3/16/2005	GMW-26	<2	<2	<2	<5	<5		
4/7/2005	GMW-26	<2	<2	<2	<5	<5		
5/24/2005	GMW-26	<2	<2	<2	<5		<5	<5
6/20/2005	GMW-26	<2	<2	<2	<5	<5	<5	<5
4/12/2006	GMW-26	<2	<2	<2	<5	<5	<5	<5
						<5		
11/23/2004	GMW-27	<2	<2	33	159	<5		
12/14/2004	GMW-27	<2	<2	<2	<5		<5	<5
3/16/2005	GMW-27	<2	<2	61	89	<5	<5	<5
4/12/2006	GMW-27	<2	64	143	548	<5	<5	<5
						<5	<5	<5
11/24/2004	GMW-28	<2	<2	<2	<5	<5	<5	<5
12/14/2004	GMW-28	<2	<2	<2	<5	<5	<5	<5
3/16/2005	GMW-28	<2	<2	<2	<5	<5		
4/7/2005	GMW-28	<2	<2	<2	<5	<5		
5/24/2005	GMW-28	<2	<2	<2	<5		<5	<5
6/20/2005	GMW-28	<2	<2	<2	<5	<5	<5	<5
4/12/2006	GMW-28	<2	<2	<2	<5	<5	<5	<5
11/24/2004	GMW-29	<2	<2	<2	<5	<5	<5	<5
12/14/2004	GMW-29	<2	<2	<2	<5	<5	<5	<5
1/18/2005	GMW-29	<2	<2	<2	<5	<5	<5	<5
2/28/2005	GMW-29	<2	<2	<2	<5	<5	<5	<5
3/16/2005	GMW-29	<2	<2	<2	<5	<5	<5	<5
4/7/2005	GMW-29	<2	<2	<2	<5	<5		
5/24/2005	GMW-29	<2	<2	<2	<5	<5		
6/20/2005	GMW-29	<2	<2	<2	8	<5		
12/22/2005	GMW-29	<2	<2	<2	<5		<5	<5
3/20/2006	GMW-29	<2	<2	<2	<5	<5	<5	<5
4/12/2006	GMW-29	<2	<2	<2	<5	<5	<5	<5
11/29/2004	GMW-30	<2	<2	<2	<5	<5	<5	<5
12/14/2004	GMW-30	<2	<2	<2	<5	<5	<5	<5

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
1/18/2005	GMW-30	<2	<2	<2	<5	<5	<5	<5
2/28/2005	GMW-30	<2	<2	<2	454	<5	<5	<5
3/15/2005	GMW-30	10	7	<2	299	<5	<5	<5
3/16/2005	GMW-30	6	<2	<2	240	<5	<5	<5
4/7/2005	GMW-30	4	<2	<2	27	<5	<5	<5
5/24/2005	GMW-30	4	<2	<2	19	<5		
6/20/2005	GMW-30	<2	<2	<2	<5	<5		
8/30/2005	GMW-30	<2	<2	<2	<5	<5		
12/22/2005	GMW-30	<2	<2	<2	<5	<5		
3/20/2006	GMW-30	<2	<2	<2	<5	<5		
9/18/2006	GMW-30	<2	<2	<2	<5	<5		
10/16/2006	GMW-30	<2	<2	<2	<5	<5		
11/13/2006	GMW-30	<2	<2	<2	<5	<5		
12/14/2006	GMW-30	<2	<2	<2	<5	<5		
1/15/2007	GMW-30	<2	<2	<2	<5	<5		
2/15/2007	GMW-30	<2	<2	<2	<5	<5		
3/6/2007	GMW-30	<2	<2	<2	<5	<5		
4/16/2007	GMW-30	<2	<2	<2	<5	<5		
5/16/2007	GMW-30	<2	<2	<2	<5	<5		
6/20/2007	GMW-30	<2	<2	<2	<5	<10		
7/16/2007	GMW-30	<2	<2	<2	<5	<10		
8/17/2007	GMW-30	<2	<2	<2	<5	<10		
9/17/2007	GMW-30	<2	<2	<2	<5	<10		
10/22/2007	GMW-30	<2	<2	<2	<5	<10		
11/19/2007	GMW-30	<2	<2	<2	<5	<10		
12/14/2007	GMW-30	<2	<2	<2	<5	<10		
1/17/2008	GMW-30	<2	<2	<2	<5	<10		
2/22/2008	GMW-30	<2	<2	<2	<5	<10		
3/24/2008	GMW-30	2	<2	<2	<5	<10		
4/22/2008	GMW-30	5	<2	<2	<5	<10		
5/14/2008	GMW-30	3	<2	<2	<5	<10		
6/23/2008	GMW-30	2	<2	<2	<5	<10		
7/18/2008	GMW-30	<2	<2	<2	<5	<10		
8/18/2008	GMW-30	<2	<2	<2	<5	<10		
9/19/2008	GMW-30	<2	<2	<2	<5	<10		
10/27/2008	GMW-30	<2	<2	<2	<5	<10		
11/20/2008	GMW-30	5	<2	<2	<5			
12/18/2008	GMW-30	<2	<2	<2	<5			
1/19/2009	GMW-30	<2	<2	<2	<5			
3/11/2009	GMW-30	<1	<1	<1	2			
6/25/2009	GMW-30	<2	<2	6	25	<5		
9/17/2009	GMW-30	<2	<2	7	33			
11/6/2009	GMW-30	<0.5	<1	<1	<4	<10		
11/6/2009	GMW-30	<5	<5	<5	<5		IDNR Split Sample	
12/3/2009	GMW-30	<0.5	<2	<2	<3			
1/5/2010	GMW-30	<0.5	<1	<1	<6	<10		
3/18/2010	GMW-30	<0.5	<1	<1	<7.5	<10		
6/17/2010	GMW-30	<0.5	<1	<1	<3	<10		
10/5/2010	GMW-30	<0.195	<0.196	<0.211	<0.407	<0.722		
12/7/2010	GMW-30	<0.5	<1	<1	<3	<10		
3/2/2011	GMW-30	<0.5	<1	<1	<3	<10		
6/9/2011	GMW-30	<0.5	<1	<1	<3	<10		
9/27/2011	GMW-30	<0.5	<1	<1	<3	<10		
12/9/2011	GMW-30	1.16	<1	1.02	<3	<10		
3/19/2012	GMW-30	<0.5	<1	<1	<3	<10		
9/26/2012	GMW-30	<0.5	<1	<1	3.21	<10		
3/26/2013	GMW-30	**5.12**	1.71	**765**	1660			
5/3/2013	GMW-30	**5.60**	2.59	432	2350			
6/26/2013	GMW-30	**6.44**	1.79	453	2500			
7/24/2013	GMW-30	**5.98**	2.30	**731**	2410			
8/28/2013	GMW-30	**5.86**	1.56	**881**	2510			
9/25/2013	GMW-30	**7.14**	1.58	**1380**	3740			
11/18/2004	GMW-31	<2	<2	<2	<5	<5	<5	<5
12/14/2004	GMW-31	<2	<2	<2	<5	<5	<5	<5
1/18/2005	GMW-31	<2	<2	<2	<5	<5	<5	<5
2/28/2005	GMW-31	<2	<2	<2	<5	<5	<5	<5

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	**WELL #**	**BENZENE**	**TOLUENE**	**E-BENZENE**	**XYLENES**	**MEK**	**CH2CL2**	**1,2-DCP**
Limits		**5**	**1000**	**700**	**10000**	**400**		
3/16/2005	GMW-31	<2	<2	<2	<5	<5		
4/7/2005	GMW-31	<2	<2	<2	<5	<5		
5/24/2005	GMW-31	<2	<2	<2	<5		<5	<5
6/20/2005	GMW-31	<2	<2	<2	<5	<5	<5	<5
12/22/2005	GMW-31	<2	<2	<2	<5	<5	<5	<5
4/12/2006	GMW-31	<2	<2	<2	<5	<5	<5	<5
						<5		
12/21/2004	GMW-32	<2	<2	<2	<5	<5		
5/24/2005	GMW-32	<2	<2	<2	<5			
6/20/2005	GMW-32	<2	<2	<2	<5	<50		
12/22/2005	GMW-32	<2	<2	<2	<5	<50		
4/12/2006	GMW-32	<2	<2	<2	<5	<75		
						<75		
5/16/2006	GMW-33	<20	**8520**	**21100**	**92300**	<50		
6/19/2006	GMW-33	<20	**7790**	**21500**	**93900**	<50		
7/17/2006	GMW-33	<30	**4390**	**8960**	**43700**	<50		
8/21/2006	GMW-33	<20	**4320**	**11500**	**56400**	<50		
9/18/2006	GMW-33	<20	**6140**	**12800**	**62900**	<50		
10/16/2006	GMW-33	<20	**4170**	**12300**	**56000**	<50		
11/13/2006	GMW-33	<20	**4960**	**11600**	**57700**	<50		
12/14/2006	GMW-33	<20	**1950**	**6800**	**41900**	<50		
1/15/2007	GMW-33	<20	**3200**	**9170**	**48700**	<50		
2/15/2007	GMW-33	<20	**3510**	**10100**	**52400**	<50		
3/6/2007	GMW-33	<20	**3440**	**10200**	**50300**	<50		
4/16/2007	GMW-33	<20	822	**7100**	**37300**	<50	IDNR sample	
5/16/2007	GMW-33	<20	106	**1800**	9930	<50		
6/20/2007	GMW-33	<20	**1310**	**5770**	**23400**	<50		
7/16/2007	GMW-33	<20	**1270**	**3080**	**14900**	<50		
7/31/2007	GMW-33	7	683	**2720**	**12800**	<50		
7/31/2007	GMW-33	<100	990	**3800**	**18000**	<50		
8/1/2007	GMW-33	<20	855	**2400**	**11500**	<10		
8/7/2007	GMW-33	<20	**1090**	**2390**	**12800**	<10		
8/17/2007	GMW-33	<20	893	**3160**	**14000**	<100		
8/28/2007	GMW-33	<20	755	**2290**	**13300**	<100		
9/28/2007	GMW-33	9	550	**1850**	**12400**	<100		
10/22/2007	GMW-33	13	**1320**	**3470**	**12600**	<100		
11/19/2007	GMW-33	<20	748	**2190**	**10400**	<100		
12/14/2007	GMW-33	<2	146	584	2750	<10		
1/17/2008	GMW-33	<2	33	245	658	<10		
2/22/2008	GMW-33	<2	74	**832**	2300	<10		
3/24/2008	GMW-33	3	28	**1100**	1680	<10		
5/14/2008	GMW-33	<2	3	98	215	<10		
6/23/2008	GMW-33	<2	15	169	481	<10		
7/18/2008	GMW-33	<2	11	215	674	<10		
8/18/2008	GMW-33	<2	5	223	463			
9/19/2008	GMW-33	5	437	**3230**	**13600**			
10/27/2008	GMW-33	4	385	**2380**	**10600**			
11/20/2008	GMW-33	2	148	**980**	3670			
12/18/2008	GMW-33	<2	33	399	1190			
1/19/2009	GMW-33	<2	36	351	909			
3/11/2009	GMW-33	<1	4	51	167			
3/11/2009	GMW-33	<2	<2	5	22			
6/25/2009	GMW-33	<2	20	241	698	<5		
9/17/2009	GMW-33	<2	3	151	266	<5		
11/6/2009	GMW-33	1	4	196	337	<10		
3/18/2010	GMW-33	<0.5	4	2	<7.5	<10		
6/17/2010	GMW-33	<0.5	<1	2	4	<10		
10/5/2010	GMW-33	<0.195	<0.196	<0.211	<0.407	<0.722		
12/7/2010	GMW-33	<0.5	<1	<1	<3	<10		
3/2/2011	GMW-33	<0.5	<1	<1	<3	<10		
6/9/2011	GMW-33	<0.5	<1	<1	4	<10		
9/27/2011	GMW-33	<0.5	<1	<1	<3	<10		
12/9/2011	GMW-33	<0.5	<1	1.09	5.76	<10		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L) /								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	**WELL #**	**BENZENE**	**TOLUENE**	**E-BENZENE**	**XYLENES**	**MEK**	**CH2CL2**	**1,2-DCP**
Limits		**5**	**1000**	**700**	**10000**	**400**		
3/19/2012	GMW-33	<0.5	<1	58.5	304	<10		
9/26/2012	GMW-33	0.71	<1	61.1	273			
3/26/2013	GMW-33	0.84	<1	126	711			
5/3/2013	GMW-33	3.37	18.5	638	4100			
6/26/2013	GMW-33	**6.14**	67.9	**2540**	**11500**			
7/24/2013	GMW-33	**5.87**	38.9	**3550**	**15000**			
8/28/2013	GMW-33	4.20	19.7	**2640**	**11400**			
9/25/2013	GMW-33	4.13	21	**2370**	**10500**			
			Average	3853	18000			
5/16/2006	GMW-34	<2	<2	<2	<5	<5	<5	<5
6/19/2006	GMW-34	<2	<2	<2	<5	<5		
7/17/2006	GMW-34	<2	<2	<2	<5	<5		
8/21/2006	GMW-34	<2	<2	<2	<5	<5	<5	<5
9/18/2006	GMW-34	<2	<2	<2	<5		<5	<5
11/13/2006	GMW-34	<2	<2	<2	<5	<5	<5	<5
11/19/2007	GMW-34	<2	<2	<2	<5	<5		
11/20/2008	GMW-34	<2	<2	<2	<5	<5		
11/6/2009	GMW-34	<0.5	<1	<1	<4	<10	<5	<5
10/5/2010	GMW-34	1	<0.196	192	928	<0.722		
11/5/2010	GMW-34	2	<1	258	1010	<10		
12/7/2010	GMW-34	10	<1	**4340**	**12500**	<10		
3/2/2011	GMW-34	3	<1	**1350**	3770	<10		
6/9/2011	GMW-34	<2.5	<5	406	1120	<50		
9/27/2011	GMW-34	<0.5	<1	<1	<3	<10		
12/9/2011	GMW-34	<0.5	<1	<1	<3	<10		
3/19/2012	GMW-34	<0.5	<1	<1	<3	<10		
9/26/2012	GMW-34	<0.5	<1	<1	<3	<10		
3/26/2013	GMW-34	<0.5	<1	<1	<3			
9/25/2013	GMW-34	4	<1	326	16			
3/24/2004	MW-1	<2	<2	<2	<5	<5		
6/25/2004	MW-1	<2	<2	<2	<5	<5		
9/27/2004	MW-1	<2	<2	<2	<5	<5	<5	<5
12/14/2004	MW-1	<2	<2	<2	<5	<5	<5	<5
3/16/2005	MW-1	<2	<2	<2	<5	<10		
6/20/2005	MW-1	<2	<2	<2	<5	<10		
12/22/2005	MW-1	<2	<2	<2	<5	<10		
11/19/2007	MW-1	<2	<2	<2	<5	<10	<5	<5
5/14/2008	MW-1	<2	<2	<2	<5	<10	<5	<5
8/7/2008	MW-1	<2	<2	<2	<5			
8/27/2008	MW-1	<2	<2	<2	<5			
10/27/2008	MW-1	<2	<2	<2	<5			
11/20/2008	MW-1	<2	<2	<2	<5	<10		
5/12/2009	MW-1	<2	<2	<2	<3			
6/25/2009	MW-1	<2	<2	<2	<3	<5		
9/17/2009	MW-1	<2	<2	<2	<3	<5		
11/6/2009	MW-1	<0.5	<1	<1	<4	<5		
9/27/2011	MW-1	<0.5	<1	<1	<3	<10		
9/26/2012	MW-1	<0.5	<1	<1	<3	<10		
7/24/2013	MW-1	<0.5	<1	<1	<3			
9/25/2013	MW-1	<0.5	<1	<1	<3			
3/24/2004	MW-5	<2	<2	<2	<5	<5		
6/25/2004	MW-5	<2	<2	<2	<5	<5		
9/27/2004	MW-5	<2	<2	<2	<5	<5		
12/14/2004	MW-5	<2	<2	<2	<5	<5		
3/16/2005	MW-5	<2	<2	<2	<5	<5		
6/20/2005	MW-5	<2	<2	<2	<5			
12/22/2005	MW-5	<2	<2	<2	<5			
11/13/2006	MW-5	<2	<2	<2	<5	<10	<50	<50
11/19/2007	MW-5	<2	<2	<2	<5	<5	<50	<50
11/20/2008	MW-5	<2	<2	<2	<5	<5	<50	<50
6/25/2009	MW-5	<2	<2	<2	<3	<5	<50	<50
11/6/2009	MW-5	<0.5	<1	<1	<4	<5	<50	<50
9/27/2011	MW-5	<0.5	<1	<1	<3	<10		
9/26/2012	MW-5	<0.5	<1	<1	<3	<10		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
7/24/2013	MW-5	<0.5	<1	<1	<3			
9/25/2013	MW-5	<0.5	<1	<1	<3			
1/3/2001	TC-6D	5	19	2100	6110	<50	<50	<50
3/27/2001	TC-6D	2	21	2840	7110	<50	<50	<50
6/29/2001	TC-6D	24	95	8700	17300	<50	<50	<50
10/17/2001	TC-6D	65	580	15200	45700	<5	<50	<50
12/14/2001	TC-6D	<20	270	10900	28400	<50	<50	<50
3/29/2002	TC-6D	<20	<20	9790	20500	<50	<50	<50
6/27/2002	TC-6D	<20	102	9550	14800	<50	<50	<50
9/26/2002	TC-6D	15	370	10100	25900	<50	<50	<50
12/11/2002	TC-6D	<2	<2	230	483	<50	<50	<50
3/26/2003	TC-6D	<20	116	1400	34300	<50	<50	<50
6/12/2003	TC-6D	<20	180	11900	19800	<50	<50	<50
8/15/2003	TC-6D	<20	127	6970	17900	<50	<50	<50
12/2/2003	TC6D	<20	151	4870	11900	<50	<50	<50
3/24/2004	TC6D	<20	<20	9820	15200	<50	<50	<50
6/25/2004	TC6D	<2	<2	3960	4580	<50		
9/27/2004	TC6D	<2	<2	1010	1180	<50		
12/14/2004	TC6D	<2	<2	28	43	<50		
12/30/2004	TC6D	<2	<2	23	58	<50		
1/18/2005	TC6D	<2	<2	49	85	<50		
2/28/2005	TC6D	<2	31	4220	7730	<50		
3/16/2005	TC6D	<2	<2	7170	19800	<50		
4/7/2005	TC6D	13	19	6260	10700	<50		
5/24/2005	TC6D	<20	<20	7230	14100	<50		
6/20/2005	TC6D	<20	<20	8030	15600	<50		
8/12/2005	TC6D	<20	<20	11740	17990	<50		
9/29/2005	TC6D	<20	<20	11200	22500	<50		
10/24/2005	TC6D	<20	<20	12600	33300	<50		
12/22/2005	TC6D	<20	186	15300	46100	<50		
3/20/2006	TC6D	<20	186	10500	30300	<50		
6/19/2006	TC6D	<20	<20	14900	44200	<100		
9/18/2006	TC6D	<20	<20	9260	24800	<100	<5	<5
11/13/2006	TC6D	<20	<20	9070	23800	<100	<5	<5
3/6/2007	TC6D	<20	<20	5670	12600	<10	<5	<5
6/20/2007	TC6D	<20	<20	5320	12500	<10	<5	<5
11/19/2007	TC6D	<20	82	6620	24100		<5	<5
3/24/2008	TC6D	<20	26	8630	28100		<5	<5
6/23/2008	TC6D	<20	426	8880	31300		<5	<5
09-19-08	TC6D	15	240	10200	41400			
11/20/2008	TC6D	14	335	8850	35000	<5		
3/11/2009	TC6D	<25	860	16450	65770	<5		
6/25/2009	TC6D	18	292	11800	32100			
9/17/2009	TC6D	17	186	14700	56500			
11/6/2009	TC6D	18	131	18700	75200	<100		
3/18/2010	TC6D	16	26	17700	60900	<10		
6/17/2010	TC6D	<50	<100	16900	58400	<1000		
10/5/2010	TC6D	<50	<100	22300	79800	<72.2		
12/7/2010	TC6D	17	63	19200	74100	<100		
3/2/2011	TC6D	<50	<100	17100	67300	<1000		
6/9/2011	TC6D	<50	<100	16800	61800	<1000		
9/27/2011	TC6D	<50	<100	13500	54200	<1000		
12/9/2011	TC6D	<50	<100	16200	55000	<1000		
3/19/2012	TC6D	<50	<100	15700	54300	<1000		
9/26/2012	TC6D	<50	<100	14900	54200	<1000		
3/26/2013	TC6D	22.1	30.5	19500	71500			
9/25/2013	TC6D	<50	<100	17800	57200			
				10188	31737			
6/27/2002	TC-6S	<2	<2	<2	24	<5	<5	<5
9/26/2002	TC-6S	<2	<2	<2	<5	<5		
12/11/2002	TC-6S	<2	<2	<2	<5	<5		
3/26/2003	TC-6S	<2	<2	<2	<5	<5	<5	<5
6/12/2003	TC-6S	<2	<2	<2	<5	<5	<5	<5
8/15/2003	TC-6S	<2	<2	<2	<5	<5	<5	<5
12/2/2003	TC-6S	<2	<2	<2	<5	<5	<5	<5

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
3/24/2004	TC-6S	<2	<2	<2	<5	<5	<5	<5
6/25/2004	TC-6S	<2	<2	<2	<5	<5		
9/27/2004	TC-6S	<2	<2	<2	<5	<5		
12/14/2004	TC-6S	<2	<2	<2	<5	<5		
3/16/2005	TC-6S	<2	<2	<2	<5	<5		
6/20/2005	TC-6S	<2	<2	<2	<5			
12/22/2005	TC-6S	<2	<2	<2	<5	<5		
11/13/2006	TC-6S	<2	<2	<2	<5	<5		
11/19/2007	TC-6S	<2	<2	<2	<5	<5		
11/20/2008	TC-6S	<2	<2	<2	<5	<5		
11/20/2008	TC-6S	<0.5	<1	<1	<4	<10		
10/5/2010	TC-6S	<0.195	<0.196	<0.211	1	<0.722		
9/27/2011	TC-6S	<0.5	<1	<1	<3	<10		
9/25/2013	TC-6S	<0.5	<1	<1	<3			
3/24/2004	TC-7	<2	<2	<2	<5	<5		
6/25/2004	TC-7	<2	<2	<2	<5	<5		
9/27/2004	TC-7	<2	<2	<2	<5	<5		
12/14/2004	TC-7	<2	<2	<2	<5	<5		
3/16/2005	TC-7	<2	<2	<2	<5	<5		
6/20/2005	TC-7	<2	<2	<2	<5			
12/22/2005	TC-7	<2	<2	<2	<5	<5		
11/13/2006	TC-7	<2	<2	<2	<5	<5		
11/19/2007	TC-7	<2	<2	<2	<5	<5		
11/20/2008	TC-7	<2	<2	<2	<5	<5		
11/6/2009	TC-7	<0.5	<1	<1	<4	<10		
11/6/2009	TC-7	<5	<5	<5	<5		IDNR Split Sample	
10/5/2010	TC-7	<0.195	<0.196	<0.211	<0.407	<0.722		
9/27/2011	TC-7	1.75	49	166	172	<10		
3/19/2012	TC-7	<0.5	<1	188	329	<10		
9/26/2012	TC-7	<0.5	<1	<1	<3	<10		
9/25/2013	TC-7	<0.5	<1	<1	<3			
3/29/2002	TC-17S	<2	<2		<5	<5		
6/27/2002	TC-17S	<2	<2	<2	10	<5		
9/26/2002	TC-17S	<2	<2	<2	<5	<5		
12/11/2002	TC-17S	<2	<2	<2	<5	<5		
3/26/2003	TC-17S	<2	<2	<2	<5			
6/12/2003	TC-17S	<2	<2	<2	<5	<5		
8/15/2003	TC-17S	<2	<2	<2	<5	<5		
5/16/2007	TC-17S	<2	<2	<2	<5	<5		
7/16/2007	TC-17S	<2	<2	<2	<5	<5		
3/24/2004	TC22D	<2	<2	<2	<2	<5		
6/25/2004	TC22D	<2	<2	<2	<2	<5		
9/27/2004	TC22D	<2	<2	<2	<2	<5		
12/14/2004	TC22D	<2	<2	<2	<2	<5		
3/16/2005	TC22D	<2	<2	<2	<2	<10		
6/20/2005	TC22D	<2	<2	<2	<2			
12/22/2005	TC22D	<2	<2	<2	<2	<5		
11/13/2006	TC22D	<2	<2	<2	<2			
6/20/2007	TC22D	<2	<2	<2	<2	<5		
11/20/2008	TC22D	<2	<2	6	46	<5		
10/5/2010	TC22D	<0.195	<0.196	<0.211	<0.407	<0.722		
11/19/2007	TC22S	<2	<2	<2	<2	<5		
11/6/2009	TC22S	<0.5	<1	<1	<4	<10		
9/27/2011	TC22S	<0.5	<1	<1	<3	<10		
5/15/1986	TC-23		<1	<1	<1	<5		
8/20/1986	TC-23		<1	<1	3	<15		
11/25/1986	TC-23		<1	<1	<1	<15		
2/17/1987	TC-23		<1	<1	<1	<20		
6/15/1987	TC-23		12	<1	<	<15		
9/2/1987	TC-23	<5	<1	<1	<1	<15		
12/17/1987	TC-23	<1	<1	<1	<1	<15		
4/7/1988	TC-23	<1	<1	<1	<1	<20		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
7/19/1988	TC-23		<1	<1	<1	<15		
10/12/1988	TC-23		<1	<1	<1	<15		
1/18/1989	TC-23		<1	<1	<1	<15		
4/12/1989	TC-23		<1	<1	<1	<15		
7/24/1989	TC-23		<2	<2	<5	<15		
10/17/1989	TC-23		<2	<2	<5	<3		
1/10/1990	TC-23		<2	<2	<5	10		
7/31/1990	TC-23		<2	<2	<5	<5		
7/24/1991	TC-23		<2	<2	<5	<3		
11/12/1991	TC-23		<2	<2	<5	<3		
3/24/1992	TC-23	<1	<1	<1	<1	<5		
3/26/1992	TC-23	<1	<1	<1	<1	<5		
6/18/1992	TC-23	<5	<5	<5	<10	<5		
12/30/1992	TC-23	<1	<1	<1	<1	<5		
3/30/1993	TC-23	<1	6	<1	<1	<5		
6/8/1993	TC-23	<5	<5	<5	<10	<5		
3/23/1994	TC-23	<2	<2	<2	<5	<5		
6/29/1994	TC-23	<2	<2	<2	<5	<5		
9/27/1994	TC-23	<2	<2	<2	<5	<5		
11/23/1994	TC-23	<2	<2	<2	<5	<5		
2/24/1995	TC-23	<2	<2	<2	<5	<5		
6/29/1995	TC-23	<2	<2	<2	<5	<5		
9/27/1995	TC-23	<2	<2	<2	<5	<5		
12/4/1995	TC-23	<2	<2	<2	<5	<5		
2/28/1996	TC-23	<2	<2	<2	<5	<5		
7/2/1996	TC-23	<2	<2	<2	<5	<5		
9/30/1996	TC-23	<2	<2	<2	<5	<5		
3/26/1997	TC-23	<2	<2	<2	<5	<5		
6/17/1997	TC-23	<2	<2	<2	<5	<5		
8/28/1997	TC-23	<2	<2	<2	<5	<5		
11/12/1997	TC-23	<2	<2	2	<5	<5	<5	<5
3/20/1998	TC-23	<2	<2	<2	<5	<5	<5	<5
6/17/1998	TC-23	<2	<2	<2	<5	<5	<5	<5
9/17/1998	TC-23	<2	<2	<2	<5	<5	<5	<5
12/15/1998	TC-23	<2	<2	<2	<5	<5	<5	<5
3/26/1999	TC-23	<2	<2	<2	<5	<5	<5	<5
6/23/1999	TC-23	<2	<2	<2	<5	<5	<5	<5
9/29/1999	TC-23	<2	<2	<2	<5	<5	<5	<5
12/23/1999	TC-23	<2	<2	6	10	<5	<5	<5
3/29/2000	TC-23	<2	<2	<2	<5	<5	<5	<5
7/21/2000	TC-23	<2	<2	<2	<5	<5	<5	<5
1/3/2001	TC-23	<2	<2	<2	<5	<5		
3/27/2001	TC-23	<2	<2	<2	<5	<5		
6/29/2001	TC-23	<2	<2	<2	<5	<5	<5	<5
10/4/2001	TC-23	<2	<2	<2	<5	<5		
12/14/2001	TC-23	<2	<2	<2	<5	<5		
3/29/2002	TC-23	<2	<2	<2	<5	<5		
6/27/2002	TC-23	<2	<2	<2	<5	<5		
9/26/2002	TC-23	<2	<2	<2	<5	<5		
12/11/2002	TC-23	<2	<2	<2	<5	<5		
3/26/2003	TC-23	<2	<2	<2	<5	<5		
6/12/2003	TC-23	<2	<2	<2	<5	<5		
8/14/2003	TC-23	<2	<2	<2	<5	<5		
12/2/2003	TC-23	<2	<2	<2	<5	<5		
3/24/2004	TC-23	<2	<2	<2	<5	<5		
6/25/2004	TC-23	<2	<2	<2	<5	<5		
9/27/2004	TC-23	<2	<2	<2	<5	<5		
12/14/2004	TC-23	<2	<2	<2	<5	<5		
3/16/2005	TC-23	<2	<2	<2	<5	<5		
6/20/2005	TC-23	<2	<2	<2	<5			
12/22/2005	TC-23	<2	<2	<2	<5			
11/23/2006	TC-23	<2	<2	5	24			
11/19/2007	TC-23	<2	<2	<2	6			

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	**WELL #**	**BENZENE**	**TOLUENE**	**E-BENZENE**	**XYLENES**	**MEK**	**CH2CL2**	**1,2-DCP**
Limits		**5**	**1000**	**700**	**10000**	**400**		
11/20/2008	TC-23	<2	<2	46	252			
11/6/2009	TC-23	<0.5	<1	<1	<4	<10		
10/5/2010	TC-23	<0.195	<0.196	<0.211	<0.407	<0.722		
9/27/2011	TC-23	<0.5	<1	<1	<3	<10		
9/26/2012	TC-23	<0.5	<1	<1	<3	<10		
9/25/2013	TC-23	<0.5	<1	<1	<3			
6/18/1992	RW-102	8	3380	1190	10100	530		
10/13/1992	RW-102	72	13100	21800	81800	510		
12/30/1992	RW-102	8	1190	3380	10100	1100		
3/30/1993	RW-102	26	2410	4940	17200	390		
9/30/1993	RW-102	20	9820	4200	20500	460		
3/23/1994	RW-102	<2	3130	1580	9730	920		
9/27/1994	RW-102	22	8530	4440	21900	2450		
11/23/1994	RW-102	12	4640	2320	19200	270		
6/29/1995	RW-102	<40	2780	1440	8950	520		
9/27/1995	RW-102	11	8990	3980	21600	170		
12/4/1995	RW-102	39	16200	31	39200	470		
2/28/1996	RW-102	<20	1290	3930	16300	370		
7/2/1996	RW-102	13	2180	4360	15500	<50		
9/30/1996	RW-102	32	5910	14700	38600	<10		
6/22/1998	RW-102	19	8180	11200	43400	<10		
9/17/1998	RW-102	27	4750	12500	51300	<10		
6/29/1999	RW-102	11	9690	7160	28900	<10		
8/14/2003	RW-102	<20	1020	3290	13400	<10		
6/23/2008	RW-102	11	1220	4630	19300	25		
6/26/2008	RW-102	<20	1110	4200	17200	<10		
7/11/2008	RW-102	<2	2240	7040	28600			
8/7/2008	RW-102	<2	1820	5840	20900			
8/27/2008	RW-102	<20	3590	7940	31900			
9/19/2008	RW-102	<2	3130	9190	35600			
10/27/2008	RW-102	10	2930	7170	31100			
5/12/2009	RW-102	9	1440	9390	35000	<3		
6/25/2009	RW-102	12	2490	8210	25400	<15		
9/17/2009	RW-102	10	2160	6770	22800	27		
		Average	4619	6315	26267			
						<2		
6/18/1992	RW-104	<1	9	4	5760	<2		
12/30/1992	RW-104	6	333	1250	4300	<5		
3/30/1993	RW-104	10	490	1660	5750	<2		
9/30/1993	RW-104	8	540	150	1190	<2		
3/23/1994	RW-104	10	460	40	1490	<5		
9/27/1994	RW-104	<2	31	<2	63	<5		
11/23/1994	RW-104	2	200	28	640	<2	IDNR sample	
6/29/1995	RW-104	14	930	180	3070	<5		
9/27/1995	RW-104	7	3	<2	12	72		
12/4/1995	RW-104	5	3	<2	7	9		
2/28/1996	RW-104	4	170	610	2110	<5		
7/2/1996	RW-104	3	70	270	937	<50		
9/30/1996	RW-104	3	40	250	760	<50		
6/22/1998	RW-104	15	1210	5160	19200	<50		
9/17/1998	RW-104	11	1430	6290	15400	<50		
6/29/1999	RW-104	3	140	770	2680	<50		
8/1/2003	RW-104+5	17	540	5810	12800	<50		
8/7/2003	RW-104+5	6	270	3690	12500	<50		
8/14/2003	RW-104	7	338	4260	14010	<50		
6/20/2007	RW-104	<20	197	8870	29300	<50		
6/21/2007	RW-104	<20	168	2150	9490	<50		
7/31/2007	RW-104	14	497	6490	21500	<50		
7/31/2007	RW-104	<100	740	8500	27000	<100		
8/1/2007	RW-104	<20	725	6070	20200	<100		
8/7/2007	RW-104	<20	639	6420	23700	<100		
8/17/2007	RW-104	18	424	8600	33500	<100		
8/28/2007	RW-104	<20	711	9040	30000	<100		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	**WELL #**	**BENZENE**	**TOLUENE**	**E-BENZENE**	**XYLENES**	**MEK**	**CH2CL2**	**1,2-DCP**
Limits		**5**	**1000**	**700**	**10000**	**400**		
9/28/2007	RW-104	<20	484	4280	17000	<10		
10/22/2007	RW-104	<20	502	8200	32700	<10		
5/14/2008	RW-104	<20	136	9800	37200			
7/11/2008	RW-104	<2	1150	11700	45100			
8/27/2008	RW-104	<20	471	5250	20100			
9/19/2009	RW-104	15	586	7840	29000			
10/27/2008	RW-104	15	542	7010	27900			
5/12/2009	RW-104	17	455	15500	48700			
6/25/2009	RW-104	<40	1030	10300	28700			
9/17/2009	RW-104	19	1030	9890	29200			
		Average	478	5186	16567			
CREEK SAMPLES								
11/6/2009	UP STREAM	<0.500	<1	<1	<4	<10		
1/13/2011	UP STREAM	<0.500	<1	<1	<3	<10		
11/6/2009	ON SITE	<0.500	<1	<1	<4	<10		
1/13/2011	ON SITE	<0.500	<1	1	<3	<10		
11/6/2009	DWN STREA	<0.500	<1	<1	<4	<10		
1/13/2011	DWN STREA	<0.500	<1	<1	<3	<10		
PHYTO REMEDIANTION SYSTEM MONITORING WELL LOCATIONS								
4/16/2007	MP-1	<2	220	1280	15900	<5		
7/31/2007	MP-1	10	5920	38400	15900	<100		
8/1/2007	MP-1	<2	737	3870	28400	<10		
8/7/2007	MP-1	<2	2	12	250	<10		
8/17/2007	MP-1	<2	6	75	734			
8/28/2007	MP-1	<2	16	27	871			
11/19/2007	MP-1	3	202	2150	12000			
5/14/2008	MP-1	<2	<2	15	280			
10/27/2008	MP-1	<2	4	90	350	<5		
5/12/2009	MP-1	<2	22	1150	3880	<5		
7/8/2009	MP-1	<2	<2	48	209	<5		
9/17/2009	MP-1	6	474	4140	13600	<5		
			634	4271	7698	<5		
4/16/2007	MP-3	<2	74	194	811	<5		
7/31/2007	MP-3	<2	<2	335	527	<5		
8/1/2007	MP-3	<2	5	294	713	<10		
8/7/2007	MP-3	<2	<2	14	88	<10		
8/17/2007	MP-3	<2	<2	3	9			
8/28/2007	MP-3	<2	<2	<2	<2			
11/19/2007	MP-3	<2	<2	692	841			
5/14/2008	MP-3	<2	<2	271	715			
10/27/2008	MP-3	<2	<2	428	849	<5		
5/12/2009	MP-3	<2	<2	91	168	<5		
7/8/2009	MP-3	<2	<2	244	493	<5		
9/17/2009	MP-3	<2	13	476	1290	<5		
				254	542			
5/16/2007	P-1	<2	22	216	753	<5		
6/1/2007	P-1	<2	<2	<2	45	<5		
7/16/2007	P-1	<2	<2	62	169	<5		
7/31/2007	P-1	<2	<2	468	562	<10		
8/1/2007	P-1	<2	<2	292	403	<10		
8/7/2007	P-1	<2	<2	<2	58	<10		
8/17/2007	P-1	<2	<2	<2	24	<10		
8/28/2007	P-1	<2	<2	<2	<5	<10		
11/19/2007	P-1	<2	<2	47	13			
5/14/2008	P-1	<2	<2	19	6			

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
7/11/2008	P-1	<2	<2	26	<5			
8/27/2008	P-1	<2	<2	25	<5			
10/27/2008	P-1	<2	<2	<2	7	<5		
5/12/2009	P-1	<2	<2	<2	<3	<5		
7/8/2009	P-1	<2	<2	<2	<3	<5		
9/17/2009	P-1	<2	<2	<2	<3	<5		
						<5		
7/16/2007	P-2	<2	<2	<2	<5	<5		
7/31/2007	P-2	<2	<2	<2	<5	<5		
8/1/2007	P-2	<2	<2	<2	<5	<10		
8/7/2007	P-2	<2	<2	<2	<5	<10		
8/17/2007	P-2	<2	<2	<2	<5	<10		
8/28/2007	P-2	<2	<2	<2	<5	<10		
11/19/2007	P-2	<2	<2	<2	<5			
5/14/2008	P-2	<2	<2	<2	<5			
7/11/2008	P-2	<2	<2	<2	<5			
8/27/2008	P-2	<2	<2	<2	<5			
10/27/2008	P-2	<2	<2	<2	<5	<10		
5/12/2009	P-2	<2	<2	<2	<3	<10		
7/8/2009	P-2	<2	<2	<2	<3	<10		
9/17/2009	P-2	<2	<2	<2	<3	<10		
6/23/2008	P-3	<2	2	35	228			
7/11/2008	P-3	<2	2	8	34			
8/7/2008	P-3	<2	<2	17	33			
8/27/2008	P-3	<2	<2	7	35			
10/27/2008	P-3	<2	<2	9	11	<10		
5/12/2009	P-3	<2	<2	72	68	<10		
7/8/2009	P-3	<2	<2	2	4	<10		
9/17/2009	P-3	<2	<2	<2	4	<10		
6/23/2008	P-4	<2	<2	<2	7			
7/11/2008	P-4	<2	<2	<2	<5			
8/7/2008	P-4	<2	<2	<2	<5			
8/27/2008	P-4	<2	<2	<2	<5	<10		
10/27/2008	P-4	<2	<2	<2	<5	<10		
5/12/2009	P-4	<2	<2	<2	7	<10		
7/8/2009	P-4	<2	<2	<2	<3	<10		
9/17/2009	P-4	<2	<2	<2	<3	<10		
6/23/2008	P-5	<2	<2	<2	<5			
7/11/2008	P-5	2	<2	<2	<5			
8/7/2008	P-5	2	<2	<2	<5			
8/27/2008	P-5	2	<2	<2	<5			
10/27/2008	P-5	<2	3	<2	10	<10		
5/12/2009	P-5	<2	<2	<2	7	<10		
7/8/2009	P-5	<2	<2	<2	<3	<10		
9/17/2009	P-5	3	<2	2	12			
6/23/2008	P-6	<2	<2	<2	<5			
7/11/2008	P-6	<2	<2	<2	<5			
8/7/2008	P-6	<2	<2	<2	<5			
8/27/2008	P-6	<2	<2	<2	<5			
10/27/2008	P-6	<2	<2	<2	<5			
5/12/2009	P-6	<2	<2	<2	5	<10		
7/8/2009	P-6	<2	<2	<2	<3	<10		
9/17/2009	P-6	<2	8	27	126	<10		
4/16/2007	L-1	50	10600	23300	94400	<50		
5/16/2007	L-1	<20	8090	18100	76900	<50		
7/16/2007	L-1	<20	7590	15200	69000	<100		
11/19/2007	L-1	34	5430	10200	50800	<100		
						<100		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	**WELL #**	**BENZENE**	**TOLUENE**	**E-BENZENE**	**XYLENES**	**MEK**	**CH2CL2**	**1,2-DCP**
Limits		**5**	**1000**	**700**	**10000**	**400**		
4/16/2007	U-1	35	8150	22200	84000			
5/16/2007	U-1	<20	7150	18300	71400			
7/16/2007	U-1	<20	5920	14800	62300	<5		
8/28/2007	U-1	<20	5160	16200	61500			
11/19/2007	U-1	22	4270	10200	46100			
5/14/2008	U-1	28	6740	15500	67100			
10/27/2008	U-1	29	5200	11200	51600	<5		
5/12/2009	U-1	33	6640	15300	54000			
7/8/2009	U-1	27	5440	15200	60800	<5		
9/17/2009	U-1	35	1290	1860	8970	<5		
4/16/2007	L-5	<2	50	559	2820	<10		
						<10		
4/16/2007	U-5	<2	505	1570	7120			
4/16/2007	U-7	<2	398	1070	5530	<5		
8/28/2007	U-7	<2	139	290	2150			
11/19/-7	U-7	<2	37	114	426			
5/14/2008	U-7	2	390	1110	5220			
10/27/2008	U-7	<2	183	366	2140			
5/12/2009	U-7	3	623	1950	10600	<10		
7/8/2009	U-7	<20	146	369	1980			
9/17/2009	U-7	<2	<2	9	48	<10		
4/16/2007	L-8	<2	388	1070	5770			
11/19/2007	L-8	dry				<10		
8/7/2008	U-11	<2	437	6710	35600			
8/27/2008	U-11	Dry				<10		
10/27/2008	U-11	<2	5	4	311	<10		
5/12/2009	U-11	<2	199	4970	24600	<10		
7/8/2009	U-11	<2	106	251	1080			
5/14/2008	U-13	<2	26	1230	2250	<10		
							IDNR sample	
8/7/2008	U-15	<2	141	3920	12000			
8/27/2008	U-15	<2	151	3940	12300			
10/27/2008	U-15	<2	31	2750	9300	<10		
5/12/2009	U-15	<2	11	967	2650	<10		
7/8/2009	U-15	<2	6	52	233	<10		
9/17/2009	U-15	2	53	3640	9720			
								DNR
5/14/2008	U-17	<2	<2	140	369	<5		
8/7/2008	U-19	<2	<2	16	63			
8/27/2008	U-19	<2	<2	16	59	<5		
10/27/2008	U-19	<2	<2	<2	<5	<5		
5/12/2009	U-19	<2	<2	<2	5	<5		
7/8/2009	U-19	<2	16	12	392	<5		
9/17/2009	U-19	<2	<2	<2	7	<10		
						<10		
7/31/2007	RW-104 Irr.	<2	8	98	276	<10		
7/31/2007	RW-104 Irr.	<2	9	94	330	<10		
8/7/2007	RW-104 Irr.	5	214	1900	7680	<10		
8/17/2007	RW-104 Irr.	<2	90	725	3570			
8/28/2007	RW-104 Irr.	<2	<2	13	51			
9/17/2007	RW-104 Irr.	<2	33	376	1740			
7/11/2008	RW-104 Irr.	<2	14	53	208			
8/27/2008	RW-104 Irr.	<2	12	171	375			
8/27/2008	RW-104 Irr.	<4	12	190	480			
9/19/2008	RW-104 Irr.	<2	3	25	115	<10		
6/25/2009	RW-104 Irr.	<2	33	329	1010	<10		
9/17/2009	RW-104 Irr.	<2	18	169	642	<10		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	WELL #	BENZENE	TOLUENE	E-BENZENE	XYLENES	MEK	CH2CL2	1,2-DCP
Limits		5	1000	700	10000	400		
		Average	41	345	1373			
6/26/2008	RW-102 Irr.	<2	7	30	102			
7/11/2008	RW-102 Irr.	<2	9	95	380			
8/7/2008	RW-102 Irr.	<2	109	368	1280			
8/27/2008	RW-102 Irr.	<2	40	140	535	<5		
9/19/2008	RW-102 Irr.	<2	86	230	930	<5		
6/25/2009	RW-102 Irr.	<2	47	165	617	<5		
9/17/2009	RW-102 Irr.	<2	32	123	487	<5		
			47	164	619			
QA/QC DUPLICATE SAMPLES								
6/25/2004	Trip Blank	<2	<2	<2	<5	<5		
9/27/2004	Trip Blank	<2	<2	<2	<5	<5		
12/14/2004	Trip Blank	<2	<2	<2	<5	<5		
3/16/2005	Trip Blank	<2	<2	<2	<5	<5		
5/24/2005	Trip Blank	<2	<2	<2	<5	<5		
6/20/2005	Trip Blank	<2	<2	<2	<5	<5		
8/30/2005	Trip Blank	<2	<2	<2	<5	<5		
9/29/2005	Trip Blank	<2	<2	<2	<5	<5		
10/24/2005	Trip Blank	<2	<2	<2	<5	<5		
12/2/2005	Trip Blank	<2	<2	<2	<5	<5		
12/22/2005	Trip Blank	<2	<2	<2	<5			
11/13/2006	Trip Blank	<2	<2	<2	<5			
3/6/2007	Trip Blank	<2	<2	<2	<5			
6/20/2007	Trip Blank	<2	<2	<2	<5			
11/19/2007	Trip Blank	<2	<2	<2	<5	<5		
3/24/2008	Trip Blank	<2	<2	<2	<5	<5		
6/23/2008	Trip Blank	<2	<2	<2	<5	<5		
9/17/2009	Trip Blank	<2	<2	<2	<5	<5		
11/6/2009	Trip Blank	<0.500	<1	<1	<4	<10		
3/24/2004	Split Sample	<2	<2	83	90	<5		
3/24/2004	GMW-19	<2	<2	104	120	<5		
6/25/2004	Split Sample	<2	<2	275	622	<5		
6/25/2004	GMW-15	<2	<2	294	673	<5		
9/27/2004	Split Sample	<2	<2	<2	<5	<5		
9/27/2004	GMW-7R	<2	<2	<2	<5	<5		
12/14/2004	Split Sample	7	61	4060	13700	<5		
12/14/2004	GMW-21	<2	<2	2380	12600	<5		
3/16/2005	Split Sample	<2	<2	53	52	<5		
3/16/2005	GMW-27	<2	<2	61	89	<5		
5/24/2005	Split Sample	<2	<2	1700	5180	<5		
5/24/2005	GMW-21	<2	24	1890	4900	<5		
6/20/2005	Split Sample	<2	<2	645	1640	<5		
6/20/2005	GMW-21	<2	<2	1020	3310	<50		
12/22/2005	Split Sample	<2	<2	1770	5340	<50		
12/22/2005	GMW-7R	<2	<2	1530	4610	<5		
3/20/2006	Split Sample	<2	<2	1280	2640			
3/20/2006	GMW-21	<2	<2	1020	2190	<50		
6/19/2006	Split Sample	<2	<2	20	56	<50		
6/19/2006	GMW-20	<2	<2	8	17	<5		
9/18/2006	Split Sample	<20	<20	8710	23800	<5		
9/18/2006	TC-6D	<20	<20	9260	24800	<100		
11/13/2006	Split Sample	<2	<2	594	1330	<100		
11/13/2006	GMW-20	<2	<2	493	1040	<100		
3/6/2007	Split Sample	<20	2360	6430	20000	<100		
3/6/2007	GMW-9R	<20	2910	6250	19300	<10		
6/20/2007	Split Sample	<2	<2	486	1260	<10		
6/20/2007	GMW-20	<2	<2	398	900	<10		
11/19/2007	Split Sample	<20	235	2040	11400	<10		

TABLE 1								
GROUNDWATER MONITORING DATA (ug/L)								
VOGEL QUARTERLY & MONTHLY MONITORING THROUGH 9/26/2012								
DATE	**WELL #**	**BENZENE**	**TOLUENE**	**E-BENZENE**	**XYLENES**	**MEK**	**CH2CL2**	**1,2-DCP**
Limits		**5**	**1000**	**700**	**10000**	**400**		
11/19/2007	MP-1	3	202	2150	12000			
3/24/2008	Split Sample	<20	1740	6610	23100			
3/24/2008	GMW-9R	21	1810	6620	23200			
6/23/2008	Split Sample	4	<2	1910	6200			
6/23/2008	GMW-7R	3	2	1800	5720			
11/20/2008	Split Sample	<2	<2	107	381			
11/20/2008	GMW-20	<2	<2	324	801			
9/17/2009	Split Sample	895	2750	4370	20500			
9/17/2009	GMW-9R	16	4150	12200	43600			
11/6/2009	Split Sample	6	44	6770	22900	<100		
11/6/2009	GMW-16	5	37	5940	20200	<10		
10/5/2010	Split Sample	<19.5	<19.6	20600	74800	<72.2		
10/5/2010	TC6D	<50	<100	22300	79800	<72.2		

TABLE 2							
HEAVY METALS GROUNDWATER DATA FROM VOGEL SITE in mg/l							
DATE	**WELL #**	**ARSENIC**	**CADMIUM**	**CHROMIUM**	**LEAD**	**MERCURY**	**NOTE**
IDNR	*MCL*	*0.01000*	*0.00500*	*0.10000*	*0.01500*	*0.00200*	
IDNR	*NPG*	*0.05000*	*0.02500*	*0.50000*	*0.07500*	*0.01000*	
6/29/2000	B-2	0.00000	0.00000	0.00000	0.00400	**0.00260**	Center of metals area*
12/23/1999	GMW-3	0.01300	0.00170	0.03000	**0.05300**	0.00000	NE of exc.
12/23/1999	GMW-4	0.01000	0.00050	0.02000	**0.02400**	0.00000	W of exc.
11/6/2009	GMW-7R	0.00000	0.00000	0.00000	0.00000	0.00000	field filtered
10/6/2010	GMW-7R	0.00604	0.00000	0.00000	0.00000	0.00000	field filtered
9/27/2011	GMW-7R	0.00513	0.00000	0.00000	0.00000	0.00000	field filtered
9/26/2012	GMW-7R	0.00575	<0.00050	<0.00500	0.00266	<0.000267	field filtered
9/25/2013	GMW-7R	0.00820	<0.00050	<0.00500	<0.00050	<0.00020	field filtered
12/22/2005	GMW-9R	**0.09100**	0.00200	0.07000	**0.06000**	0.00070	
11/13/2006	GMW-9R	**0.01000**	0.00000	0.01000	0.00000	0.00000	
11/19/2007	GMW-9R	**0.05000**	0.00200	0.06000	0.04000	0.00000	
12/18/2008	GMW-9R	**0.02000**	0.00000	0.00000	0.00000	0.00000	
11/6/2009	GMW-9R	0.00000	0.00000	0.00000	0.00000	0.00000	field filtered
10/5/2010	GMW-9R	0.00898	0.00000	0.00000	0.00000	0.00000	field filtered
9/27/2011	GMW-9R	**0.02480**	0.00000	0.00000	0.00000	0.00000	field filtered
9/26/2012	GMW-9R	**0.02520**	<0.00050	<0.00500	0.00506	<0.000267	field filtered
9/25/2013	GMW-9R	**0.02720**	<0.00050	<0.00500	<0.00050	<0.00020	field filtered
Average		0.02858	0.00057	0.02000	0.01313	0.00010	
12/23/1999	GMW-12	0.00500	0.00000	0.00000	0.00200	0.00000	200' S of RW-102
3/29/2002	GMW-13	0.00000	0.00000	**0.16000**		**0.00920**	center of metals area
6/27/2002	GMW-13	0.00000	0.00000	0.01000	**0.02000**	**0.10500**	
9/26/2002	GMW-13	0.00000	0.00000	0.04000	**0.05000**	**0.01000**	
12/11/2002	GMW-13	**0.01000**	0.00400	0.06000	**0.08000**	**0.01000**	
3/26/2003	GMW-13	0.00000	0.00200	0.07000	**0.09000**	**0.01000**	
6/12/2003	GMW-13	0.00000	0.00200	0.06000	**0.09000**	**0.00900**	
8/29/2003	GMW-13	0.00000	0.00100	0.03000	**0.04000**	**0.00700**	
12/2/2003	GMW-13	0.00000	0.00000	0.00000	**0.05000**	**0.02000**	
3/24/2004	GMW-13	0.00000	0.00100	0.04000	**0.06000**	**0.04000**	
6/25/2004	GMW-13	0.00000	0.00000	0.02000	**0.03000**	**0.03000**	
9/27/2004	GMW-13	0.00000	0.00000	0.02000	0.01000	**0.03000**	
12/14/2004	GMW-13	0.00000	0.00100	0.02000	**0.05000**	**0.04000**	
3/18/2005	GMW-13	**0.01000**	0.00200	0.04000	**0.07000**	**0.03000**	
6/20/2005	GMW-13	0.00900	0.00200	0.01000	**0.05000**	**0.39000**	
12/22/2005	GMW-13	0.00500	0.00100	0.01000	0.01000	0.00020	
Average		0.00227	0.00000	0.03933	**0.05000**	**0.04936**	
3/29/2002	GMW-14	0.00000	**0.00600**	**0.16000**	**0.09000**	**0.01970**	S edge of metals area
6/27/2002	GMW-14	**0.02000**	0.00000	0.04000	0.01000	**0.00620**	
9/26/2002	GMW-14	**0.03000**	0.00200	0.08000	**0.03000**	**0.03800**	
12/11/2002	GMW-14	**0.02000**	0.00300	0.07000	**0.02000**	**0.02000**	
3/26/2003	GMW-14	**0.03000**	0.00400	**0.11000**	**0.05000**	**0.03000**	
6/12/2003	GMW-14	0.00000	0.00000	0.01000	0.00000	**0.01000**	
8/29/2003	GMW-14	0.00000	0.00100	0.04000	0.00000	**0.00700**	
6/25/2004	GMW-14	0.00000	0.00000	0.02000	0.00000	**0.00900**	
Average		0.01250	0.00200	0.06625	**0.02500**	**0.01749**	
11/6/2009	GMW-15	0.00000	0.00000	0.00000	0.00000	0.00000	field filtered
11/6/2009	GMW-15	0.00800	<0.001	<0.01	<0.001	<0.00005	IDNR Split Sample
10/8/2010	GMW-15	**0.02120**	<0.0005	0.00205	<0.0004	<0.0002	field filtered
9/27/2011	GMW-15	**0.01710**	<0.0005	<0.0020	<0.0040	<0.0002	field filtered
9/26/2012	GMW-15	**0.02460**	<0.0005	<0.0050	0.00355	<0.000267	field filtered
9/25/2013	GMW-15	**0.02130**	<0.0005	<0.0050	<0.00050	<0.0002	field filtered
12/23/1999	MW-1	0.00000	0.00000	0.00000	0.00200	0.00000	W of exc.
12/11/2002	MW-1	0.00000	0.00000	0.00000	0.00000	0.00000	
3/26/2003	MW-1	0.00000	0.00000	0.00000	0.00000	0.00000	

TABLE 2							
HEAVY METALS GROUNDWATER DATA FROM VOGEL SITE in mg/l							
DATE	**WELL #**	**ARSENIC**	**CADMIUM**	**CHROMIUM**	**LEAD**	**MERCURY**	**NOTE**
IDNR	*MCL*	*0.01000*	*0.00500*	*0.10000*	*0.01500*	*0.00200*	
6/12/2003	MW-1	0.00000	0.00000	0.00000	0.00000	0.00000	
8/29/2003	MW-1	0.00000	0.00000	0.00000	0.00000	0.00000	
12/2/2003	MW-1	0.00000	0.00000	0.00000	0.00000	0.00000	
3/24/2004	MW-1	0.00000	0.00000	0.00000	0.00000	0.00000	
6/25/2004	MW-1	0.00000	0.00000	0.00000	0.00000	0.00000	
9/27/2004	MW-1	0.00000	0.00000	0.00000	0.00000	0.00000	
12/14/2004	MW-1	0.00000	0.00000	0.00000	0.00000	0.00000	
3/18/2005	MW-1	0.00000	0.00000	0.00000	0.00000	0.00000	
6/20/2005	MW-1	0.00000	0.00000	0.00000	0.00000	0.00000	
3/26/2003	TC-6D	0.01000	0.00000	0.00000	0.00000	0.00000	Near RW 104
6/12/2003	TC-6D	0.00000	0.00000	0.02000	0.00000	0.00000	in deep aquifer
8/29/2003	TC-6D	0.00000	0.00000	0.01000	0.00000	0.00000	
12/2/2003	TC-6D	0.02000	0.00000	0.00000	0.00000	0.00000	
3/24/2004	TC-6D	0.00000	0.00000	0.03000	0.00000	0.00000	
6/25/2004	TC-6D	0.00000	0.00000	0.04000	0.00000	0.00000	
9/27/2004	TC-6D	0.01000	0.00000	0.05000	0.00000	0.00000	
12/14/2004	TC-6D	0.00000	0.00000	0.03000	0.00000	0.00000	
3/18/2005	TC-6D	0.00000	0.00000	0.01000	0.00000	0.00000	
6/20/2005	TC-6D	**0.01700**	0.00000	0.01000	0.00000	0.00000	
12/22/2005	TC-6D	**0.01500**	0.00000	0.00000	0.00000	0.00000	
11/13/2006	TC-6D	**0.02000**	0.00000	0.00000	0.00000	0.00000	
11/19/2007	TC-6D	**0.02000**	0.00000	0.00000	0.00000	0.00000	
12/18/2008	TC-6D	**0.02000**	0.00000	0.00000	0.00000	0.00000	
11/6/2009	TC-6D	0.00000	0.00000	0.00000	0.00000	0.00000	field filtered
10/5/2010	TC-6D	**0.01880**	0.00000	0.00000	0.00000	0.00000	field filtered
9/27/2011	TC-6D	**0.01400**	0.00000	0.00000	0.00000	0.00000	field filtered
9/26/2012	TC-6D	**0.01710**	<0.00050	<0.00500	<0.00050	<0.000267	field filtered
9/25/2013	TC-6D	**0.01510**	<0.00050	<0.00500	<0.00050	<0.00020	field filtered
Average		0.01037	0.00000	0.01176	0.00000	0.00000	
*IDNR geoprobe 6/29/2000 soil boring in metals placement area.							
Bold numbers = exceeds MCL limits							
MCL = Maximum Contaminant Level for a protected groundwater source; NPG = Non-protected Groundwater							


Section 8
Section 7
Section 6
Section 5
Section 4
Section 3
Section 2
Section 1
Stanley
Google earth

APPLIED SPECIATION AND CONSULTING, LLC

18804 Northcreek Parkway Bothell, WA. 98011
Tel: (425) 483-3300 Fax: (425) 483-9818
www.appliedspeciation.com

December 13, 2013

Linda Watts
GeoTek Engineering & Testing Services, Inc.
909 East 50th Street North
Sioux Falls, SD 57104
(605) 335-5512

Re: Vogel Paint Waste Site

Ms. Watts,

Attached is the report associated with eight (8) tree core samples submitted for metals (As, Cd, and Cr) quantitation on November 20, 2013. The samples were received on November 21, 2013 in a sealed package at -0.1°C. Total metals analyses were performed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS). Any issues associated with the analyses are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Ben Wozniak

Ben Wozniak
Project Manager
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report Prepared for:

Linda Watts
GeoTek Engineering & Testing Services, Inc.
909 East 50th Street North
Sioux Falls, SD 57104

December 13, 2013

1. Sample Reception

Eight (8) tree core samples were submitted for As, Cd, and Cr quantitation on November 20, 2013. The samples were received in acceptable condition on November 21, 2013 in a sealed package at -0.1°C.

Each sample was received in a laminar flow clean hood, void of trace metals contamination and ultra-violet radiation, and designated a discrete sample identifier. Each sample was then stored in a secure, monitored refrigerator (maintained at a temperature of $\leq$6°C) until the analyses could be performed.

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are also monitored for contamination to account for any biases associated with the sample results.

Prior to digestion each submitted sample was homogenized on a polyethylene cutting board using a ceramic knife. The knife and cutting board were pre-cleaned before each sample via sequential rinses with detergent solution, dilute nitric acid, and reagent water. All sample homogenates were subsequently prepared as described herein.

Total As, Cd, and Cr Quantitation by ICP-DRC-MS A known mass of each sample was weighed into a polypropylene vial. All samples were then digested with aliquots of concentrated HNO_3 and H_2O_2 in a hot block apparatus, in accordance with EPA Method 3050B. The resulting digests were analyzed for total As, Cd, and Cr via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS).

3. Sample Analysis

All sample analysis is preceded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. All calibration curves, associated with each analyte of

interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimum interval of every ten analytical runs.

Total As, Cd, and Cr Quantitation by ICP-DRC-MS The sample digests for total As, Cd, and Cr quantitation were analyzed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS) on December 9th through 10th. Aliquots of each sample digest are introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through a pressurized chamber (DRC) containing a specific reactive gas which preferentially reacts with either interfering ions of the same target mass to charge ratios (m/z) or with the target analyte, producing an entirely different mass to charge ratio (m/z) which can then be differentiated from the initial interferences. A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

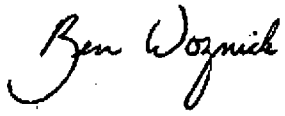
4. Analytical Issues

No significant issues were encountered with the requested analyses. In accordance with Applied Speciation and Consulting's SOPs, the estimated method detection limit (eMDL) for each analyte is generated from the standard deviation of the preparation blanks digested and analyzed concurrently with the submitted samples. All quality control parameters associated with these samples were within acceptance limits, with the following exception:

The recoveries of the matrix spike (MS) and matrix spike duplicate (MSD) performed on Section #8 were above the established control limit of 125% for cadmium (141.6% and 140.4%, respectively). The recoveries of the laboratory control sample (LCS, 97.9%) and NIST 1547 certified reference material (106.2%) were acceptable, demonstrating the accuracy of the applied digestion and analysis. Since the concentrations of the Cd spikes added to the MS and MSD were less than one-half the native Cd concentration of the spiked sample, the elevated recoveries observed for the MS and MSD are deemed to be due to normal analytical variability expected with such a small increase in the analyte concentration. No corrective action was taken since the reported results are deemed to be representative of the submitted samples.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,



Ben Wozniak
Project Manager
Applied Speciation and Consulting, LLC

Results for GeoTek Engineering & Testing Services, Inc.
Contact: Linda Watts
Project Name: Vogel Paint Waste Site

Date: December 13, 2013
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Sample Results

Sample ID	As	Cd	Cr	Units
Section #1	0.012	0.784	0.452	µg/g
Section #2	0.013	0.957	0.876	µg/g
Section #3	0.010	0.598	0.237	µg/g
Section #4	0.008	0.572	0.178	µg/g
Section #5	0.011	0.641	0.216	µg/g
Section #6	0.008	0.436	0.211	µg/g
Section #7	0.007	0.469	0.248	µg/g
Section #8	0.008	0.543	0.267	µg/g

All results are reported as received (wet weight)

Results for GeoTek Engineering & Testing Services, Inc.
Contact: Linda Watts
Project Name: Vogel Paint Waste Site

Date: December 13, 2013
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Quality Control Summary - Preparation Blank Summary

Analyte	Units	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL	RL
As	µg/g	0.001	0.001	0.002	0.002	0.001	0.000	0.001	0.020
Cd	µg/g	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.020
Cr	µg/g	0.003	0.005	0.010	0.008	0.006	0.003	0.010	0.020

eMDL = Estimated Method Detection Limit (at the applied sample dilution)
RL = Reporting Limit (at the applied sample dilution)

Quality Control Summary - Certified Reference Materials

Analyte	Units	CRM	True Value	Result	Recovery
As	µg/g	LCS	2.000	1.807	90.3
Cd	µg/g	LCS	0.200	0.196	97.9
Cr	µg/g	LCS	2.000	1.891	94.5
As	µg/g	NIST 1547	0.060	0.071	118.8
Cd	µg/g	NIST 1547	0.026	0.028	106.2

Results for GeoTek Engineering & Testing Services, Inc.
Contact: Linda Watts
Project Name: Vogel Paint Waste Site

Date: December 13, 2013
Report Generated by: Ben Wozniak
Applied Speciation and Consulting, LLC

Quality Control Summary - Matrix Duplicates

Analyte	Units	Sample ID	Rep 1	Rep 2	Mean	RPD
As	µg/g	Section #8	0.008	0.009	0.009	8.9
Cd	µg/g	Section #8	0.543	0.611	0.577	11.8
Cr	µg/g	Section #8	0.267	0.240	0.253	10.8

ND = Not detected at the applied dilution

NC = Not calculated due to one or more concentrations below the eMDL

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte	Units	Sample ID	MS Spike Conc	MS Result	MS Recovery	MSD Spike Conc	MSD Result	MSD Recovery	RPD
As	µg/g	Section #8	2.006	1.818	90.2	1.810	1.713	94.2	4.3
Cd	µg/g	Section #8	0.201	0.861	141.6*	0.181	0.831	140.4*	0.9
Cr	µg/g	Section #8	2.006	2.332	103.7	1.810	1.976	95.2	8.5

* The spike concentration is less than one-half the native sample concentration

APPLIED SPECIATION AND CONSULTING, LLC

18804 Northcreek Parkway
Bothell, WA 98011

Phone (425) 483-3300
Fax (425) 483-9818

Company Name: GeoTek Engineering & Testing	ASC Project Manager:
Contact Person: Keith DeLange or Linda Watts	By submitting of samples the client agrees to all terms and conditions set forth in the quotation provided by the ASC project manager. If you are not familiar with the term and conditions associated with your project, please contact your ASC representative as soon as possible (425) 483-3300.
Address: 909 E. 51st St. N. Sioux Falls, SD 57104	
Phone Number: 605-335-5512	Requested Turn Around Time:
Fax Number: 605-335-0773	Method of Sample Delivery:
Email Address: lwatts@geotekeng.com	Currier Tracking Number:
Project Name: Vogel Paint Waste Site	Confirmation of Sample Reception: ☐ Yes ☐ No
Project Number: 91-400	
PO Number:	

Sample ID	Bottle ID	Date and Time	Matrix*	Volume	Preservative	Initials	Requested Analytes and Methods	Comments
Section #1	#1	11/20/13 11:30	TreeCore		ICE	LOW	Arsenic, Cadmium, Chromium	9/25/13
Section #2	#2	11/20/13 11:50	"		"	LOW	"	Price Quote
Section #3	#3	11/20/13 12:10	"		"	LOW	"	
Section #4	#4	11/20/13 12:25	"		"	LOW	"	
Section #5	#5	11/20/13 12:40	"		"	LOW	"	
Section #6	#6	11/20/13 1:00	"		"	LOW	"	
Section #7	#7	11/20/13 1:15	"		"	LOW	"	
Section #8	#8	11/20/13 1:30	"		"	LOW	"	
Secti								

Relinquished by: (sign) _____ (print) Linda J. Watts Date/Time: _____

Received by: (sign) _____ (print) Nancy Cullinan Date/Time: 11/21 9:30

Comments:

Temp: -0.1°C

Relinquished by: (sign) _____ (print) _____ Date/Time: _____

Received by: (sign) _____ (print) _____ Date/Time: _____

Comments:

Temp:

Please account for each sample bottle as a seperate line item for verification purposes.

*Matrix: Air, Freshwater (FW), seawater (SW), groundwater (GW), wastewater (WW), soil (SL), sediment (SD), tissue (TS), product (P), other (O)

Rev 1.1 (April 2005)

TABLE 3

MNA analytical results for 6/26/09

Well	BTEX mg/l	pH	Redox EV	DO mg/l	Nitrate mg/l	Sulfate mg/l	Fe (II) mg/l	Methane ug/l
Wells within the plume								
GMW-7R	9,034	7.30	-192	1.06	0.0	47	2.23	82
GMW-9R	22,686	7.14	-167	1.31	0.0	14	3.17	146
GMW-13	93,786	7.03	-83	1.09	0.0	0.0	3.14	347
GMW-21	6,563	7.12	-200	1.81	0.0	56	3.10	<26
GMW-25	161	6.78	83.7	10.98	0.9	+700	0.08	<26
Sentinel Well (farthest downgradient well)								
GMW-30	31	6.92	138	9.13	1.9	27	1.64	<26
No detectable Hydrocarbons (up gradient and side gradient wells)								
MW-1	ND	7.19	-49.5	7.50	0.0	+700	0.0	<26
MW-5	ND	7.05	-12.7	7.75	0.4	43	0.03	<26

ND = non-detected; na = not analyzed

MNA analytical results for 9/17/09

Well	BTEX mg/l	pH	Redox EV	DO mg/l	Nitrate mg/l	Sulfate mg/l	Fe (II) mg/l	Methane ug/l
Wells within the plume								
GMW-7R	12,455	7.07	-178	1.01	2.1	57	1.44	na
GMW-9R	59,966	7.01	-152	1.11	1.4	28	3.08	na
GMW-13	117,528	6.91	-98.5	0.81	5.6	0.0	+3.0	na
GMW-21	11,788	6.99	-186.5	1.33	11.7	61	+3.0	na
GMW-25	367	6.72	62.9	8.74	14.6	49	2.4	na
Sentinel Well (farthest downgradient well)								
GMW-30	42	6.57	95.2	9.07	0.0	23	0.23	na
No detectable Hydrocarbons (up gradient and side gradient wells)								
MW-1	ND	7.02	-45.8	10.1	1.1	+700	0.0	na
MW-5	ND	6.97	-27.1	9.13	0.8	49	0.0	na

MNA analytical results for 11/06/09

Well	BTEX mg/l	pH	Redox EV	DO mg/l	Nitrate mg/l	Sulfate mg/l	Fe (II) mg/l	Methane ug/l
Wells within the plume								
GMW-7R	15,759	6.84	-164.5	1.84	1.2	64	0.64	na
GMW-9R	59,810	6.81	-136.9	1.15	0.0	35	+3.0	na
GMW-13	140,730	6.79	-114.0	1.04	4.4	0.0	+3.0	na
GMW-21	13,334	6.87	-173.0	1.92	10.3	+70	+3.0	na
GMW-25	106	6.66	42.0	9.00	15.5	36	+3.0	na
Sentinel Well (farthest downgradient well)								
GMW-30	ND	6.25	52.3	8.40	0.0	15	0.52	na
No detectable Hydrocarbons (up gradient and side gradient wells)								
MW-1	ND	6.85	-42.0	8.76	1.9	+700	0.06	na
MW-5	ND	6.89	-27.0	8.80	0.5	35	0.0	na

ND = non-detected; na = not analyzed

TABLE 3

MNA analytical results for 5/10/10

Well	BTEX mg/l	pH	Redox EV	DO mg/l	Nitrate mg/l	Sulfate mg/l	Fe (II) mg/l	Methane ug/l
Wells within the plume								
GMW-7R	6,960	7.64	2.20	1.58	<1.0	94	2.12	na
GMW-9R	55,020	7.42	-11.1	1.89	<1.0	9	9.15	na
GMW-13	140,230	7.30	7.48	1.72	0.3	0.0	8.40	na
GMW-21	2,283	7.66	8.1	1.75	<1.0	+700	0.98	na
GMW-25	552	8.05	30.5	9.05	<1.0	68	1.02	na
Sentinel Well (farthest downgradient well)								
GMW-30	ND	7.78	35.7	3.13	3.6	53	0.17	na
No detectable Hydrocarbons (up gradient and side gradient wells)								
MW-1	ND	7.62	22.2	6.0	0.3	350	0.26	na
MW-5	ND	7.74	22.4	7.07	0.9	112	0.17	na

MNA analytical results for 6/24/10

Well	BTEX mg/l	pH	Redox EV	DO mg/l	Nitrate mg/l	Sulfate mg/l	Fe (II) mg/l	Methane ug/l
Wells within the plume								
GMW-7R	6,960	6.73	80.3	1.78	1.6	29	0.26	na
GMW-9R	55,020	7.07	45.0	1.93	4.7	40	3.11	na
GMW-13	140,230	6.82	63.7	2.25	3.0	7	7.38	na
GMW-21	2,283	7.14	69.3	4.9	4.9	+700	2.12	na
GMW-25	552	7.19	83	8.58	4.0	+700	0.97	na
Sentinel Well (farthest downgradient well)								
GMW-30	ND	7.16	101.8	7.77	4.8	157	0.00	na
No detectable Hydrocarbons (up gradient and side gradient wells)								
MW-1	ND	6.3	74.9	8.8	5.2	706	0.07	na
MW-5	ND	7.02	98.9	9.82	2.0	71	0.00	na

MNA analytical results for 10/20/10

Well	BTEX mg/l	pH	Redox EV	DO mg/l	Nitrate mg/l	Sulfate mg/l	Fe (II) mg/l	Methane ug/l
Wells within the plume								
GMW-7R	11,350	8.0	-26.9	2.10	0.80	24	0.44	na
GMW-9R	44,250	7.40	-19.8	1.94	0.0	32	6.24	na
GMW-13	145,300	7.30	-18.1	1.58	3.2	0.0	6.25	na
GMW-21	2,878	7.0	26.4	2.12	2.9	670	0.37	na
GMW-25	291	6.9	29.5	7.52	0.0	440	0.37	na
Sentinel Well (farthest downgradient well)								
GMW-30	ND	7.3	27.3	9.1	0.0	35	0.28	na
No detectable Hydrocarbons (up gradient and side gradient wells)								
MW-1	ND	7.5	0.60	4.81	2.3	730	0.0	na
MW-5	ND	7.3	8.2	7.39	1.1	51	0.06	na

ND = non-detected; na = not analyzed

Secondary Lines of Evidence that Natural Attenuation is Occurring

Secondary lines of evidence that MNA is occurring can be obtained by monitoring of geochemical indicators of natural biodegradation processes. Monitoring was conducted during three events in 2009 and three events in 2010 to document that MNA was occurring at the site. This monitoring included samples from: up-gradient or side-gradient wells outside the plume (MW-1 and MW-5); wells within the plume (GMW-7R, GMW-9R, GMW-21 & GMW-25); and a downgradient "sentinel" well (clean) located outside but directly downgradient of the plume, that is capable of detecting further migration of the contamination (GMW-30). The 2012 monitoring activities for natural attenuation were completed in July.

The geochemical indicators used to measure the natural attenuation of petroleum compounds in groundwater monitoring wells included: dissolved oxygen (DO), pH, eH redox (oxidation reduction potential {ORP}), nitrate (NO_3), sulfate (SO_4), and soluble (ferrous) iron (Fe II). Field analysis for these parameters was conducted during each sampling event.

The following field analysis methods and equipment were utilized during each sampling event: YSI 556 Multi-Parameter Probe for pH, DO, redox, and specific conductivity and a Hach DR/2010 spectrophotometer for nitrates, sulfates, iron, and manganese. MNA data for 2011 and 2012 is summarized in the following tables. Table 3 provides MNA data and results for 2009 through 2010.

MNA analytical results for 6/02/11

Well	BTEX mg/l	pH	Redox EV	DO mg/l	Nitrate mg/l	Sulfate mg/l	Fe (II) mg/l	Methane ug/l
Wells within the plume								
GMW-7R	5,290	7.61	50.1	6.29	0	18	1.14	na
GMW-9R	44,140	7.77	59.0	14.09	3.4	19	8.3	na
GMW-13	99,780	7.48	10.5	6.51	0	1	4.6	na
GMW-21	3,860	7.25	43.6	10.65	0	67	2.11	na
GMW-25	307	7.28	38.8	14.60	0	140	0.37	na
Sentinel Well (farthest downgradient well)								
GMW-30	ND	7.45	50.0	11.58	0	26	0.46	na
No detectable Hydrocarbons (up gradient and side gradient wells)								
MW-1	ND	7.75	39.9	17.25	0.6	700	0.05	na
MW-5	ND	7.51	56.6	16.63	0.4	700	0.08	na

ND = non-detected; na = not analyzed

MNA analytical results for 7/24/12

Well	BTEX mg/l	pH	Redox EV	DO mg/l	Nitrate mg/l	Sulfate mg/l	Fe (II) mg/l	Methane ug/l
Wells within the plume								
GMW-7R	13,500	6.80	-142	3.10	0	9	0.94	120
GMW-9R	97,000	6.93	-102	3.31	2.0	0	10	550
GMW-13	123,400	6.72	-12.9	4.08	0	0	2.4	870
GMW-21	13,760	7.01	-275	6.95	0	55	2.54	130
GMW-25	26	6.95	242	8.73	0	700	1.06	1.9
Sentinel Well (farthest downgradient well)								
GMW-30	ND	6.99	230	2.51	0	13	1.65	130
No detectable Hydrocarbons (up gradient and side gradient wells)								
MW-1	ND	6.94	250	10.03	0.8	700	0.29	<0.58
MW-5	ND	7.03	-85.3	8.31	0.9	26	0.05	<0.58

ND = non-detected; na = not analyzed

The 2012 MNA results generally indicate that natural biodegradation continues to take place. Several of the monitored geochemical parameters demonstrated the occurrence of natural biodegradation.

The pH values measured for the 2012 MNA monitoring event varied little from well to well. The pH levels are in the neutral range, therefore they do not adversely impact natural biodegradation.

The Redox (ORP) results for 2012 generally indicate lower levels in the most contaminated wells versus those noted in the less contaminated wells. The average ORP reading for the contaminated wells (GMW-7R, 9R, 12 and 21) was -133 ev and the average ORP reading for the cleaner wells (GMW-25, 30, MW1 and MW5) was +159 ev. Theoretically, aerobic degradation activity occurs at a highly positive redox potential, while anaerobic microbial processes such as nitrate and sulfate reduction will occur at strongly negative redox potentials.

The DO results for 2012 indicate that aerobic biodegradation is occurring. Based on literature, approximately 1 to 2 mg/L DO is needed to sustain aerobic biodegradation. Measured DO concentrations at the site ranged from 2.51 to 10.03 mg/L. The average DO concentration in the contaminated wells was 4.36 mg/L while the average DO in the cleaner wells was 7.40 mg/L.

With the exception of GMW-9R, MW-1 and MW-5, nitrate was not detected in the monitoring wells. The 2012 nitrate results are comparable to 2011. Also similar to 2011, lower sulfate concentrations were noted in the more contaminated wells in 2012 as compared to the less contaminated wells. Decreased nitrate and sulfate concentrations in the anaerobic (more contaminated) portion of the plume indicate use of nitrate and sulfate as electron acceptors for anaerobic biodegradation of petroleum hydrocarbons. The average sulfate concentration in the contaminated wells (GMW-7R, 9R, 13, and 21) was 16 mg/L and the average sulfate concentration in the cleaner wells (GMW-25, 30, and MW-1 and 5) was 360 mg/L.

Comparable to 2009 through 2011 results, the iron (Fe II) concentrations for 2012 demonstrated the most consistent evidence that biodegradation was occurring. The average iron concentration in the contaminated wells (GMW-7R, 9R, 13, and 21) was 3.97 mg/L and the average detected in the cleaner wells (GMW-25, 30, and MW-1 and 5) was 0.0.76 mg/L. Higher concentrations of iron (Fe II) indicate that iron (Fe III) is being used as an electron acceptor during anaerobic biodegradation of petroleum hydrocarbons.

TABLE 3

HEAVY METALS CREEK DATA FROM VOGEL SITE in mg/l

DATE	WELL #	ARSENIC	CADMIUM	CHROMIUM	LEAD	MERCURY	NOTE
IDNR	*SWQS**	*0.15000*	*0.00045*	*0.01100*	*0.00770*	*0.00090*	
Creek Samples							
11/06/09	Up Stream	<0.01	<0.001	<0.01	<0.01	<0.001	
01/13/01	Up Stream	0.00142	<0.0005	0.00231	<0.0040	<0.0002	
02/16/11	Up Stream	0.00337	<0.0005	<0.0020	<0.0040	0.00106	
11/06/09	On Site	<0.001	<0.01	<0.001	<0.001	<0.00005	IDNR Split Sample
11/06/09	On Site	<0.01	<0.001	<0.01	<0.01	<0.001	
01/13/11	On Site	0.01730	0.00295	0.02230	0.02780	0.00020	
02/16/11	On Site	0.00302	<0.0005	<0.0020	<0.0040	0.00163	
11/06/09	Down Stream	<0.01	<0.001	<0.01	<0.01	<0.001	
01/13/11	Down Stream	<0.00100	<0.00050	<0.00200	<0.00400	<0.00020	
02/16/11	Down Stream	0.00377	<0.00050	0.00226	<0.0040	0.00162	

* Iowa Surface Water Quality Standards

ATTACHMENT E

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Vogel Paint and Wax Superfund Site	**Date of inspection: December 12, 2013**
Location and Region: Maurice, IA. EPA Region 7	**EPA ID:** IAD980630487
Agency, office, or company leading the five-year review: U.S. Army Corps of Engineers – Kansas City District	**Weather/temperature: Clear, sunny, approximately 1-2 inches snow on the ground, temperature minus 7 degrees Fahrenheit**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Scott Heemstra (Name) Corporate Director of Manufacturing (Title) 10-Dec-2013 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached No problems or suggestions were reported during the interview

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Iowa Department of Natural Resources
Contact Bob Drustrup (Name) Environmental Engineer (Title) 10-Dec-2013 (Date) 515-281-8900 (Phone no.)
Problems; suggestions; ☐ Report attached Would like to see the groundwater treatment plant removed due to its current condition. IDNR would also like the Bos and Neiss groundwater wells removed

Agency _____
Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ (Name) _____ (Title) _____ (Date) _____ (Phone no.)
Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☒ O&M manual — ☒ Readily available — ☐ Up to date — ☐ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

2. **Site-Specific Health and Safety Plan** — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks Site activities have not occurred over the past 5 years aside from the pilot study and groundwater sampling.

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Other permits ____ — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks Currently no air or effluent discharge is generated at the site, the permits were not reviewed.

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

7. **Groundwater Monitoring Records** — ☒ Readily available — ☒ Up to date — ☐ N/A

   Remarks Annual groundwater monitoring reports were reviewed.

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☒ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☒ N/A

   Remarks

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☒ N/A

    Remarks The treatment plant has been inactive since 2009.

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☒ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____

2. **O&M Cost Records (was not reviewed)**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: The groundwater treatment plant has not been used for remediation since 2004. The extraction system was utilized for irrigation of the phytoremediation trees from 2007 to 2009. O&M costs incurred over this review period would include groundwater sampling costs and any miscellaneous housekeeping activities (mowing, maintenance to wells, free product removal, etc.)

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks Fencing is not required as an IC, however the site does maintain a gate and property fencing. All were in good condition.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks_____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Deed restrictions

Frequency _____

Responsible party/agency _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A

Violations have been reported ☒ Yes ☐ No ☐ N/A

Other problems or suggestions: ☒ Report attached

See issues and recommendations made in the five-year review report.

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks For the short term, the ICs are adequate, however an Environmental Covenant is preferred in order to prevent potential contaminant pathways from developing in the future.

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks _____

2. **Land use changes on site** ☒ N/A

Remarks A change in land use is unlikely at the site.

3. **Land use changes off site** ☒ N/A

Remarks A change in land use nearby the site is unlikely.

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A

Remarks _____

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____
   _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____
   _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks_____
   _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent_____ Height_____
   Remarks_____
   _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent_____
   ☐ Ponding ☐ Location shown on site map Areal extent_____
   ☐ Seeps ☐ Location shown on site map Areal extent_____
   ☐ Soft subgrade ☐ Location shown on site map Areal extent_____
   Remarks_____
   _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent_____
Remarks_____

B. Benches ☐ Applicable ☒ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

C. Letdown Channels ☐ Applicable ☒ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☒ Passive
☐ Properly secured/locked ☒ Functioning ☐ Routinely sampled ☒ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks Gas vents are not associated with a landfill cover, but are used to encourage natural degradation of source material.

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
Remarks_____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
Remarks_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☒ N/A
Remarks_____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks_____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks_____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks_____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
   ☐ Siltation not evident
   Remarks_____

2. **Erosion** Areal extent_____ Depth_____
   ☐ Erosion not evident
   Remarks_____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks_____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks_____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** ☐ Functioning ☐ N/A
   Remarks_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   ☐ Performance not monitored
   Frequency_____ ☐ Evidence of breaching
   Head differential_____
   Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   ☒ Good condition ☒ All required wells properly operating ☐ Needs Maintenance ☐ N/A
   Remarks All wells were observed to be in good condition, there were no problems reported in the latest Annual Groundwater Monitoring Report.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☒ Good condition ☐ Needs Maintenance
   Remarks

3. **Spare Parts and Equipment**
   ☒ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
   ☐ Good condition ☐ Needs Maintenance
   Remarks

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
   - ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
   - ☒ Air stripping ☐ Carbon adsorbers
   - ☐ Filters
   - ☐ Additive (*e.g.*, chelation agent, flocculent)
   - ☐ Others
   - ☐ Good condition ☒ Needs Maintenance
   - ☐ Sampling ports properly marked and functional
   - ☐ Sampling/maintenance log displayed and up to date
   - ☒ Equipment properly identified
   - ☐ Quantity of groundwater treated annually
   - ☐ Quantity of surface water treated annually

   Remarks Air stripper is currently inoperable, a bioremediation pilot study using phytoremediation has been operating at the site since 2007, however the remedy has not been formally approved in a decision document.

2. **Electrical Enclosures and Panels** (properly rated and functional)
   ☐ N/A ☒ Good condition ☐ Needs Maintenance
   Remarks

3. **Tanks, Vaults, Storage Vessels**
   ☒ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
   Remarks

4. **Discharge Structure and Appurtenances**
   ☐ N/A ☒ Good condition ☐ Needs Maintenance
   Remarks

5. **Treatment Building(s)**
   ☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair
   ☐ Chemicals and equipment properly stored
   Remarks

6. **Monitoring Wells** (pump and treatment remedy)
   ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks

D. Monitoring Data

1. Monitoring Data
   ☒ Is routinely submitted on time ☒ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks Monitoring Natural Attenuation is currently being utilized though a decision document has not formally been approved for the change in remedy.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Currently the use of MNA and phytoremediation is not containing the plume within the site boundary, as required in the decision documents. A decision document or amendment is recommended to address the change in remedy at the site as well as to address the point of compliance which may not be attainable under the current remedy.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

See issues and recommendations made in the five-year review report.

C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. No such issues were noted during the site inspection, nor were comments provided during the interviews which would suggest current O&M costs are a concern.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. See recommendations made in the five-year review report regarding optimization.

ATTACHMENT F

Vogel Paint and Wax Superfund Site
Site Visit 10-December-2013
Photo Log

Photo 1: Interior pump, piping, and equalization tank for the groundwater treatment plant. System feeds into air stripper tower located behind the wall to the right of the photo.

Photo 4: Extraction well house, typical exterior.

Photo 5: Extraction well house, typical interior

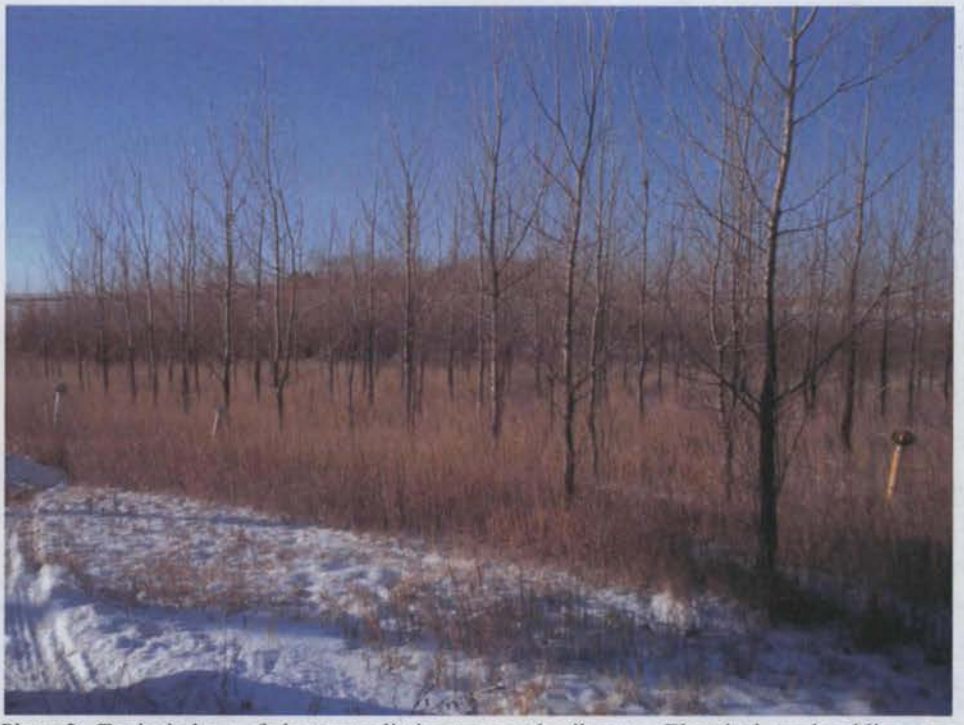


Photo 2: Typical photo of phytoremediation trees and soil vents. Electrical overhead lines are visible from upper left hand corner of photo. Photo taken from outside the west side of the groundwater treatment plant facing south-by-southwest.

Photo 3: GMW-2, typical photo of condition of monitoring wells at the site.

Photo 6: Phytoremediation trees located in northwest portion of site, these are the most recently planted trees and were not mature enough for core sampling. Photo taken from south facing northwest.

Photo 7: Two off-site wells located on property to south of the site.

Photo 8: Photo of site from southern site boundary facing towards the groundwater treatment plant and phytoremediation trees to the north.

Photo 9: Photo of site from south of groundwater treatment plant facing west-by-northwest. Photo foreground shows the soil vents, background is the phytoremediation trees and extraction well house shown in Photo 4.

Photo 10: Concrete slab-on-grade equipment cover for farming equipment located north of the groundwater treatment plant. The only other structure on the site besides the treatment plant and extraction well houses.

Photo 11: Two extraction well houses located on eastern portion of the site. Photo taken from east side of groundwater treatment plant facing east.

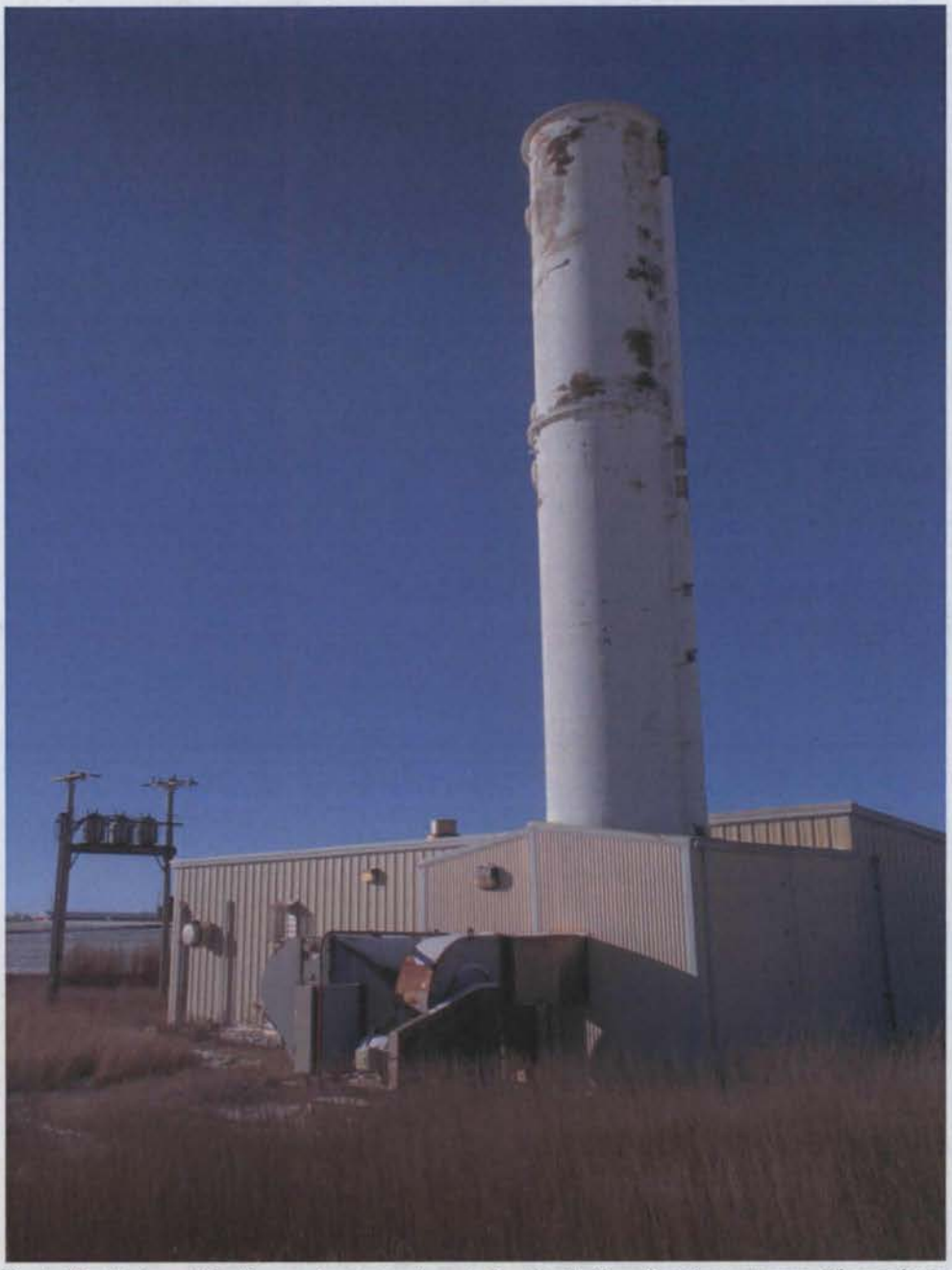


Photo 12: Eastern side of groundwater treatment plant, including air stripper tower. Blower-heater equipment for the air stripper is in the foreground. Incoming power lines to the treatment plant are located on the left side of the photo.

Photo 13: Mineral fouling of the air stripper media. Photo taken through access porthole of the air stripper tower inside the treatment plant.

ATTACHMENT G

EPA Reg. 7

Fields of Opportunities

STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR
KIM REYNOLDS, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
ROGER L. LANDE, DIRECTOR

April 25, 2012

Scott Heemstra
Diamond Vogel Paint Co.
Industrial Air Park
Box 266
Orange City, IA 51041

RE: 2011 Annual Groundwater Monitoring Report (the 2011 Groundwater Report)
Vogel Paint & Wax Superfund Site, Maurice, Iowa (the Vogel Site)

Dear Scott:

Thank you for the above-referenced annual report for the Vogel disposal site south of Maurice. We concur with the conclusions of the 2011 Groundwater Report with the clarification that, while the water treatment plant has been off for 7 years, some of the recovery wells were utilized for phytoremediation irrigation through the 2009 growing season. We also agree with the report's recommendations and hereby approve the 2011Groundwater Report.

In addition to the approved change from quarterly sampling to semi-annual sampling, we approve annual sampling of monitoring wells GMW-17, 18 and 34 in lieu of semi-annual sampling. This department is satisfied that the stream sampling conducted in response to a recommendation in the 2009 Superfund Five-year Review has sufficiently demonstrated no adverse impact on the stream from the Vogel site. Therefore, stream sampling may be discontinued. Please submit a table with the revised groundwater monitoring schedule.

We encourage Vogel to proceed with the on-site and off-site environmental covenants as recommended in the 2011 Groundwater Report, if not sooner. We will also propose to EPA that an explanation of significant differences (ESD) to the Record of Decision change the point of compliance to the off-site property with the environmental covenant.

Please contact me with any questions or comments.

Yours truly,

Robert D. Drustrup

Robert D. Drustrup
Contaminated Sites Section

cc: Cal Lundberg, Supervisor DNR Contaminated Sites Section,
Ken Hessenius, DNR Field Office 3
Jim Colbert, EPA Region 7
Keith Delange, Geotek

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