FIVE-YEAR REVIEW REPORT

Fourth Five-Year Review Report
For
Utah Power & Light-American Barrel Superfund Site
Salt Lake City, Utah

September 2016

Prepared By:

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Date:

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Table of Contents

Tables

Appendix A:

Appendix B:

Appendix C: Photos

List of Acronyms

ABY	American Barrel Yard
ARARS	Applicable or Relevant and Appropriate Requirements
AS	Air Sparging
BTEX	Benzene, Toluene, Ethyl Benzene, Xylene
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminants of Concern
DNAPL	Dense Nonaqueous Phase Liquid
EL	Exposure Limit
EPA	Environmental Protection Agency
GAC	Granular Activated Carbon
GRPCMP	Groundwater Restoration Performance and Compliance Monitoring Plan
HASP	Health and Safety Plan
LNAPL	Light Non-aqueous Phase Liquid
MCLs	Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OUs	Operable Units
POTW	Publicly Owned Treatment Works
PRP	Potentially Responsible Party
PTS	Principal Threat Source
RAO	Remedial Acton Objective
RI/FS	Remedial Investigation/Feasibility Study
RL	Remediation Level
ROD	Record of Decision
SEA	Southeast Yard
SSC	Superfund State Contract
SVE	Soil Vapor Extraction
UDEQ	Utah Department of Environmental Quality
VOCs	Volatile Organic Compounds

Executive Summary

EPA Region 8 has conducted the fourth five-year review of the remedy implemented at the Utah Power & Light-American Barrel Superfund Site (Site) located in Salt Lake City, Utah. The review was conducted from December 2015 through August 2016. Groundwater monitoring data suggest that the underlying contaminated plumes have remained within the boundaries of the Site. Present contaminant levels in groundwater are consistent with expectations at the time of the 1993 Record of Decision. Stringent institutional controls are in place to restrict use of the contaminated groundwater and the residents/businesses in the area are connected to the municipal water system.

Two issues that do not immediately impact the protectiveness of the remedy were identified. It is still not known if natural attenuation (NA) is actually occurring at the Site. Using monitored NA data, PacifiCorp will need to evaluate the biotransformation process and determine if the geochemistry at the Site is favorable for NA. No indoor air samples have been collected from the North Sixth Apartments. PacifiCorp will need to conduct a vapor intrusion investigation at the North Sixth Apartments.

The remedy at the Site currently protects human health and the environment because exposure pathways that could result in unacceptable risks are being controlled in the short term. However, in order for the remedy to be protective in the long-term, it must be determined if natural attenuation is actually occurring at the Site and a vapor intrusion investigation must be conducted at the North Sixth Apartments.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name: Utah Power & Light - American Barrel Superfund Site		
EPA ID: UTD980667240		
Region: 8	**State:** UT	**City/County:** Salt Lake City, Utah
SITE STATUS		
NPL status: **x** Final ☐ Deleted		
Remediation status (choose all that apply): ☐ Under Construction ☐ Operating **x** Complete		
Multiple OUs? ☐ YES **x** NO	**Construction completion date:** 9/30/96	
Has site been put into reuse? x YES ☐ NO		
REVIEW STATUS		
Reviewing agency: **x** EPA ☐ State ☐ Tribe ☐ Other Federal Agency		
Author name: Armando Saenz		
Author title: RPM	**Author affiliation:** Region 8	
Review period: December 2015 to August 2016		
Date(s) of site inspection: August 13, 2016		
Type of review: **x** Statutory ☐ Policy ☐ Post-SARA		
Review number: ☐ 1(first) ☐ 2 (second) ☐ 3 (third) **x** Other (4)		
Triggering action: ☐ Actual RA Onsite Construction ☐ Actual RA Start at OU# ___ ☐ Construction Completion **x** Previous Five-Year Review Report		
Triggering action date: July 26, 2011		
Due date *(five years after triggering action date)*: July 26, 2016		

Five-Year Review Summary Form (continued)

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the Five-Year Review:				
Site has no OUs.				
Issues and Recommendations Identified in the Five-Year Review:				
OU(s): Site-wide	**Issue Category: Monitoring**			
	Issue: It is still not known if natural attenuation (NA) is actually occurring at the Site.			
	Recommendation: Using MNA data, evaluate the biotransformation process and determine if the site geochemistry is favorable for NA.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA & UDEQ	12/31/18
Issues and Recommendations Identified in the Five-Year Review:				
OU(s): Site-wide	**Issue Category: Monitoring**			
	Issue: No indoor air samples have been collected from the North Sixth Apartments.			
	Recommendation: Conduct a vapor intrusion investigation at the North Sixth Apartments.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA & UDEQ	12/31/18
Sitewide Protectiveness Statement				
Protectiveness Determination: Protective			*Addendum Due Date (if applicable):* Click here to enter date.	
Protectiveness Statement: The remedy at the Site currently protects human health and the environment because exposure pathways that could result in unacceptable risks are being controlled in the short term. However, in order for the remedy to be protective in the long-term, it must be determined if natural attenuation is actually occurring at the Site and a vapor intrusion investigation must be conducted at the North Sixth Apartments.				

Utah Power & Light-American Barrel Superfund Site
Fourth Five-Year Review Report

1.0 Introduction

EPA Region 8 has conducted a fourth five-year review of the remedial actions implemented at the Utah Power & Light-American Barrel Superfund Site (Site) located in Salt Lake City, Utah. This review was conducted from December 2015 through August 2016. This report documents the results of the review. The purpose of a five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review, if any, and identify recommendations to address them.

This review is required by statute. EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121(c), as amended, 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 the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The NCP [Part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR)] 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.

This is the fourth five-year review for the Site. The triggering action for this review is the last Five-Year Review Report dated July 26, 2011. Due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unrestricted use and unlimited exposure, another five-year review is required.

2.0 Site Chronology

Table 1: Chronology of Site Events

Date	Event
1870 - 1987	Activities, at the Site, during this period included coal gasification, creosote pole treating operations and drum storage.
1987 - 1988	Preliminary Assessment/Site Investigation conducted at the Site.
10/4/89	Site listed on the National Priorities List.
1993	Remedial Investigation/Feasibility Study completed for Site.
7/7/93	Record of Decision signed for Site.
1995 - 1996	Remedial action conducted.
9/30/96	Preliminary Close-Out Report (i.e. Construction Completion).
9/26/01	First Five-Year Review Report.
9/27/06	Second Five-Year Review Report.
April 2007	Remedy transitioned to Monitored Natural Attenuation (MNA).
7/26/11	Third Five-Year Review Report

3.0 Background

The Site is located just west of the downtown area in Salt Lake City (SLC) as shown in Figure 1. The most contaminated area (i.e. the main study area) was designated as the American Barrel Yard (ABY). A residential area exists 200 feet directly west of the railroad tracks and the Site.

Activities at the Site began in the 1870's and continued until 1987 when a preliminary assessment was conducted. The activities at the Site included coal gasification, creosote pole treating operations and drum storage. Coal gasification activities were conducted until the early 1900's on the ABY. By-products of the gasification process included tars, sludges, coke, toluene, naphthalene, anthracene, phenols, ash and liquid wastes.

Creosote pole treating operations were also conducted on the ABY. Although specific chemical composition of the creosote used at the Site is unknown, typical creosote compounds include polynuclear aromatic hydrocarbons (PAHs) and phenolic compounds. The ABY was also used as a storage yard for used and empty 55-gallon drums. Although the drums were supposed to be empty, residual contents are believed to have included solvents, resins, paints, paint removers, pesticides, gasoline and acetone. Evidence of leakage from the drums was prevalent throughout the ABY. The barrels were removed in 1988.

Through three investigations of the Site, EPA identified high levels of PAHs, heavy metals, pesticides and petroleum hydrocarbon constituents in the soils and benzene, toluene, ethyl benzene and xylene (BTEX) in the surface/subsurface soils and shallow groundwater.

The Site was listed on the National Priorities List on October 4, 1989. The contaminants at the Site posed the greatest risks to human health through direct contact with the soils and contaminants themselves since the Site was immediately adjacent to a residential area and was frequented by transients. Groundwater also posed a threat due to the potential for contamination of the deeper aquifer which is used as a drinking water source in SLC.

4.0 Remedial Actions

4.1 Remedy Selection

The Record of Decision (ROD) for the Site was signed on July 7, 1993. The ROD stated that the response actions would permanently address all principal threats through treatment. The remedial action objective (RAO) for soils was to reduce contamination to health-based remediation levels for all contaminants of concern (COCs). The levels were based on a worker exposure scenario and set at the more protective end of the risk range. The RAO for groundwater was to clean up contamination to Safe Drinking Water Act maximum contaminant levels (MCLs), proposed MCLs or carcinogenic exposure limits (ELs) for future residential inhalation/ingestion exposures equivalent to risks of $1x10^{-6}$. Remediation Levels (RLs) for groundwater are either MCLs or ELs. The following are the major components of the remedy as described in the ROD:

- Excavation of soils that are principal threats based on visual observation and confirmed by sampling to the extent possible (given physical limitations resulting from locations of existing railroad lines).

- Excavation of soils exceeding health based levels based on a 10^{-6} worker exposure pathway. Soils ten feet deep were to be considered to have an exposure pathway.

- Treatment of excavated soils through offsite recycling of soils into a cold mix asphalt product suitable for paving roads. Incorporation of contaminated soils, as a raw material, into the asphalt product involves treatment through solidification.

- If encountered, RCRA characteristic hazardous wastes were to be shipped off-site for incineration and would not be utilized in the asphalt treatment process.

- Soil vapor extraction (SVE) for the principal threat light non-aqueous phase liquid (LNAPL). Groundwater would be extracted from SVE wells to enhance the remediation process. Off-gas from the SVE system would be treated before being

discharged into the atmosphere.

- Groundwater extracted from SVE wells, water pumped from excavations and decontamination water would be treated to Publicly Owned Treatment Works (POTW) standards then discharged to the Salt Lake City POTW for further treatment.

- The dissolved contaminant groundwater plume was expected to naturally attenuate once the principal threat sources for groundwater contamination had been remediated. If monitoring of groundwater contamination indicated that natural attenuation was not restoring groundwater to remediation levels, additional source removal or more active groundwater remediation would be required.

- Deed notices would be placed on the chains of title of the UP&L property and Denver & Rio Grande Western property disclosing the presence of potentially contaminated soils below the excavated depth and the presence of contaminated groundwater and prohibiting the drilling of water wells. Excavation of contaminated material would require handling in accordance with all applicable regulations.

- Institutional controls to prevent exposure to contaminated groundwater would be implemented. The Potentially Responsible Party (PRP), EPA and the Utah Department of Environmental Quality (UDEQ) would inform the State Engineer for the Division of Water Rights of the potential risks associated with the use of groundwater from the Site.

4.2 Remedy Implementation

Under a Consent Decree (CD, Civil #94-C-1162W) entered in April 1995, construction of the remedy was conducted by the PRP (PacifiCorp) in two phases. Phase I included soil excavation, construction of the temporary groundwater treatment facility and installation of groundwater monitoring wells. Phase II included construction of the SVE treatment system.

Construction of Phase I began in April 1995 with well installation and site preparation activities. Excavation activities began with the removal of surface soils in May 1995 and proceeded with excavation of principal threat wastes throughout the summer and early fall. By the end of November, backfilling with clean soil in all excavated areas was complete. Installation of the SVE wells (part of Phase II) began in September 1995 after excavation, but prior to backfilling. Construction of the SVE treatment facility began in May 1996 and was complete in June 1996. A pre-final inspection of construction activities was conducted on June 26, 1996 along with the start-up of the SVE treatment plant. A list of minor outstanding construction items were fully addressed by the final inspection on August 29, 1996. By the final inspection, the SVE treatment facility was fully operational and functional. The Site achieved construction completion status with

the signing of the Preliminary Close-Out Report on September 30, 1996.

Deed notices were placed on the original chains of title of the UP&L (i.e. PacifiCorp) and the Denver & Rio Grande Western properties. The notices disclosed the presence of potentially contaminated soils below the excavated depth and contaminated groundwater and prohibited the drilling of water wells.

There was no need to notify the State Engineer's Office of the potential risks associated with the use of groundwater from the Site because there were already institutional controls in place to protect nearby residents/businesses from the contaminated groundwater. Salt Lake City Ordinance #17.16.510 requires connection to a public water system if a public water main is available within city limits. Also, under Section II of the *Salt Lake Valley Interim Ground-water Management Plan,* well applications will not be granted in areas where a public water system is available. Nearby residents and businesses are all connected to the municipal water system.

In March 2011, an environmental covenant (EC) with activity/use limitations was placed on the properties owned by SLC. These properties, previously owned by PacifiCorp, encompass the area formerly known as ABY. Generally, the EC prohibits the use of groundwater, discloses the presence of potentially contaminated soil below the excavated depth and prohibits land uses that would interfere with or adversely affect current/future remedial activities at the Site.

4.3 Remedy Evaluation

The original remedy at the Site included SVE with groundwater depression wells to allow the entire vadose and smear zones to be remediated. The SVE and depression well systems were operated continuously from July 1996 to April 2007. Piping was manifolded into a treatment building where extracted vapors were treated using carbon adsorption units and groundwater extracted from the depression wells was treated in a UV-Oxidation Unit.

In a document titled *Five Year Review* dated July 1999, PacifiCorp proposed minor modifications to the operation of the remedy based on sampling results conducted in 1998. The document presented sampling results that identified the heavily contaminated areas and the cleaner areas of the Site. It suggested that the cleaner areas had begun to reach an asymptotic state and were more conducive to a less aggressive remedial approach. A model, presented in the document, also suggested that the organic plume was stable and estimated that the plume, upon source removal, could be removed in five years. In addition, the model suggested that the plume would degrade faster if more dissolved oxygen was available for biodegradation. The proposed remedial approach to "polish" the cleaner areas of the plume was to convert the SVE/depression well system to an air sparging (AS) system. EPA and UDEQ approved the AS enhancement on a conceptual basis in June 2000 and the design in October 2000 because AS is commonly used with SVE to successfully treat groundwater.

The enhancement was installed in the cleaner areas of the plume in June 2002. A summary of construction and future monitoring activities of the AS enhancement is presented in PacifiCorp's *Construction Complete Report for American Barrel Biosparging System* (June 2002).

The 2006 Five-Year Review Report recommended three reports to address specific issues related to air sparging, DNAPL and current/future conditions for groundwater. It was also thought that the recommended reports could be used to evaluate the viability of transitioning from active remediation to passive remediation (i.e. monitored natural attenuation). The three reports are summarized below:

Study on the Effectiveness of Air Sparging. In June 2002, the SVE and depression well system in cleaner areas of the plume was converted to an AS system. The purpose was to "polish" the cleaner areas by providing more dissolved oxygen to the subsurface to enhance biodegradation via AS. However, a comprehensive study on the effectiveness of the conversion had not been conducted as of 2006.

PacifiCorp conducted a comprehensive study on the effectiveness of the conversion and presented the results in a report titled *Effectiveness of Air Sparging* dated January 2007. The report essentially concluded that AS was very successful in areas of low contamination, but not successful in areas of high contamination. Further, the report concluded that AS could be a viable remedial option if the Site ever transitioned from active to passive remediation (i.e. monitored natural attenuation) and groundwater monitoring indicated that natural attenuation was not restoring groundwater to remediation levels.

Updated Evaluation of DNAPL. During construction of the remedy in 1995, dense non-aqueous phase liquid (DNAPL) had been excavated down two feet below the confining clay layer and DNAPL stringers were followed horizontally in all directions and removed. It was determined that it was not physically/feasibly possible to remove the remaining isolated pocket of DNAPL due to its location under an active rail line adjacent to the Site. It was also determined that attempting to excavate to the depth of the DNAPL would, more than likely, exacerbate the problem by mobilizing the liquid and contaminating the groundwater further. Since an evaluation on the feasibility of cleaning up the DNAPL had not been conducted since 1995, the 2006 Five-Year Review Report recommended an updated evaluation.

PacifiCorp conducted a comprehensive evaluation on the viability of cleaning up the remaining DNAPL pocket and presented the results in a report titled *Updated Evaluation on Feasibility of Removing DNAPL at the American Barrel Site* dated January 2007. The report concluded that the DNAPL pocket was still small, isolated and immobile. Also, modeling suggested that natural attenuation would be just as effective and timely as any available technology in cleaning up the contaminated groundwater plume without physically/chemically/biologically exacerbating the isolated DNAPL.

Report on Current and Future Conditions for Groundwater. During the 2006 review, PacifiCorp claimed that contaminant levels in extracted organic vapors had reached asymptotic (i.e. stable) conditions given data from the previous five years and the results of a recent groundwater model of the organic plume. PacifiCorp requested approval to transition from active remediation to monitored natural attenuation as recommended in the 1993 ROD. The ROD states that the dissolved phase aqueous groundwater contamination plume is expected to naturally attenuate once the threat sources to groundwater were addressed. Also, the ROD states that the SVE system shall be operated and monitored until groundwater performance standards are achieved or until sufficient data has been collected to demonstrate that contaminant concentrations in the extracted soil vapors are at asymptotic levels. Therefore, the 2006 Five-Year Review Report recommended a comprehensive report on current and future conditions for groundwater.

PacifiCorp's *Comprehensive Site Condition Report*, dated March 2007, effectively demonstrated that: 1) all of the necessary principal/low level threat wastes were addressed; 2) organic vapors had reached asymptotic levels; 3) best efforts had been conducted to optimize the performance of the SVE system since 1996; 4) the contaminated groundwater plume was stable and not migrating off the Site; and, 5) there was no significant difference in the time it would take to remediate the contaminated groundwater plume between active remediation and monitored natural attenuation.

4.4 Remedy Transition to Monitored Natural Attenuation (MNA)

With the approval of the three reports in April 2007, EPA/UDEQ accepted PacifiCorp's request to transition from active remediation (SVE and AS with groundwater treatment) to passive remediation (monitored natural attenuation) under the condition that additional source removal or more active groundwater remediation would be required if monitoring information showed that natural attenuation was not restoring groundwater to remediation levels. The SVE/AS systems and associated components were entirely dismantled and removed by July 2007.

The 1993 ROD requires groundwater monitoring for at least five years to measure the effectiveness of natural attenuation as predicted by groundwater modeling. The *Groundwater Restoration Performance and Compliance Monitoring Plan* (GRPCMP, PacifiCorp, 1995) details the requirements for monitoring during natural attenuation and requires two wells to be added at the leading edge of the plume. In order to better define the extent of the organic plume and locate the two additional wells, PacifiCorp developed a work plan titled *Groundwater Plume Characterization for Placement of Monitored Natural Attenuation Wells* dated August 2007.

The study utilized geoprobe direct push technology and was conducted in three phases between November 2007 and July 2010. The results are included in two documents: *American Barrel Site Investigation November 2007 and July 2008* (PacifiCorp, 2008) and

the *American Barrel Site Phase III Geoprobe Investigation Report* (PacifiCorp, 2010).

A total of thirty-five boreholes were installed over the three phases of the geoprobe study. Ten soil samples and thirty-six groundwater samples were collected (including one duplicate sample). Groundwater samples from the Phase 1 investigation were analyzed for BTEX and for BTEX plus Naphthalene (BTEXN) in Phases 2 and 3. Cyanide was not included in the study because it was not considered a concern from a risk standpoint when the work plan was completed. All cyanide concentrations in boundary wells had been below the MCL except for one result in RW-522 that was suspected to be spurious at the time. Based on data collected, four monitoring wells were installed in 2008: RW-602, RW-603, RW-604 and RW-605.

It should be noted that stringent institutional controls are in place to restrict the use of well water at the Site (Section 4.2). In addition, the major forms of cyanide at the Site are iron-cyanide complexes. Groundwater containing iron-cyanide complexes is not toxic unless the groundwater is removed from the subsurface and a significant amount of cyanide complex undergoes photolysis and produces free cyanide. Free cyanide forms the basis of risk. Even if photolysis were to occur, it does not necessarily follow that toxic levels of cyanide would be available because many factors influence the concentration of free cyanide.

The procedures and methods for implementing and documenting MNA have evolved since the creation of the GRPCP in 1997. Therefore, the GRPCP was superseded by the Monitored Natural Attenuation Plan (MNAP) in March 2013. The MNAP will guide the MNA phase of remediation and was revised in November 2015 to include two new wells, RW-606 and RW-607.

4.5 Groundwater Monitoring Program for Natural Attenuation

PacifiCorp began the MNAP groundwater monitoring program in 2013 with the objective of documenting the progress of natural attenuation and determining if groundwater restoration at the Site has been achieved. The program includes:

- Monitoring water table elevations and collecting groundwater samples from the selected existing monitoring wells;
- Monitoring the degree and extent of natural attenuation occurring at the Site by analyzing groundwater samples for benzene, naphthalene and cyanide on a semi-annual basis;
- Preparing a report at the completion of each monitoring event that presents an interpretation of the sampling data and a discussion on the performance of natural attenuation at the Site.

From 2008 to 2012, a network of eight wells has been monitored to measure the performance of natural attenuation. The network was designed to assess plume stability and was structured to take into account seasonal fluctuations in groundwater flow

direction (generally westerly to southwesterly). The well network included four principal threat wells inside the plume (RW-602, RW-603, RW-604, and RW-605) and four boundary wells (RW-505R, RW-506R, RW-600, and RW-60l).

The MNAP modified the well network by deleting RW- 506R and adding RW-514, RW-606 and RW-607. Three up-gradient wells (UG-1, UG-2 and UG-3), installed as part of the cyanide investigation in 2012, are utilized as piezometers to better define the potentiometric surface. This configuration supports the monitoring of three potential centerlines of the organic plume to allow for possible variations in groundwater flow direction.

During the post-remediation monitoring period from June 2007 through September 2012, only three COCs exceeded their respective RLs: benzene, naphthalene and cyanide. Since all of the other COCs were detected at concentrations below 25% of the RL, it is highly unlikely that these compounds would exceed their respective RLs in the future. Therefore, benzene, naphthalene, and cyanide are the only COCs being monitored during the MNA phase of remediation.

Wells are monitored semi-annually in the spring and fall to coincide with high and low water table conditions, respectively. Based on post-remediation monitoring results thus far, semi-annual monitoring should be adequate to ensure that COCs are not migrating beyond the study area at concentrations exceeding RLs. If it appears that COCs are migrating off-site at concentrations exceeding RLs, the monitoring schedule will be evaluated at that time.

4.6 Semi-Annual Reports

Semi-Annual groundwater monitoring reports are required by the MNAP. After sampling events, groundwater monitoring reports are prepared and submitted to EPA/UDEQ. The reports are submitted to EPA/UDEQ and include groundwater elevation measurements, a potentiometric surface map, analytical results, interpretation of the sampling data and a discussion on the performance of natural attenuation at the Site. They also include statistical evaluations of contaminant concentration trends for each well. The reports are due by July 31 (spring monitoring report) and by January 31 (fall monitoring report).

5.0 Progress Since Last Five-Year Review

The last five-year review report was signed on July 26, 2011 with the following protectiveness statement: The remedy at the Site currently protects human health and the environment because exposure pathways that could result in unacceptable risks are being controlled in the short term. However, in order for the remedy to be protective in the long term, increasing cyanide levels in RW-600 and the potential ILCR for the vapor intrusion pathway must be addressed. All of the issues and recommendations in the report were addressed as shown in the following table:

Table 2: Five Year Review Status Table (Review Date: 7/26/11)			
Issues	**Recommendations/ Follow-Up Actions**	**Action Taken or Outcome**	**Party Responsible**
No Interpretation of Sampling Data in Quarterly Reports	Incorporate interpretation of sampling data in quarterly reports.	COMPLETED: Sampling data interpretation incorporated in first quarterly report of 2012 and subsequent ones.	PacifiCorp
GRPCMP Not Up-to-Date	Update GRPCMP to include current understandings, procedures and methods for effective implementation and evaluation of monitored natural attenuation.	COMPLETED: MNAP completed in March 2013.	PacifiCorp
Increasing Cyanide Levels in RW-600	Conduct an investigation utilizing geoprobe direct push technology to determine the source and areal extent of the cyanide plume around RW-600.	COMPLETED: Investigation completed in 2012 with report titled *Spring 2012 Cyanide Investigation*.	PacifiCorp
Potential ILCR for Vapor Intrusion Pathway	Conduct an investigation in accordance with all EPA guidance concerning vapor intrusion to confirm or refute the ILCR and address the risk, if confirmed.	COMPLETED: Investigation completed in 2011with report titled *American Barrel Site Vapor Intrusion Pathway Report*.	PacifiCorp

6.0 Redevelopment Activities at the Site

As stated in Section 4.4, the SVE/AS systems and associated components were entirely dismantled and removed by July 2007. This facilitated a number of land swaps and major redevelopment activities in the area around the former ABY.

In 2007, the Union Pacific Railroad (UPRR) realigned its tracks to reduce the curvature of the tracks on the Site and increase the efficiency of its rail service throughout the regional area. The realignment also facilitated the closing of the "900 South Street" track, a notoriously dangerous track with many safety complaints from the public to

UPRR and SLC. Further, the realignment facilitated the construction of the Utah Transit Authority (UTA) FrontRunner commuter rail line through the Site in 2007/2008.

In 2009, EPA and the Redevelopment Agency of SLC (RDA) entered into an Agreement & Covenant Not to Sue (Agreement) to facilitate "green" commercial redevelopment of the two properties owned by SLC within the Site. In February 2011, EPA, RDA, Gateway Parking L.C., and SLC signed a Successor Addendum to the Agreement. The Addendum allowed the RDA to step away from any further obligations under the Agreement and Gateway Parking L.C. to assume all of the remaining ones, except executing/recording an environmental covenant. SLC agreed to execute and record an environmental covenant.

In March 2011, SLC recorded an environmental covenant (EC) that places activity/use limitations on the properties specified in the Agreement. These properties, previously owned by PacifiCorp, encompass the area formerly known as ABY. The EC prohibits the use of groundwater, discloses the presence of potentially contaminated soil below the excavated depth and prohibits land uses that would interfere with or adversely affect current/future remedial activities at the Site.

In January 2013, Give Holdings North Sixth bought the properties on what is now the North Sixth Apartments (Figure 1). Construction of the five-story complex began in mid-2013 and was completed in mid-2014. The North Sixth Apartments are on 600 West Street (western side of the Site) and represent the up and coming vibrancy of the neighborhood.

7.0 Five-Year Review Process

The five-year review was led by Armando Saenz, EPA Project Manager for the Site. The following team members assisted in the review:

- Katie Crane, UDEQ Project Manager
- Erin Agee, EPA Attorney

The five-year review consisted of the following activities: a review of relevant documents; review of ARARs and groundwater sampling data; and a site inspection. A notice stating that the five-year review was in progress was placed in The Salt Lake Tribune on February 12, 2016. A notice of completion of the five-year report will also be placed in The Salt Lake Tribune.

8.0 Five Year Review Findings

8.1 Site Inspection

The inspection of the Site was conducted on August 13, 2016. The purposed of the inspection was to assess the protectiveness of the remedy. There were no issues observed. All of the wells used for sampling seemed to be in good condition and well-maintained. The Site (and surrounding area) have gone through a lot of changes throughout the years. Physically, the Site looks vastly different from ten years ago. Fencing is no longer needed because the SVE/AS systems no longer exist and there is no surface contamination. On the Site, redevelopment improvements include the realigned UPRR track, FrontRunner commuter rail line and the North Six Apartments. Around the Site, redevelopment has increased with new condominiums, apartments, office buildings and small businesses. The streets surrounding the Site have been greatly improved and 500 and 600 West Streets are now often-used. The reconstructed North Temple Viaduct has greatly improved traffic efficiency in the area. See photos in Appendix C.

8.2 ARARs Review

As part of the five-year review, state and federal Applicable and Relevant and Appropriate Requirements (ARARs) were reviewed. The primary purpose of this review was to determine if any newly promulgated or modified requirements of federal and state environmental laws have significantly changed the protectiveness of the remedies implemented at the Site. The ARARs reviewed were those included in the 1993 ROD.

Overall, the review does not indicate any substantive changes to regulations that would affect the remedy or its protectiveness. EPA and UDEQ will continue to monitor this Site and any future changes or modifications in ARARs will be reported in the next five-year review.

8.3 Review of Groundwater Monitoring Data

Currently, groundwater samples are collected from ten monitoring wells: RW-505R, RW-514, RW-600, RW-601, RW-602, RW-603, RW-604, RW-605, RW-606, and RW-607. The groundwater samples are collected to evaluate the effectiveness of past remedial activities in reducing contaminant levels at the Site. Groundwater elevations are measured prior to sampling the ten monitoring wells and are also measured from three additional wells (UG-1, UG-2R and UG-3) to aid in defining the direction of groundwater flow (groundwater samples are not collected from these three wells).

Historical data for groundwater field parameters, benzene, naphthalene and cyanide are summarized for each well in Table 5 in Appendix A. Remediation Levels (RLs) for each COC are also included in Table 5 for comparison purposes. The RLs are either federal Maximum Contaminant Levels (MCLs) or Exposure Levels (ELs).

The latest potentiometric surface map from December 2015 is shown as Figure 1 in Appendix B. It illustrates that the direction of groundwater flow is generally to the west and the gradient is steeper on the eastern portion of the Site than on the western portion. The local hydraulic gradient was approximately 0.015 feet/foot in December 2015. This flow pattern and hydraulic gradient are consistent with previous sampling events.

Hydrographs for upgradient wells UG-1, UG-2R, and UG-3 are included as Figure 2 in Appendix B. Groundwater elevations have remained relatively stable in all three wells for the previous three events.

Boundary Wells. As shown in Table 5, analytical data for groundwater collected from the boundary wells indicate that no contaminants are migrating off-site above RLs. Benzene, naphthalene and cyanide concentration trends have been graphed for RW-505R, Rw-600 and RW-601 and are presented as Figures 3 – 11 in Appendix B. It should be noted that RW-606 was only recently added to the sampling program in December 2015. Trends are discussed below:

RW-505R (central boundary well): As shown in Figure 3, benzene has been detected in RW-505R three times since 2008, but only at concentrations below the RL. Naphthalene has never been detected in RW-505R as shown in Figure 4. Historically, RW-505R has detected relatively stable concentrations of cyanide at concentrations of less than 50 ug/L (well below the RL of 200 ug/L) as shown in Figure 5.

RW-600 (southern boundary well): Benzene has only been detected twice in RW-600 at concentrations below the RL of 5 ug/L (Figure 6). Naphthalene has never been detected in this well (Figure 7). Cyanide concentrations in RW-600 steadily increased from March 2008 through December 2010, but have decreased since then. While the RL of 200 ug/L was exceeded for ten consecutive sampling events from June 2009 to August 2011, cyanide concentrations have been below 100 ug/L for the past twelve consecutive sampling events (Figure 8).

RW-601 (northern boundary well): Benzene in RW-601 has never exceeded the RL of 5 ug/L (Figure 9). Naphthalene has only been detected once at an estimated concentration of 0.82 µg/L in June 2009 (Figure 10). Historically, cyanide has only been detected in RW-601 three times (Figure 11).

Overall, the contaminant trend graphs indicate that contaminant plumes are stable at the boundaries of the Site. Since being installed in 2008, none of the boundary wells have exceeded the RLs for benzene or naphthalene. Since December 2011, cyanide concentrations have been below the RL for RW-505R, RW-600 and RW601. None of the COCs were detected in new boundary well RW-606.

On-site Wells. Onsite wells RW-602, RW-603, RW-604 and RW-605 are referred to as the "source wells." RW-514 and RW-607 are also on-site, but outside the known source

area. As shown in Table 5, analytical data for groundwater collected from the on-site wells indicate that all six wells have exceeded the RL for at least one of the COCs. Benzene, naphthalene, and cyanide concentration trends have been graphed for the on-site wells and are presented as Figures 12 – 26 in Appendix B. It should be noted that RW-607 was only recently added to the sampling program in December 2015. Trends are discussed below:

RW-514 (southern on-site well): Concentrations of benzene have exceeded RLs since sampling began in 2013, but have remained generally stable in the 20-30 µg/L range (Figure 12). Naphthalene and cyanide concentrations have remained generally stable and below their respective RLs since May 2013 (Figures 13 and 14).

RW-602 (northwestern source well): Concentrations of benzene and cyanide have exceeded RLs since sampling began in 2008, but the concentrations have generally decreased over time (Figures 15 and 17). Naphthalene concentrations exceeded the RL of 1,460 µg/L between December 2010 and March 2013, but have been below the RL since December 2013 (Figure 16).

RW-603 (northeastern source well): Benzene and cyanide concentrations in RW-603 have exhibited a fair degree of fluctuation over time and have consistently remained above the RLs (Figures 18 and 20). Naphthalene concentrations in RW-603 have been generally stable and have never exceeded the RL (Figure 19).

RW-604 (western-central source well): Benzene and cyanide concentrations in RW-604 increased significantly to all-time highs in 2013, but have significantly decreased since that time (Figures 21 and 23). While benzene continues to exceed the RL, cyanide has not exceeded the RL since 2013. Naphthalene concentrations have always been below the RL, but steadily increased between 2012/2014 and then decreased in 2015 (Figure 22).

RW-605 (southeastern source well): Benzene and cyanide concentrations have remained essentially stable, and naphthalene concentrations have decreased since the last sampling event. Concentrations of all three contaminants have always exceeded the RLs. Since 2008, benzene concentrations have fluctuated between 5,000 and 9,000 ug/L (Figure 24). Naphthalene concentrations have generally decreased, but have slightly increased since August 2011 (Figure 25). Cyanide concentrations in RW-605 have exhibited a decreasing trend since June 2011 (Figure 26).

8.4 Investigation of Cyanide in RW-600

In response to increasing cyanide concentrations in RW-600 from 2008 - 2010, PacifiCorp prepared a plan to further investigate the issue titled *Cyanide in Groundwater Plume Characterization and Installation of Upgradient Boundary Monitoring Wells at the American Barrel Site* (2011). The investigation was conducted in May 2012 to better define the nature and extent of the cyanide plume and better define groundwater flow direction and gradient at the Site. Three new upgradient monitoring wells (UG-1, UG-2

and UG-3) were added and aided in more clearly defining the groundwater flow direction and gradient. The analytical results suggested that Cyanide was generally restricted to the Site and no longer leaving the property at concentrations above RLs. Despite past remedial activities, isolated cyanide pockets still remain beneath operational railroad lines at depths where excavation is impractical. The investigation was completed with PacifiCorp's *Spring 2012 Cyanide Investigation* (2012) which determined that further attempts at remediating the remaining cyanide pockets were not warranted and recommended continued monitoring of the cyanide plume.

It should be noted that stringent institutional controls are in place to restrict the use of well water at the Site (Section 4.2). In addition, the major forms of cyanide at the Site are iron-cyanide complexes. Groundwater containing iron-cyanide complexes is not toxic unless the groundwater is removed from the subsurface and a significant amount of cyanide complex undergoes photolysis and produces free cyanide. Free cyanide forms the basis of risk. Even if photolysis were to occur, it does not necessarily follow that toxic levels of cyanide would be available because many factors influence the concentration of free cyanide.

8.5 Investigation of the Vapor Intrusion Pathway

Modeling of groundwater data from the Phase III Geoprobe investigation indicated a potential increased lifetime cancer risk (ILCR) to some nearby residences from the inhalation of volatile compounds emanating from the groundwater. To further evaluate this risk, PacifiCorp prepared a plan titled *Vapor Intrusion Pathway Investigation Plan for the American Barrel Site* (2011). The investigation included soil gas and indoor/outdoor air sampling and was conducted in September 2011. The analytical data indicated that there was no clear indication that vapor intrusion was occurring at the residences. Although benzene was present in soil gas beneath the buildings, modeling of the data indicated that the predicted concentrations due to vapor intrusion were below levels that would pose a threat to human health. Also, based on existing studies of background concentrations in indoor/outdoor air, it is likely that the benzene, toluene and xylene measured in and around the residences were likely due to source(s) other than the dissolved phase groundwater plume. The investigation was completed with PacifiCorp's report titled *American Barrel Site Vapor Intrusion Pathway Report* (2011).

Subsequent to the 2011 vapor intrusion report, the residential structures where the soil gas samples were collected were demolished and the North Sixth Apartment complex was constructed. In 2015, RW-607 was installed on the east side of the apartment to gain a better understanding of the downgradient edges of plumes. The 2015 and 2016 sampling events suggest a presence of benzene and cyanide in the groundwater beneath the complex, however the concentrations are unlikely to be at levels that would impact that building's occupants; shallow groundwater is not used at the Site, and vapor intrusion into living spaces is most likely not a concern due to the building's construction (i.e. no apartments on ground level). No indoor soil gas samples have been collected from the North Sixth Apartment complex.

9.0 Assessment

Question A: Is the remedy functioning as intended by the decision documents? Yes.

HASP/Contingency Plan/Other Plans & Reports: The Health & Safety Plan (with Contingency Plan) is in place, sufficient to control risks and properly implemented. Semi-annual reports are in accordance with the CD/MNAP and include the necessary interpretation of sampling data to measure the performance of natural attenuation. The MNAP has been effective in guiding groundwater monitoring activities at the Site to date and includes current understandings, procedures and methods for effective implementation/evaluation of monitored natural attenuation.

Implementation of Institutional Controls and Other Measures: ICs, called for in the 1993 ROD, have been implemented. The ICs remain in place and no uses and/or activities at the Site are inconsistent with the ICs.

Remedial Action Performance: The AS, SVE and depression well systems have been dismantled/removed and the remedy has transitioned from active remediation to monitored natural attenuation. The monitoring program for natural attenuation is in place and appears to be adequate at this time. However, there is not enough information yet to determine if natural attenuation is working or not working.

System Operations/O&M/Monitoring: Contaminant trend graphs indicate that contaminant plumes are stable at the boundaries of the Site. Since being installed in 2008, none of the boundary wells have exceeded the RLs for benzene or naphthalene. Since December 2011, cyanide concentrations have been below the RL for RW-505R, RW-600 and RW601. None of the COCs were detected in new boundary well RW-606.

Opportunities for Optimization: There are no opportunities for optimization at this time. However, adjustments to improve the current monitoring program are not only expected by the parties, but encouraged as well.

Early Indicators of Potential Remedy Failure: No early indicators of potential remedy failure were noted during this review.

Question B: Are the assumptions at the time of remedy selection still valid? Yes.

Changes in Standards: No newly promulgated or modified ARARs that would significantly change the protectiveness of the remedies implemented at the Site were found.

Changes in Exposure Pathways: No changes in site conditions that affect exposure pathways were identified as part of this review. First, there are no current changes in land use. Second, no new contaminants, sources or routes of exposure were identified. Finally, there is no indication that hydrologic or hydrogeologic conditions are not adequately characterized. Present contaminant levels in groundwater are consistent with expectations at the time of the ROD.

Changes in Toxicity and Other Contaminant Characteristics: Since the time of the 1993 ROD, no changes in toxicity and other factors for contaminants of concern call into question the protectiveness of the remedy.

Changes in Risk Assessment Methodologies: Since the time of the 1993 ROD, changes in risk assessment methodologies do not call into question the protectiveness of the remedy.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy? No.

No additional information has been identified.

10.0 Issues

Table 3: Issues

Issue No.	*Issue*	*Currently Affects Protectiveness*	*Affects Future Protectiveness*
1	It is still not known if natural attenuation (NA) is actually occurring at the Site.	No	Yes
2	No indoor air samples have been collected from the North Sixth Apartment complex.	No	Yes

11.0 Recommendations and Follow-up Actions

Table 4: Recommendations and Follow-Up Actions

Issue	*Recommendations/ Follow-Up Actions*	*Party Responsible*	*Oversight Agency*	*Milestone Date*	*Affects Current Protectiveness?*	*Affects Future Protectiveness?*
1 Not Known if NA is Occurring	Using MNA data, evaluate the biotransformation process and determine if the site geochemistry is favorable for NA.	PRP	EPA & UDEQ	12/31/18	No	Yes
2 No Indoor Air Samples from North Sixth	Conduct a vapor intrusion investigation at North Sixth Apartments.	PRP	EPA & UDEQ	12/31/18	No	Yes

12.0 Protectiveness Statement

Groundwater monitoring data suggests that the underlying contaminated plumes have remained within the boundaries of the Site. Present contaminant levels in groundwater are consistent with expectations at the time of the 1993 ROD. Stringent institutional controls are in place to restrict use of the contaminated groundwater and the residents/businesses in the area are connected to the municipal water system.

The remedy at the Site currently protects human health and the environment because exposure pathways that could result in unacceptable risks are being controlled in the short term. However, in order for the remedy to be protective in the long-term, it must be determined if natural attenuation is actually occurring at the Site and a vapor intrusion investigation must be conducted at the North Sixth Apartments.

13.0 Next Review

The five-year reviews for this Site are statutory. The next review will be conducted within five years of the completion of this five-year review report. The completion date is the date of the signature shown on the cover page of the report.

Appendix A

Table 5: Historical Groundwater Field Parameters, Benzene, Naphthalene and Cyanide Concentrations

Table 5
Historical Groundwater Field Parameters, Benzene, Naphthalene and Cyanide Concentrations, 2008 – 2015
(1 of 5)

Well / Sample Identification:	Sample Date	Field Parameters						Contaminants of Concern		
		Groundwater elevation (ft-AMSL)	Temperature (°C)	pH (standard units)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Benzene (µg/L) EPA 8260C	Naphthalene (µg/L) EPA 8260C	Cyanide (µg/L) EPA 9012A
Remediation Level	--	--	--	--	--	--	--	5*	1,460**	200*
RW-505R	3/20/2008	4221.85	13.9	6.98	1.87	186	2.34	0.15 J	NT	34
Duplicate (from RW-505R)	3/20/2008	NA	NA	NA	NA	NA	NA	0.17 J	NT	32
RW-505R	6/26/2008	4221.32	14.7	7.44	1.66	>999	0.72	ND	NT	31
Duplicate (from RW-505R)	6/26/2008	NA	NA	NA	NA	NA	NA	ND	NT	ND
RW-505R	9/3/2008	4220.95	15.2	7.76	1.51	190	1.07	ND	NT	23
RW-505R	11/19/2008	4221.60	15.0	7.34	1.82	351	0.78	<1	NT	30
RW-505R	3/5/2009	4222.04	13.7	7.62	1.70	84	0.61	<1	NT	24
RW-505R	6/9/2009	4222.02	14.2	7.34	1.74	284	0.40	0.47 J	<1.0	15 J
RW-505R	8/13/2009	4221.41	15.2	7.18	1.85	516	0.95	<1.0	NA	8.5 J
RW-505R	12/1/2009	4221.24	14.7	7.12	1.88	504	0.76	<1.0	NA	6.9 J
RW-505R	3/9/2010	4221.76	13.6	6.80	1.99	421	5.37	<1.0	NA	8.8 J
RW-505R	6/8/2010	4222.67	15.1	7.13	1.86	108	4.07	<1.0	<1.0	17
RW-505R	8/24/2010	4222.48	14.5	6.88	1.95	290	4.05	<1.0	NA	45
RW-505R	12/2/2010	4223.04	14.3	7.02	1.82	94	5.78	<1.0	NA	30
RW-505R	3/2/2011	4223.13	13.4	7.07	2.13	109	6.41	<1.0	NA	<10
RW-505R	5/31/2011	4223.40	13.92	7.06	1.89	124	4.02	<1.0	<1.0	<10
RW-505R	8/23/2011	4222.98	14.7	7.17	1.61	47	3.33	<1.0	NA	<10
RW-505R	12/7/2011	4223.05	14.0	7.39	1.22	73	3.91	<1.0	NA	<10
RW-505R	3/5/2012	4223.21	14.2	7.38	1.21	178	3.63	<1.0	NA	<10
RW-505R	6/6/2012	4223.40	13.14	7.35	1.37	61.9	2.59	<1.0	<1.0	<10
RW-505R	8/20/2012	4222.61	15.05	7.25	1.26	51	4.13	0.5 J	NA	<10
RW-505R	12/4/2012	4222.61	14.89	6.90	1.27	143	3.01	<1.0	NA	<10
RW-505R	3/12/2013	4223.12	13.63	7.25	1.36	39.3	2.77	<1.0	NA	<10
RW-505R	5/15/2013	4223.24	14.65	7.42	1.48	457	3.39	<1.0	<1.0	3.5 J
RW-505R	12/11/2013	4222.16	15.60	7.45	1.43	460	4.25	<1.0	<1.0	<10 HT
RW-505R	1/9/2014	4222.12	16.29	7.42	1.34	86.0	8.64	NS	NS	5.5 J
RW-505R	6/3/2014	4222.96	14.58	7.42	1.35	823	4.12	<1.0	<1.0	14
RW-505R	12/5/2014	4222.46	15.64	7.32	1.39	136	2.90	<1.0	<1.0	<10 J
RW-505R	5/20/2015	4231.91	16.12	7.27	1.46	231	1.93	<1.0	<1.0	<10
RW-505R	12/4/2015	4222.89	17.46	7.17	1.46	562	4.11	<1.0	<1.0	<10
RW-514	5/14/2013	4223.56	16.27	7.31	1.02	27.0	7.30	31	110	11
Duplicate "RW-777" (from RW-514)	5/14/2013	NA	NA	NA	NA	NA	NA	33	120	13
RW-514	12/11/2013	4222.57	16.22	7.44	1.04	63	4.68	38	110	12 HT
RW-514	1/8/2014	4222.53	16.21	7.37	1.00	109	4.73	NA	NA	17
RW-514	6/3/2014	4223.21	16.97	7.10	0.990	153	2.40	25	75	27
RW-514	12/4/2014	4222.85	16.27	7.21	1.02	128	2.66	24	64	13 J
RW-514	5/20/2015	4239.03	15.68	7.24	0.984	70.9	2.20	22	48	14
RW-514	12/3/2015	4223.09	15.58	7.17	1.02	6.1	2.73	26	76	14

Well / Sample Identification:	Sample Date	Field Parameters						Contaminants of Concern		
		Groundwater elevation (ft-AMSL)	Temperature (°C)	pH (standard units)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Benzene (µg/L) EPA 8260C	Naphthalene (µg/L) EPA 8260C	Cyanide (µg/L) EPA 9012A
Remediation Level	--	--	--	--	--	--	--	5*	1.460**	200*
RW-600	3/20/2008	4222.22	13.5	7.04	2.00	133	0.97	0.56 J	NT	66
RW-600	6/26/2008	4221.59	16.2	7.47	1.48	173	2.28	ND	NT	140
RW-600	9/3/2008	4221.00	16.6	7.52	1.36	356	0.94	ND	NT	110
RW-600	11/19/2008	4221.88	17.0	7.20	1.59	135	1.37	<1	NT	130
RW-600	3/5/2009	4222.21	14.0	7.39	1.66	330	0.76	<1	NT	150
RW-600	6/9/2009	4222.19	14.1	7.11	1.79	92	0.65	<1.0	<1.0	360 J
RW-600	8/13/2009	4221.44	15.7	7.07	1.87	74	0.56	0.13 J	NA	410 J
RW-600	12/1/2009	4221.21	16.1	6.95	1.79	287	0.62	<1.0	NA	330
RW-600	3/9/2010	4221.77	13.7	6.58	2.15	739	2.94	<1.0	NA	450
RW-600	6/8/2010	4222.83	15.8	7.00	2.08	201	4.76	<1.0	<1.0	620
Duplicate "RW-777" (from RW-600)	6/8/2010	NA	NA	NA	NA	NA	NA	<1.0	<1.0	680
RW-600	8/24/2010	4222.78	16.3	6.84	2.11	169	2.81	<1.0	NA	750
RW-600	12/2/2010	4222.86	15.4	6.87	2.10	514	4.03	<1.0	NA	750
RW-600	3/2/2011	4223.10	13.1	6.98	2.03	356	3.88	<1.0	NA	420
RW-600	6/1/2011	4224.07	14.08	6.92	1.92	307	9.34	<1.0	<1.0	440
Duplicate "RW-777" (from RW-600)	6/1/2011	NA	NA	NA	NA	NA	NA	<1.0	<1.0	420
RW-600	8/23/2011	4222.99	15.9	6.91	2.11	405	3.66	<1.0	NA	340
RW-600	12/7/2011	4222.95	15.1	7.22	2.00	339	4.23	<1.0	NA	<10
RW-600	3/5/2012	4223.09	14.4	6.90	1.84	236	6.14	<1.0	NA	99
RW-600	6/6/2012	4223.45	14.23	7.11	1.80	254	3.13	<1.0	<1.0	67
Duplicate "RW-777" (from RW-600)	6/6/2012	NA	NA	NA	NA	NA	NA	<1.0	<1.0	63
RW-600	8/21/2012	4222.39	16.35	7.64	1.71	>800	3.18	<1.0	NA	68
RW-600	12/4/2012	4222.53	16.31	6.87	1.79	>800	2.39	<1.0	NA	31
RW-600	3/12/2013	4223.08	14.05	7.05	1.75	277	2.89	<1.0	NA	61
RW-600	5/15/2013	4223.16	14.56	7.16	1.71	257	4.03	<1.0	<1.0	79
RW-600	12/11/2013	4222.14	15.87	7.27	1.76	>1000	4.45	<1.0	<1.0	31 HT
RW-600	1/9/2014	4222.06	16.16	7.28	1.67	648	4.86	NA	NA	55
RW-600	6/3/2014	4222.87	14.56	6.97	1.65	>1000	3.64	<1.0	<1.0	55
RW-600	12/5/2014	4222.44	16.86	7.13	1.58	867	1.81	<1.0	<1.0	36 J
RW-600	5/21/2015	4232.34	14.73	7.23	1.34	319	3.17	<1.0	<1.0	35
RW-600	12/4/2015	4222.64	17.74	6.99	1.83	>1000	6.94	<1.0	<1.0	23
RW-601	3/20/2008	4221.96	13.7	7.22	1.94	153	1.10	0.31 J	NT	ND
RW-601	6/26/2008	4222.19	18.7	7.50	1.74	171	1.82	0.17 J	NT	ND
RW-601	9/3/2008	4222.13	17.1	7.20	1.86	129	2.02	ND	NT	ND
RW-601	11/19/2008	4222.25	17.1	7.34	1.77	152	1.04	1.7	NT	<10
RW-601	3/6/2009	4222.68	11.4	7.19	2.08	105	1.57	3.1	NT	<10 U
RW-601	6/9/2009	4222.72	14.1	7.36	1.70	281	2.16	0.47 J	<1.0	<10 J
Duplicate "RW-777" (from RW-601)	6/9/2009	NA	NA	NA	NA	NA	NA	0.52 J	0.82 J	<10 J
RW-601	8/13/2009	4222.44	17.9	7.14	1.86	51	1.75	0.28 J	NA	<10
RW-601	12/1/2009	4222.15	15.0	7.32	1.60	173	2.47	0.28 J	NA	<10
RW-601	3/9/2010	4222.74	11.1	7.16	1.82	305	3.89	0.24 J	NA	<10
RW-601	6/8/2010	4223.25	16.2	7.15	1.65	149	3.61	<1.0	<1.0	<10
RW-601	8/24/2010	4222.57	17.5	7.08	1.52	632	5.33	<1.0	NA	<10
RW-601	12/2/2010	4224.29	15.3	7.18	1.43	130	5.63	0.7 J	NA	<10
RW-601	3/2/2011	4223.81	11.2	6.94	1.43	245	5.19	<1.0	NA	<10
RW-601	6/1/2011	4225.06	14.16	7.21	1.31	315	4.88	0.35 J	<1.0	<10
RW-601	8/23/2011	4223.72	17.7	6.89	1.46	304	3.89	<1.0	NA	<10
RW-601	12/7/2011	4223.78	13.2	7.10	1.46	17	3.95	<1.0	NA	<10
RW-601	3/5/2012	4223.98	12.1	7.09	1.40	91	4.30	<1.0	NA	<10
RW-601	6/5/2012	4223.77	12.48	7.14	1.36	168	3.83	<1.0	<1.0	<10
RW-601	8/21/2012	4223.08	18.61	6.99	1.29	220	4.52	<1.0	NA	<10
RW-601	12/4/2012	4222.90	15.02	7.15	1.28	302	3.30	<1.0	NA	4.6 J
RW-601	3/12/2013	4223.50	10.79	7.17	1.42	99.3	4.45	<1.0	NA	<10
RW-601	5/15/2013	4223.77	14.62	7.36	1.40	251	10.84	<1.0	<1.0	<10
RW-601	12/11/2013	4222.79	16.39	7.43	1.32	931	4.52	<1.0	<1.0	<10 HT
RW-601	1/9/2014	4222.78	15.67	7.39	1.26	270	5.18	NA	NA	6.1 J
RW-601	6/3/2014	4223.62	15.28	7.09	1.34	742	4.35	<1.0	<1.0	12
RW-601	12/5/2014	4223.01	15.82	7.32	1.34	389	5.25	<1.0	<1.0	<10 J
RW-601	5/21/2015	4232.33	15.04	7.57	1.24	285	3.47	<1.0	<1.0	<10
RW-601	12/4/2015	4223.58	16.59	7.28	1.30	399	8.04	<1.0	<1.0	<10

Well / Sample Identification:	Sample Date	Field Parameters						Contaminants of Concern		
		Groundwater elevation (ft-AMSL)	Temperature (°C)	pH (standard units)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Benzene (µg/L) EPA 8260C	Naphthalene (µg/L) EPA 8260C	Cyanide (µg/L) EPA 9012A
Remediation Level	--	--	--	--	--	--	--	5*	1,460**	200*
RW-602	9/3/2008	4222.99	17.9	7.90	1.52	85	2.89	5,000	NT	890
RW-602	11/19/2008	4223.13	15.5	7.37	1.81	436	1.39	5,200	NT	790
Duplicate "RW-777" (from RW-602)	11/19/2008	NA	NA	NA	NA	NA	NA	4,800	NT	760
RW-602	3/5/2009	4223.47	13.4	7.42	1.73	120	0.94	5,200	NT	710
RW-602	6/9/2009	4223.59	14.9	7.29	1.77	413	1.23	5,300	560 J	740 J
RW-602	8/13/2009	4223.25	15.2	7.07	1.79	173	2.21	5,600	690	750 J
Duplicate "RW-777" (from RW-602)	8/13/2009	NA	NA	NA	NA	NA	NA	5,200	910	750 J
RW-602	12/1/2009	4222.99	13.9	7.17	1.74	251	1.05	5,200	980 J	460
Duplicate "RW-777" (from RW-602)	12/1/2009	NA	NA	NA	NA	NA	NA	4,500	1,100 J	580
RW-602	3/9/2010	4223.32	12.9	7.15	1.80	342	3.73	5,100	810	750
Duplicate "RW-777" (from RW-602)	3/9/2010	NA	NA	NA	NA	NA	NA	5,000	900	770
RW-602	6/8/2010	4224.03	17.2	7.20	1.75	227	4.72	4,700	1,200	750
RW-602	8/24/2010	4223.99	17.3	7.19	1.72	149	6.37	5,200	1,100	680
Duplicate "RW-777" (from RW-602)	8/24/2010	NA	NA	NA	NA	NA	NA	5,400	1,200	680
RW-602	12/2/2010	4224.43	12.2	7.15	1.65	>800	5.87	5,200	1,800	680
Duplicate "RW-777" (from RW-602)	12/2/2010	NA	NA	NA	NA	NA	NA	5,000	1,900	670
RW-602	3/2/2011	4224.36	13.7	7.09	1.63	595	5.93	4,300	2,100	620
Duplicate "RW-777" (from RW-602)	3/2/2011	NA	NA	NA	NA	NA	NA	4,300	2,000	600
RW-602	6/1/2011	4225.79	14.67	7.27	1.57	727	6.26	3,500	2,000	610
RW-602	8/23/2011	4224.25	16.5	7.19	1.59	244	3.49	3,800	1,800	580
Duplicate "RW-777" (from RW-602)	8/23/2011	NA	NA	NA	NA	NA	NA	4,000	2,100	590
RW-602	12/7/2011	4224.27	13.4	7.26	1.66	205	5.62	3,700	2,000	560
Duplicate "RW-777" (from RW-602)	12/7/2011	NA	NA	NA	NA	NA	NA	3,400	800	570
RW-602	3/5/2012	4224.42	14.5	7.19	1.58	324	7.92	2,900	1,700 J	560
Duplicate "RW-777" (from RW-602)	3/5/2012	NA	NA	NA	NA	NA	NA	3,400	1,600 J	460
RW-602	6/5/2012	4224.26	12.58	7.13	1.60	165	4.13	2,700	1,900	480
RW-602	8/20/2012	4223.75	18.17	6.94	1.53	210	7.33	2,800	1,800	490
Duplicate "RW-777" (from RW-602)	8/20/2012	NA	NA	NA	NA	NA	NA	2,700	1,600	520
RW-602	12/3/2012	4223.69	14.28	7.04	1.60	749	4.84	3,600	2,300	460
Duplicate "RW-777" (from RW-602)	12/3/2012	NA	NA	NA	NA	NA	NA	3,500	2,300	450
RW-602	3/11/2013	4224.23	14.45	7.17	1.60	348	6.24	3,100 J	1,700 J	470 J
Duplicate "RW-777" (from RW-602)	3/11/2013	NA	NA	NA	NA	NA	NA	3,100 J	1,900 J	460 J
RW-602	5/14/2013	4224.39	16.44	7.26	1.54	54.4	10.58	2,400	1,500	390
RW-602	12/10/2013	4223.59	14.54	7.38	1.60	319	5.56	2,500	1,000	250 HT
RW-602	1/8/2014	4223.57	14.48	7.30	1.54	216	6.28	NA	NA	380
RW-602	6/3/2014	4224.12	18.27	7.36	1.43	137	4.87	1,800	720	270 J
Duplicate "RW-777" (from RW-602)	6/3/2014	NA	NA	NA	NA	NA	NA	1,900	660	270 J
RW-602	12/4/2014	4223.79	16.32	7.21	1.48	214	4.16	1,300	400	260 J
RW-602	5/20/2015	4224.28	16.04	7.09	1.39	103	3.89	1,200	170 J	250
Duplicate "RW-777" (from RW-602)	5/20/2015	NA	NA	NA	NA	NA	NA	1,200	240	250
RW-602	12/3/2015	4224.07	15.32	7.08	1.46	54.9	5.98	1,400	74	260
RW-603	9/3/2008	4225.09	17.8	7.78	1.93	869	1.06	2,700	NT	2,100
RW-603	11/19/2008	4224.97	17.0	6.94	2.19	209	1.71	3,200	NT	1,900
RW-603	3/5/2009	4225.28	13.3	7.06	2.09	66	1.95	3,300	NT	1,800 J
RW-603	6/9/2009	4225.42	15.5	7.04	2.16	387	1.48	2,000	53 J	1,500 J
RW-603	8/13/2009	4225.09	15.9	6.92	2.19	386	3.14	3,000	55	1,700 J
RW-603	12/1/2009	4224.70	14.5	6.90	2.13	196	2.93	4,500	120 J	1,400
RW-603	3/9/2010	4224.88	13.3	6.86	2.04	103	4.02	2,400	37	1,500
RW-603	6/8/2010	4226.25	16.2	7.00	2.09	212	5.85	1,300	27	1,800
RW-603	8/24/2010	4227.01	18.1	7	2.04	>800	8.02	1,100	15	1,500
RW-603	12/2/2010	4225.91	12.4	7.09	1.92	711	4.65	1,400	19	1,400
RW-603	3/2/2011	4225.80	13.4	6.96	1.94	792	8.09	1,800	33	1,000
RW-603	6/1/2011	4227.73	14.47	7.00	2.05	381	6.13	820	16	1,300
RW-603	8/23/2011	4225.85	16.1	7.02	1.97	61	5.31	1,700	29	1,500
RW-603	12/7/2011	4225.75	13.6	6.99	1.96	199	6.20	2,000	19	1,300
RW-603	3/5/2012	4225.84	13.9	6.70	1.96	386	7.18	2,900	22 J	1,600
RW-603	6/5/2012	4225.71	12.92	6.93	1.99	193	6.84	2,500	52	1,700
RW-603	8/20/2012	4225.40	17.77	6.83	1.95	213	10.20	3,200	37	1,700
RW-603	12/3/2012	4225.36	14.37	6.95	2.13	150	5.46	3,100	36	1,200
RW-603	3/11/2013	4225.98	14.31	7.01	2.03	677	6.47	2,300 J	32 J	1,300 J
RW-603	5/14/2013	4225.89	17.19	7.06	2.06	76.9	12.24	2,200	48	1,200
RW-603	12/10/2013	4225.27	15.01	7.12	2.06	112	7.15	3,300	25	830 HT
RW-603	1/8/2014	4225.26	14.91	7.08	1.95	262	6.49	NA	NA	1,400
RW-603	6/3/2014	4225.65	18.19	6.92	1.90	150	6.52	2,600	34	1,400 J
RW-603	12/4/2014	4225.40	16.72	7.01	1.98	19.7	6.23	3,300	71	1,400 J
RW-603	5/20/2015	4225.94	15.98	7.02	1.87	109	4.51	3,200	50	1,300
RW-603	12/3/2015	4225.42	15.26	6.86	2.01	110	8.37	5,100	61	1,100

Well / Sample Identification:	Sample Date	Field Parameters						Contaminants of Concern		
		Groundwater elevation (ft-AMSL)	Temperature (°C)	pH (standard units)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Benzene (µg/L) EPA 8260C	Naphthalene (µg/L) EPA 8260C	Cyanide (µg/L) EPA 9012A
Remediation Level	--	--	--	--	--	--	--	5*	1,460**	200*
RW-604	9/3/2008	4222.94	14.8	7.65	1.12	803	2.82	78	NT	32
Duplicate "RW-777" (from RW-604)	9/3/2008	NA	NA	NA	NA	NA	NA	82	NT	36
RW-604	11/19/2008	4222.77	14.4	7.50	1.37	369	4.26	68	NT	29
RW-604	3/5/2009	4223.05	13.1	7.52	1.29	>999	1.31	64	NT	24
Duplicate "RW-777" (from RW-604)	3/5/2009	NA	NA	NA	NA	NA	NA	65	NT	25
RW-604	6/9/2009	4223.09	14.0	7.36	1.29	142	3.01	54	6.6 J	27 J
RW-604	8/13/2009	4222.48	16.4	6.86	1.28	113	0.87	68	8.8	25 J
RW-604	12/1/2009	4222.51	13.6	7.26	1.29	260	0.90	68	9.5 J	24
RW-604	3/9/2010	4222.78	13.9	7.26	1.43	138	2.80	80	8.0	39
RW-604	6/8/2010	4223.57	14.8	7.21	1.41	307	2.98	90	8.8	48
RW-604	8/24/2010	4223.68	15.1	7.16	1.47	798	3.64	110	9	43
RW-604	12/2/2010	4223.78	13.3	7.00	1.45	41	5.43	95	11	52
RW-604	3/2/2011	4223.85	13.6	7.11	1.51	145	8.14	80	9.6	48
RW-604	6/1/2011	4225.18	15.39	7.19	1.51	245	3.80	67	5.5	57
RW-604	8/23/2011	4223.78	16.0	7.11	1.53	35	3.32	150	8.1	60
RW-604	12/7/2011	4223.78	14.0	7.13	1.67	21	4.84	250	7.8	90
RW-604	3/6/2012	4223.94	13.5	7.19	1.67	27	7.00	610	5.3 J	140
RW-604	6/5/2012	4223.86	13.28	7.16	1.62	28.1	4.39	1,200	9.8	190
RW-604	8/20/2012	4223.26	17.08	7.12	1.53	23	6.28	1,600	10	220 J
RW-604	12/3/2012	4223.30	13.34	7.21	1.49	11.4	6.12	2,600	34	240
RW-604	3/12/2013	4223.80	14.42	7.40	1.44	31.7	4.13	2,800	120	260
RW-604	5/14/2013	4223.93	15.44	7.30	1.51	93.7	6.93	2,800	110	260
RW-604	12/11/2013	4223.01	14.50	7.39	1.84	159	3.28	1,400	340	140 HT
Duplicate "RW-777" (from RW-604)	12/11/2013	NA	NA	NA	NA	NA	NA	1,700	370	130 HT
RW-604	1/8/2014	4223.00	14.39	7.30	1.78	897	6.72	NA	NA	170
Duplicate "RW-777" (from RW-604)	1/8/2014	NA	NA	NA	NA	NA	NA	NA	NA	160
RW-604	6/3/2014	4223.64	15.78	7.38	1.85	415	3.85	600	630	120
RW-604	12/4/2014	4223.29	15.61	7.21	1.98	46.5	5.93	420	1,000	150 J
Duplicate "RW-777" (from RW-604)	12/4/2014	NA	NA	NA	NA	NA	NA	400	990	140 J
RW-604	5/20/2015	4223.87	14.99	7.23	1.90	45.7	5.07	340	610	120
RW-604	12/3/2015	4223.53	14.66	7.10	2.03	805	4.89	260	130	160
Duplicate "RW-777" (from RW-604)	12/3/2015	NA	NA	NA	NA	NA	NA	260	140	150
RW-605	9/3/2008	4223.62	17.8	7.98	2.55	249	1.13	7,800	NT	1,400
RW-605	11/19/2008	4223.70	16.0	7.51	2.59	683	2.41	6,800	NT	1,400
RW-605	3/6/2009	4223.90	13.1	7.29	2.53	350	1.51	6,500	NT	1,400
RW-605	6/9/2009	4224.00	15.8	7.35	2.53	334	1.64	6,400	3,300 J	1,300 J
RW-605	8/13/2009	4223.76	17.6	7.08	2.53	35	1.08	7,200	2,700	1,400 J
RW-605	12/1/2009	4223.46	14.3	7.16	2.52	64	1.31	6,000	3,400 J	1,300
RW-605	3/9/2010	4223.68	12.9	7.21	2.64	221	3.77	7,900	3,600	1,500
RW-605	6/8/2010	4224.46	16.3	7.28	2.46	109	4.25	6,000	3,800	1,500
RW-605	8/24/2010	4224.64	16.2	7.2	2.62	191	5.35	5,900	2,900	1,500
RW-605	12/2/2010	4224.50	14.0	7.02	2.51	236	4.87	5,500	3,700	1,400
RW-605	3/2/2011	4224.61	13.2	7.20	2.55	238	6.70	6,600	3,400	1,400
RW-605	6/1/2011	4226.15	15.64	7.27	2.53	144	5.87	7,000	3,500	1,700
RW-605	8/23/2011	4224.56	16.0	7.23	2.53	36	3.71	9,000	4,900	1,500
RW-605	12/7/2011	4224.5	13.1	7.24	2.50	124	5.43	6,500	2,900	1,400
RW-605	3/5/2012	4224.61	13.8	7.24	2.39	342	8.75	7,100	2,900 J	1,400
RW-605	6/5/2012	4224.50	13.38	7.23	2.40	193	5.27	8,500	4,700	1,300
RW-605	8/20/2012	4224.14	17.90	7.12	2.29	204	8.66	7,100	3,600	1,200
RW-605	12/3/2012	4224.05	14.21	7.34	2.42	118	5.23	8,400	5,100	1,100
RW-605	3/11/2013	4224.56	14.20	7.32	2.40	77	5.99	8,300 J	5,000 J	1100 J
RW-605	5/14/2013	4224.62	16.18	7.30	2.34	27.2	10.94	8,400	5,100	1,100
RW-605	12/10/2013	4223.93	13.82	7.36	2.51	181	6.41	7,800	4,200	560 HT
RW-605	1/8/2014	4223.92	14.99	7.32	2.42	119	5.46	NA	NA	1,100
RW-605	6/3/2014	4224.41	17.62	7.12	2.28	87.5	13.54	6,100	4,000	940
RW-605	12/4/2014	4224.15	16.08	7.23	2.36	104	4.72	5,000	5,200	920 J
RW-605	5/20/2015	4224.64	16.01	7.28	2.21	139	3.81	5,000	5,800	760
RW-605	12/3/2015	4224.27	15.82	7.31	2.29	99.2	6.99	5,300	4,800	830
RW-606	12/4/2015	4227.57	17.09	7.16	1.48	22.6	4.54	<1.0	<1.0	<10
RW-607	12/4/2015	4223.94	17.89	7.16	1.45	806	3.29	310	37	50

Well / Sample Identification:	Sample Date	Field Parameters						Contaminants of Concern		
		Groundwater elevation (ft-AMSL)	Temperature (°C)	pH (standard units)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Benzene (µg/L) EPA 8260C	Naphthalene (µg/L) EPA 8260C	Cyanide (µg/L) EPA 9012A
Remediation Level	--	--	--	--	--	--	--	5*	1,460**	200*
Trip Blank	3/20/2008	NA	NA	NA	NA	NA	NA	ND	NT	NA
Trip Blank	6/26/2008	NA	NA	NA	NA	NA	NA	ND	NT	NA
Trip Blank	9/3/2008	NA	NA	NA	NA	NA	NA	ND	NT	NA
Trip Blank	11/19/2008	NA	NA	NA	NA	NA	NA	<1	NT	NA
Trip Blank	3/5/2009	NA	NA	NA	NA	NA	NA	<1	NT	NA
Trip Blank	6/9/2009	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	8/13/2009	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	12/1/2009	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	3/9/2010	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	6/8/2010	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	8/24/2010	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	12/2/2010	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	3/2/2011	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank [1]	6/1/2011	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank [2]	6/9/2011	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	8/23/2011	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	12/7/2011	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	3/5/2012	NA	NA	NA	NA	NA	NA	<1.0	<1.0 J	NA
Trip Blank	8/21/2012	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	12/3/2012	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	3/11/2013	NA	NA	NA	NA	NA	NA	<1.0 J	<1.0 J	NA
Trip Blank	5/14/2013	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	12/10/2013	NA	NA	NA	NA	NA	NA	0	<1.0	0
Trip Blank	6/3/2014	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	12/4/2014	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	5/21/2015	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Trip Blank	12/4/2015	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Field Blank	3/20/2008	NA	NA	NA	NA	NA	NA	ND	NT	ND
Field Blank	6/26/2008	NA	NA	NA	NA	NA	NA	ND	NT	**28**
Field Blank	9/3/2008	NA	NA	NA	NA	NA	NA	ND	NT	ND
Field Blank	11/19/2008	NA	NA	NA	NA	NA	NA	<I	NT	<10
Field Blank	3/5/2009	NA	NA	NA	NA	NA	NA	<1	NT	<10
Field Blank	6/9/2009	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA
Field Blank	8/13/2009	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	12/1/2009	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	3/9/2010	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	6/8/2010	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	8/24/2010	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	12/2/2010	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	3/2/2011	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	6/1/2011	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	8/23/2011	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	12/7/2011	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	3/5/2012	NA	NA	NA	NA	NA	NA	<1.0	<1.0 J	<10
Field Blank	6/5/2012	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	8/20/2012	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	12/3/2012	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	3/11/2013	NA	NA	NA	NA	NA	NA	<1.0 J	<1.0 J	<10 J
Field Blank	5/14/2013	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	12/11/2013	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10 HT
Field Blank	1/9/2014	NA	NA	NA	NA	NA	NA	NA	NA	<10
Field Blank	6/3/2014	NA	NA	NA	NA	NA	NA	NA	NA	**9.6 J**
Field Blank	12/4/2014	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	5/20/2015	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10
Field Blank	12/4/2015	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<10

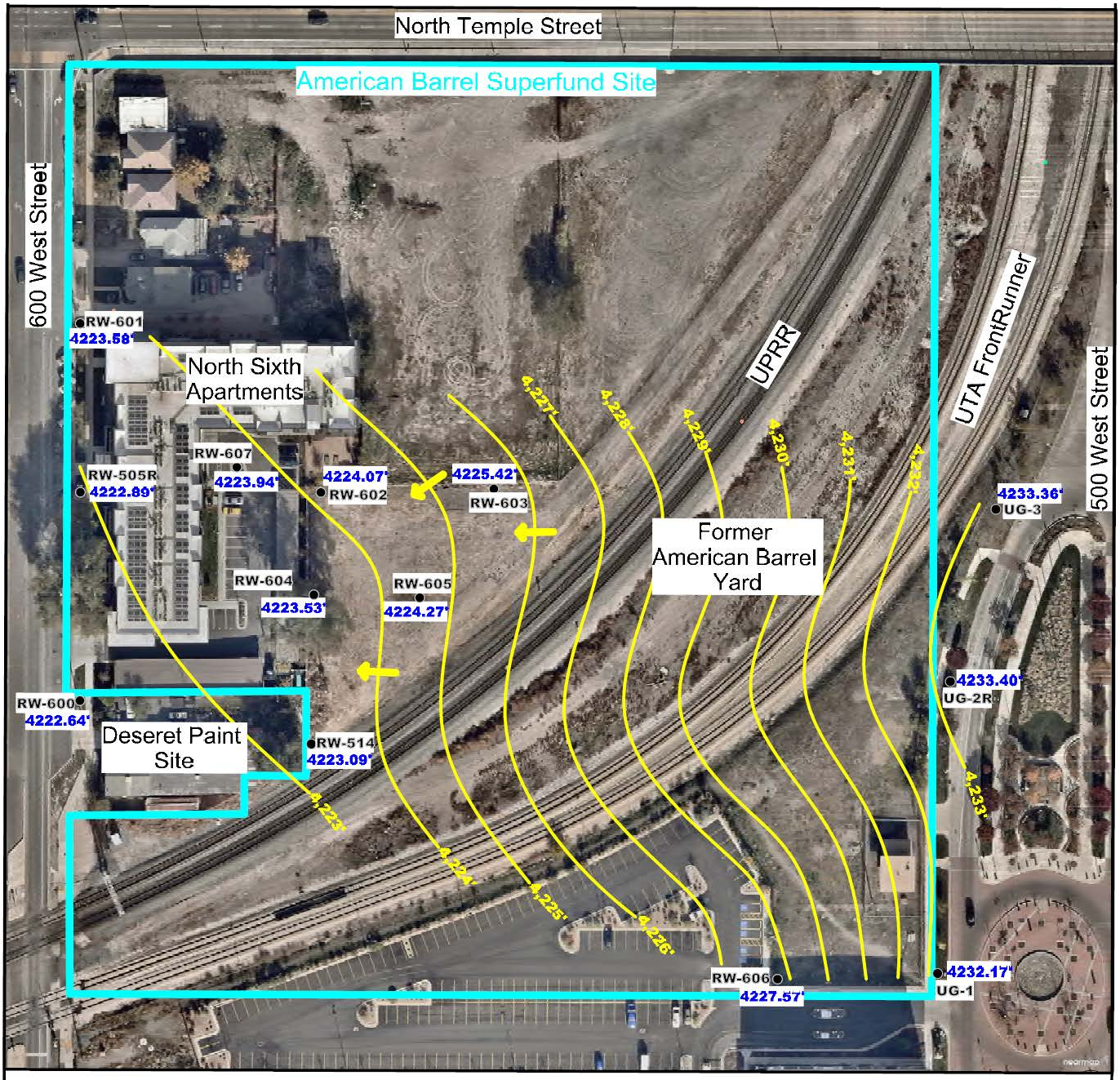
Key:

ft-AMSL = Feet above mean sea level
NM = Not measured
NA = Not analyzed or Not applicable
ND = Not detected
NT = Not detected, and not tabulated for the respective quarter's dataset
* = Maximum Contaminant Level (MCL)
** = Exposure Level (EL), as calculated in the initial risk assesment for the site

< = Not Detected above the PQL(for Benzene, Naphthalene, and Cyanide)
BOLD = Contaminant detected above Remediation Level (RL)
BOLD = Compound detected above analytical reporting limit
B = Please refer to respective dataset for flag definitions
J = Please refer to respective dataset for flag definitions
J = Please refer to respective data vaildation report for flag definitions

Appendix B

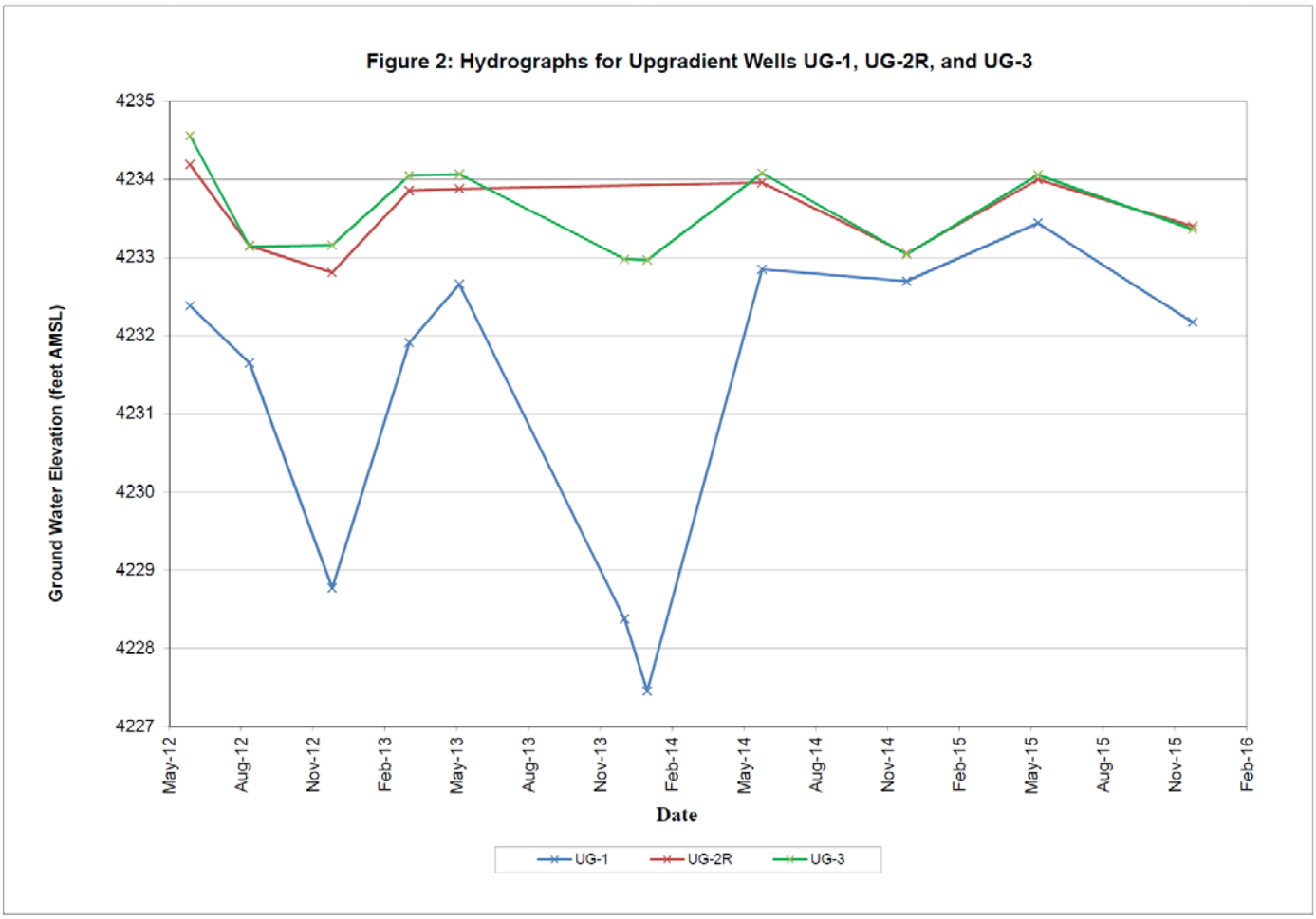
Figure 1:	**Potentiometric Contour Map (December 2015)**
Figure 2:	**Hydrographs for Upgradient Wells**
Figures 3 – 11:	**COC Trends in Boundary Wells**
Figures 12 – 26:	**COC Trends in Onsite Wells**



SAGE environmental

PacifiCorp
American Barrel Site
2nd Semi-Annual 2015
Groundwater Monitoring Report

Figure 1
Potentiometric Contour Map
December 3-4, 2015
Groundwater Elevations



Note that UG-2 was discovered damaged on December 10, 2013; As a result water levels were not collected from this well in December 2013 and January 2014. Well UG-2 was replaced on 1/20/14 with Well UG-2R. For graphing purposes well UG-2 data has been included with well UG-2R

Figure 3: Boundary Well RW-505R
Benzene in Groundwater Trends 2008-Present

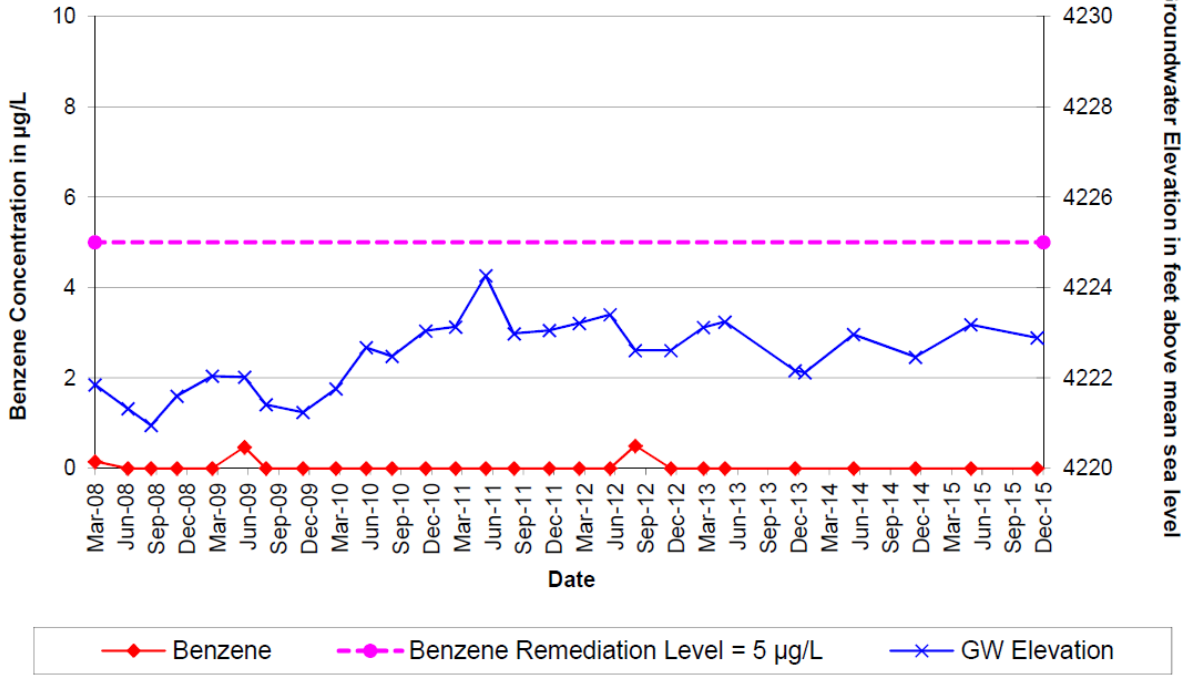


Figure 4: Boundary Well RW-505R
Naphthalene in Groundwater Trends 2009-Present

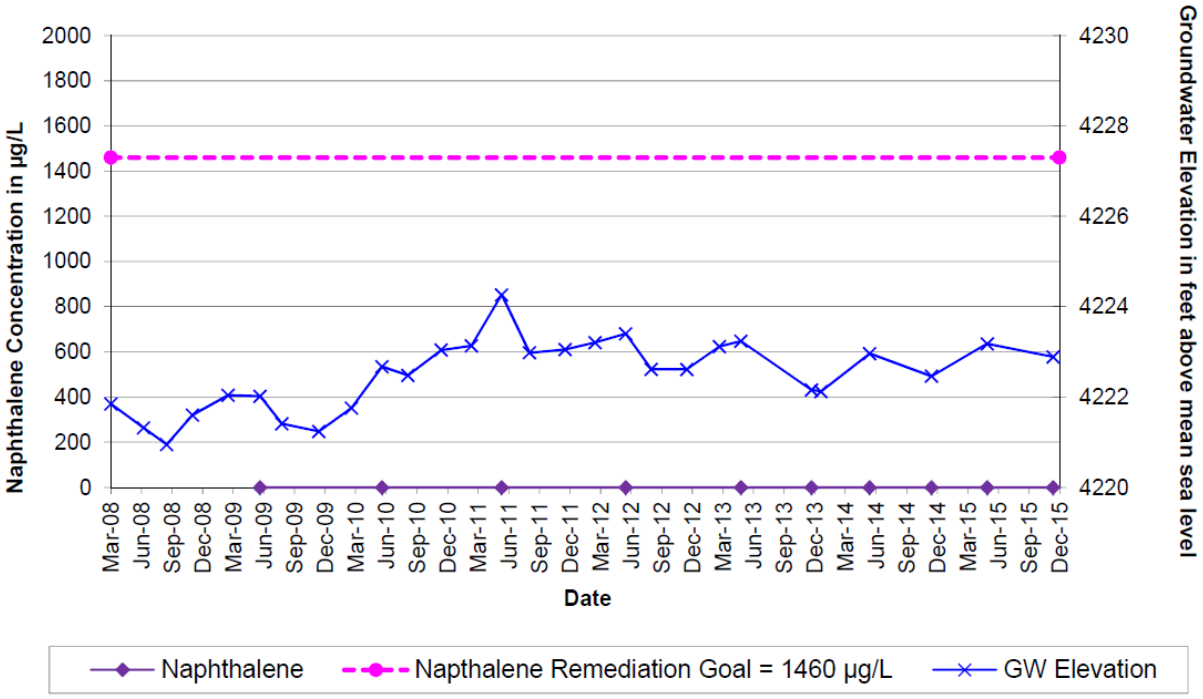


Figure 5: Boundary Well RW-505R
Cyanide in Groundwater Trends 2008-Present

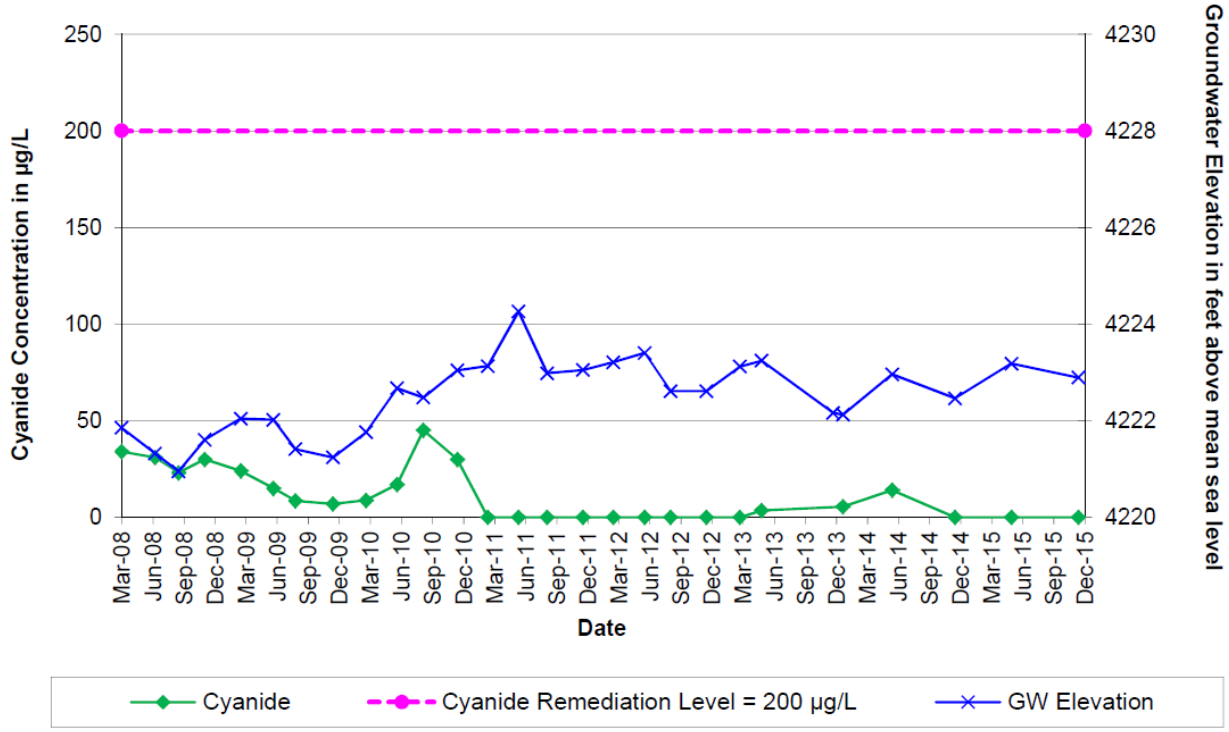


Figure 6: Boundary Well RW-600
Benzene in Groundwater Trends 2008-Present

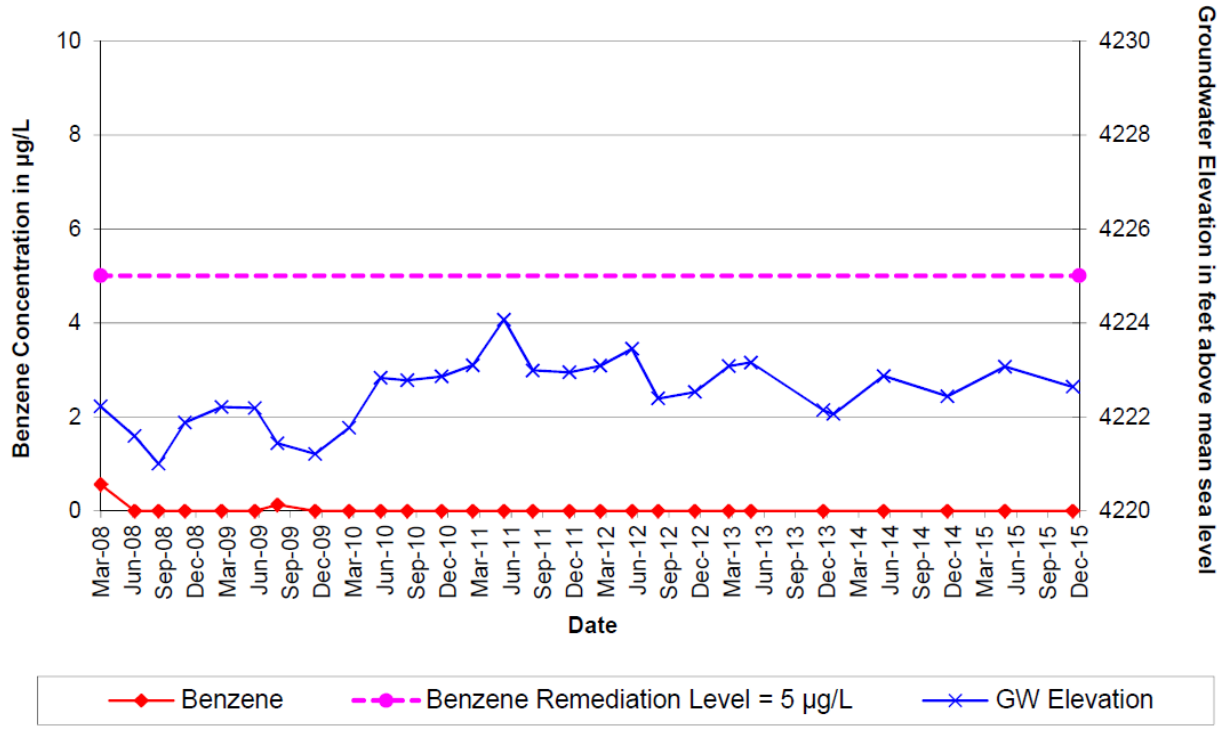


Figure 7: Boundary Well RW-600
Naphthalene in Groundwater Trends 2009-Present

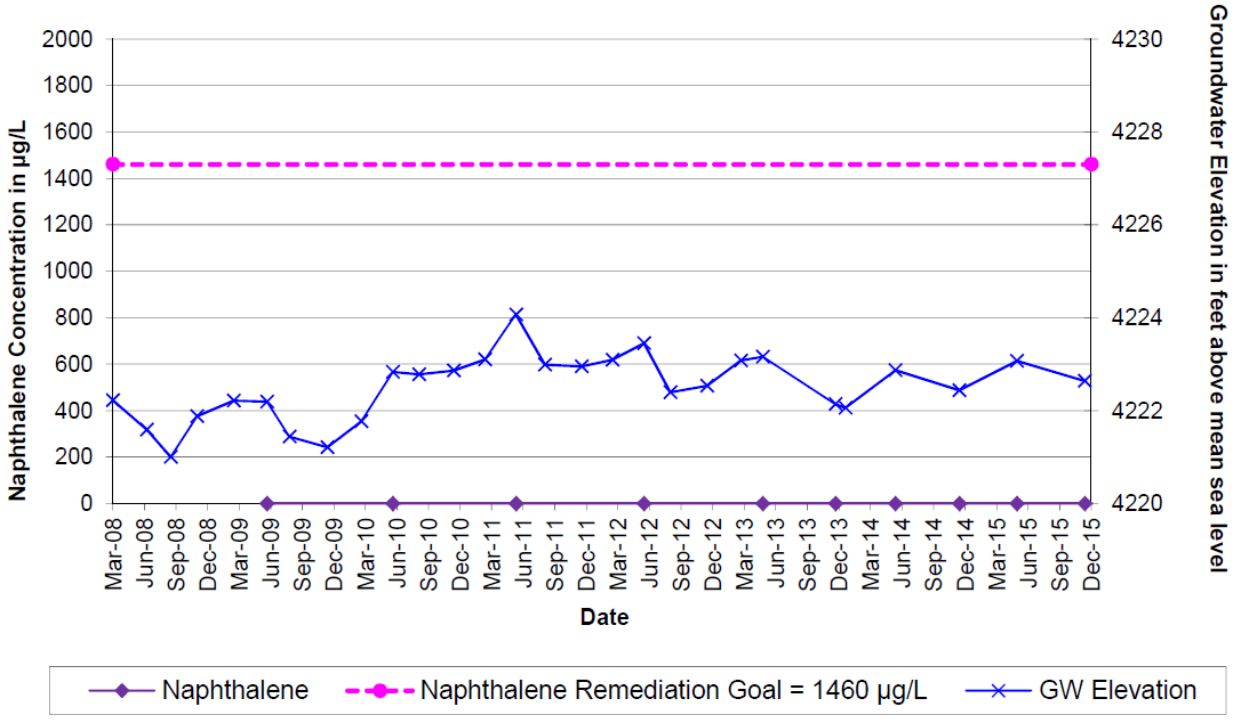


Figure 8: Boundary Well RW-600
Cyanide in Groundwater Trends 2008-Present

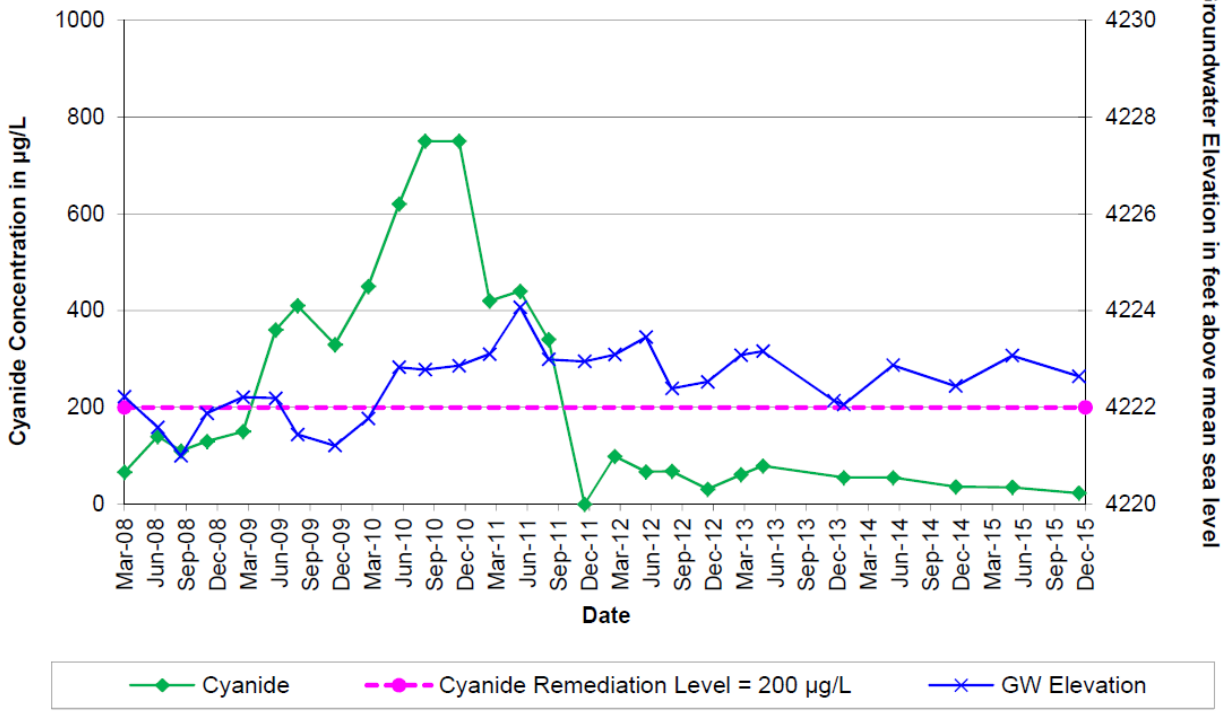


Figure 9: Boundary Well RW-601
Benzene in Groundwater Trends 2008-Present

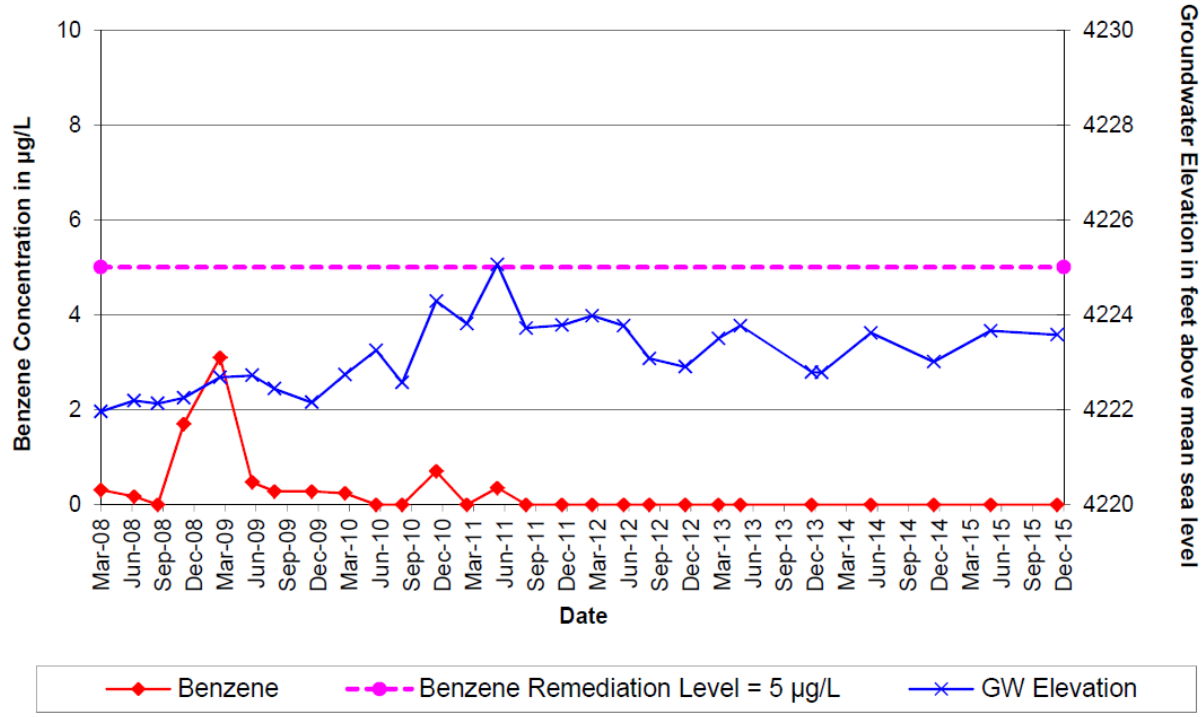


Figure 10: Boundary Well RW-601
Naphthalene in Groundwater Trends 2009-Present

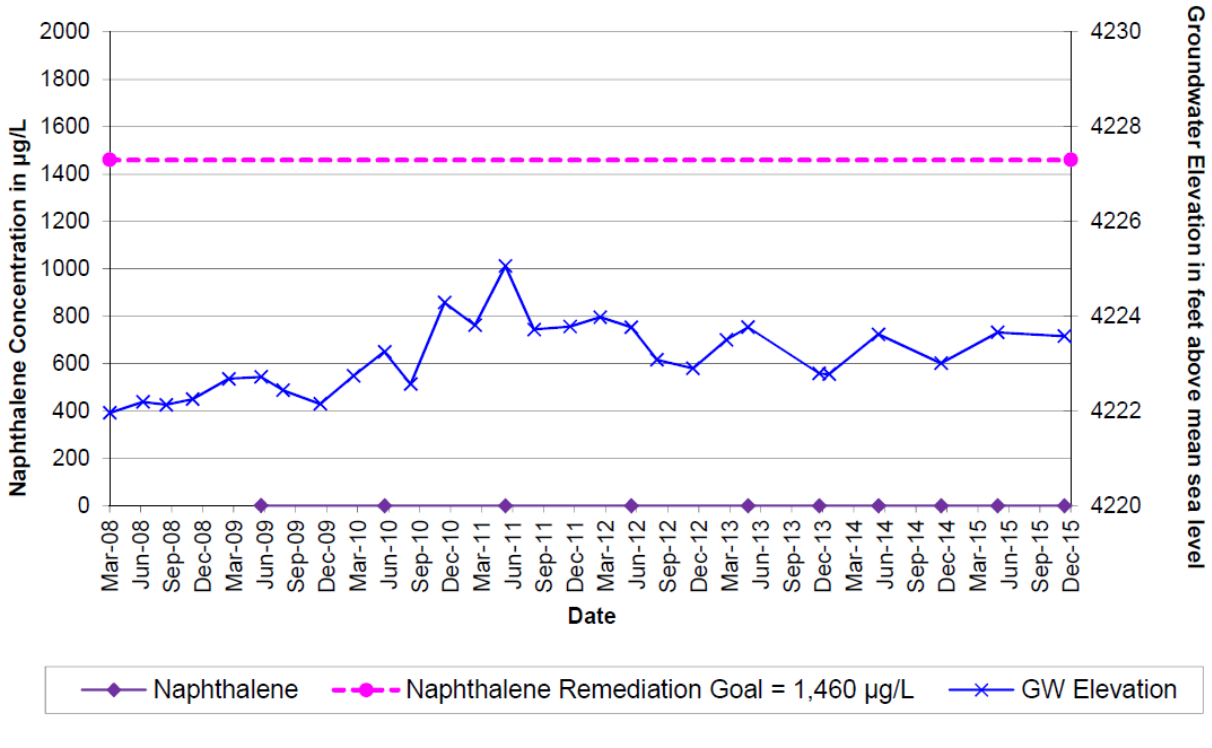


Figure 11: Boundary Well RW-601
Cyanide in Groundwater Trends 2008-Present

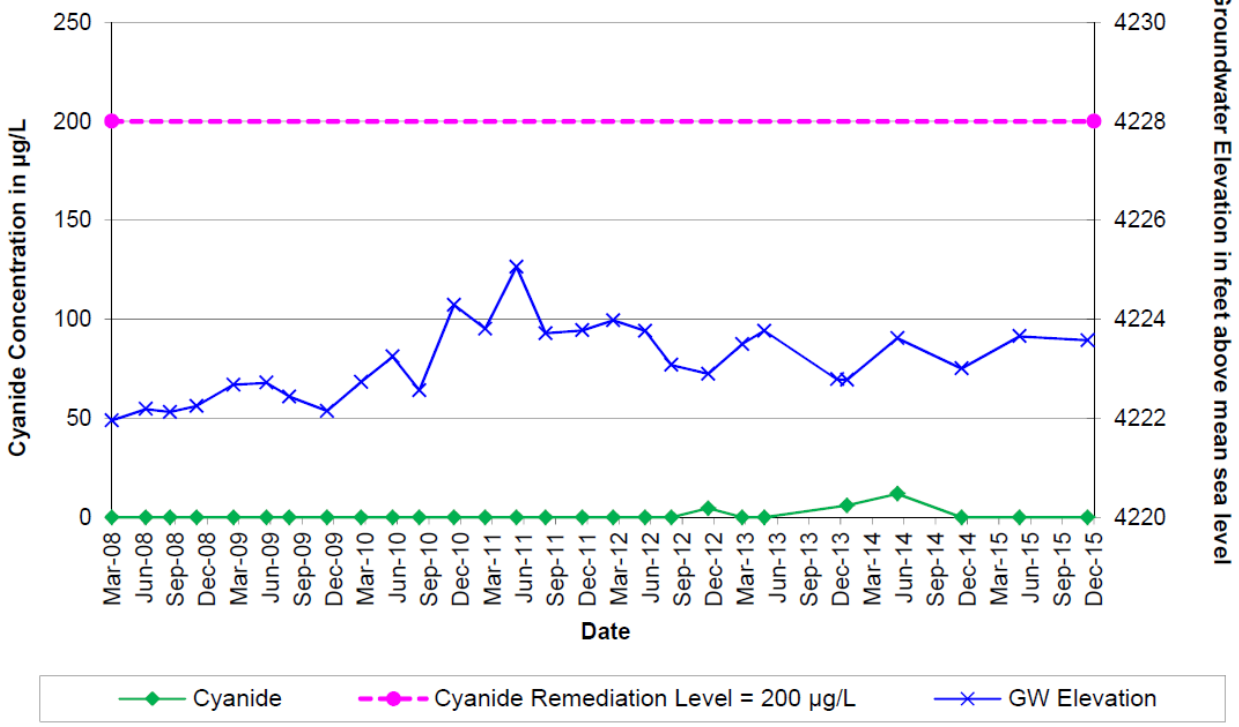


Figure 12: Onsite Well RW-514
Benzene in Groundwater Trends 2013-Present

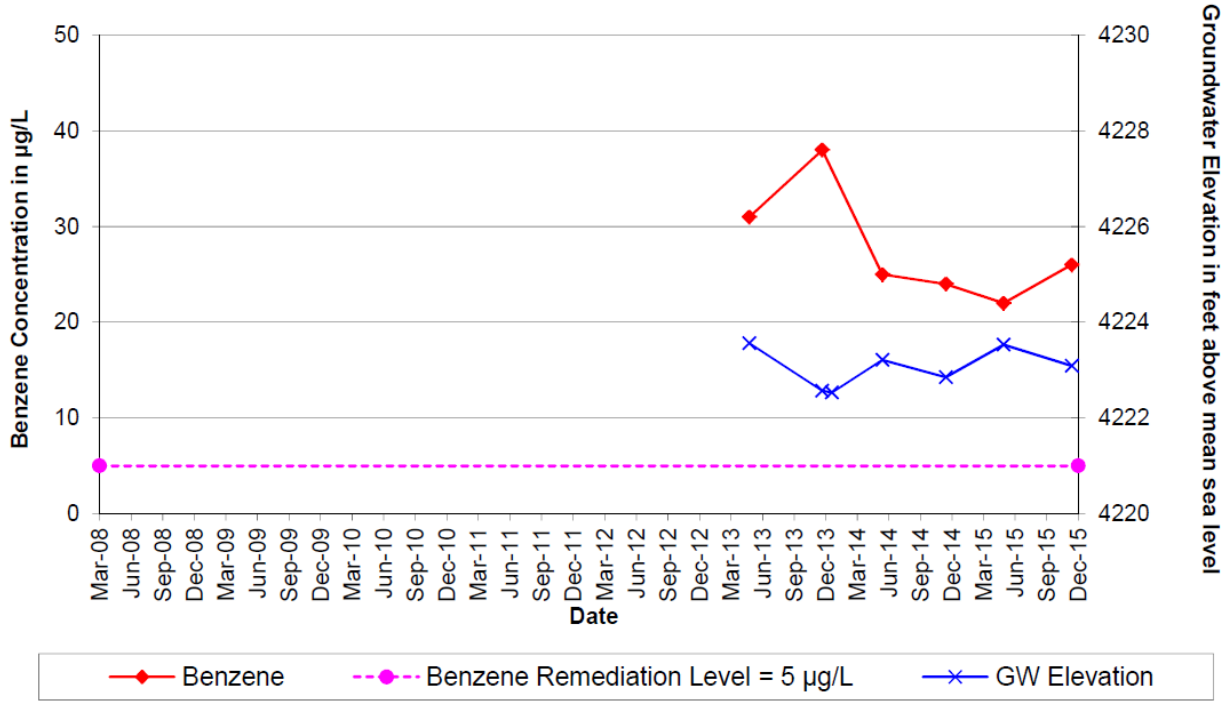


Figure 13: Onsite Well RW-514
Naphthalene in Groundwater Trends 2013-Present

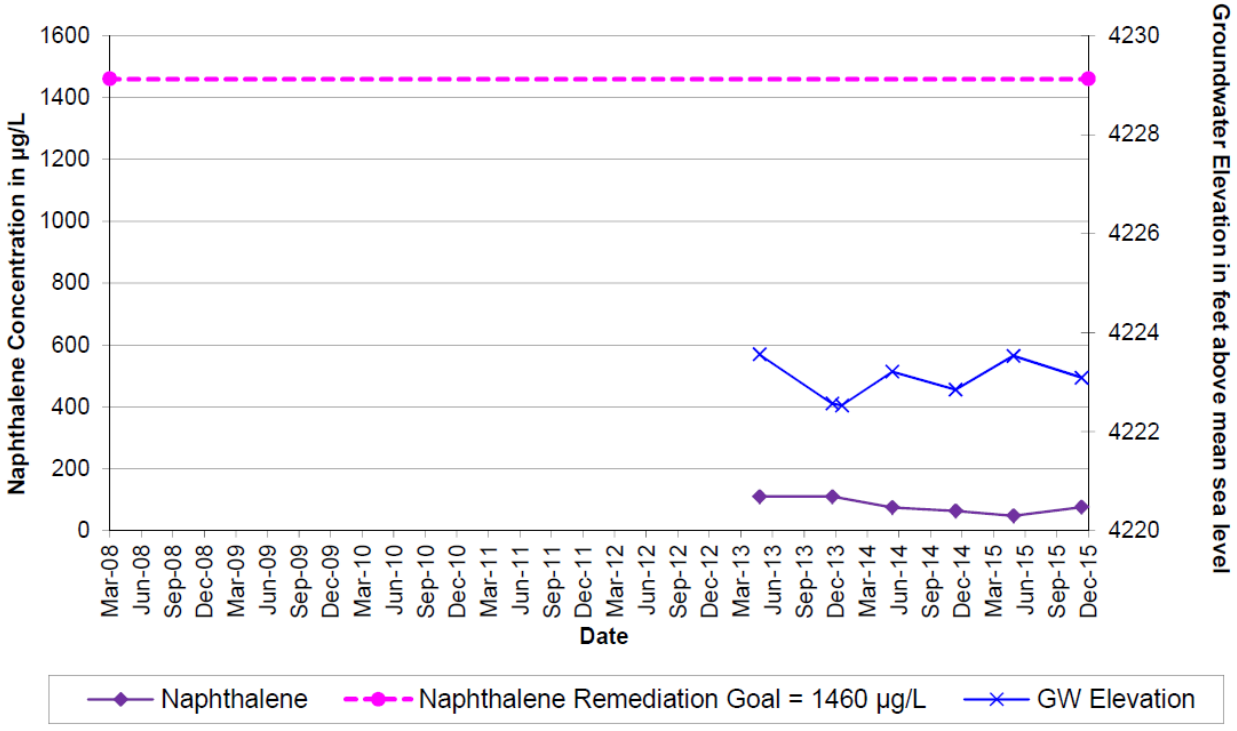


Figure 14: Onsite Well RW-514
Cyanide in Groundwater Trends 2013-Present

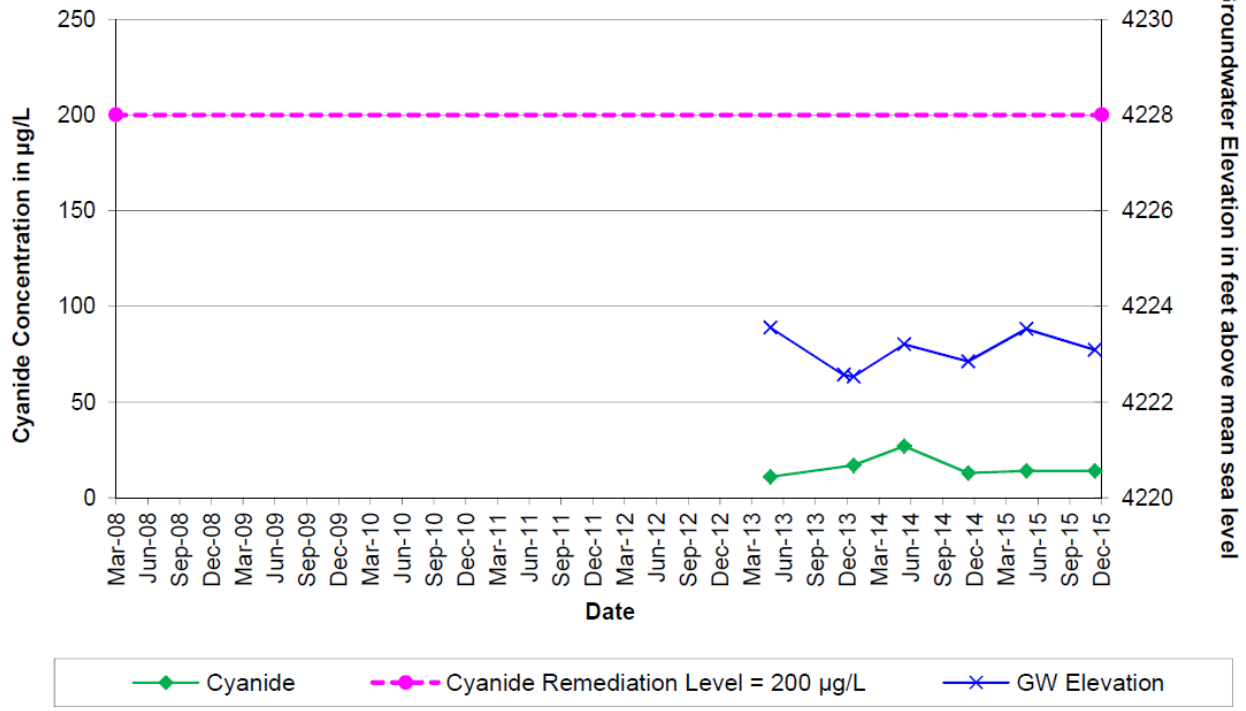


Figure 15: Source Well RW-602
Benzene in Groundwater Trends 2008-Present

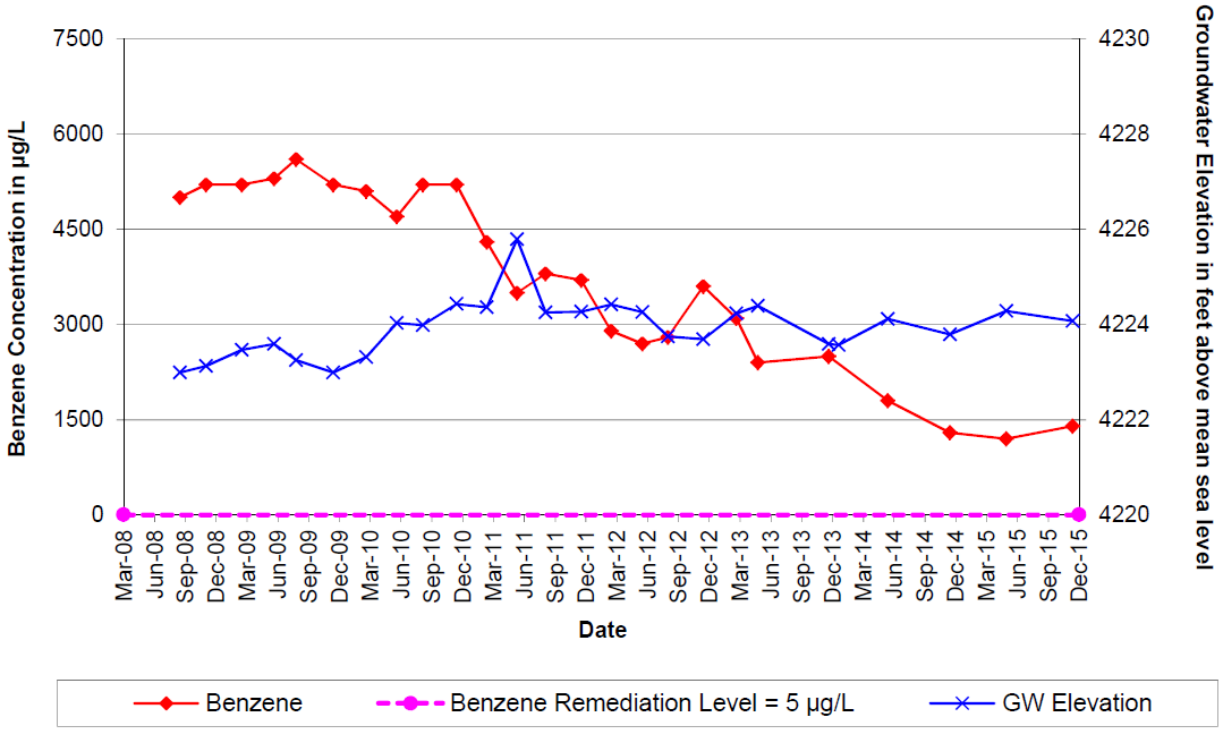


Figure 16: Source Well RW-602
Naphthalene in Groundwater Trends 2009-Present

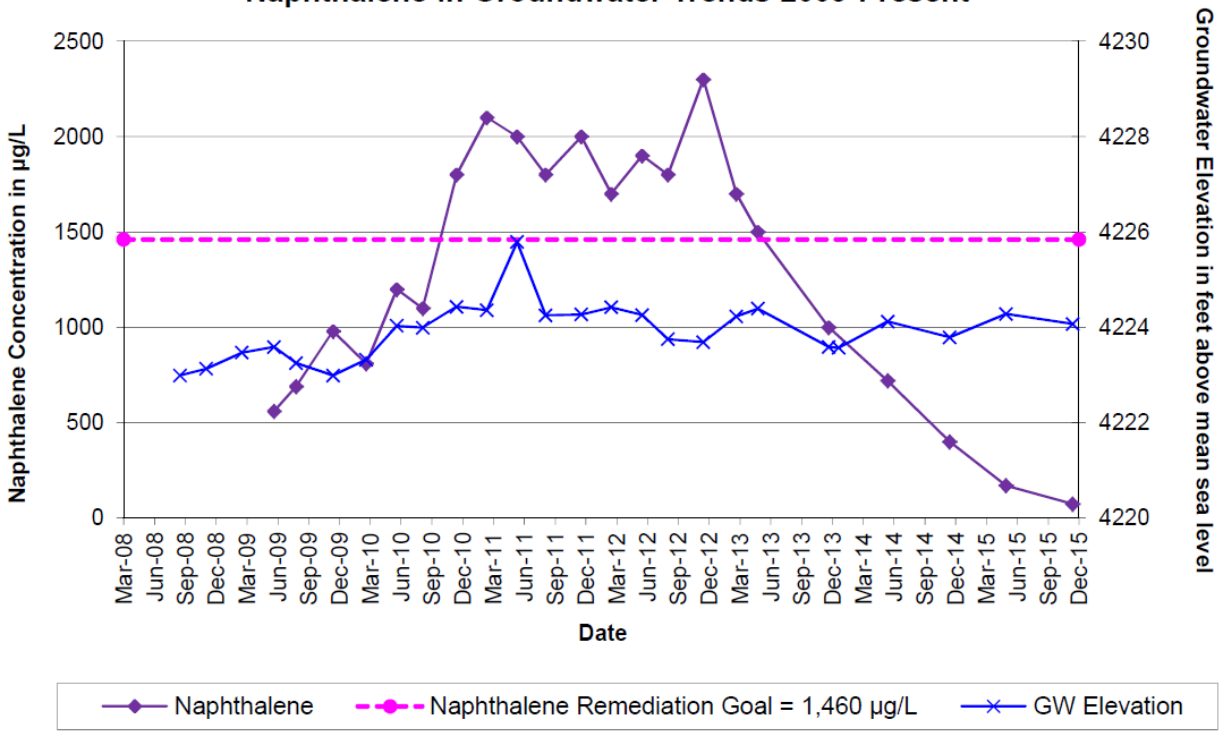


Figure 17: Source Well RW-602
Cyanide in Groundwater Trends 2008-Present

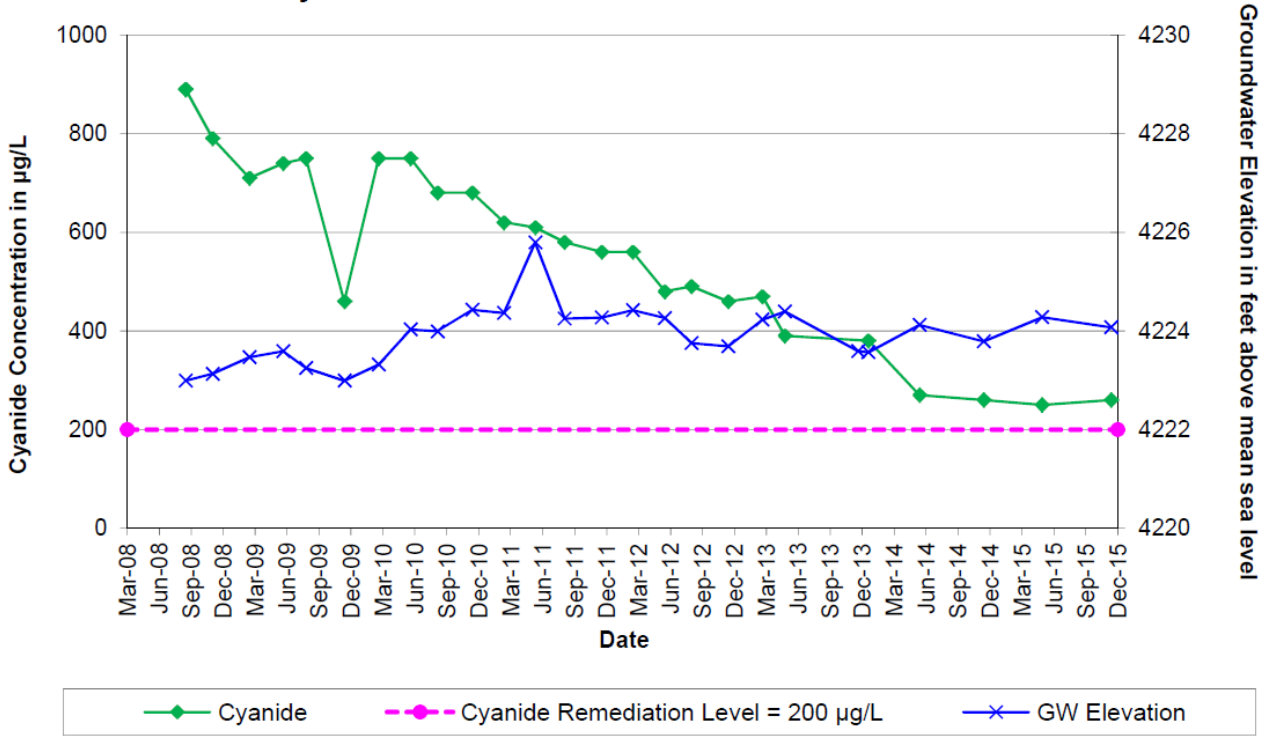


Figure 18: Source Well RW-603
Benzene in Groundwater Trends 2008-Present

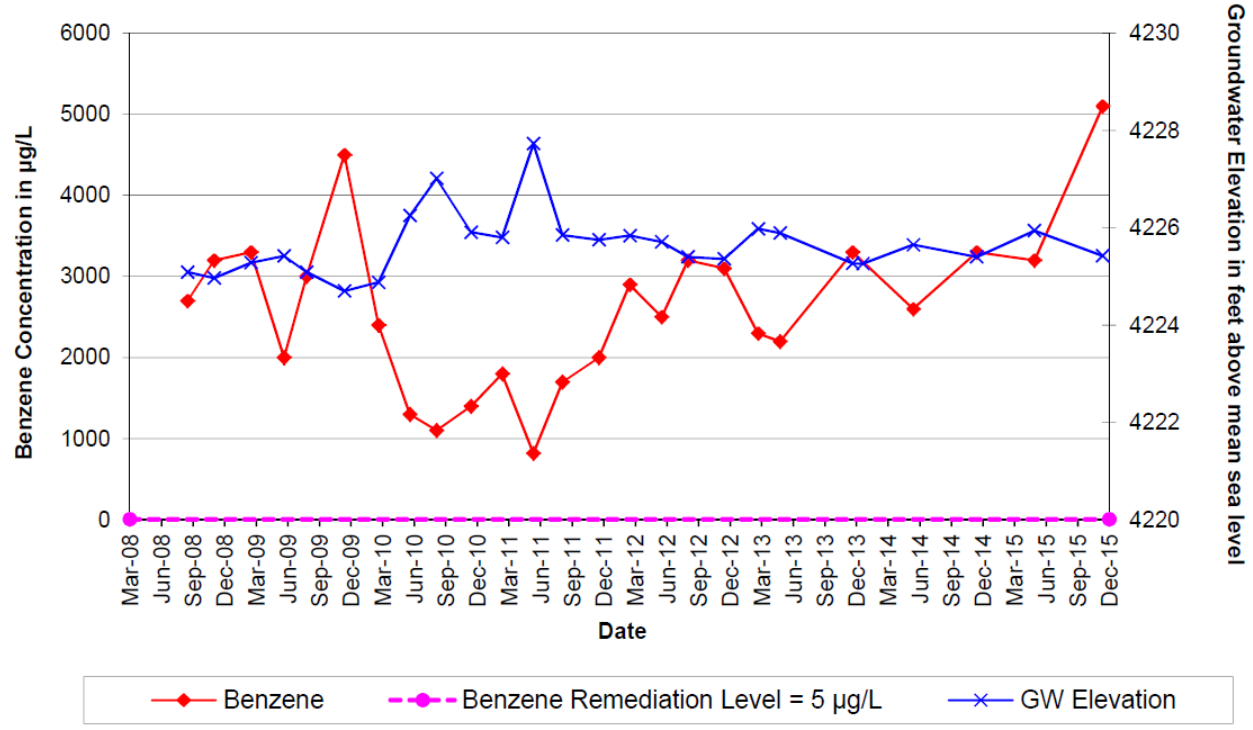


Figure 19: Source Well RW-603
Naphthalene in Groundwater Trends 2009-Present

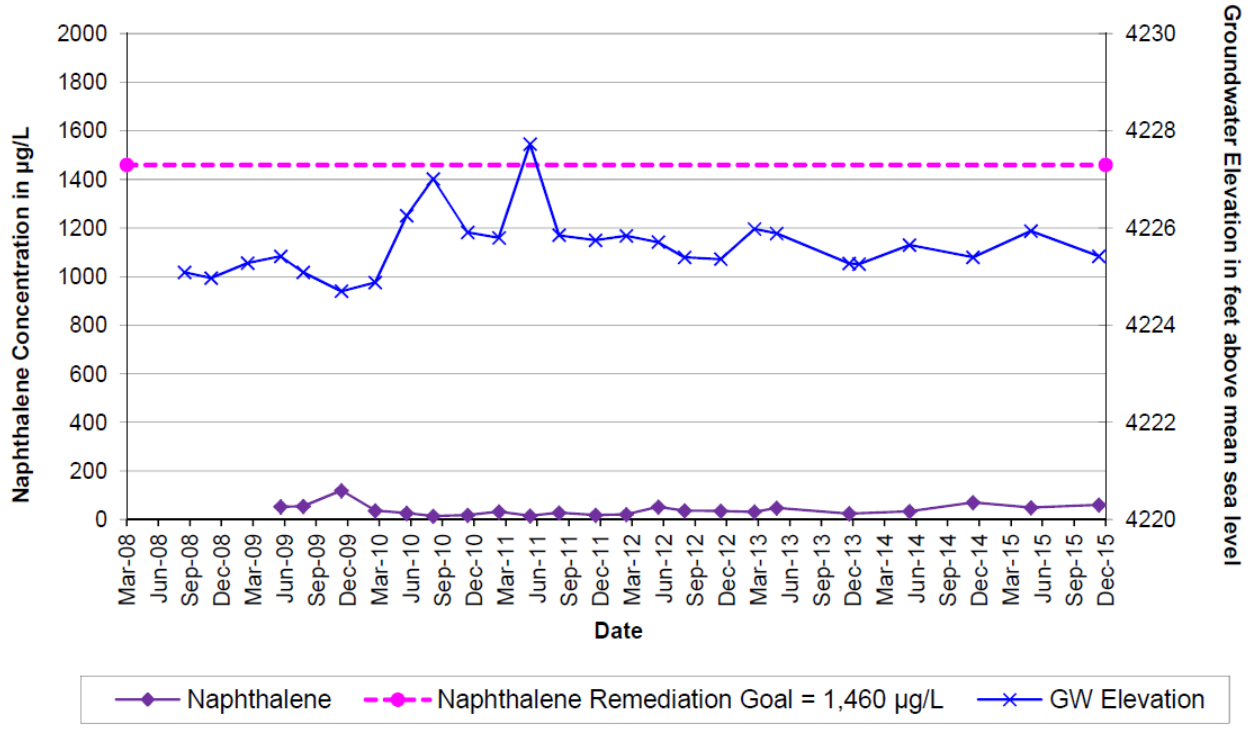


Figure 20: Source Well RW-603
Cyanide in Groundwater Trends 2008-Present

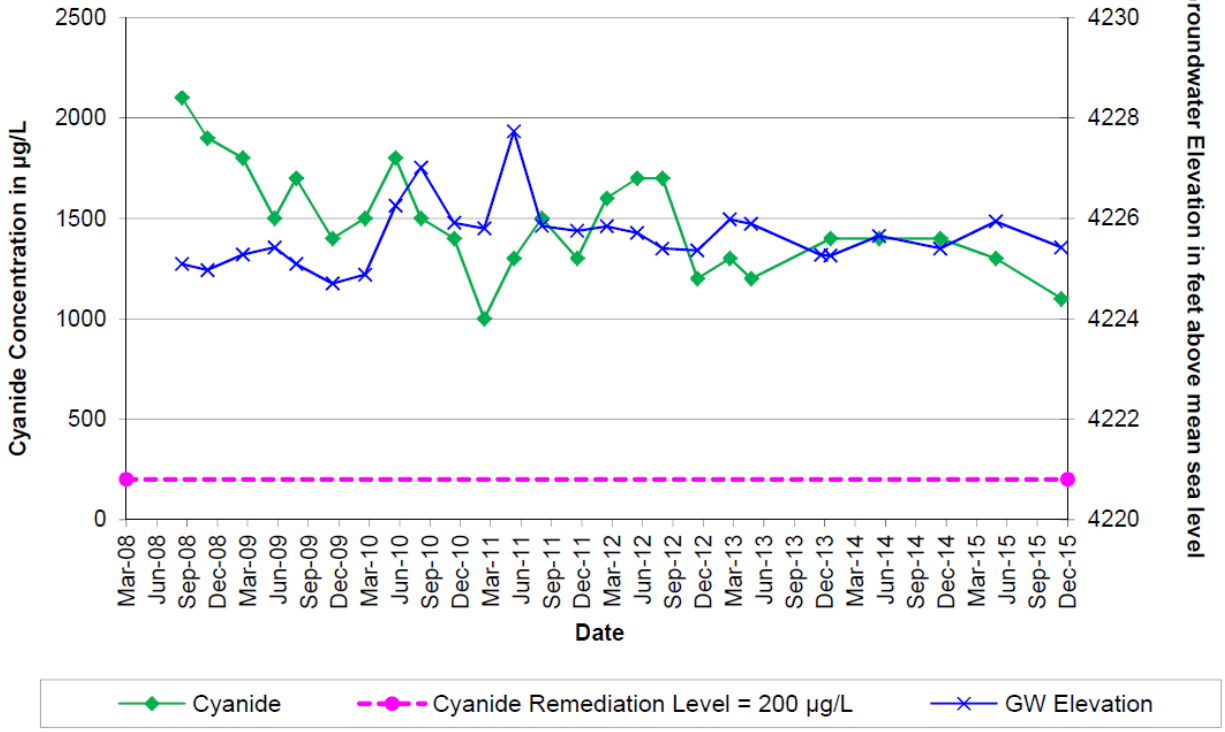


Figure 21: Source Well RW-604
Benzene in Groundwater Trends 2008-Present

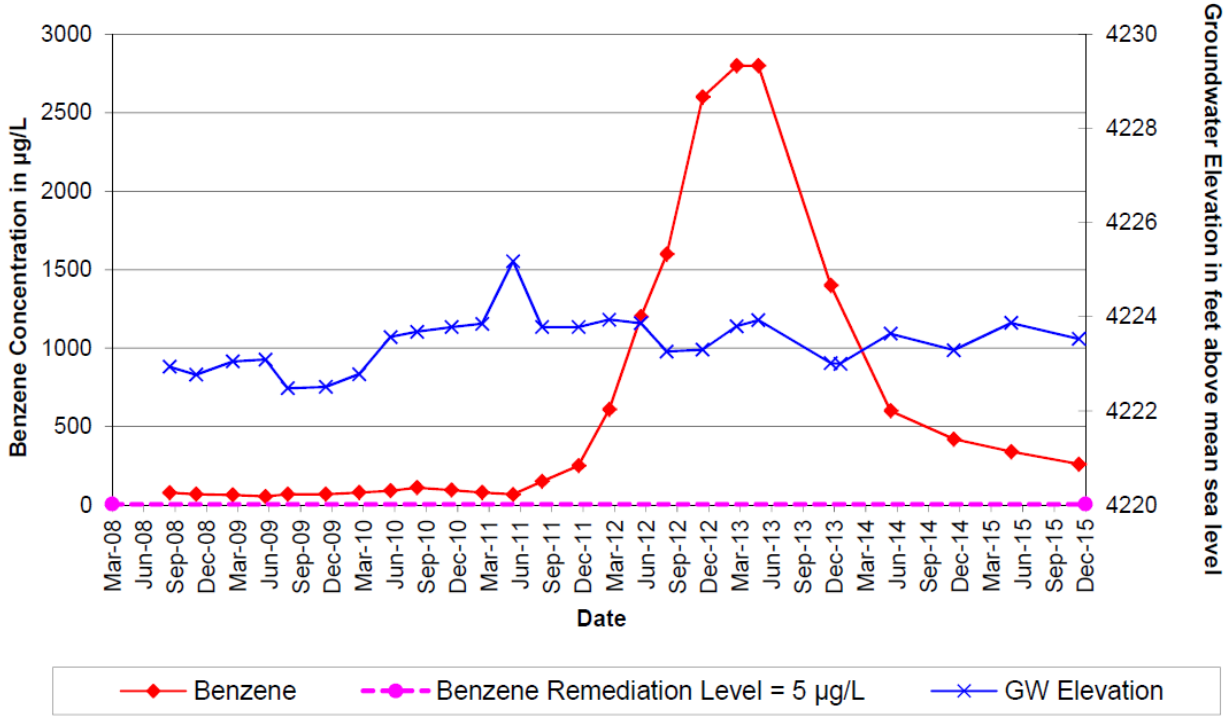


Figure 22: Source Well RW-604
Naphthalene in Groundwater Trends 2009-Present

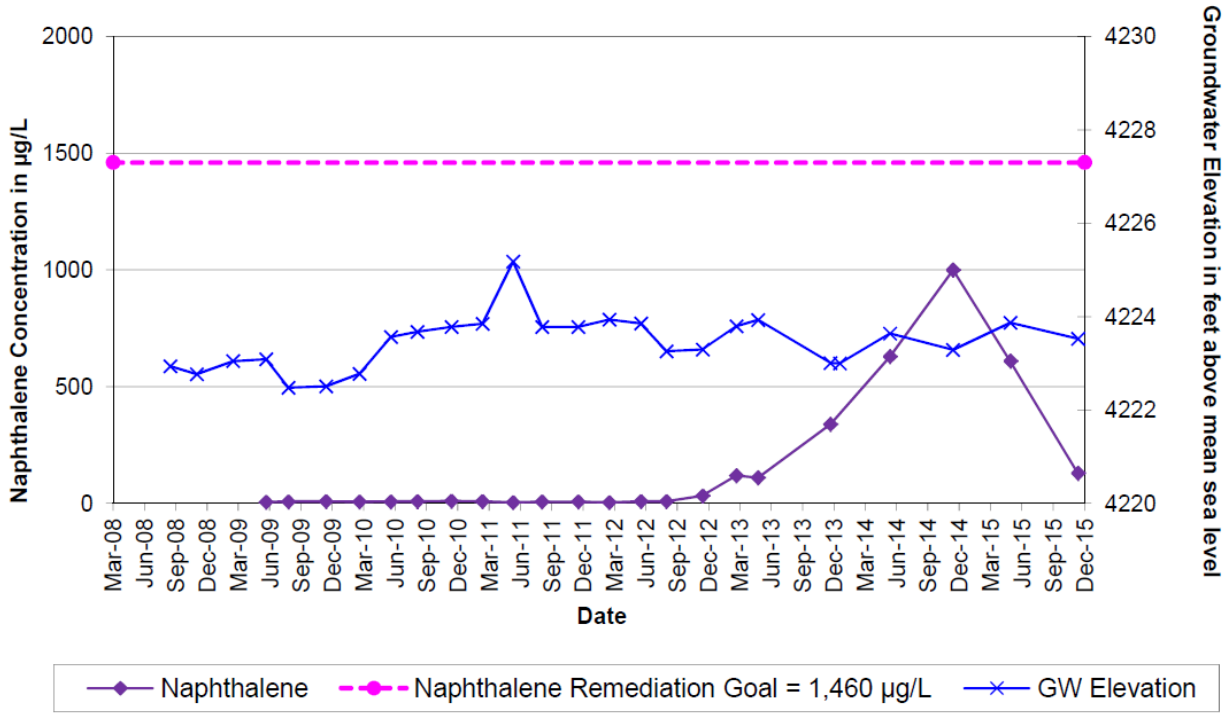


Figure 23: Source Well RW-604
Cyanide in Groundwater Trends 2008-Present

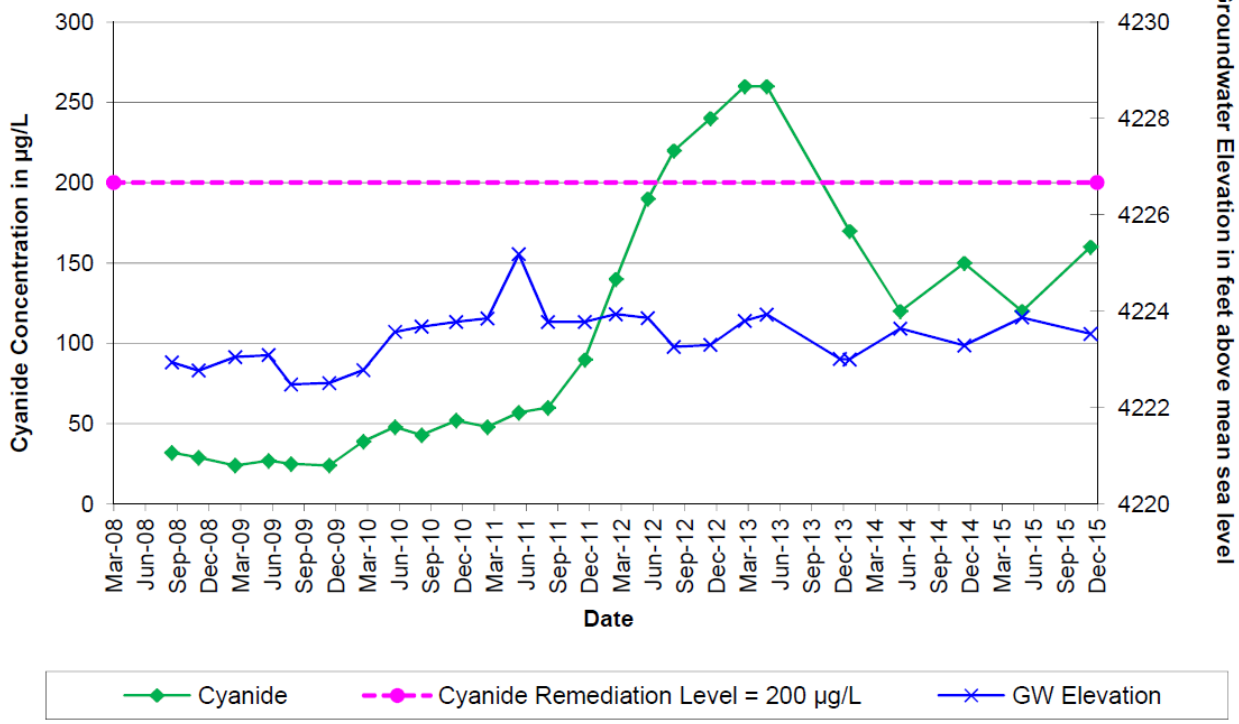


Figure 24: Source Well RW-605
Benzene in Groundwater Trends 2008-Present

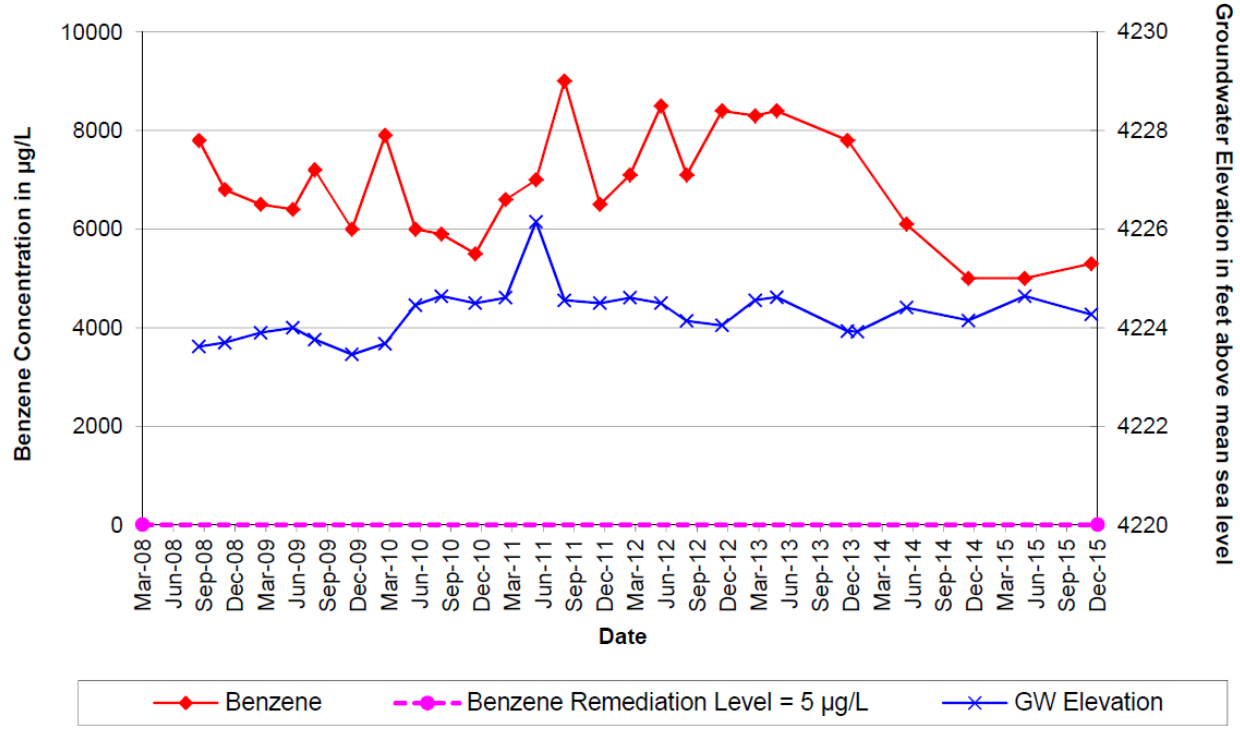


Figure 25: Source Well RW-605
Naphthalene in Groundwater Trends 2009-Present

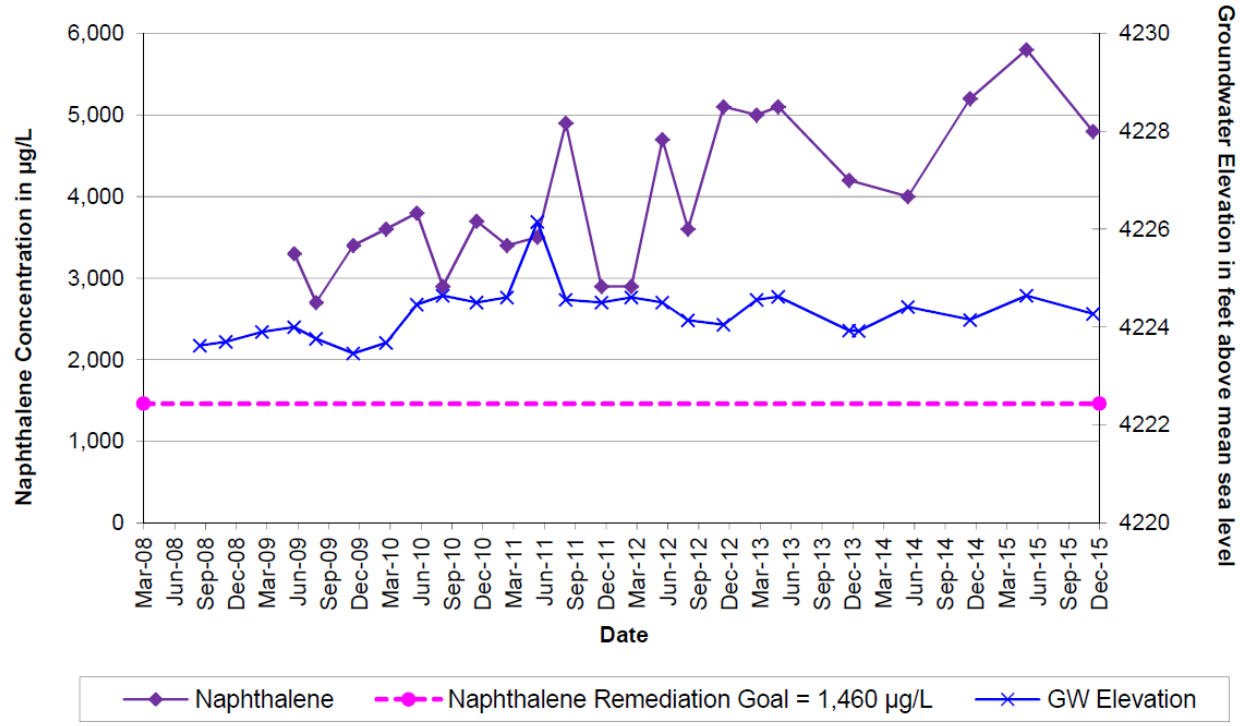
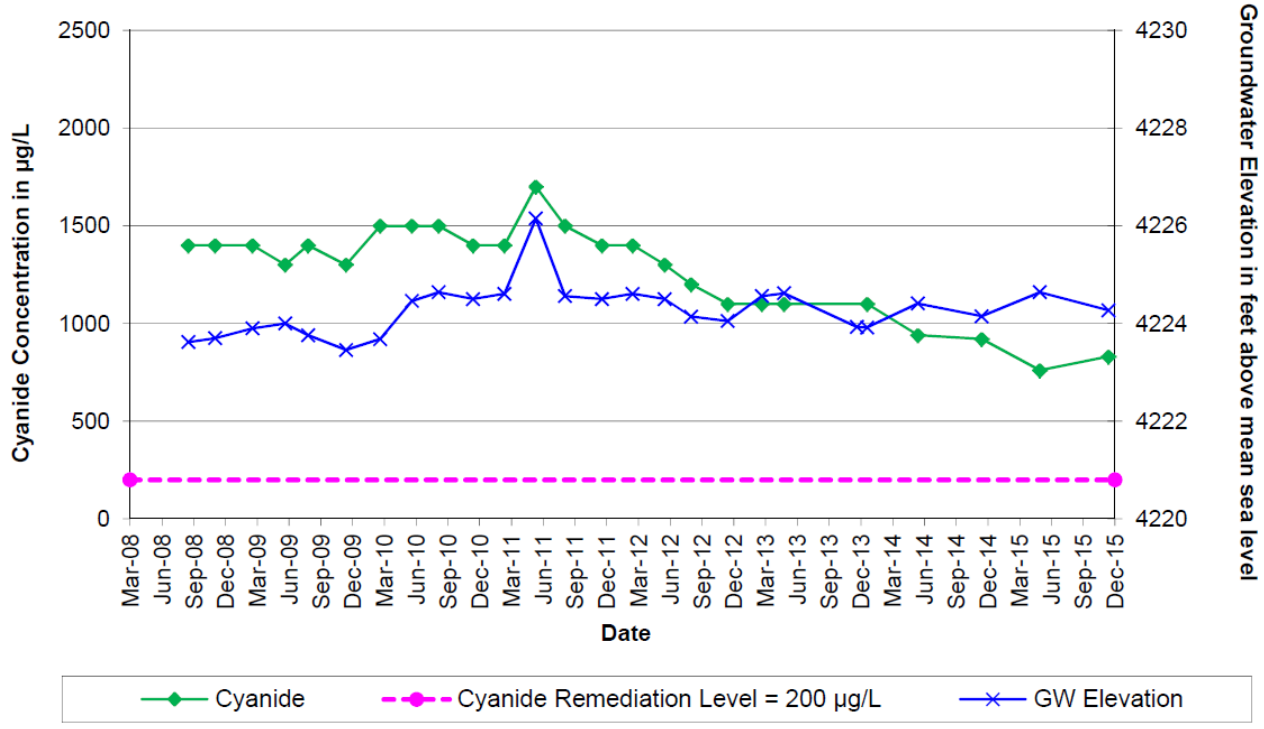


Figure 26: Source Well RW-605
Cyanide in Groundwater Trends 2008-Present

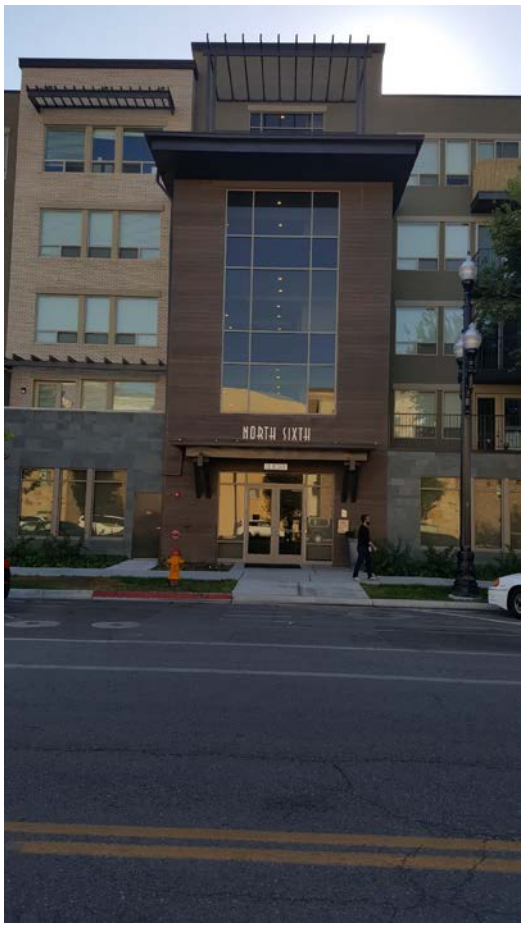


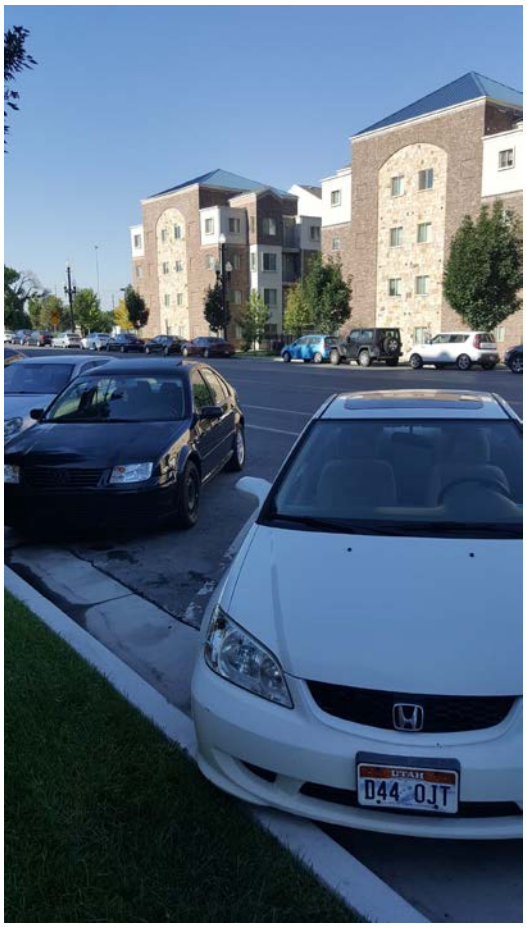
Appendix C: Photos

Viewing northeast across Site. The new FrontRunner commuter rail tracks are on the left and the north end. The Gateway mixed-use development is on the right.

Viewing southeast across Site. The northwest end of the Gateway mixed-use development is visible.

View looking southeast across Site. The FrontRunner train is running through the Site.





View of front of North Sixth Apartments and across street from North Sixth front door.

All observed wells appeared in good condition and well-maintained.