# FIVE-YEAR REVIEW REPORT

First Five-Year Review Report

for

West Kingston Town Dump / URI Disposal Area
Superfund Site

South Kingstown, Rhode Island

August 2010

Prepared by:

U.S. Environmental Protection Agency
Region 1 – New England



Approved by:

Date:

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U.S. EPA, Region 1- New England

8/18/10

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| | |
|---|---|
| AALs | Ambient Air Levels |
| ac | acre |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| AWQC | Ambient Water Quality Criteria |
| bgs | below ground surface |
| Cal/EPA | California Environmental Protection Agency |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| COC | contaminant of concern |
| ELUR | Environmental Land Use Restriction |
| FDSA | Former Drum Storage Area |
| FS | Feasibility Study |
| ICP | Institutional Controls Plan |
| IRIS | Integrated Risk Information System |
| ISCO | *in situ* chemical oxidation |
| $KMnO_4$ | potassium permanganate |
| lbs | pounds |
| LTM | long-term monitoring |
| LTMP | Long-Term Monitoring Plan |
| MCL | Maximum Contaminant Level |
| mg/kg | milligrams per kilogram |
| MNA | monitored natural attenuation |
| msl | mean sea level |
| $NaMnO_4$ | sodium permanganate |
| NCP | National Contingency Plan |
| npw | net present worth |
| NPL | National Priorities List |
| O&M | operation and maintenance |
| PCE | tetrachloroethylene |
| ppb | parts per billion |
| ppm | parts per million |
| PRGs | preliminary remediation goals |
| PRP | potentially responsible party |
| RAO | remedial action objective |
| RCRA | Resource Conservation and Recovery Act |
| RI | Remedial Investigation |
| RIDEM | Rhode Island Department of Environmental Management |
| ROD | Record of Decision |

| | |
|---|---|
| SOW | Statement of Work |
| TCE | trichloroethylene |
| µg/L | micrograms per liter |
| URI | University of Rhode Island |
| USEPA | United States Environmental Protection Agency |
| VOC | volatile organic compound |

## EXECUTIVE SUMMARY

The remedy for the West Kingston (WK) Town Dump/University of Rhode Island (URI) Disposal Area Superfund Site (the "Site") in South Kingstown, Rhode Island began with the closure and capping of the former waste disposal areas with a Resource Conservation and Recovery Act (RCRA) cover system pursuant to state law and under state oversight in 2006. Following the landfill closure, EPA selected a remedy for the Site in the September 2006 Record of Decision (ROD) that includes treatment of the source area soils and source groundwater using in situ chemical oxidation processes and monitored natural attenuation (MNA) to restore the groundwater aquifer to drinking water standards. The remedy also includes institutional controls until groundwater restoration is achieved. The remedy selected in the ROD is being implemented by PRPs at the Site (the Towns of Narragansett and South Kingston, and URI, collectively the "PRP Group"). This five-year review covers maintenance and monitoring of the Landfill Areas as well as remedial actions under the 2006 ROD.

The Site achieved construction completion with the signing of the Preliminary Close Out Report on September 29, 2009. The trigger for this five-year review was the initiation of on-site construction of landfill closure on August 24, 2005. This statutory five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

This five-year review concludes that the remedial actions performed to date have been in accordance with the requirements of the 2006 ROD and the remedy is functioning as designed and is protective of human health and the environment. The five-year review also found that the landfill closure is functioning as designed. However, in order for the remedy to remain protective in the long term, the required institutional controls must be put in place.

# FIVE-YEAR REVIEW SUMMARY FORM

| SITE IDENTIFICATION | | |
|---|---|---|
| **Site name** *(from WasteLAN)*: West Kingston Town Dump/URI Disposal Area | | |
| **EPA ID** *(from WasteLAN)*: RID981063993 | | |
| **Region:** 1 | **State:** RI | **City/County:** South Kingstown/Washington County |

| SITE STATUS | |
|---|---|
| **NPL status:** ☒ Final ☐ Deleted ☐ Other (specify) | |
| **Remediation status** (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete | |
| **Multiple OUs?*** ☒ YES ☐ NO | **Construction completion date:** 9 / 29 / 2009 |
| **Has site been put into reuse?** ☐ YES ☒ NO | |

| REVIEW STATUS | |
|---|---|
| **Lead agency:** ☒EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____ | |
| **Author name:** Anna Krasko | |
| **Author title:** Remedial Project Manager | **Author affiliation:** U.S. EPA, Region 1 |
| **Review period:**** 12 / 01 / 2009 to 8 / 24/ 2010 | |
| **Date(s) of site inspection:** 4 / 23 / 2010 | |
| **Type of review:** ☒ **Post-SARA** Pre-SARA ☐NPL-Removal only ☐Non-NPL Remedial Action Site ☐NPL State/Tribe-lead ☐Regional Discretion | |
| **Review number:** ☒ 1 (first) ☐ 2 (second) ☐ 3 (third) ☐ Other (specify) _____ | |
| **Triggering action:** ☒**Actual RA Onsite Construction at OU #1** ☐Actual RA Start at OU#____ ☐Construction Completion ☐Previous Five-Year Review Report ☐Other (specify) | |
| **Triggering action date** *(from WasteLAN)*: 08 / 24 / 2005 | |
| **Due date** *(five years after triggering action date)*: 08 / 24 / 2010 | |

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

## Five-Year Review Summary Form, cont'd.

**Issues:**

The following issues have been identified during this five-year review:

1. Implementation of Institutional Controls: The remedy includes institutional controls in the form of an ELUR to prevent the disturbance of the remedy components, to protect the integrity of the two landfill caps, and to restrict the use of contaminated groundwater for drinking water purposes until restoration to drinking water standards is achieved. An ICP was prepared by the PRP Group and submitted to USEPA on December 31, 2009. The ICP has been approved by USEPA and the PRP Group will complete the implementation process.

2. Restriction of Unauthorized Motor Vehicles: At the time of the April 2010 Site inspection, all-terrain vehicle access was evident on the Site and needs to be restricted.

**Recommendations and Follow-up Actions:**

1. Implementation of Institutional Controls: In accordance with the ICP, institutional controls will be implemented by the PRP Group to protect the integrity of the landfill caps and to restrict future groundwater use at the Site.

2. Restriction of Unauthorized Motor Vehicles: Post signage to restrict motorized access to authorized vehicles only and evaluate effectiveness of this warning signage.

**Protectiveness Statement(s):**

The remedy at the Site currently protects human health and the environment because the remedial actions performed to date have been in accordance with the requirements of the 2006 ROD and the remedy is functioning as designed. The landfill closure is also functioning as designed. However, in order for the remedy to be protective in the long term, the required institutional controls must be put in place to ensure long-term protectiveness.

**Other Comments:**
None.

# I. INTRODUCTION

The purpose of this Five-Year Review is to determine if the remedy selected for the West Kingston Town Dump/University of Rhode Island (URI) Disposal Area Superfund Site (Site) in South Kingstown, Rhode Island, is protective of human health and the environment as implemented. This report summarizes the Five-Year Review process, investigations, and remedial actions conducted at the Site, evaluates the monitoring data collected at the Site, discusses issues identified during the review, and presents recommendations to address them.

EPA Region 1 is conducting this five-year review 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 the initiation of such 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 site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 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.*

This is the first five-year review for the WK/URI Site. The next review will be prepared in 2015. This statutory review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

# II. SITE CHRONOLOGY

This section presents a chronology of events that have taken place at the Site. Events are presented in chronological order in **Table 1**.

**TABLE 1: CHRONOLOGY OF SITE ACTIVITIES**

| Date | Activity |
|---|---|
| **1951-1987** | The West Kingston Town Dump operated and accepted waste from industrial, residential, commercial, and institutional sources. The disposal area was approximately 6 acres. Although the dump formally closed in 1978, some dumping continued until 1987. |
| **1945-1987** | The URI Disposal Area operated unregulated. Solid waste was disposed in an area covering approximately 6 acres. |
| **1987** | RIDOH began to investigate groundwater and surface water quality in the area of the Site. |
| **1987** | RIDEM investigated groundwater, surface water, and surface soils at the Site. |
| **1987** | URI removed 159 tons of waste material from the Site and disposed of it at a federally-approved waste disposal facility. |
| **1988** | Four residences with private wells along Plains Road were connected to the URI water supply system after site contaminants were discovered in the well water. |
| **1989** | USEPA conducted a site investigation. Twelve rusted drums were observed lying on the ground in a former drum storage area east of the Town Dump and URI Disposal Area, and west of the access road. |
| **1990** | Final Listing Site Inspection Report was completed. |
| **1992** | Site was listed on the National Priorities List (NPL). |
| **2000** | An additional residence with a private well along Plains Road was connected to the URI water supply system. |
| **2001** | Rhode Island Department of Environmental Management (RIDEM) and USEPA entered into an enforcement agreement to implement a presumptive remedy (landfill closure) and a Remedial Investigation/Feasibility Study (RI/FS) for the Site. |
| **2002 –2005** | The RI was completed to evaluate the nature and extent of contamination and potential impacts from the landfill areas and Former Drum Storage Area (FDSA). |
| **2005 – 2006** | The landfill areas were consolidated and permanently closed under state law with RIDEM oversight, consistent with USEPA's presumptive remedy guidance for municipal landfills. |
| **2006** | The RI Report and FS Report were completed. |
| **2006** | USEPA issued the ROD on September 28, 2006. |
| **2007** | In June 2007, USEPA commenced Special Notice negotiations with the PRPs to implement the remedy documented in the September 2006 ROD. |
| **2008** | The Source Area Soils Treatment 100% Design Report was completed on September 15, 2008. |
| **2009** | USEPA issued an Administrative Order for Remedial Design and Remedial Action to URI, the Town of Narragansett, and the Town of South Kingstown. |

| Date | Activity |
|---|---|
| **2009** | The Final Remedial Design Report (100% Design) For Source Groundwater was completed on February 26, 2009. |
| **2009** | The ROD selected remedy was initiated:<br>Source Area Soils: 2,100 cubic yards of PCE and TCE contaminated soil were treated with ISCO using potassium permanganate ($KMnO_4$) in January and June 2009.<br>These soils were treated to meet the RIDEM Cleanup Standard of 100 µg/kg for PCE. The Demonstration of Compliance was completed on August 21, 2009.<br>Source Groundwater: Source Groundwater has been treated by ISCO since the fall of 2009. The applications occurred in October 2009 and May 2010. If needed, a third application will be injected in the spring of 2011.<br>Downgradient (Non-Source) Groundwater: Downgradient groundwater is being monitored to assess the extent to which residual contaminants are reduced during the natural attenuation process. |

# III. BACKGROUND

## A. PHYSICAL CHARACTERISTICS

### Setting

The Site is located on the eastern side of Plains Road in South Kingstown, Rhode Island as shown on the Site Plan (**Figure 1**). The Site includes two former disposal areas: the West Kingston Town Dump and the URI Disposal Area (see Figure 1). The West Kingston Town Dump, which comprises the southern portion of the Site, is located to the east of Plains Road, approximately 0.4 miles north of the URI campus. The Town Dump was comprised of the western 6.5 acres of a 117-acre mixed forest parcel formerly owned by Alice Tibbits of South Kingstown which has since been incorporated into a 17-acre parcel transferred to the Town of South Kingstown. The URI Disposal Area, which comprises the northern portion of the Site, is also located to the east of Plains Road, 0.5 miles north of the URI campus. The URI Disposal Area consists of approximately 12 acres (see Figure 1). The FDSA is located on the URI property to west and upgradient of the landfill areas. The URI pond lies between the FDSA and the URI landfill with a smaller Tibbits pond to the south. Hundred Acre Pond is found approximately 1,500 feet west of the landfill areas.

### Topography

The elevation at the Site ranges from 175 ft above mean sea level (msl) at the FDSA near the radio tower to 110 ft above msl at the on-site surface water bodies. As a result of the past history of sand and gravel excavation at the landfills, the majority of the Site is at a lower elevation than the surrounding land.

Based on the topography of the Site, there is no surface water runoff from the Site. All the surface water runoff either infiltrates into the soil or flows into the surface water bodies located on the Site.

### Subsurface Conditions

The overburden at the Site ranges in thickness from 10 to 150 feet in the east-west direction, increasing sharply downgradient from the landfills, toward Hundred Acre Pond. The upper over-burden unit consists of fine to medium sand interbedded with fine to medium angular gravel. The basal portion of the overburden has been mapped as a till or ground moraine (NUS, 1990). This till unit is dense and compact and includes fractions of sand and silt with a trace of fine gravel. Subsurface investigations in the vicinity of the FDSA indicated that till, on average, is encountered between eight and 21 feet below ground surface (bgs), and is generally around six-feet thick depending on the depth of bedrock. The average depth to bedrock is 18 feet bgs in the vicinity of the FDSA, increases to 30 feet bgs near URI pond and dips sharply about 150 feet in the direction of Hundred Acre Pond.

Groundwater from the Site generally moves toward and discharges to the west to two surface water bodies, URI Pond and Hundred Acre Pond. The water table slopes quite steeply from the recharge area in the FDSA vicinity, where it drops 40 feet to the outwash plan above the URI pond, then continues rather flat through a deep unconsolidated till under Plains Road, and again drops off to its discharge zone into Hundred Acre Pond. Groundwater elevations in the vicinity of the FDSA are seasonally-dependent and fluctuate near the till/bedrock interface such that during drier periods (i.e., June through September) there is minimal groundwater in the overburden aquifer and the majority of groundwater is located within the bedrock aquifer. Depending on seasonal variation, groundwater in the FDSA is typically encountered between 10 to 15 feet bgs during high precipitation times of the year, but will be below the top of bedrock surface (approximately 22 feet bgs) at drier times of the year.

## B. LAND AND RESOURCE USE

Land use in the vicinity of the Site consists, or has consisted, of residential, agricultural, and commercial uses. Residential areas comprise a small portion of the land surrounding the Site. Except for the adjacent URI campus, land in the vicinity of the Site is used primarily for agriculture and forestry. Turf farming and hay production occur both south and west of the Site, while the areas to the north and east are primarily forested. Land used for potato farming is located about 1.5 miles to the north and west of the Site. The Site is used by local residents and URI students for passive recreation, such as walking. According to discussions with the URI and Town officials, there is no specific re-use planned at this time.

No groundwater is currently drawn from the Site, which is classified as a drinking water aquifer, but there are public and private wells in surrounding areas. Five residences with private wells on Plains Road closest to the Site have been connected to the public water supply. There are two public water supply sources within 1.5 miles of the Site and sampling results for these sources show no site-related VOCs.

In general, the Site consists of an early succession forest of oak, maple, and white pine surrounding the open areas of the capped landfill. Turf farms lie to the west of the landfill cells. Non-forested areas include the landfill areas, URI Pond and surrounding wetland areas, plus overgrown shrub and field areas characteristic of unused re-vegetating land. Some of this land was cleared as part of the cap and ISCO system construction.

URI Pond is the primary aquatic habitat on-site, and the shallow, still waters may provide habitat for amphibians, aquatic organisms, and waterfowl. No fish are believed to exist in this water body, although fish are present in the smaller Tibbits Pond. Since construction of the landfill cover system, the pond is currently surrounded by open grassed areas that are maintained as part of the landfill cover system.

Hundred Acre Pond supports recreational fishing for species such as largemouth bass, pickerel, northern pike, and yellow perch. The eastern shoreline nearest the Site consists of a thick scrub-shrub wetland, with standing water and woody vegetation.

## C. HISTORY OF CONTAMINATION

The Site is comprised of two areas at which remedial actions have occurred. These areas are summarized as follows:

- Landfill Areas – The Landfill Areas include six former solid waste disposal areas east of Plains Road which collectively formed the Town Dump and URI Disposal Areas. The Town Dump received waste from industrial, residential, commercial and institutional sources. The Town Dump closed in 1978 but some continued dumping was observed until 1987. The URI Disposal Areas were used to dispose of solid waste, furniture, and building and landscaping debris. These areas closed in 1975. As part of a presumptive remedy, these six disposal areas were consolidated into three landfill cells (FA2, FA4, and FA5) and capped with a Resource Conservation and Recovery Act (RCRA) impermeable cover system completed in 2006.

- Former Drum Storage Area (FDSA) – In 1989, 12 rusted drums were observed on the ground at the FDSA reportedly without secondary containment on wooden pallets on the ground surface. The FDSA is located approximately 300 feet south of the radio tower and was reportedly used by URI in the past to store drums. The drum contents were described as brown, caked material, or a hardened tar-like substance. Stained soil was noted around one drum. Additionally, during the RI, two partially filled drums were discovered in this area. After analytical testing, it was determined that both drums contained a material similar to roofing tar, and were not the source of the chlorinated VOCs. However, based on the results of the RI, the FDSA is the source of VOCs to

groundwater, primarily TCE and PCE. This has resulted in a groundwater plume that extends approximately 2,500 feet in the eastern direction from the FDSA towards Hundred Acre Pond.

## D. Initial Response

Several environmental investigations have been conducted at the Site since 1975 by RIDOH, RIDEM, USEPA, and URI. In 1987, RIDEM and RIDOH conducted groundwater, sediment and surface water sampling at the Site which resulted in three residences with private drinking water wells being connected to the URI water supply in 1988. That year, URI also removed 159 tons of waste and shipped it off-site. The Site was listed on the National Priorities List (NPL) in October 1992. An additional residence with a private well on Plains Road was connected to the URI water system in 2000.

In August 2001, EPA and RIDEM entered into an enforcement agreement to implement a presumptive remedy (landfill closure) and a Remedial Investigation/Feasibility Study (RI/FS) for the Site. In 2006, the Landfill Areas were consolidated and permanently closed with the RCRA cap by the PRPs under State-lead oversight.

From 2002 to 2006 the PRPs completed an RI/FS to characterize and to assess response action for the contamination at and from the FDSA.

## E. Basis for Taking Action

The hazardous substances that have been released to the Site are primarily chlorinated VOCs. Based on the compounds detected during site investigation activities, contaminants of concern (COCs) were identified in the 2006 ROD. PCE was the COC identified for soil and both PCE and TCE were identified as groundwater COCs. These COCs and ROD-specified clean up levels are presented by medium in **Table 2**.

**TABLE 2: MEDIA SPECIFIC CLEANUP GOALS FOR CONTAMINANTS OF CONCERN**

| Contaminant by Media | Cleanup Level (ppb) | Cleanup Level Basis |
|---|---|---|
| **Soil** | | |
| Tetrachloroethene (PCE) | 100 | RIDEM Soil Leachability Criteria |
| **Groundwater** | | |
| Tetrachloroethene (PCE) | 5 | MCL |
| Trichloroethene (TCE) | 5 | MCL |

MCL = Maximum Contaminant Level
ppb = parts per billion, ug/kg equivalent in soil and ug/L equivalent in groundwater

Exposure to Site groundwater (via ingestion, inhalation and dermal contact) is associated with significant human health risks. Exposure to groundwater as a drinking water source for potential future residents or commercial/industrial/facility worker exceeds EPA's acceptable risk levels for PCE and TCE under a reasonable maximum exposure scenario.

# IV. REMEDIAL ACTIONS

This section discusses the selection and implementation of remedial actions.

## A. REMEDY SELECTION

Independent phases of remediation were undertaken to expedite the closure of the Landfill Areas under the presumptive remedy program. Once the landfill closure was completed, a ROD was issued by EPA to address soil and groundwater impacts in the FDSA. Collectively, both remedies incorporated source control and management of migration components to address the principal Site risks to human health based upon historic Site contamination.

USEPA signed a Record of Decision (ROD) for the Site on September 28, 2006 which selected the following remedy for the Site:

- Treatment of source area soils with chemical oxidation;
- Treatment of source groundwater with chemical oxidation;
- Monitored natural attenuation (MNA) of downgradient groundwater after treatment of the source groundwater plume;
- Environmental monitoring;
- Institutional controls in the form of land use restrictions to prevent use of groundwater; and
- Five-year reviews.

In addition to the remedial actions specified by the ROD, beginning in 2005, the six former solid waste disposal areas associated with the Site were consolidated into three and have been closed and capped with a Resource Conservation and Recovery Act (RCRA) impermeable cover system. These closure activities were performed by the PRPs under RIDEM administration and consistent with USEPA presumptive remedy initiative regarding municipal landfill closure. The closure of these Landfill Areas was completed in 2006, and operation and maintenance (O&M) activities remain on-going for continued protection of human health and the environment. The implementation of ROD-designated remedial actions began in 2008 (EPA, 2008).

The data and supporting documentation provided in this Five-Year Review encompass the five-year period which began following the initiation of the landfill closure. ROD-designated remedial actions remain on-going, with the exception of source area soil treatment by *in situ* chemical oxidation (ISCO), which was completed in August 2009. This Five-Year Review covers maintenance and monitoring of the Landfill Areas as well as remedial actions under the 2006 ROD.

The following presents a summary of the presumptive landfill closure remedy and the remedy selected in the 2006 ROD.

Landfill Areas

The Landfill Areas were capped in 2006 pursuant to a remedy overseen by the state of Rhode Island. This remedy is a USEPA presumptive remedy (i.e., a remedy commonly applied to landfills), which in this case required installation and maintenance of a cap over the fill areas under the specifications of Subtitle C of RCRA. The selected cap configuration was based on USEPA's Alternative Cap Design for Unlined Hazardous Waste Landfills in Region I and RIDEM's Solid Waste Regulations.

Source Area Soil Treatment

The remedy selected for source area soil was in-situ chemical oxidation (ISCO). ISCO treatment consists of mixing a chemical oxidant into the contaminated soil in sufficient concentrations to oxidize the PCE and TCE in the soil to benign products. The source area soils were treated in 2009 by mechanically mixing in an oxidant (KMnO4) after the top clean layer was removed. Following the treatment, confirmation soil samples were collected to demonstrate compliance with required cleanup levels.

Source Groundwater Treatment

The management of migration component applies to impacted groundwater associated with the FDSA and within the two primary groundwater zones at the Site: the source groundwater and downgradient groundwater (depicted in **Figure 2**). For source groundwater, the selected remedy was designed to address the bedrock groundwater plume and residual overburden impacts. Groundwater treatment was selected to occur on an annual basis using a permanganate solution ($NaMnO_4$) injected through a series of injection wells.

Downgradient Groundwater/Environmental Monitoring/Institutional Controls

Downgradient groundwater will be monitored to assess the extent to which residual contaminants are reduced during the natural attenuation process. In addition to these remedy components, the 2006 ROD also requires institutional controls in the form of deed restrictions to restrict impacted groundwater use. Monitoring of the groundwater well network and institutional controls to protect integrity of the landfills closure are also required as part of the Landfill Areas closure.

## B. REMEDY IMPLEMENTATION

A summary of remedial actions completed at the Site are described in this section.

Two source control mechanisms have been implemented at the Site and include waste consolidation and closure of the Landfill Areas and the treatment of source area soils which represent a continuing source of contamination to soil and groundwater within the source groundwater zone.

Landfill Areas

To reduce the extent of waste disposal areas, waste from other on-site fill areas and from within the same disposal area was consolidated into three main areas: FA2, FA4, and FA5. The areas of consolidation are shown on Figure 2. The cover system cap on Landfill Areas FA2 (8.09 acres [ac]), FA4 (1.70 ac) and FA5 (2.38 ac) covers an area of about 12 acres. The cover system was designed to meet the performance requirements of RCRA Subtitle C regulations, and existing requirements of RIDEM and USEPA. The cover system consists (from top to bottom) of a 6 inch topsoil layer, a 18 inch vegetative support layer, a drainage geocomposite, a 60 mil high-density polyethylene textured geomembrane, a 12 inch low permeability soil layer, a 6 inch sand gas venting layer and a base soil layer. The cover system also includes passive gas vents and trenches, drainage channels, culverts and detention basins. Landfill Area FA2 is located on property owned by the Town of South Kingstown and Landfill Areas FA4 and FA5 are located on property owned by URI.

The protectiveness of the remedy is based on the continued maintenance of these landfill closures. The RCRA cover system is inspected and maintained as part of the state-regulated landfill closure, which includes a requirement for institutional controls in a form of deed restrictions to protect the landfill caps from being disturbed.

Source Area Soil Treatment

Following additional delineation activities in the FDSA, a total of 1,770 cubic yards (cy) of soils were treated in the source area. The first round of treatment occurred in January/February 2009 using 10,000 pounds (lbs) of potassium permanganate. Following the application, soil clean-up objectives were not met and, consistent with the USEPA April 2009 Request for Change in Work Directive, an additional 21,000 lbs of potassium permanganate were mixed in June 2009 as part of a modified treatment approach to target soils with residual concentrations of PCE and TCE and provide a significant quantity of additional oxidant to supplement source groundwater treatment in the vicinity of the FDSA. At the conclusion of mixing, all confirmatory soil results were below the 100 µg/kg clean-up level for PCE specified by the ROD (see Table 2). The Demonstration of Compliance Report for Source Area Soil Treatment was completed on August 21, 2009 (W&C, 2009).

To address the requirements of the selected remedy in accordance with the ROD, the following remedial actions related to the management of migration component have been completed:

Source Groundwater Treatment

The construction of Site infrastructure associated with the source groundwater remedy was completed in September 2009. Activities included the installation of a series of injection and monitoring wells for chemical oxidant injection and performance monitoring (**Figure 3**). The first round of chemical oxidant injections occurred between September 16 – 18, 2009, using approximately 7,000 gallons of sodium permanganate. Oxidant performance monitoring will continue on a semi-annual basis as part of on-going long-term monitoring (LTM) activities consistent with the monitoring program presented in the Demonstration of Compliance Work Plan (W&C, 2009). Performance monitoring results from the source groundwater zone will be compared with MCLs for PCE and TCE (both 5 micrograms per liter [µg/L]) to determine when compliance requirements have been achieved. In August 2010, a series of additional groundwater monitoring wells (designated as well clusters MW-105, MW-106, and MW-107 in Figure 3) are to be installed in the source groundwater zone, further to the west and downgradient of the FDSA to expand the performance monitoring network to evaluate the remedy's effectiveness over time.

Downgradient Groundwater/Environmental Monitoring/Institutional Controls

Monitoring of the downgradient groundwater plume for VOCs is also performed to assess progress of the groundwater remedy toward meeting preliminary remediation goals (PRGs). The groundwater monitoring wells associated with the downgradient groundwater zone are shown in **Figure 4**.

An Institutional Control Plan (ICP) regarding Site groundwater was prepared by the PRP Group and submitted to USEPA on December 31, 2009. The ICP has been approved by USEPA and the PRP Group will begin the implementation process. The PRP Group will also work to implement institutional controls to protect the integrity of the landfill cover.

## C. OPERATION AND MAINTENANCE

The remedies include long-term environmental monitoring of groundwater and surface water to monitor natural attenuation (MNA) and the effectiveness of the selected remedy. MNA is part of the source groundwater remedy following ISCO. MNA is also expected to be the primary means of reducing contaminant concentrations in the portion of the groundwater plume that is downgradient from the source area.

The operation and maintenance and monitoring activities are currently being conducted by the PRP Group. The cost incurred for O&M and environmental monitoring through June 2010 was approximately $106,000.

In addition to state oversight of the Landfill Areas closure, reports on the status of these landfill caps are included in the environmental monitoring reports submitted to USEPA as part of the 2006 ROD remedy implementation.

## V. PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This is the first five-year review for the Site.

# VI. FIVE-YEAR REVIEW PROCESS

## A. ADMINISTRATIVE COMPONENTS

This section describes the activities performed during the five-year review process and provides a summary of findings. The WK/URI five-year review team consisted of representatives of EPA and RIDEM and was also assisted by staff from the PRPs' contractor, Woodard and Curran, Inc., with expertise in hydrogeology, landfill closure, and risk assessment.

## B. COMMUNITY NOTIFICATION AND INVOLVEMENT

USEPA issued a press release that was published in the Narragansett Times on January 13, 2010 and the Providence Journal on January 15, 2010 announcing USEPA's start of the Five-Year Review process at the Site and describing how the public can contribute during the review process. Key Site-related documents are available at the South Kingstown Public Library in Peace Dale, Rhode Island.

## C. DOCUMENT REVIEW

This evaluation included a review of all relevant documents including decision documents, work plans, and various monitoring reports. A complete list of these documents is provided in **Attachment 1**.

## D. DATA REVIEW

For this five-year review, the following historic results were reviewed and are summarized below:

- Source Groundwater – October 2009 and April 2010 post-oxidant injection results compared to September 2009 baseline monitoring results
- Downgradient Groundwater – April/October 2009 and April 2010 results compared to Pre-LTM May 2007 results
- Surface Water – April/October 2009 and April 2010 results compared to Pre-LTM May 2007 results
- Landfill Gas and Ambient Air – April/October 2009 and April 2010
- Source Area Soil – Demonstration of Compliance Report, August 2009

### Source Area Soil

These soils were treated in 2009 to meet the RIDEM Cleanup Standard of 100 µg/kg for PCE. The Demonstration of Compliance Report for Source Area Soil Treatment was completed on August 21, 2009 (W&C, 2009).

### Source Groundwater

Cleanup standards for groundwater were set in the ROD for PCE (5 µg/L) and TCE (5 µg/L). **Figure 5** presents the PCE and TCE results from the post-oxidant injection monitoring events conducted in October 2009 and April 2010. Data from the September 2009 baseline monitoring event are also presented in Figure 5 for comparison.

During baseline monitoring (prior to oxidant injection) of source groundwater in September 2009, concentrations of PCE and TCE were the only VOCs detected in excess of the federal MCL standards (5

µg/L). PCE was detected above the MCL in 10 of 13 wells, and detected concentrations ranged from 7.1 µg/L (PSB-MW-2) to 542 µg/L (MW-103I). TCE was detected above the MCL in four of 13 wells, and detected concentrations ranged from 6.9 µg/L (MW-102BR) to 108 µg/L (MW-102I). In regard to subsurface oxidant performance, post-injection PCE and TCE results (October 2009) indicated a reduction in concentration in all but two of the 13 wells sampled (MW-101T and MW-102I). These results confirm the effective distribution of oxidant and treatment of residual VOCs associated with the FDSA.

During the April 2010 sampling event for source groundwater, PCE was detected above the MCL in six of 13 wells, and detected concentrations ranged from 7.4 µg/L in MW-104BR to 501 µg/L in MW-102I. TCE was only detected in two wells with concentrations of 12 µg/L (MW-101T) and 157 (MW-102I). For subsurface oxidant performance, the April 2010 results indicated a reduction in PCE concentration from the October 2009 results in all but three of the wells sampled (MW-101T, MW-102I, and MW-103T). In addition, TCE results have also indicated a reduction in concentration from October 2009 to April 2010 in all but two of the wells sampled (MW-101T and MW-102I). **Figure 6** shows the distribution of PCE and TCE in source groundwater in April 2010. These results confirm the effective distribution of oxidant and treatment of residual VOCs associated with the FDSA. The second annual injection event was completed in April 2010. Scheduled permanganate injection in spring 2011 will continue to reduce concentrations of PCE and TCE in the source area in accordance with clean-up objectives and Performance Standards.

**Downgradient Groundwater**

Cleanup standards for groundwater were set in the ROD for PCE (5 µg/L) and TCE (5 µg/L). **Figure 5** presents TCE and PCE results from the downgradient groundwater LTM events conducted in April/October 2009 and April 2010. Data from the May 2007 pre-LTM event are also presented in Figure 5 for comparison.

The monitoring results indicated a notable decrease in PCE concentrations between the October 2009 and April 2010 sampling events at wells MW-1R, MW-1S, MW-2R, and MW-2S. However, PCE concentrations in wells MW-4, MW-5, and MW-7S showed an increase between these two sampling events. TCE concentrations above the MCL decreased between the October 2009 (7 of 18 wells > MCL) and April 2010 (5 of 18 wells > MCL). These trends suggest that the attenuation processes are beginning to improve groundwater quality.

Consistent with the results from wells located in the vicinity of URI Pond, concentrations of PCE and TCE in wells located along Plains Road also decreased between 2007 and 2010. At the western limit of the groundwater plume near Hundred Acre Pond, only TCE was detected at concentrations above the MCL in the overburden well (MW-7S). These results were consistent between 2007 and 2010. PCE was detected above the MCL in MW-7S in only the April 2010 sampling event. Based on these results, overall groundwater quality within the downgradient groundwater zone may be improving as a result of natural attenuation processes. The exact mechanism(s) responsible for attenuation have not been identified because only three rounds of MNA indicator samples (i.e., calcium, sulfite, hydrogen sulfide, nitrate, and sulfate) have been collected to date. Future MNA sampling and data analysis will continue as part of future LTM activities. **Figure 7** shows the distribution of PCE and TCE in downgradient groundwater in April 2010.

**Surface Water**

For surface water, results were compared to applicable state and federal drinking water standards and state and federal Ambient Water Quality Criteria (AWQC). During the April/October 2009 and April

2010 surface water sampling events, no VOC concentrations exceeded applicable standards or criteria at the four surface water sampling locations. However, during the pre-LTM surface water sampling event in May 2007, concentrations of PCE were detected slightly above the MCL (5 µg/L) at surface water sampling locations SW-101 at 7 µg/L and 6 µg/L (duplicate) and SW-102 at 6 µg/L. The decreasing trend in PCE concentrations at these two locations in 2009 correspond with reduced concentrations of PCE in wells located upgradient of URI Pond, specifically well MW-1S. These locations are within a distinct groundwater discharge zone, therefore as groundwater quality improves, changes will be observed directly in surface water quality.

Manganese has been analyzed on a semi-annual basis at location SW-101 to evaluate potential increases as a result of permanganate injections in the source groundwater zone. Although standards do not exist for manganese in surface water, results between 2007 and 2009 indicate a general decrease. Furthermore, based on estimated groundwater seepage velocities from oxidant injection wells located in the vicinity of the FDSA, concentrations of permanganate would not reach URI Pond for at least three years.

**Landfill Areas**

Following the 2005/2006 landfill closure construction, Landfill Areas inspection activities found the cover system, detention basins, and wetlands to be in good condition and consistent with design requirements. Minor maintenance and repair activities, such as silt removal, have been conducted and most recent repairs were addressed in 2010.

Landfill gas has been monitored at select vent locations in each of the three consolidated Landfill Areas on an annual basis beginning in 2009 to evaluate potential gas accumulation. During these events, landfill gas monitoring has been performed along with the collection of a downgradient ambient air sample adjacent to MW-12R (2009 only). Samples have been collected and analyzed for VOCs in accordance with USEPA Method TO-15 and for fixed (permanent atmospheric) gases (oxygen, methane, carbon dioxide, and hydrogen sulfide) in accordance with ASTM method D-1946 at each landfill gas vent. Field screening at each of the three gas vents and three of the four landfill gas wells (LG-05 has been destroyed and is currently scheduled for replacement in the Fall of 2010) has also been conducted on a quarterly frequency for the following parameters: %-oxygen, hydrogen sulfide, carbon dioxide, methane, and total ionizable VOCs. These activities have been conducted in accordance with requirements of the LTM (W&C, 2007) and the post-closure O&M plan for Landfill Areas (W&C, 2007).

In 2009, the results from the gas monitoring wells did not indicate levels of landfill gas or the presence of VOCs during screening. The gas vent field screening data indicated elevated $CO_2$ and $CH_4$ along with a decrease in $O_2$. Consistent with RIDEM's post-closure requirements, landfill gas VOC results from each of the vent wells were directly compared to 1-hour, 24-hour, and annual Ambient Air Levels (AALs) as outlined in the *RIDEM Air Pollution Control Regulation Number 22 for Air Toxics*. Based on the scaled values, these results indicated that concentrations of 1,3-butadiene, benzene, and naphthalene at vent V-5 exceeded the RIDEM ambient air criteria (annual), and acrolein exceeded both the 1 hour and annual criteria. At vent V-9, the 1,3-butadiene concentration exceeded the annual RIDEM criteria, and acrolein exceeded both the 1-hour and annual criteria. There were no exceedances at vent V-13.

As part of the 2009 LTM report, these results were further evaluated using the atmospheric dispersion model, SCREEN3, to calculate the average exposure point concentration for each compound. During modeling, the resulting maximum one-hour predicted concentrations from SCREEN3 were systematically multiplied by the gas emission rates established by the LandGEM model for each of the three landfill areas to determine the maximum one-hour concentration, 24-hour, and annual average for comparison along with a "cumulative" scenario by which emissions from adjacent landfill parcels were summed to

evaluate impacts to a single receptor. Modeling results for each landfill constituent at each time interval were below RIDEM AALs by several orders of magnitude using extremely conservative meteorological and climatological input parameters and assumptions for an increased "factor of safety." Therefore a supplemental ambient air sampling plan is not required during future LTM activities based on the criteria established in the 2007 LTMP.

As part of the April 2010 LTM activities, samples were again collected from each of the three gas vent wells. An ambient air sample was not obtained in the vicinity of MW-12R based on the favorable modeling results for each landfill gas constituents during the SCREEN3 modeling exercise. The 2010 gas vent results confirmed a decrease in the following compounds compared to the 2009 results: propene, acetone (a known laboratory artifact), and trichlorofluoromethane (V-09 and V-13 only). Concentrations of tetrahydrafuran exhibited an increase at V-05 and V-09, however a significant decrease occurred at V-13. Low incremental increases were noted for some aromatics (ethylbenzene, xylenes, toluene, styrene), as well as ketones and longer-chain (6,7,8,9) alkanes in each of the three wells. No RIDEM AALs exceedances have occurred in 2010 monitoring event.

## E. SITE INSPECTION

A Site inspection was conducted on April 23, 2010 with representatives from USEPA, RIDEM, URI, the Towns of Narragansett and South Kingstown, and Woodard & Curran. The inspection included a Site walkover focused on the landfill areas, monitoring wells, site fence, and general site conditions. There has been no reported vandalism on the Site. The inspection of the monitoring wells revealed that all monitoring wells have locks and are in good condition. The locked gate continues to restrict vehicular traffic to the Site; however, apparent all-terrain vehicle access was evident at the time of the site visit and a sign will be posted restricting motorized access to authorized vehicles only. Stressed vegetation was not observed during the site inspection.

A recent (March 2010) historically significant rain storm caused erosion of the access road at the Site. The road was regraded and repaired prior to the Five-Year Review Site inspection. The small area of siltation in the drainage ditch adjacent to FA-5 and along the access road has since been removed and repaired.

The landfills were in good condition, with no evidence of settlement (low spots), cracking, erosion, holes, stress or excessive vegetation, bulges, wet areas/water damage, slope instability, material degradation, undercutting, or obstructions. The landfill gas vents and monitoring probes were also in good condition. No issues with the outlet pipes or rock support structures were noted. Neither siltation nor erosion was evident in the detention ponds.

Site paperwork was available and well organized. The necessary O&M and health and safety manuals were readily available and up to date. Groundwater monitoring records were readily available.

The Site inspection report is included in **Attachment 2** to this report.

## F. SITE INTERVIEWS

General discussions and observations were documented during the Site inspection on April 23, 2010. All individuals contacted during this five-year review are identified in **Attachment 3**.

Mr. Gary Jablonski, RIDEM Project Manager of the Site, was interviewed during the Site inspection on April 23, 2010. In addition, Settling Defendant representatives Mr. Jon Shock (Town of South

Kingstown), Mr. Jerome Sidio (URI), and Mr. Jeffery Ceasrine (Town of Narragansett) were interviewed during the Site inspection. Neither the RIDEM Project Manager nor Settling Defendant reported any significant issues associated with the Site remedy.

# VII. TECHNICAL ASSESSMENT

This section discusses the technical assessment of the remedy and provides answers to the three questions posed in the EPA Comprehensive Five Year Review Guidance (USEPA, 2001).

## QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?

Yes.

Remedial Action Performance: A review of relevant project documents and the results of soil treatment and groundwater monitoring indicate that the remedy is functioning as intended. Cleanup levels for soil have been met and groundwater cleanup levels are expected to be met at the completion of the remedial action. Also, each of the three (3) landfill caps are performing as intended.

Monitoring Results: As described earlier in this report, concentrations of PCE and TCE monitored at the Site overall either meet the ROD cleanup goals or trend downward (except for source groundwater wells MW-101T, -102I, and -103T and downgradient groundwater wells MW-4, -5, and -7S). Additionally, over the period of monitoring, the plume at the Site has been reducing in overall size and concentration, as illustrated in Figure 5.

Opportunities for Optimization: There were no opportunities for system optimization observed during this review. Optimization opportunities will be assessed as additional data becomes available.

Indicators of Remedy Problems: Based on the Site inspections performed and the evaluation of the performance of the remedy, there are no remedy problems identified which could lead to the remedy not being protective or suggest protectiveness is at risk unless changes are made.

Implementation of Institutional Controls: The remedy also includes institutional controls in the form of an Environmental Land Use Restriction (ELUR), to prevent the disturbance of the remedy components and to restrict the use of contaminated groundwater for drinking water purposes until restoration to drinking water standards is achieved. Although no groundwater from the Site is currently being used, implementation of institutional controls will be necessary to restrict future groundwater use at the Site. Implementation of institutional controls to protect the integrity of the landfill caps is also required. The Institutional Controls Plan (ICP) was prepared and submitted to USEPA on December 31, 2009. The PRP Group will implement the ICP and the required institutional controls for the landfill caps.

## QUESTION B: ARE THE EXPOSURE ASSUMPTIONS, TOXICITY DATA, CLEANUP LEVELS AND REMEDIAL ACTION OBJECTIVES (RAOS) USED AT THE TIME OF REMEDY SELECTION STILL VALID?

Yes.

### Review of Remedial Action Objectives

There have been no changes in the physical conditions or land use at the Site that would affect the protectiveness of the remedy. Remedial Action Objectives (RAOs) for groundwater were established in the 2006 ROD to mitigate, restore, and/or prevent existing and future potential threats to human health and the environment from groundwater and are still valid. Cleanup levels, which are equivalent to federal

MCLs for drinking water, and post-ROD maximum concentrations are presented in **Table 3** below for the two COCs identified in the ROD. The RAOs for the selected remedy at the Site are to:

- Prevent potential human exposure (dermal contact, ingestion, inhalation) to groundwater containing Site contaminants at concentrations that exceed state drinking water standards or federal MCLs until this groundwater has been restored to safe drinking water levels. For contaminants for which no state drinking water standard or MCL has been established, prevent potential human exposure (dermal contact, ingestion, inhalation) to concentrations which exceed human health risk-based levels (i.e., greater than $1.0 \times 10^{-6}$ to $1.0 \times 10^{-4}$ excess carcinogenic risk or non-carcinogenic hazard quotient greater than 1.0). The groundwater at the Site currently exceeds USEPA risk criteria (lifetime excess cancer risk above $1.0 \times 10^{-4}$ and a hazard quotient greater than 1.0) and MCLs for PCE and TCE.

- Prevent migration/leaching of contaminants from subsurface soil that would result in groundwater contamination (by eliminating contaminant concentrations in soil above the RIDEM soil leachability criteria).

## Expected Progress toward meeting Remedial Action Objectives (RAOs)

The ISCO treatment of the source area soils has reduced soil contaminant concentrations below the cleanup levels and the RAO concerning soil has been met. The implemented remedial actions have shown progress towards meeting the RAO concerning groundwater. The 2006 ROD estimated it would take 80 to 325 years to reach the clean up standards (although the selected remedy should achieve significant contaminant mass reductions within approximately 6 to 12 years). It is too early in the progress of the remedy to suggest that this duration will change. Continued progress towards meeting the groundwater RAO will be assessed in the second five-year review scheduled for 2015.

**TABLE 3: REMEDIAL ACTION PROGRESS FOR GROUNDWATER CONTAMINANTS**

| Contaminant | Groundwater Cleanup Level (ug/L) | Maximum Detected Post-ROD Groundwater Concentration 2007-2010 (ug/l) | Maximum Detected Groundwater Concentration 2010 (ug/l) |
|---|---|---|---|
| ***2006 ROD Contaminant of Concern*** | | | |
| Tetrachloroethene (PCE) | 5 | 542 | 501 |
| Trichloroethene (TCE) | 5 | 311 | 191 |
| ***Additional Contaminant of Potential Concern*** | | | |
| None | | | |

## Review of Applicable or Relevant and Appropriate Requirements (ARARs)

The selected remedies for the Site must comply with all federal and any more stringent state Applicable or Relevant and Appropriate Requirements (ARARs) that pertain to the Site. The following major

ARARs for groundwater and surface water at the Site still must be met (a full list of ARARs is provided in Attachment 4):

*Groundwater*

- Chemical-Specific: Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) and Rhode Island Rules and Regulations for Groundwater Quality. MCLs are used to evaluate the extent of chemical contamination in groundwater associated with the Site. At the state level, groundwater at the Site is classified as Class GA groundwater and therefore, shall not: threaten public health or the environment; cause a violation of surrounding groundwater quality standards; adversely impact groundwater and surface water at boundary of facility; or violate or have the potential to cause a violation of Rhode Island surface water quality standards.

*Surface Water*

- Action-Specific: Clean Water Act Ambient Water Quality Criteria (AWQC) and Rhode Island Water Quality Regulations. Acute and chronic AWQC are set for the protection of aquatic organisms in surface water.

A list of ARARs from the 2006 ROD is included in **Attachment 4** of this report. There have been no changes in these ARARs affecting the protectiveness of the remedy.

## Review of the Chemicals of Concern (COCs) and Cleanup Levels

There have been no changes to the COC list from the 2006 ROD; PCE and TCE remain as the only Site COCs. No changes to the regulatory standards for PCE or TCE have been made since the 2006 ROD. Groundwater in the vicinity of the Landfill Areas is monitored for metals to evaluate the effectiveness of the landfill cover system. RCRA metals including barium, cadmium, chromium, manganese, and silver have been detected in groundwater; however, concentrations have not exceeded the respective MCLs in any of the wells sampled. Therefore, no inorganic analytes will be added as COCs at this time.

Similarly, VOC concentrations in surface water continue to be monitored at the Site to assess progress of the groundwater remedy and to document continued protection of human health and the environment at URI Pond and Hundred Acre Pond. During the 2009 and 2010 surface water sampling events, concentrations of VOCs in surface water did not exceed applicable AWQCs at each of the four surface water sampling locations. These results confirm the protectiveness of the selected remedy for the Site.

## Changes in Exposure Pathways/Assessment

There have been no changes in the physical conditions or land use at the Site that would affect the protectiveness of the remedy. The objective of the Exposure Assessment from the RI was to estimate the type and magnitude of potential exposure to site-related COCs present at or migrating from the Site. Exposure was quantified for the populations potentially exposed to contaminated media via specific exposure pathways, based on current and future potential land use. The following populations were considered during the RI:

- Youth Trespasser/Recreational User
- Residents
- Future Site Workers

Due to the capping of the Landfill Areas after the completion of the RI, several of the exposure pathways considered in the RI are no longer complete pathways at the Site. Changes in the exposure pathways since the 2006 RI are discussed below.

***Youth Trespasser/Recreational User***

Prior to the capping of the landfills, trespassers/recreational users were considered in the exposure assessment since they could have had dermal contact with or incidental ingestion of COCs in impacted surface soils across the uncapped portions of the Site. However, since the capping of the landfills in 2006, this pathway is no longer complete. The potential trespasser surface water and sediment exposure pathway in the URI Pond is still complete as long as VOCs are detected, even at the levels below AWQC. However, the remedy is currently protective of trespassers/recreational users.

***Residents***

The 2006 RI evaluated future residential exposure to uncapped (upland) Site soil and Site groundwater (from uncapped areas) and assumed that future residents may have dermal contact with or incidental ingestion of COCs in soils, and may inhale COCs entrained in soil dust. However, since the capping of the landfills in 2006, this pathway is no longer complete.

Future residential users potentially exposed to contaminated groundwater via ingestion, inhalation and dermal contact continue to present an unacceptable human health risk. Residences across the Site along Plains Road continue to be connected to the public water supply, and vapor intrusion is still not a completed exposure pathway because there is approximately 40 to 50 ft of 'clean water' above the PCE plume, separating it from residences. The 'clean water' lens produces a diffusion barrier which prevents vapor intrusion. The 'clean water' lens produces a diffusion barrier which prevents vapor intrusion, see **Figure 8** for the groundwater plume cross section schematic.

***Future Site Workers***

Future site workers could be exposed to COCs in soils if the Site is disturbed or redeveloped in the future. The future commercial/industrial facility workers continue to be at risk from ingestion of and dermal contact with groundwater as a drinking water source. There are no plans to redevelop the site at this time and the required Institutional Controls to prevent disturbance of the landfill caps and use of Site groundwater are in the process of being finalized and implemented.

## Changes in Toxicity Data

As stated above, no changes to the regulatory standards have been made to PCE or TCE since the 2006 ROD. However, EPA has proposed a draft TCE cancer slope factor of 0.05 per mg/kg/day in its October 2009 document "Toxicological Review of Trichloroethylene (CAS No. 79-01-6), In Support of Summary Information on the Integrated Risk Information System (IRIS)." This draft value is currently under external review, and is about an order of magnitude lower (less conservative) than the value (0.4 per mg/kg/day) that was used in the RI risk assessment. The value used in the RI risk assessment was from the Oak Ridge Risk Assessment Information System (RAIS) which was the only available source for a TCE cancer slope factor at the time. Because there is no current exposure to groundwater, the proposed change to the cancer slope does not alter the current protectiveness of the remedy for groundwater. There could be trespasser exposure to minimal COC concentrations in sediment and surface water but the adoption of this less conservative draft value for TCE will not change the protectiveness of the remedy

because it is already currently protective of trespassers. However, if the less conservative cancer slope factor is adopted by EPA, the risk assessment will be revisited to evaluate whether any changes are warranted.

### Changes in Risk Assessment Methods

The risk characterizations conducted in 2006 were reviewed to evaluate whether changes in risk assessment practices have been made since the 2006 ROD was signed, which may affect the protectiveness of the cleanup remedy. No significant changes in risk assessment methods have occurred.

## QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?

No.

With a few exceptions as described above, a downward trend in concentrations of ROD targeted contaminants has been observed over the past few years indicating that the source control remedy continues to function as intended. It is too early to assess long term trends in the groundwater contaminant concentrations. The remedy is protective, and no other information has been discovered that would call into question the protectiveness of the remedy at this time.

## VIII. ISSUES

The following issues have been identified during this five-year review:

1. Implementation of Institutional Controls: The remedy includes institutional controls in the form of an ELUR to prevent the disturbance of the remedy components and to restrict the use of contaminated groundwater for drinking water purposes until restoration to drinking water standards is achieved. Implementation of institutional controls to protect integrity of the landfill caps is also required. An ICP was prepared by the PRP Group and submitted to USEPA on December 31, 2009. The ICP has been approved by USEPA and the PRP Group will complete the implementation process.

2. Restriction of Unauthorized Motor Vehicles: At the time of the April 2010 Site inspection, all-terrain vehicle access was evident on the Site and needs to be restricted.

Table 4, Recommendations and Follow-Up Actions in Section IX below summarizes these issues and indicates if they affect current and/or future protectiveness.

## IX. RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Recommendations and follow-up actions for the Site are summarized in **Table 4** below.

**TABLE 4: RECOMMENDATIONS AND FOLLOW-UP ACTIONS**

| Issue | Recommendations / Follow-up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness | |
|---|---|---|---|---|---|---|
| | | | | | Current | Future |
| Implementation of Institutional Controls | Implementation of Institutional Controls to protect integrity of the landfill caps and to prevent future groundwater use at the town's property | Towns of South Kingstown and Narragansett | USEPA, RIDEM | 9/30/2011 | No | Yes |
| | Implementation of Institutional Controls to protect integrity of the landfill caps and to prevent future groundwater use at URI's property | URI | USEPA, RIDEM | 12/31/2011 | No | Yes |
| | Implementation of Institutional Controls to prevent future groundwater use at identified off-site properties | Towns of South Kingstown and Narragansett and URI | USEPA, RIDEM | 12/31/2012 | No | Yes |
| Restriction of Unauthorized Motor Vehicles | Post signage to restrict motorized access to authorized vehicles only and evaluate effectiveness of this warning signage | URI | USEPA, RIDEM | 12/31/2010 | No | Yes |

## X. PROTECTIVENESS STATEMENT

The remedy at the Site currently protects human health and the environment because the remedial actions performed to date have been in accordance with the requirements of the 2006 ROD and the remedy is functioning as designed. The landfill closure is also functioning as designed. However, in order for the remedy to be protective in the long term, the required institutional controls must be put in place to ensure long-term protectiveness.

## XI. NEXT REVIEW

The next Five-Year Review for the WK/URI Superfund Site will be due five years from the signature date of this review. The next Five-Year Review will include a review of the issues described herein along with a complete review of analytical data associated with the Site to assess whether the remedy as implemented remains protective of human health and the environment.

# FIGURES


N
SHRUB WETLAND
HUNDRED ACRE POND
CONRAIL
ACCESS ROAD
SAINT ROAD
URI DISPOSAL AREA
URI POND
WEST KINGSTON TOWN DUMP
TIBBITS POND
ACCESS ROAD
APPROXIMATE LOCATION OF FORMER DRUM STORAGE AREA
LEGEND
CLOSED LANDFILL AREA
0 250 500
APPROXIMATE SCALE IN FEET
55 CEDAR STREET, SUITE 100
PROVIDENCE, RHODE ISLAND 02903
WOODARD & CURRAN
COMMITMENT & INTEGRITY DRIVE RESULTS
SITE PLAN
DESIGNED BY: MAA
DRAWN BY: EVR
CHECKED BY: KK
Figure 1.dwg
WK/URI SUPERFUND SITE
SOUTH KINGSTOWN, RHODE ISLAND
FIRST FIVE-YEAR REVIEW REPORT
JOB NO: 219293
DATE: JUNE 2010
SCALE: AS NOTED
FIGURE 1


WOODARD & CURRAN
COMMITMENT & INTEGRITY DRIVE RESULTS
85 CEDAR STREET, SUITE 100
PROVIDENCE, RHODE ISLAND 02903
800.903.7697 | www.woodardcurran.com

# TREATMENT AND MONITORING ZONE

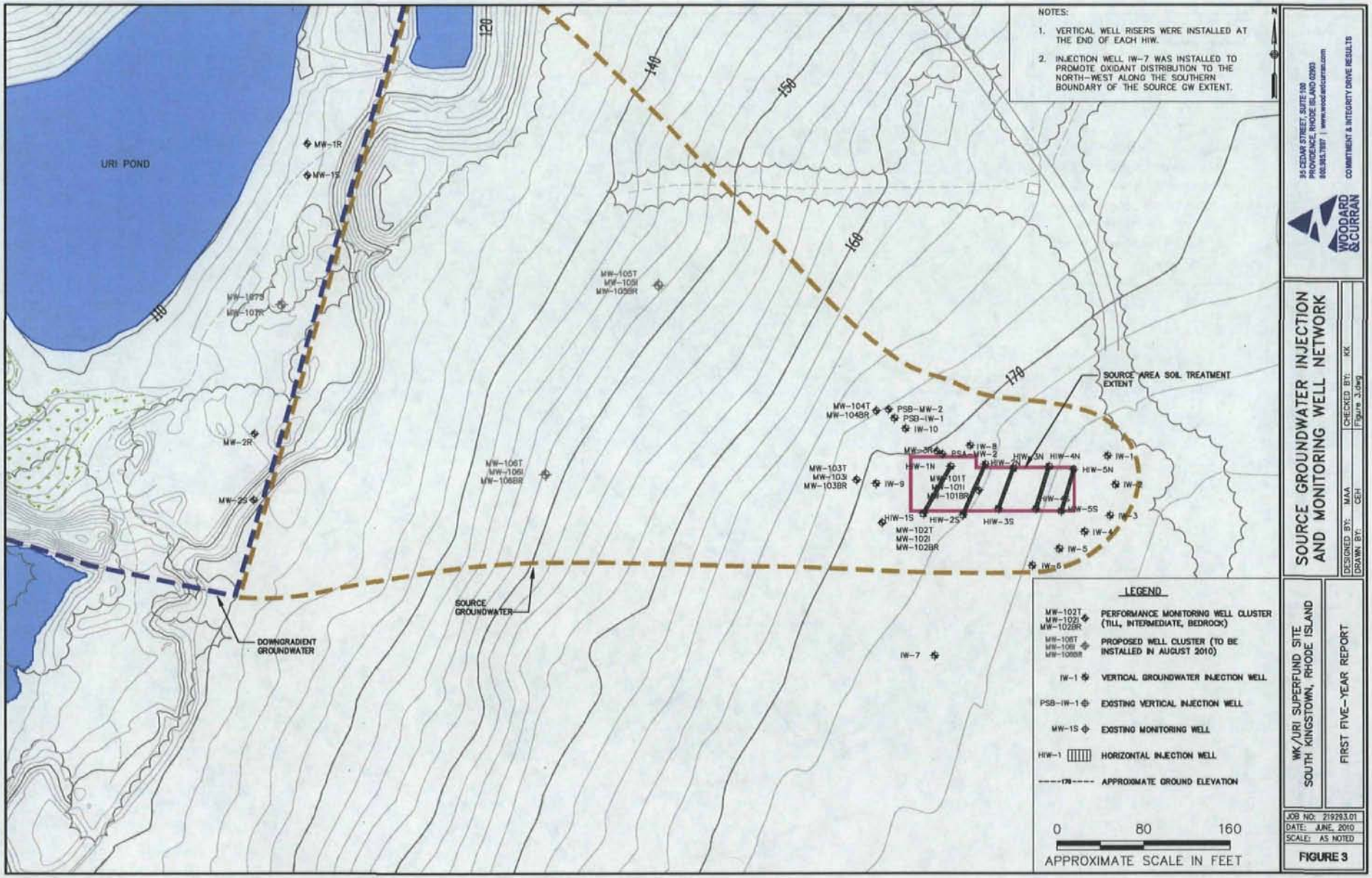
DESIGNED BY: MAA
DRAWN BY: EVR
CHECKED BY: KK
Figure 2.dwg

WK/URI SUPERFUND SITE
SOUTH KINGSTOWN, RHODE ISLAND

FIRST FIVE-YEAR REVIEW REPORT

JOB NO: 219293
DATE: JUNE 2010
SCALE: AS NOTED

**FIGURE 2**

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PROVIDENCE, RHODE ISLAND 02903
800.983.7697 | www.woodardcurran.com

# SOURCE GROUNDWATER INJECTION AND MONITORING WELL NETWORK

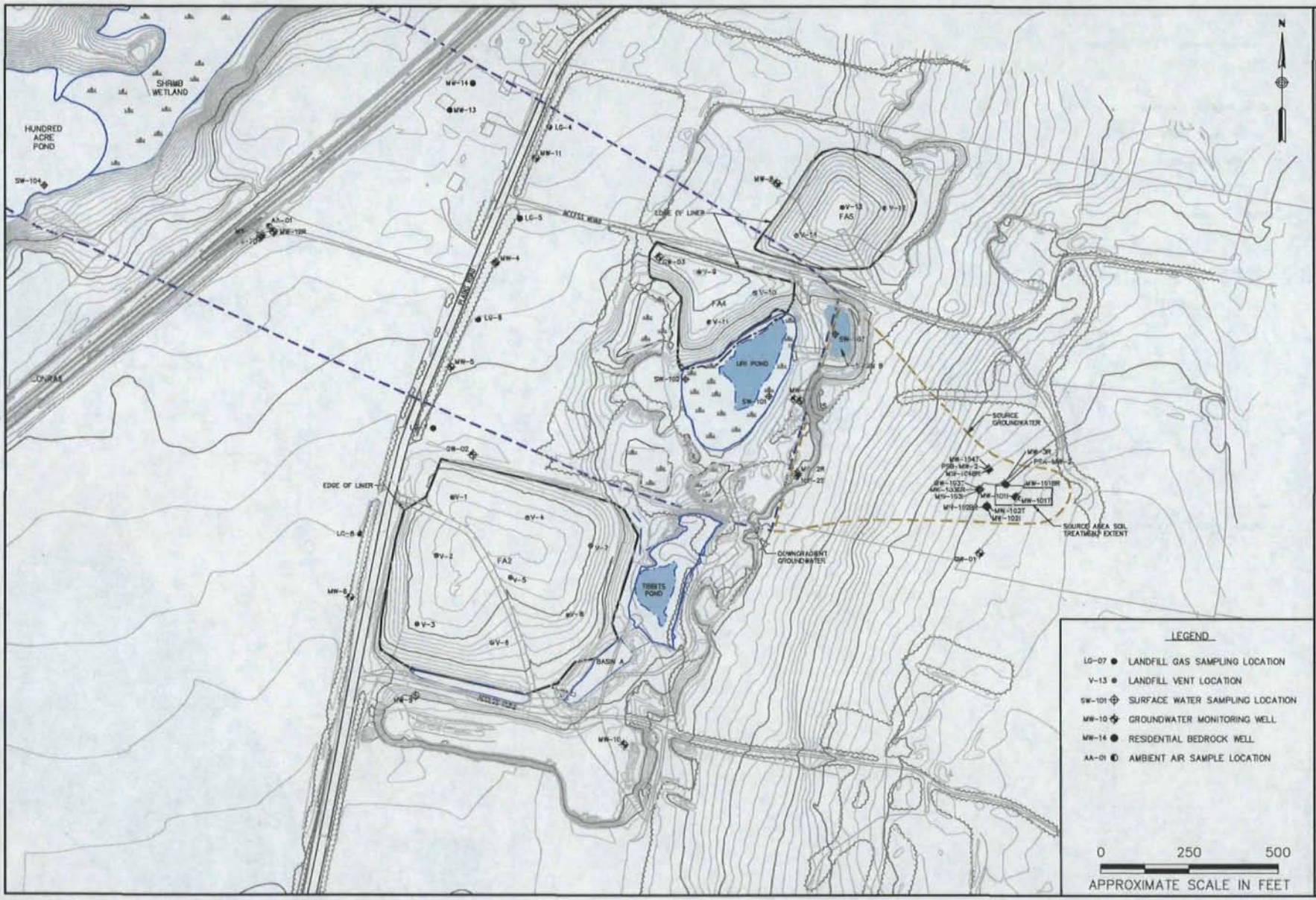
DESIGNED BY: MAA
DRAWN BY: CEH
CHECKED BY: KK
Figure 3.dwg

WK/URI SUPERFUND SITE
SOUTH KINGSTOWN, RHODE ISLAND

FIRST FIVE-YEAR REPORT

JOB NO: 21929.01
DATE: JUNE, 2010
SCALE: AS NOTED

**FIGURE 3**





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COMMITMENT & INTEGRITY DRIVE RESULTS


# SOURCE AND DOWNGRADIENT MONITORING LOCATIONS

| | |
|---|---|
| DESIGNED BY: | MAA |
| DRAWN BY: | EVR |
| CHECKED BY: | KK |
| | Figure 4.dwg |

WK/URI SUPERFUND SITE
SOUTH KINGSTOWN, RHODE ISLAND

FIRST FIVE-YEAR REVIEW REPORT

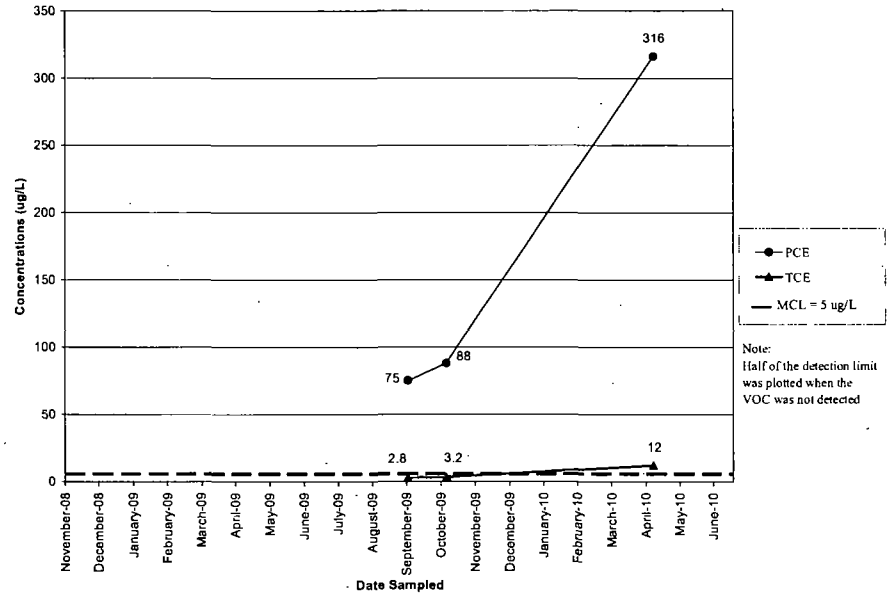
| | |
|---|---|
| JOB NO: | 219293 |
| DATE: | DECEMBER 2009 |
| SCALE: | AS NOTED |

**FIGURE 4**

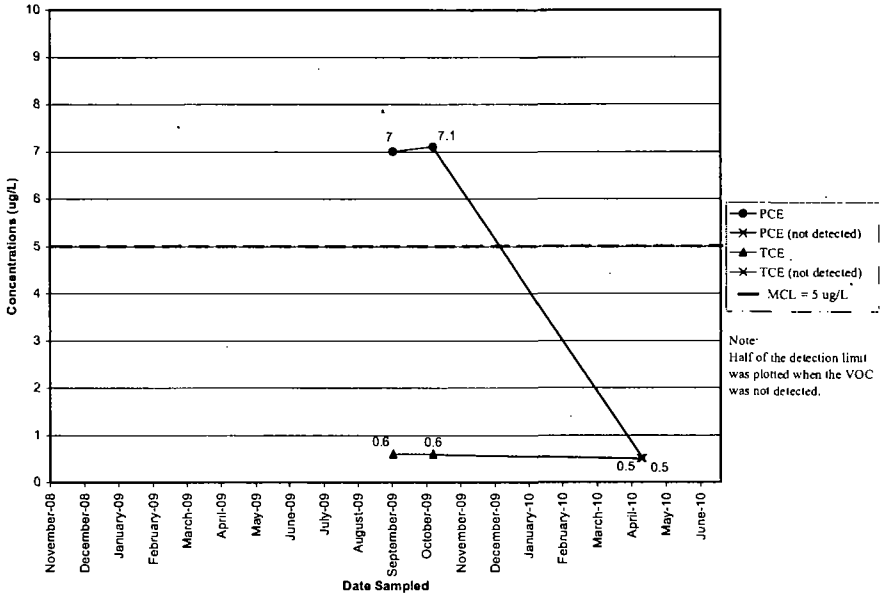
**Figure 5: PCE and TCE Trends in Groundwater**

# SOURCE GROUNDWATER WELLS

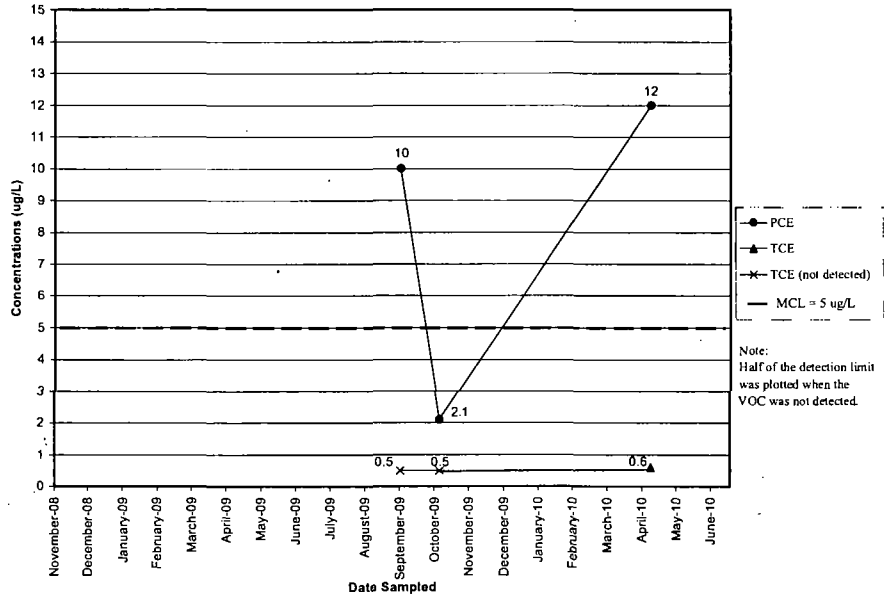
## MW-101T



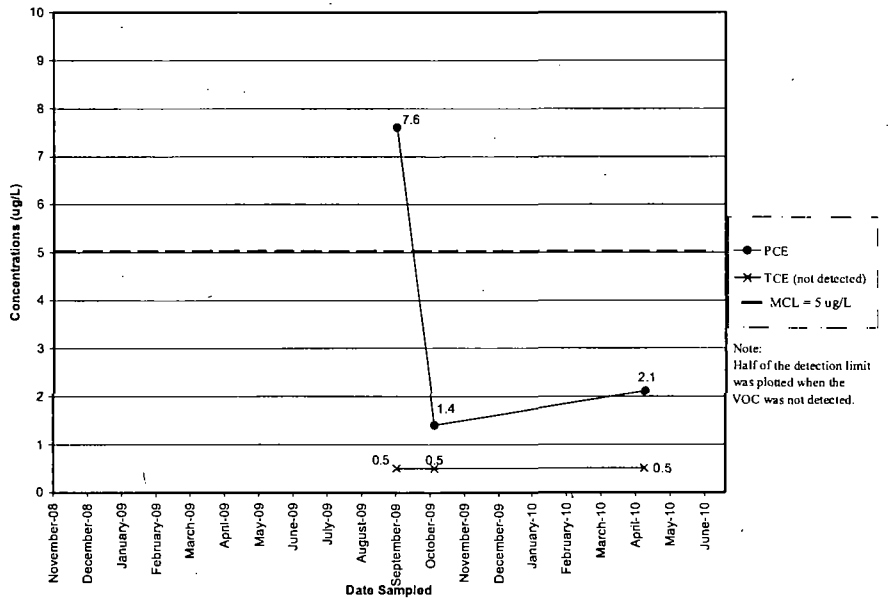

## MW-102T



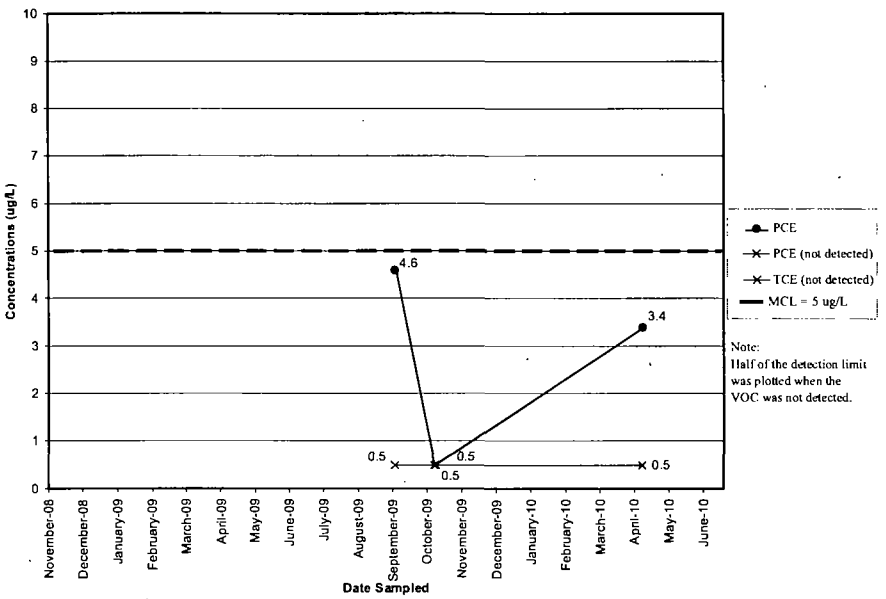

## MW-103T




## MW-104T



## MW-101I

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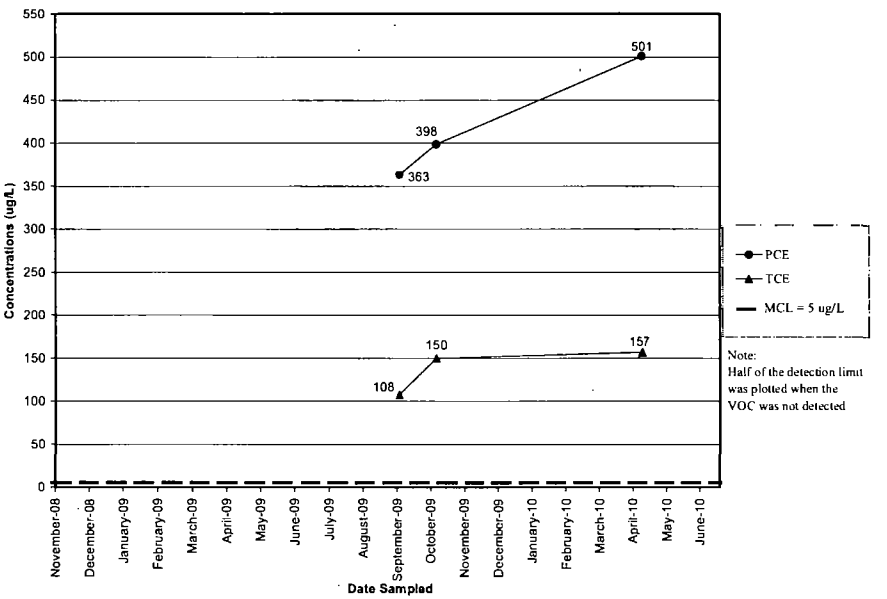
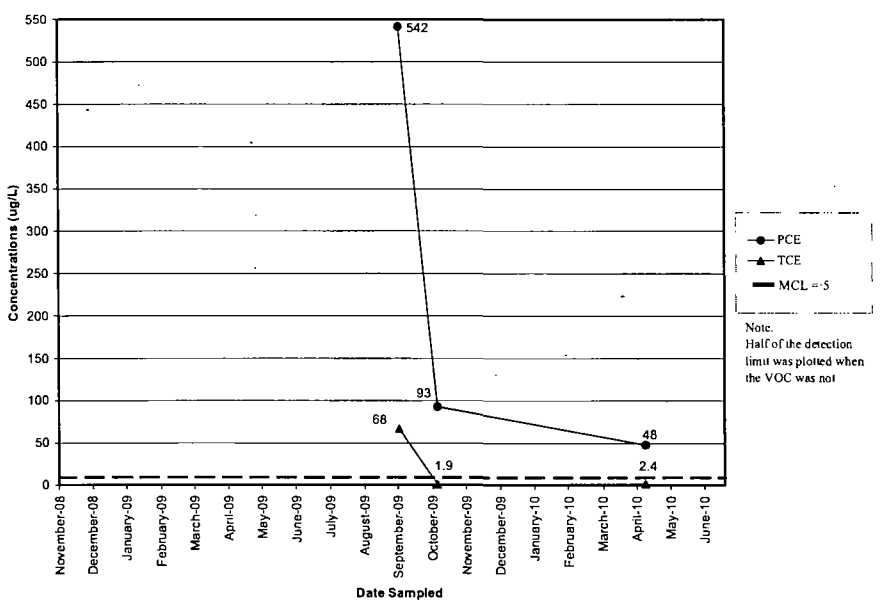
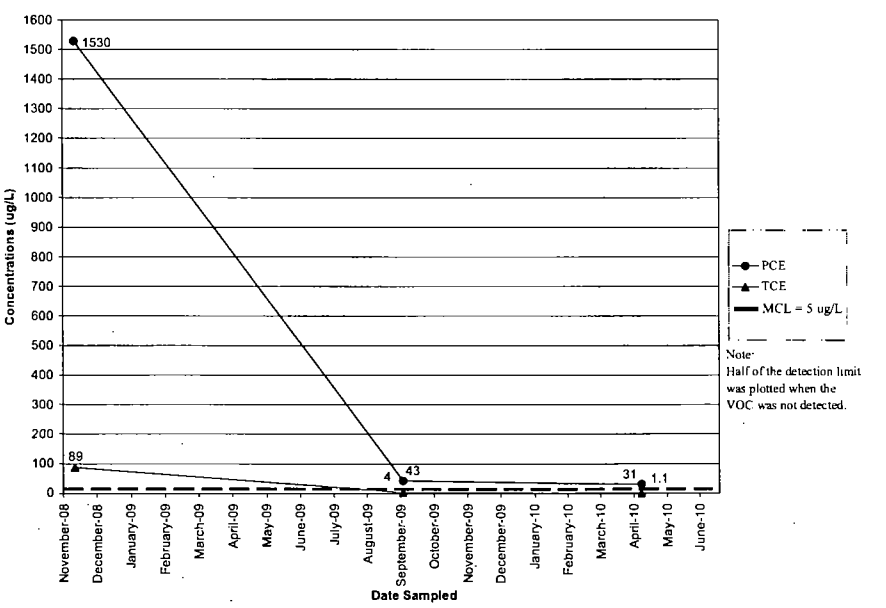



## MW-103I




## PSA-MW-2



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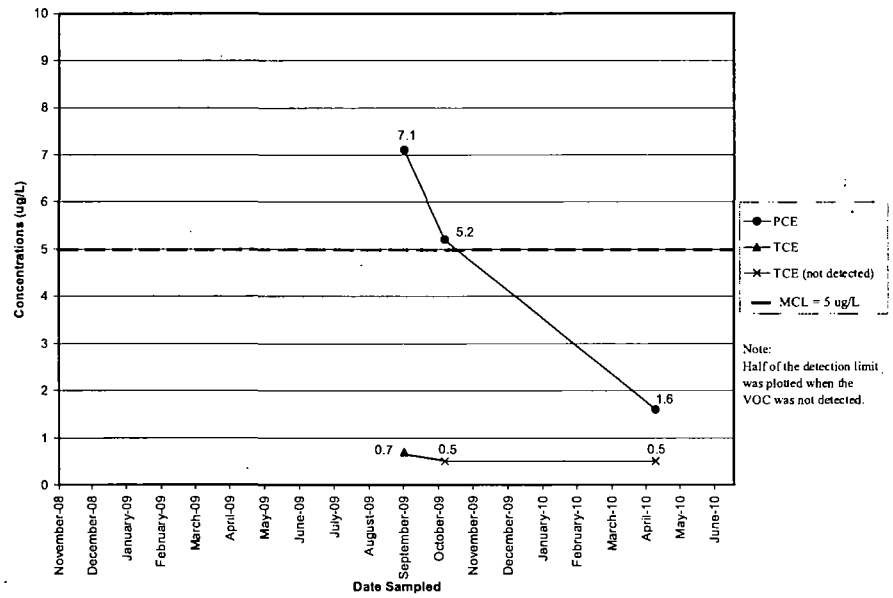
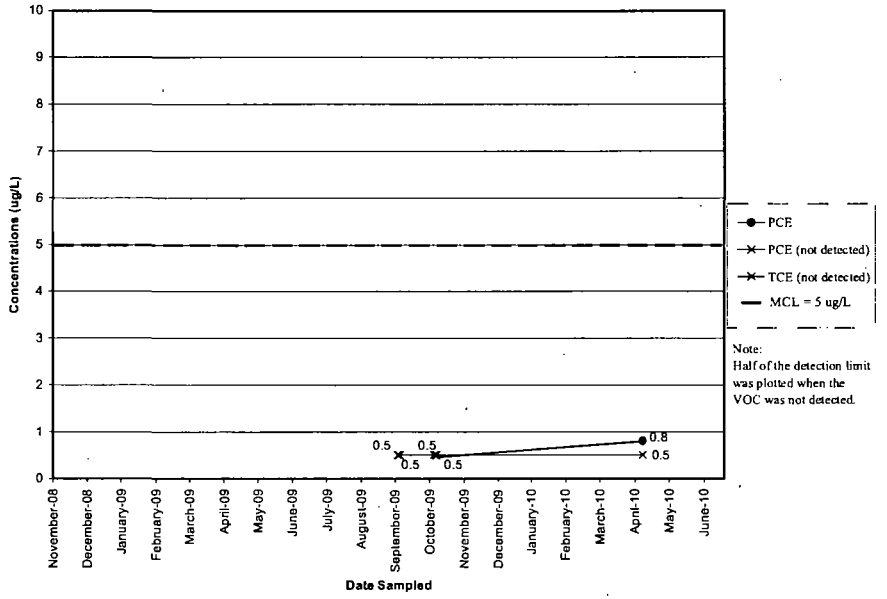
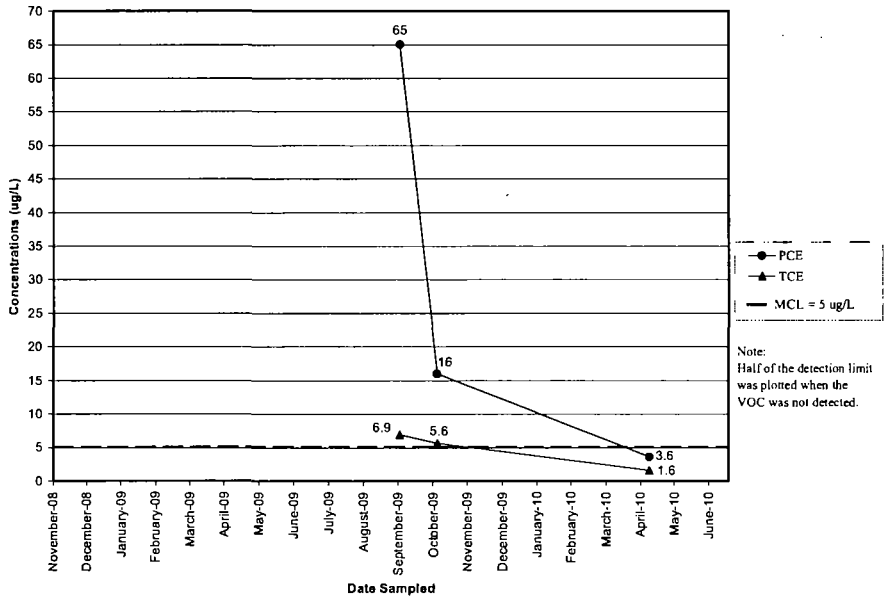



## MW-101BR




## MW-102BR

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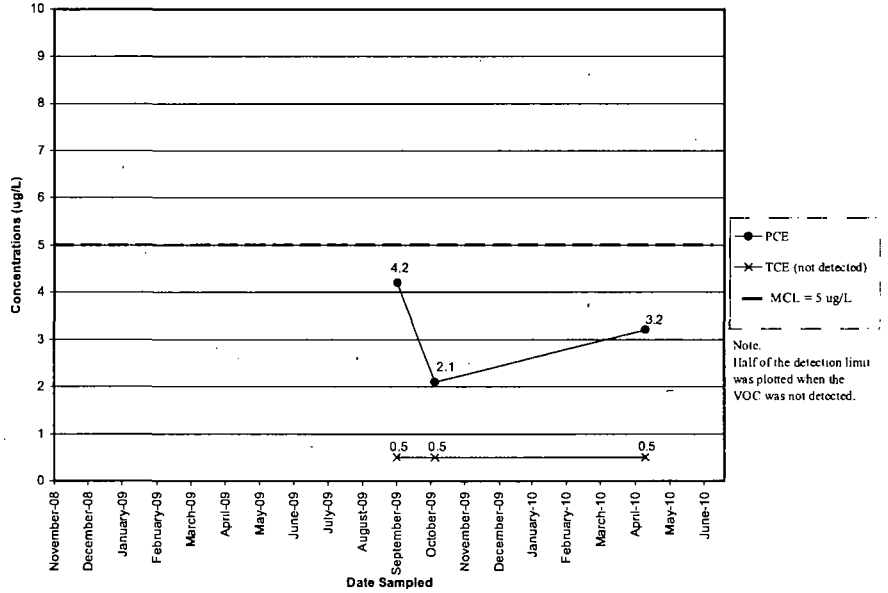
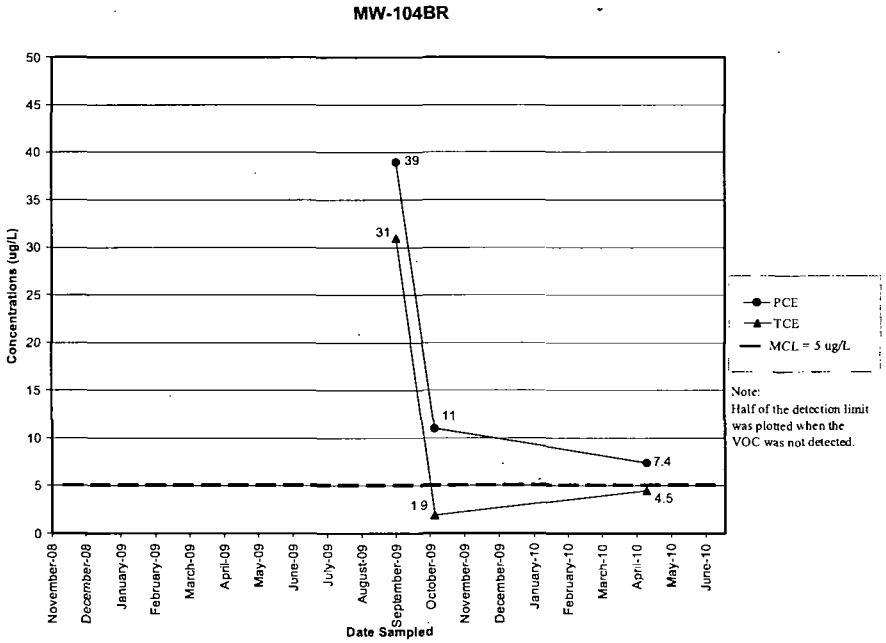
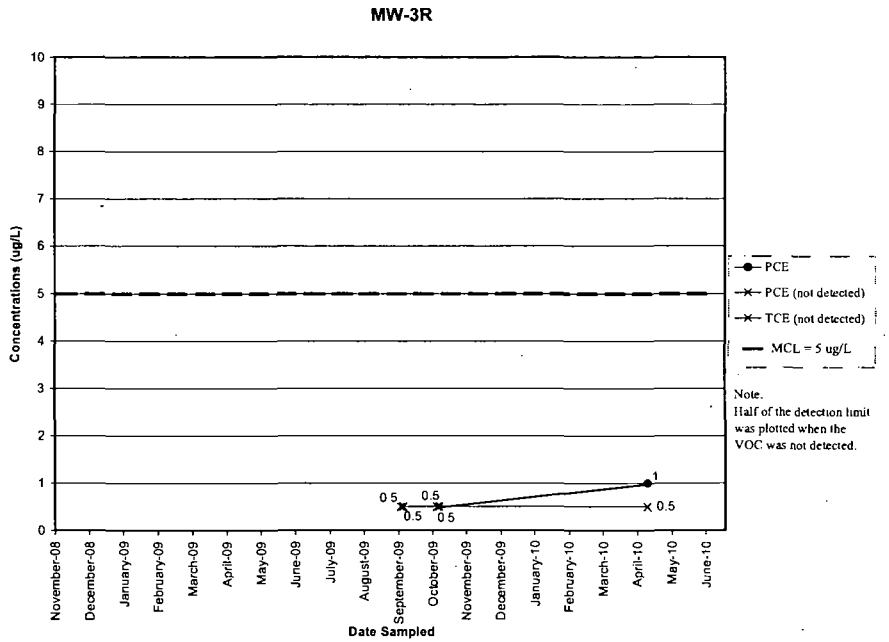
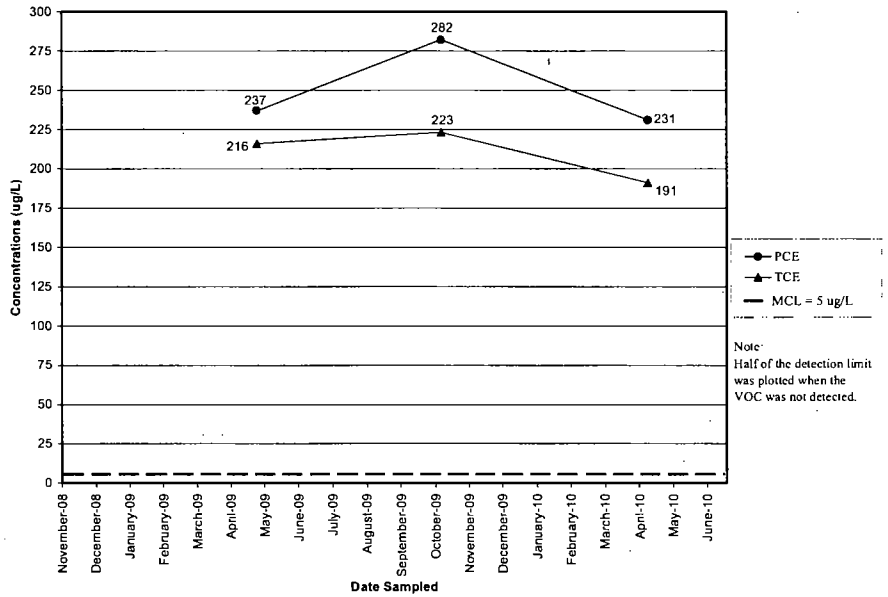



MW-104BR
Concentrations (ug/L)
50
45
40
35
30
25
20
15
10
5
0
39
31
11
7.4
1.9
4.5
November-08
December-08
January-09
February-09
March-09
April-09
May-09
June-09
July-09
August-09
September-09
October-09
November-09
December-09
January-10
February-10
March-10
April-10
May-10
June-10
Date Sampled
PCE
TCE
MCL = 5 ug/L
Note:
Half of the detection limit was plotted when the VOC was not detected.

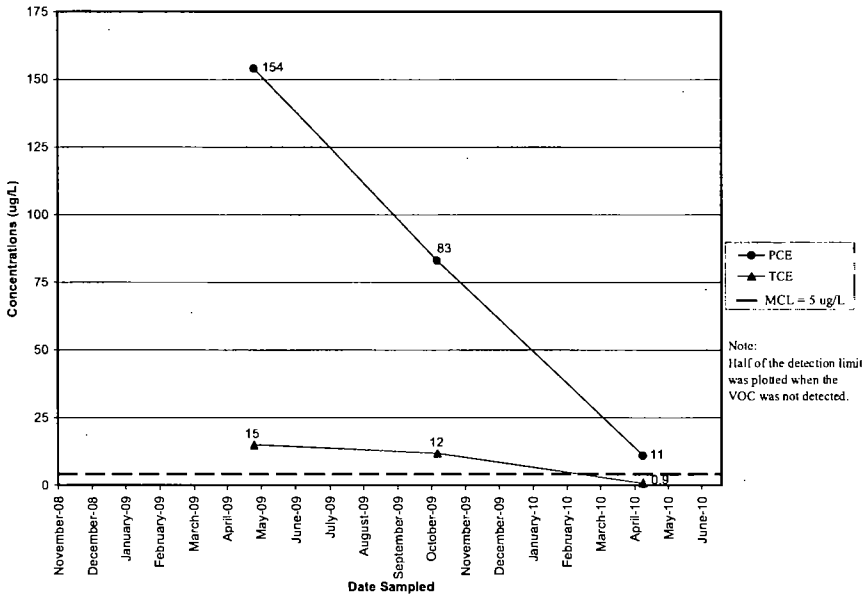

MW-3R
Concentrations (ug/L)
10
9
8
7
6
5
4
3
2
1
0
0.5
0.5
0.5
0.5
1
0.5
November-08
December-08
January-09
February-09
March-09
April-09
May-09
June-09
July-09
August-09
September-09
October-09
November-09
December-09
January-10
February-10
March-10
April-10
May-10
June-10
Date Sampled
PCE
PCE (not detected)
TCE (not detected)
MCL = 5 ug/L
Note.
Half of the detection limit was plotted when the VOC was not detected.

# DOWNGRADIENT GROUNDWATER WELLS

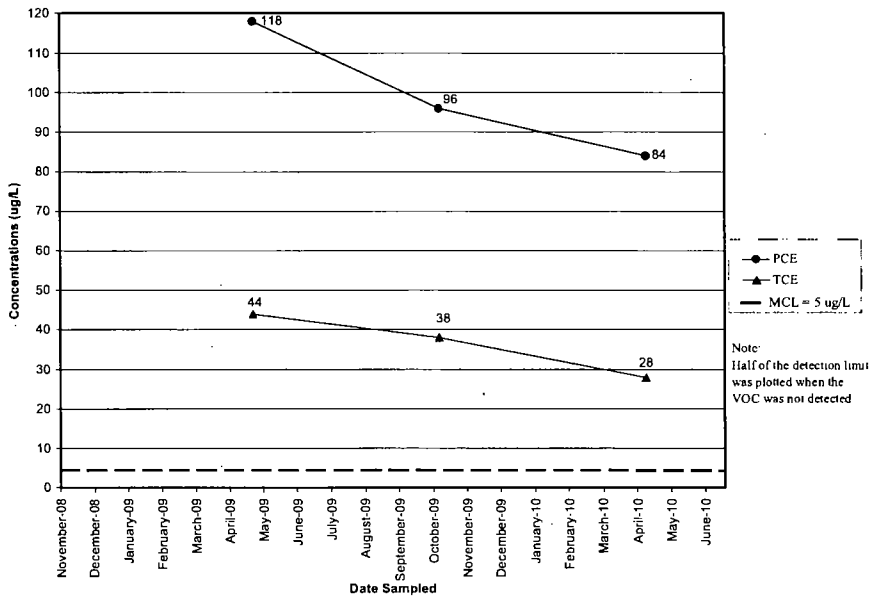
## MW-1R



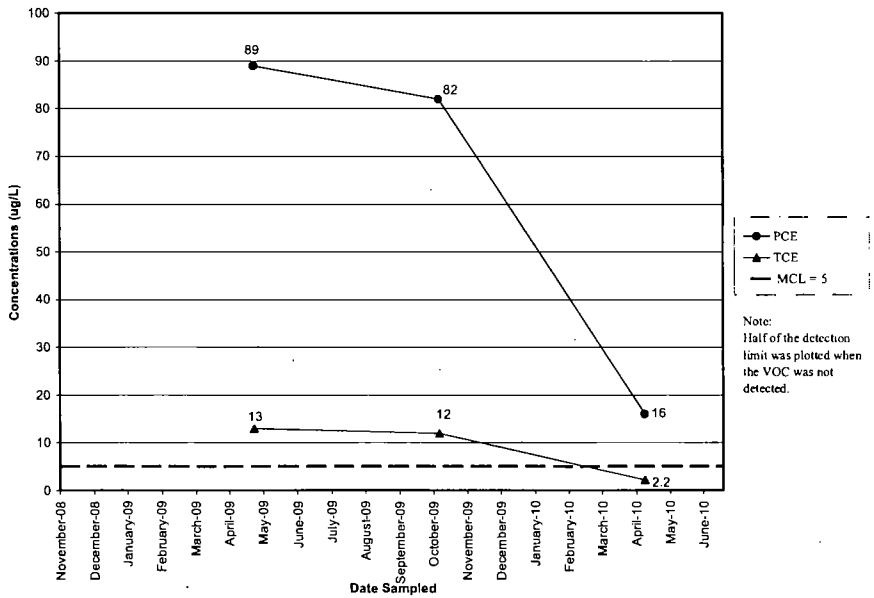

## MW-1S



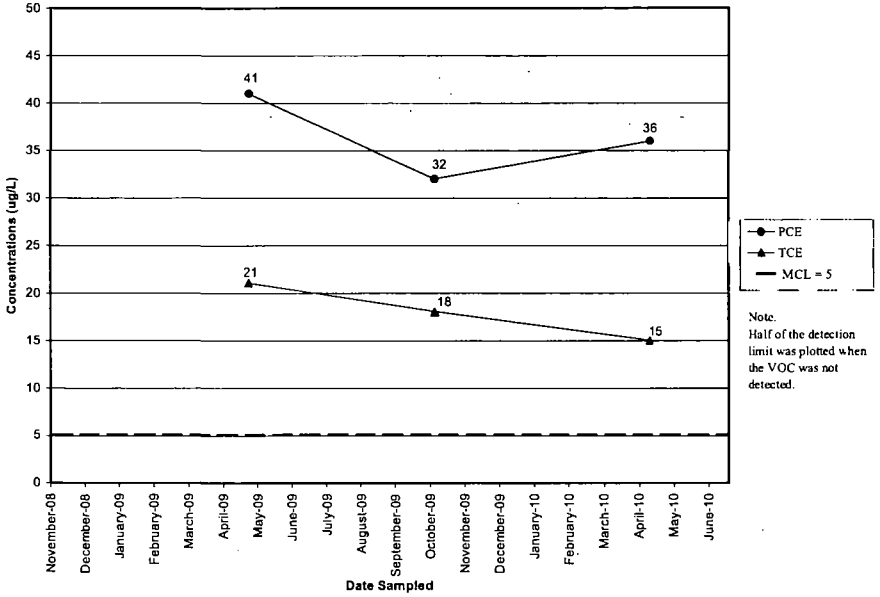

## MW-2R



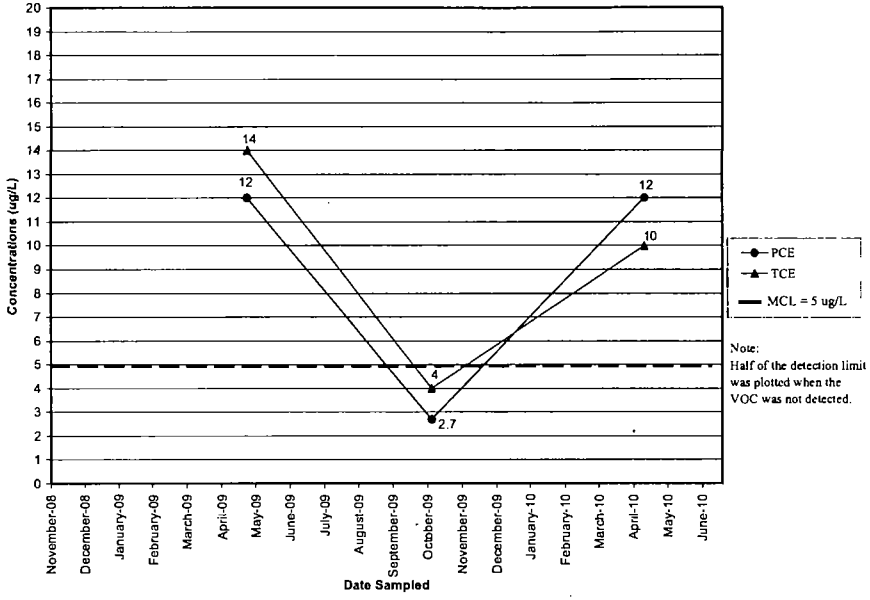

## MW-2S



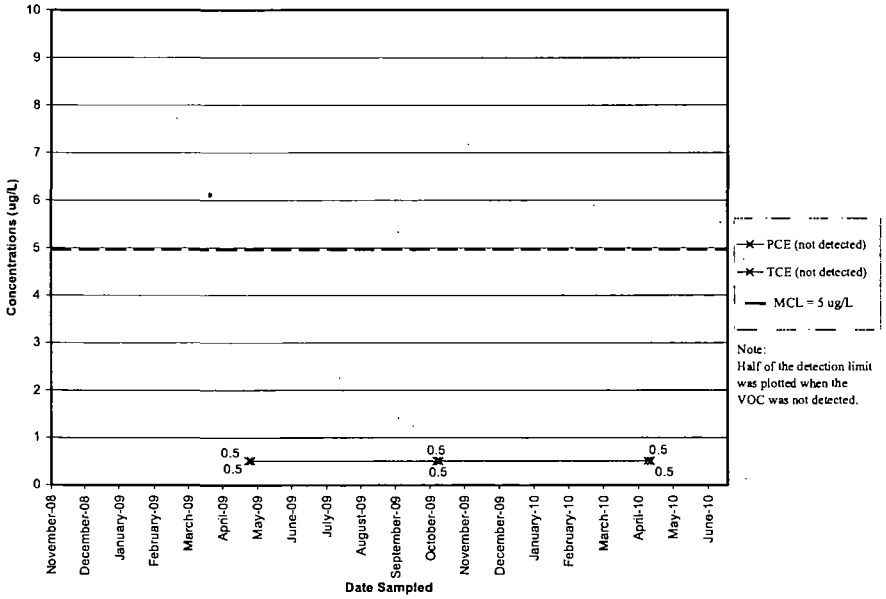
## MW-4



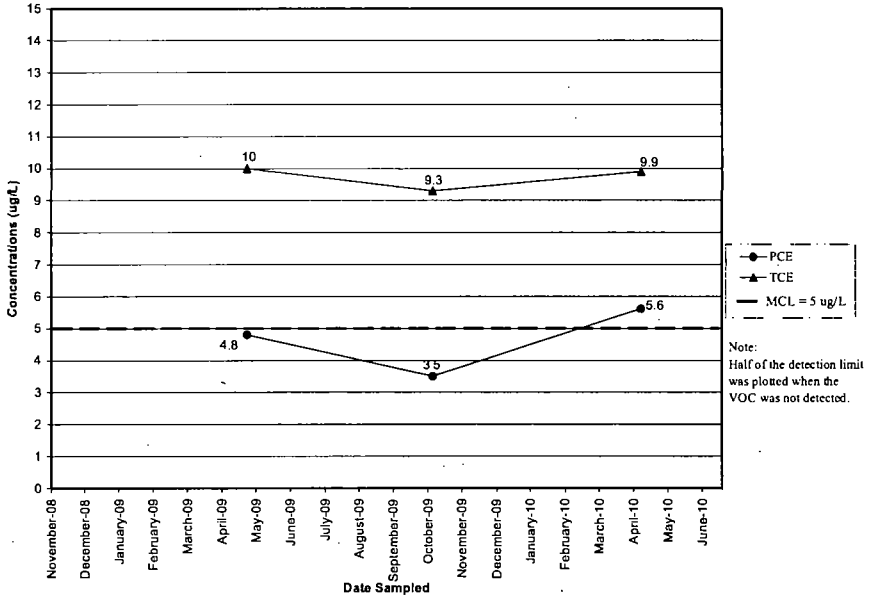

## MW-5



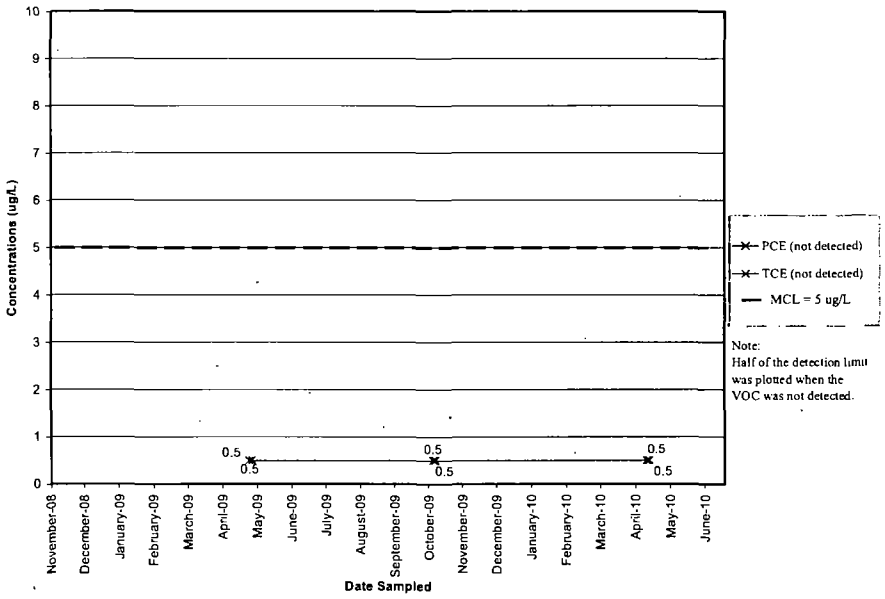

## MW-6



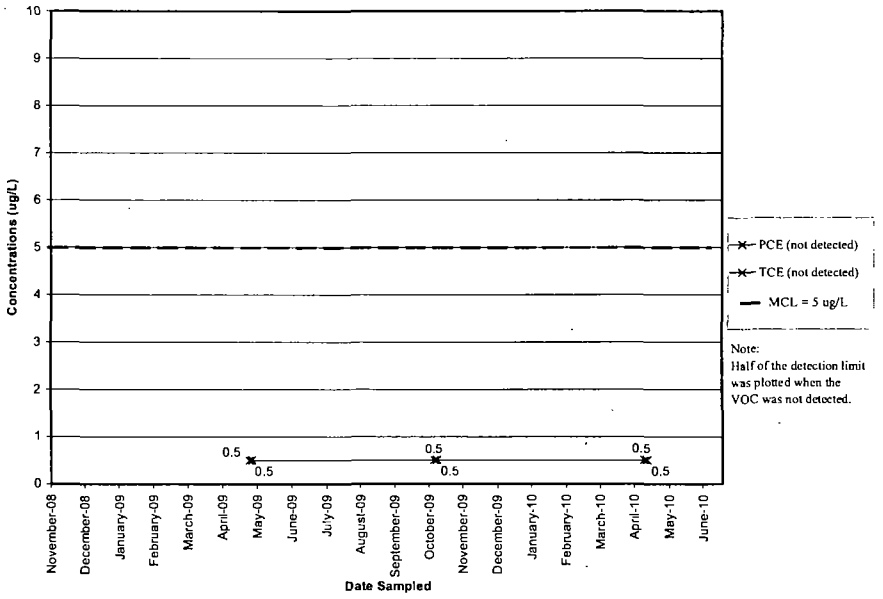

## MW-7S



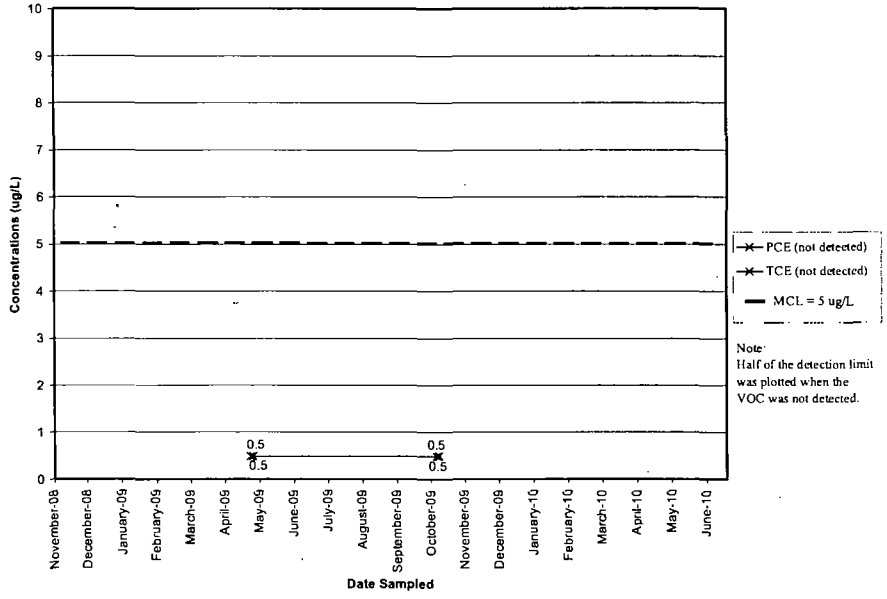
## MW-8



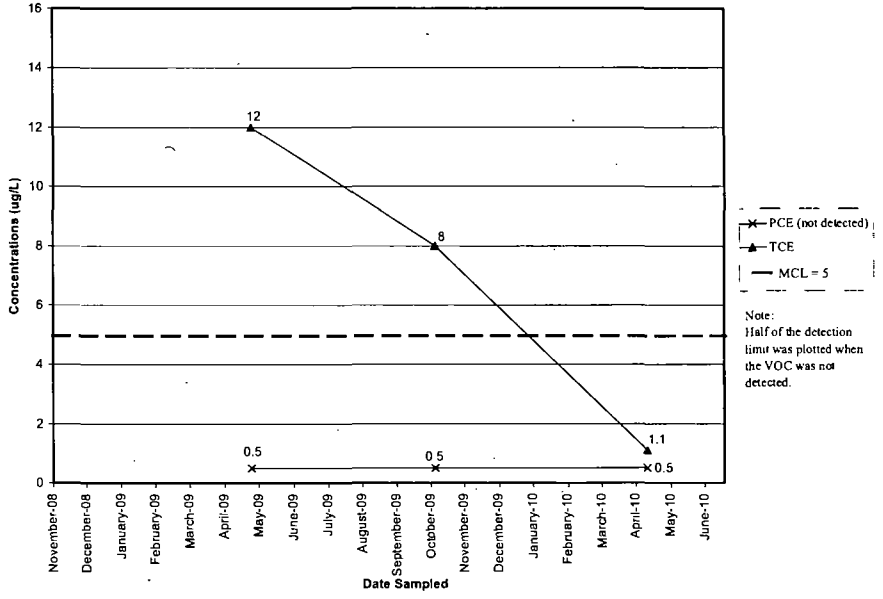

## MW-9




## MW-10




## MW-11



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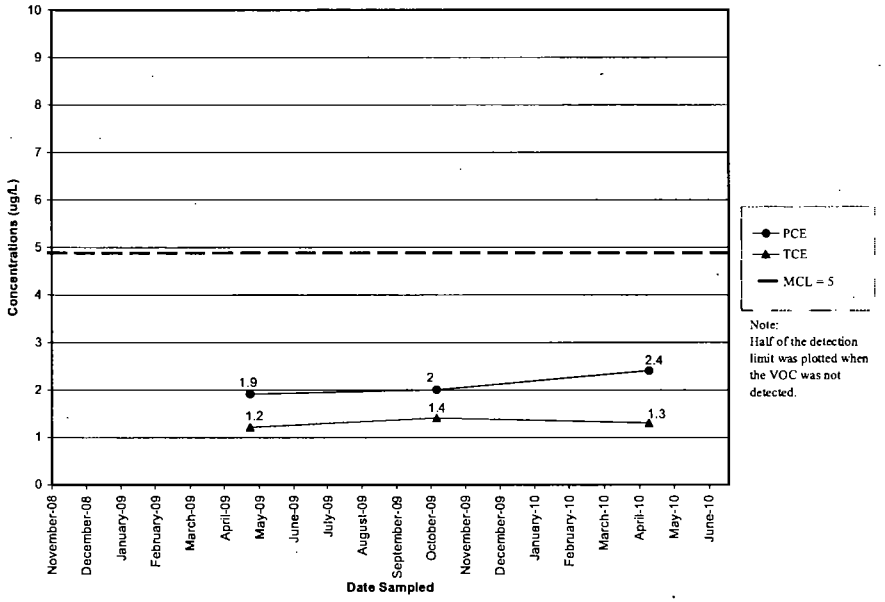
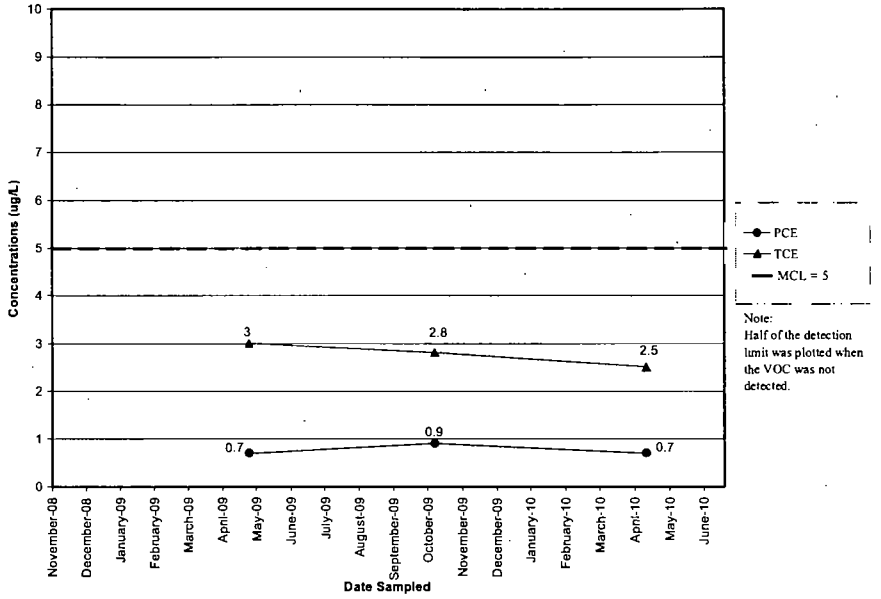
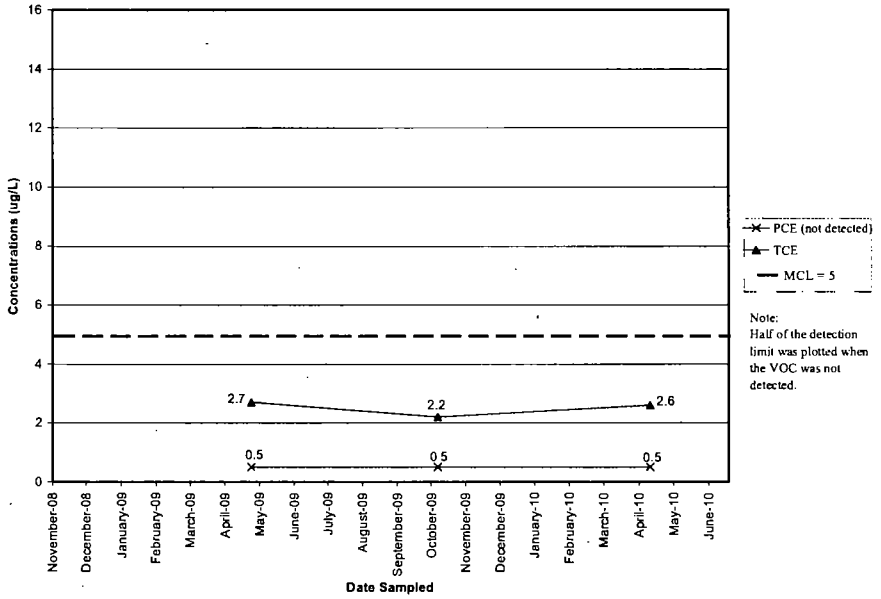


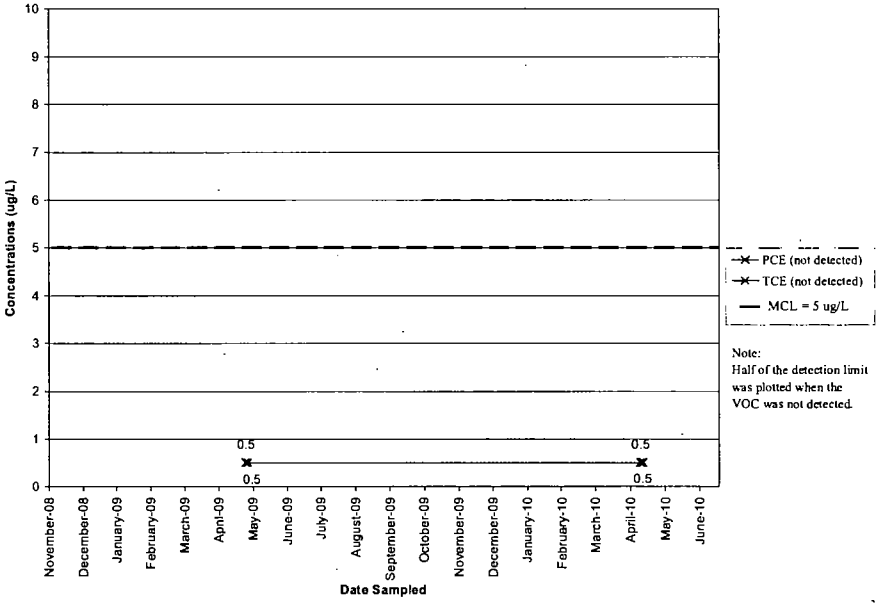

## MW-13

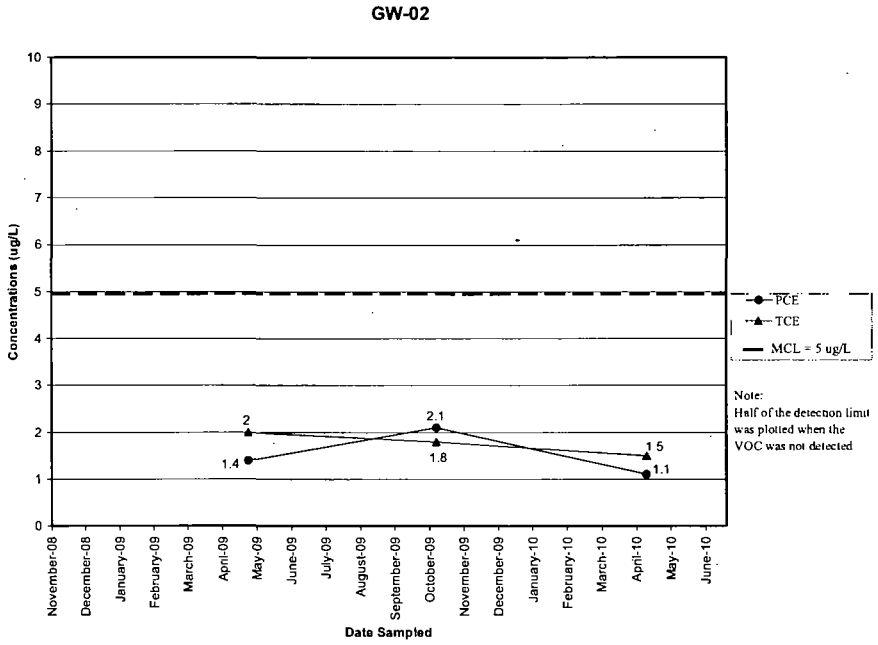


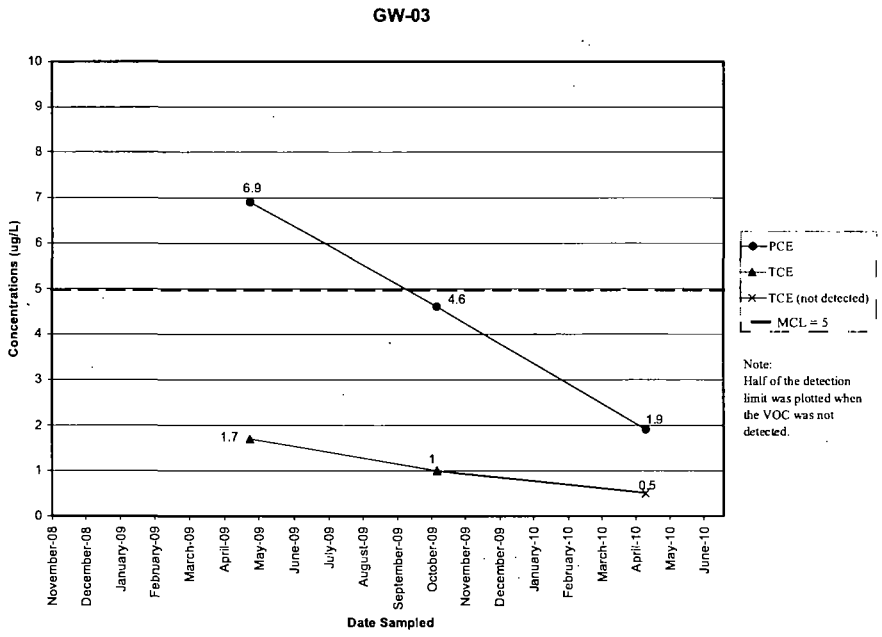

## MW-14




## GW-01

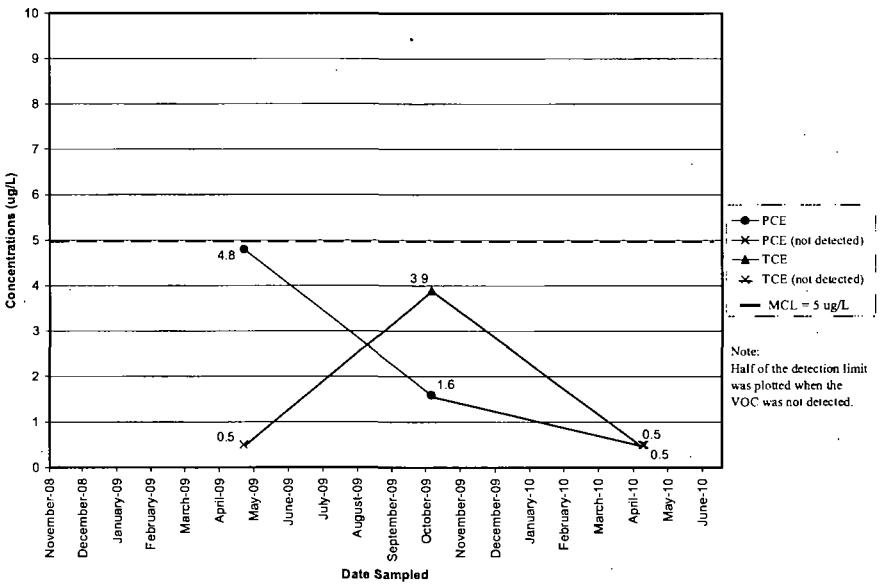



GW-02
Concentrations (ug/L)
Date Sampled
PCE
TCE
MCL = 5 ug/L
Note:
Half of the detection limit was plotted when the VOC was not detected
2
2.1
1.4
1.8
1.5
1.1

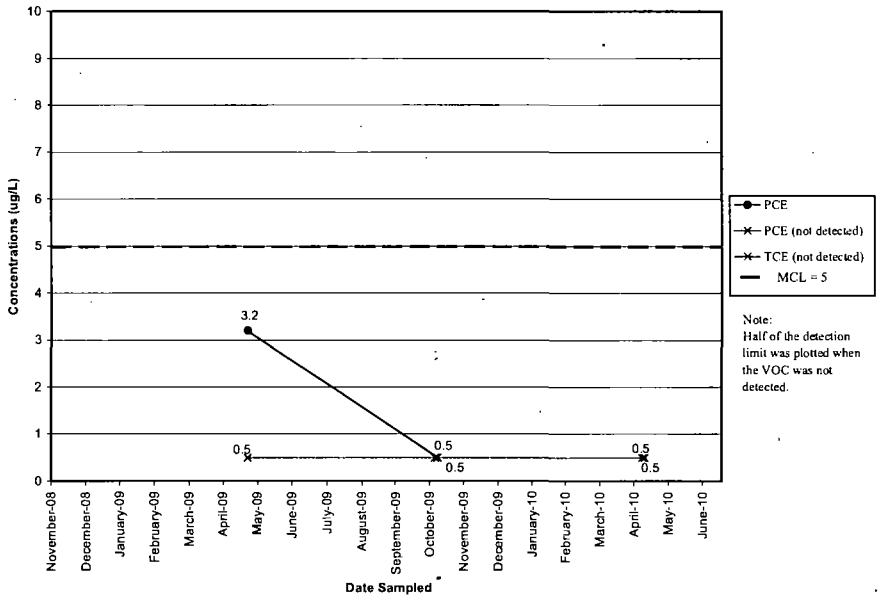

GW-03
Concentrations (ug/L)
Date Sampled
PCE
TCE
TCE (not detected)
MCL = 5
Note:
Half of the detection limit was plotted when the VOC was not detected.
6.9
4.6
1.9
1.7
1
0.5

# SURFACE WATER

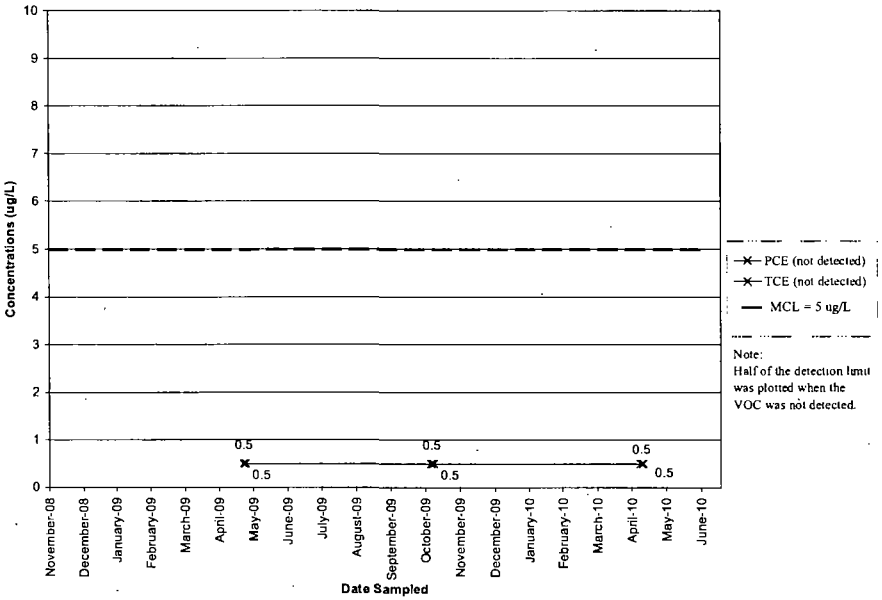
## SW-101



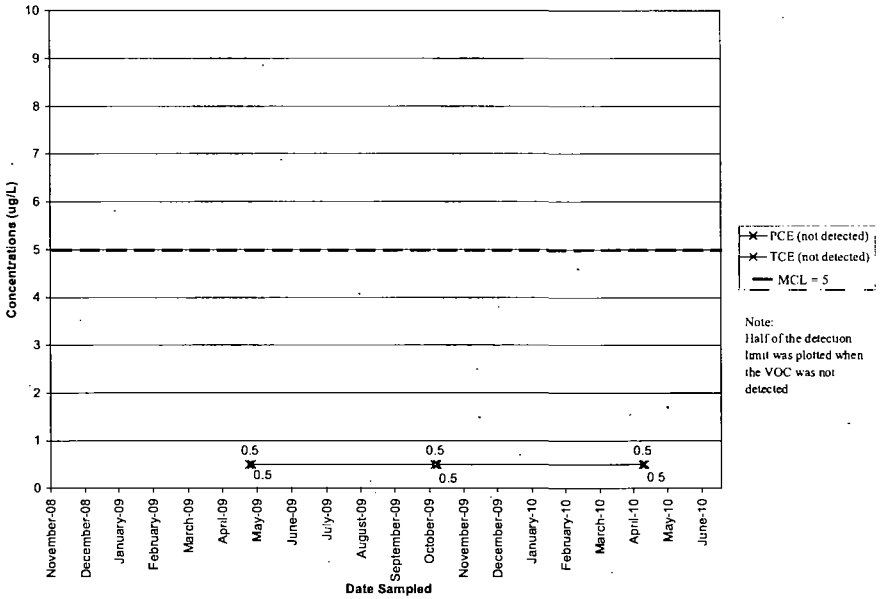

## SW-102

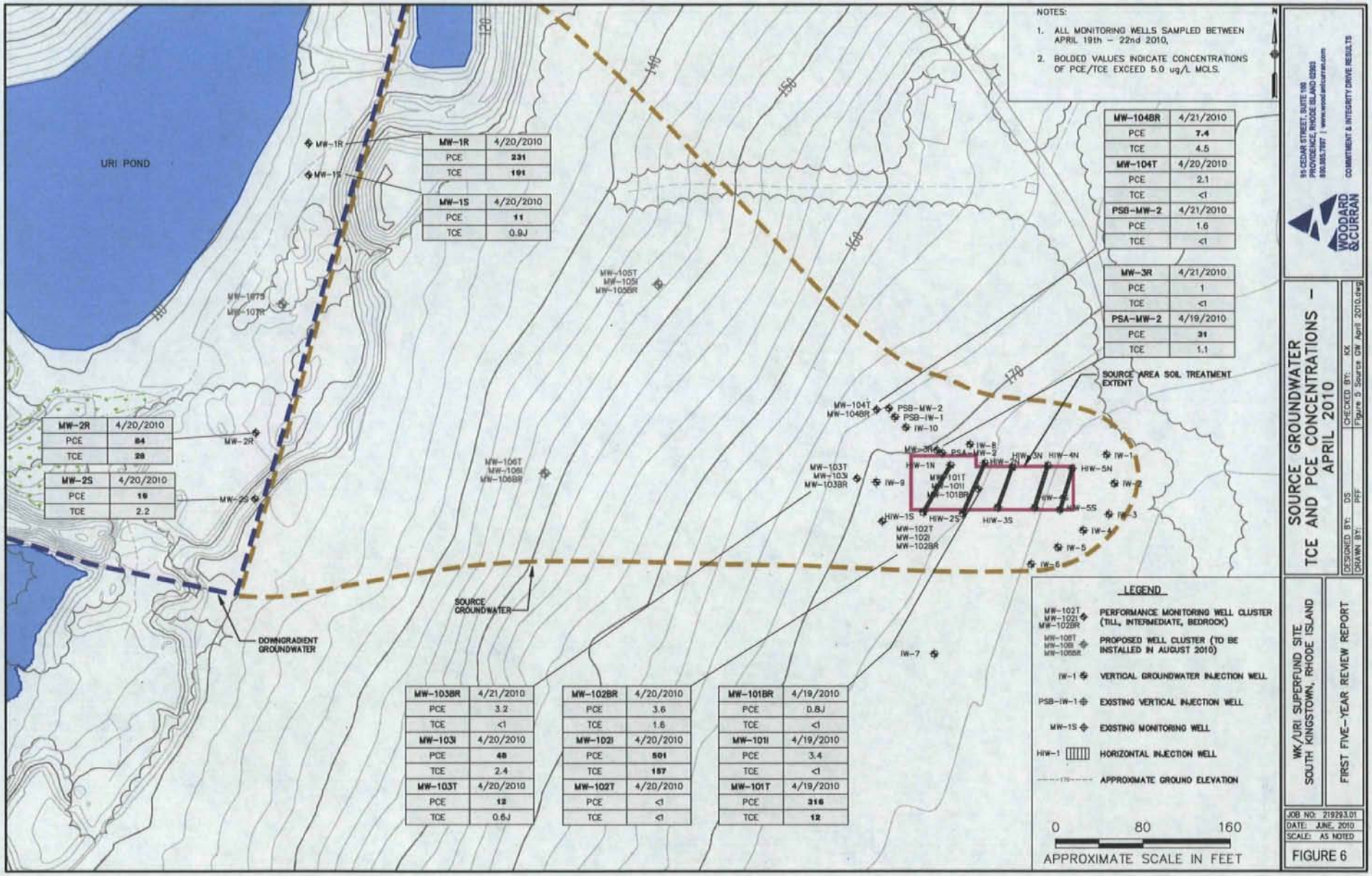



## SW-103




## SW-104




NOTES:
1. ALL MONITORING WELLS SAMPLED BETWEEN APRIL 19th – 22nd 2010,
2. BOLDED VALUES INDICATE CONCENTRATIONS OF PCE/TCE EXCEED 5.0 ug/L MCLS.
URI POND
MW-1R
MW-1S
MW-1R | 4/20/2010
PCE | 231
TCE | 191
MW-1S | 4/20/2010
PCE | 11
TCE | 0.9J
MW-107S
MW-107R
MW-105T
MW-105I
MW-105BR
MW-2R
MW-2S
MW-2R | 4/20/2010
PCE | 84
TCE | 28
MW-2S | 4/20/2010
PCE | 16
TCE | 2.2
MW-106T
MW-106I
MW-106BR
MW-104BR | 4/21/2010
PCE | 7.4
TCE | 4.5
MW-104T | 4/20/2010
PCE | 2.1
TCE | <1
PSB-MW-2 | 4/21/2010
PCE | 1.6
TCE | <1
MW-3R | 4/21/2010
PCE | 1
TCE | <1
PSA-MW-2 | 4/19/2010
PCE | 31
TCE | 1.1
SOURCE AREA SOIL TREATMENT EXTENT
MW-104T
MW-104BR
PSB-MW-2
PSB-IW-1
IW-10
MW-3R
PSA-MW-2
IW-8
MW-2
HIW-1N
HIW-2N
HIW-3N
HIW-4N
IW-1
HIW-5N
MW-103T
MW-103I
MW-103BR
IW-9
MW-101T
MW-101I
MW-101BR
IW-2
HIW-1S
HIW-2S
HIW-3S
HIW-5S
IW-3
IW-4
IW-5
IW-6
MW-102T
MW-102I
MW-102BR
SOURCE GROUNDWATER
DOWNGRADIENT GROUNDWATER
IW-7
MW-103BR | 4/21/2010
PCE | 3.2
TCE | <1
MW-103I | 4/20/2010
PCE | 48
TCE | 2.4
MW-103T | 4/20/2010
PCE | 12
TCE | 0.6J
MW-102BR | 4/20/2010
PCE | 3.6
TCE | 1.6
MW-102I | 4/20/2010
PCE | 501
TCE | 157
MW-102T | 4/20/2010
PCE | <1
TCE | <1
MW-101BR | 4/19/2010
PCE | 0.8J
TCE | <1
MW-101I | 4/19/2010
PCE | 3.4
TCE | <1
MW-101T | 4/19/2010
PCE | 316
TCE | 12
LEGEND
PERFORMANCE MONITORING WELL CLUSTER (TILL, INTERMEDIATE, BEDROCK)
PROPOSED WELL CLUSTER (TO BE INSTALLED IN AUGUST 2010)
VERTICAL GROUNDWATER INJECTION WELL
EXISTING VERTICAL INJECTION WELL
EXISTING MONITORING WELL
HORIZONTAL INJECTION WELL
APPROXIMATE GROUND ELEVATION
0 80 160
APPROXIMATE SCALE IN FEET
WOODARD & CURRAN
COMMITMENT & INTEGRITY DRIVE RESULTS
SOURCE GROUNDWATER - TCE AND PCE CONCENTRATIONS - APRIL 2010
DESIGNED BY: DS
DRAWN BY: PFF
CHECKED BY: KK
Figure 5 Source GW April 2010.dwg
WK/URI SUPERFUND SITE
SOUTH KINGSTOWN, RHODE ISLAND
FIRST FIVE-YEAR REVIEW REPORT
JOB NO: 219293.01
DATE: JUNE, 2010
SCALE: AS NOTED
FIGURE 6


SOURCE AND DOWNGRADIENT GROUNDWATER TCE AND PCE CONCENTRATIONS - APRIL 2010

WOODARD & CURRAN
COMMITMENT & INTEGRITY DRIVE RESULTS
33 CEDAR STREET, SUITE 100
PROVIDENCE, RHODE ISLAND 02903
800.983.7897 | www.woodardcurran.com

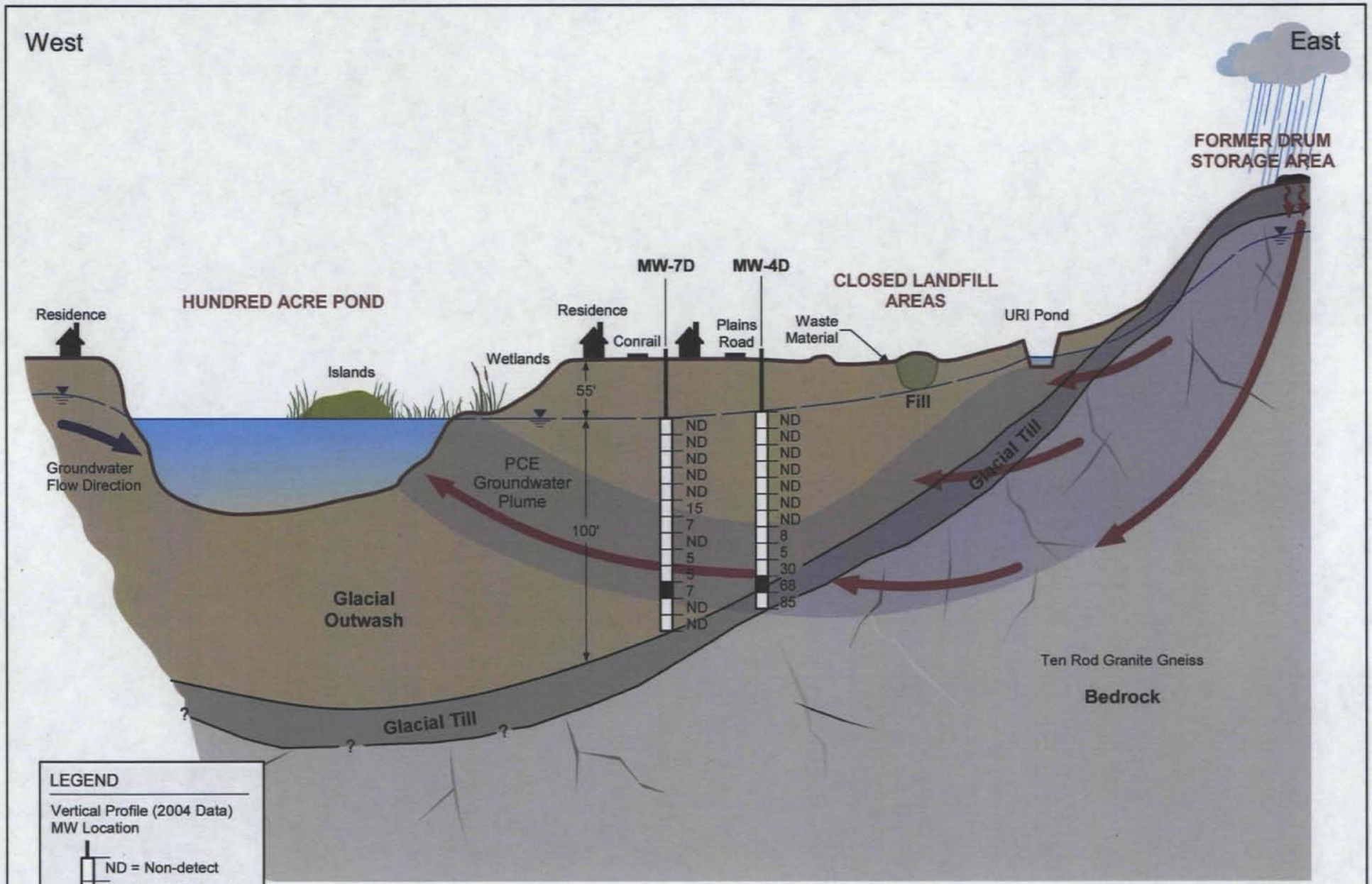
DESIGNED BY: DS | CHECKED BY: KK
DRAWN BY: PFF | Figure 8_DG GW April 2010.dwg

WK/URI SUPERFUND SITE
SOUTH KINGSTOWN, RHODE ISLAND

FIRST FIVE-YEAR REVIEW REPORT

JOB NO: 219293.01
DATE: JUNE, 2010
SCALE: AS NOTED

FIGURE 7




Not to Scale

Figure 8
Groundwater Plume Cross Section Schematic
West Kingston Town Dump/URI Disposal Area Site

WOODARD&CURRAN

219293\gcw\conceptual site model.cvx

# ATTACHMENT 1: DOCUMENT REVIEW LIST/REFERENCES

**KEY DOCUMENTS REVIEWED/REFERENCES CITED**


NUS Corporation, 1990. *Final Listing Site Inspection of the West Kingston Town Dump/URI Disposal Area;* April 27.

RIDEM Office of Air Resources, 2008. *Air Pollution Control Regulation No. 22, Air Toxics*; October 9.

USEPA. 2001. *Comprehensive Five-Year Review Guidance.* June 2001.

USEPA, 2006. *USEPA Superfund Record of Decision, West Kingston Town Dump/URI Disposal Area Superfund Site, South Kingstown, Rhode Island;* September.

USEPA, 2009. *Request for Change in Work Directive, West Kingston Town Dump/URI Disposal Area Superfund Site, South Kingstown, Rhode Island;* April 20.

W&C, 2006. *Remedial Investigation Report, West Kingston/URI Superfund Site, South Kingstown, RI,* April 12, 2006.

W&C, 2006. *Feasibility Study Report, West Kingston/URI Superfund Site, South Kingstown, RI,* June 16, 2006.

W&C, 2007. *Long-Term Monitoring Plan, West Kingston Town Dump/URI Superfund Site, South Kingstown, Rhode Island*; April 20.

W&C, 2007. *Operation and Maintenance Plan, West Kingston Town Dump/URI Superfund Site, South Kingstown, Rhode Island*; April 20.

W&C, 2008. *Source Area Soils Treatment 100% Design Report, West Kingston Town Dump/URI Disposal Area Superfund Site, South Kingstown, RI*; September 15.

W&C, 2009. *Demonstration of Compliance Work Plan, West Kingston Town Dump/URI Disposal Area Superfund Site, South Kingstown, RI*; February 26.

W&C, 2009. *Final Remedial Design Report (100% Design) For Source Groundwater, West Kingston Town Dump/URI Disposal Area Superfund Site, South Kingstown, RI*; February 26.

W&C, 2009. *Demonstration of Compliance, West Kingston Town Dump/URI Disposal Area Superfund Site, South Kingstown, RI*; April 21.

W&C, 2010. *Long-Term Monitoring Report, West Kingston Town Dump/URI Disposal Area Superfund Site, South Kingstown, RI*; April 16.

# ATTACHMENT 2: SITE INSPECTION REPORT

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# Five-Year Review Site Inspection Checklist

## Purpose of the Checklist

The site inspection checklist provides a useful method for collecting important information during the site inspection portion of the five-year review. The checklist serves as a reminder of what information should to be gathered and provides the means of checking off information obtained and reviewed, or information not available or applicable. The checklist is divided into sections as follows:

I. Site Information
II. Interviews
III. On-site Documents & Records Verified
IV. O&M Costs
V. Access and Institutional Controls
VI. General Site Conditions
VII. Landfill Covers
VIII. Vertical Barrier Walls
IX. Groundwater/Surface Water Remedies
X. Other Remedies
XI. Overall Observations

Some data and information identified in the checklist may or may not be available at the site depending on how the site is managed. Sampling results, costs, and maintenance reports may be kept on site or may be kept in the offices of the contractor or at State offices. In cases where the information is not kept at the site, the item should not be checked as "not applicable," but rather it should be obtained from the office or agency where it is maintained. If this is known in advance, it may be possible to obtain the information before the site inspection.

This checklist was developed by EPA and the U.S. Army Corps of Engineers (USACE). It focuses on the two most common types of remedies that are subject to five-year reviews: landfill covers, and groundwater pump and treat remedies. Sections of the checklist are also provided for some other remedies. The sections on general site conditions would be applicable to a wider variety of remedies. The checklist should be modified to suit your needs when inspecting other types of remedies, as appropriate.

The checklist may be completed and attached to the Five-Year Review report to document site status. Please note that the checklist is not meant to be completely definitive or restrictive; additional information may be supplemented if the reviewer deems necessary. Also note that actual site conditions should be documented with photographs whenever possible.

## Using the Checklist for Types of Remedies

The checklist has sections designed to capture information concerning the main types of remedies which are found at sites requiring five-year reviews. These remedies are landfill covers (Section VII of the checklist) and groundwater and surface water remedies (Section IX of the checklist). The primary elements and appurtenances for these remedies are listed in sections which can be checked off as the facility is inspected. The opportunity is also provided to note site conditions, write comments on the facilities, and attach any additional pertinent information. If a site includes remedies beyond these, such as soil vapor extraction or soil landfarming, the information should be gathered in a similar manner and attached to the checklist.

## Considering Operation and Maintenance Costs

Unexpectedly widely varying or unexpectedly high O&M costs may be early indicators of remedy problems. For this reason, it is important to obtain a record of the original O&M cost estimate and of annual O&M costs during the years for which costs incurred are available. Section IV of the checklist provides a place for documenting annual costs and for commenting on unanticipated or unusually high O&M costs. A more detailed categorization of costs may be attached to the checklist if available. Examples of categories of O&M costs are listed below.

Operating Labor - This includes all wages, salaries, training, overhead, and fringe benefits associated with the labor needed for operation of the facilities and equipment associated with the remedial actions.

Maintenance Equipment and Materials - This includes the costs for equipment, parts, and other materials required to perform routine maintenance of facilities and equipment associated with a remedial action.

Maintenance Labor - This includes the costs for labor required to perform routine maintenance of facilities and for equipment associated with a remedial action.

Auxiliary Materials and Energy - This includes items such as chemicals and utilities which can include electricity, telephone, natural gas, water, and fuel. Auxiliary materials include other expendable materials such as chemicals used during plant operations.

Purchased Services - This includes items such as sampling costs, laboratory fees, and other professional services for which the need can be predicted.

Administrative Costs - This includes all costs associated with administration of O&M not included under other categories, such as labor overhead.

Insurance, Taxes and Licenses - This includes items such as liability and sudden and accidental insurance, real estate taxes on purchased land or right-of-way, licensing fees for certain technologies, and permit renewal and reporting costs.

Other Costs - This includes all other items which do not fit into any of the above categories.

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# Five-Year Review Site Inspection Checklist

| I. SITE INFORMATION | |
|---|---|
| **Site name:** West Kingston Town Dump and the University of Rhode Island (URI) Disposal Area | **Date of inspection: April 21, 2010** |
| **Location and Region: Kingston RI, Region 1** | **EPA ID:** RID981063993 |
| **Agency, office, or company leading the five-year review:** EPA | **Weather/temperature:** Clear and 60 deg F |

**Remedy Includes**: (Check all that apply)

- **X** Landfill cover/containment
- Access controls
- Institutional controls
- Groundwater pump and treatment
- Surface water collection and treatment
- Monitored natural attenuation
- Groundwater containment
- Vertical barrier walls
- **X** Other: Source Area Soil and Groundwater Treated with ISCO

**Attachments:** **X** Inspection team roster attached **X** Site map attached (See Figure 2-1)

**X** Significant weather event report **X** Photo Log

**II. INTERVIEWS** (Check all that apply)

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: RIDEM.
Contact: Gary J. Jablonski (Name) Engineer (Title) 4/21/10 (Date) (401) 222-2797 (Phone no.)
Problems; suggestions; Report attached _None

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

PRP Representative: Jon Schock, Public Service Director, Town of South Kingstown , Wakefield, RI 02879

(401) 789-9331

Issues: None

| |
|---|
| PRP Representative: Jerome B. Sidio, Director of Facilities, University of Rhode Island, Kingston, RI 02881 (401) 874-5488<br>Issues: None |
| PRP Representative: Jeffry Ceasrine, Town Engineer, Town of Narragansett, Narragansett, RI 02882<br>(401) 782-0637<br>Issues: None |
| PRP Consultant: Karl Kasper, Project Manager, Woodard &Curran, Portland ME 04102<br>(207) 774-2112<br>Issues: None |
| |
| |
| |
| |
| |

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

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

   Remarks_____

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

   Remarks_____

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

   Remarks_____

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

   Remarks_____

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

   Remarks_____

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

   Remarks_____

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

   Remarks_____

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

   Remarks_____

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

   Remarks_____

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

    Remarks_____

## IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
**X** PRP in-house **X** Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____

2. **O&M Cost Records**

**X** Readily available **X** Up to date
**X** Funding mechanism/agreement in place
Original O&M cost estimate__$126,000/year for 1st 10 years_ ☐ Breakdown attached

Total annual cost by year for review period if available

| | | | |
|---|---|---|---|
| From_July 2005_ To_June 2006_ | ___$66,000____ | ☐ Breakdown attached |
| Date Date | Total cost | |
| From_ July 2005_ To_ June 2006_ | ___$5,000_____ | ☐ Breakdown attached |
| Date Date | Total cost | |
| From_ July 2005_ To_ June 2006_ | ___$5,000_____ | ☐ Breakdown attached |
| Date Date | Total cost | |
| From_ July 2005_ To_ June 2006_ | ___$36,000____ | ☐ Breakdown attached |
| Date Date | Total cost | |
| From_ July 2005_ To_ June 2006_ | ___$190,000___ | ☐ Breakdown attached |
| Date Date | Total cost | |

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

Describe costs and reasons: _____
__05-06 mowing & two GW sampling events _____
__06-07 mowing only_____
__07-08 mowing only_____
__08-09 mowing & one GW sampling event_____
__09-10 mowing, two GW sampling events & three ISCO applications_____

## V. ACCESS AND INSTITUTIONAL CONTROLS **X** Applicable ☐ N/A

### A. Fencing

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

### B. Other Access Restrictions

1. **Signs and other security measures** **X** Location shown on site map ☐ N/A
Remark: Vehicular traffic restricted by locking gates. See Figure 2-1. Site is open to passive recreation.

**C. Institutional Controls (ICs)**

1. **Implementation and enforcement**

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

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

Type of monitoring (*e.g.*, self-reporting, drive by) __Restriction on GW use. Must apply to RIDEM to install a well.

Frequency _____NA_____

Responsible party/agency __RIDEM working in conjunction with PRPs_____

Contact: Gary Jablonski Engineer 4/21/2010 401-222-2797

Name Title Date Phone no.

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

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

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

Violations have been reported ☐ Yes ☐ No **X** N/A

Other problems or suggestions: ☐ Report attached

____PRPs have developed ICP that is currently being implemented. EPA has requested a schedule for implementation for ICs._____

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

Remarks____ICs as proposed are adequate. Once implemented this will be revisited. (See Figure 2-1).

**D. General**

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

Remarks: Apparent four-wheeler access is evident but not a real problem. PRP will post signed restricting motorized access to authorized vehicles only.

2. **Land use changes on site X** N/A

Remarks_____

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

Remarks_____

## VI. GENERAL SITE CONDITIONS

**A. Roads** **X** Applicable ☐ N/A

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

Remarks: Recent 500-year rain storm caused erosion of access road. Road was regarded and repaired prior to 5-year site inspection. Small area of siltation in drainage ditch along access road, is schedule to be removed and repaired. Significant weather event field report attached and photos #1 & #2 depicting the access road erosion damage.

**B. Other Site Conditions**

Remarks ___Site is in good condition.

**VII. LANDFILL COVERS** ☐ Applicable ☐ N/A

**A. Landfill Surface**

1. **Settlement** (Low spots) ☐ Location shown on site map **X** Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____Covers are in good condition; see Photo #3._____

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

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

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

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

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

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

8. **Wet Areas/Water Damage** **X** 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_____Despite 500-year storm event, no damage to Stormwater Retention System. See_____ ___photo #4. _____

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

**B. Benches** ☐ Applicable **X** 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** **X** 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 **X** No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

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

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

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

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

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

**D. Cover Penetrations** **X** Applicable G N/A

1. **Gas Vents** Active **X** Passive
☐ Properly secured/locked G Functioning ☐ Routinely sampled **X** Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked G Functioning **X** Routinely sampled **X** Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks: Two gas monitoring probes are broken and will be replaced this yaer.

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

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

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

**E. Gas Collection and Treatment** ☐ Applicable **X** 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** **X** Applicable ☐ N/A

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

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

**G. Detention/Sedimentation Ponds** **X** Applicable ☐ N/A

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

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

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

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

**H. Retaining Walls** ☐ Applicable **x** 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** **x** Applicable ☐ N/A

1. **Siltation** **x** Location shown on site map ☐ Siltation not evident
   Areal extent: Approx. 20 ft2_____ Depth: Max 6-inches_____
   Remarks: URI is schedule to remove silt and repair as needed.

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

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

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

**VIII. VERTICAL BARRIER WALLS** ☐ Applicable **x** 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** x Applicable ☐ N/A

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

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks_____

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

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

**B. Surface Water Collection Structures, Pumps, and Pipelines** ☐ Applicable x 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 G Requires upgrade ☐ Needs to be provided
Remarks_____

**C. Treatment System** X 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: Groundwater remedy is MNA and ISCO Photo #5 is revegetated Source Area Soil_____
   __Treatment Zone._____

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

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

4. **Discharge Structure and Appurtenances**
   X N/A ☐ Good condition ☐ Needs Maintenance
   Remarks_____

5. **Treatment Building(s)**
   X 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 G Functioning ☐ Routinely sampled ☐ Good condition
   ☐ All required wells located ☐ Needs Maintenance X N/A
   Remarks_____

**D. Monitoring Data**

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

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

**D. Monitored Natural Attenuation**

1. **Monitoring Wells** (natural attenuation remedy)

| | | | |
|---|---|---|---|
| **X** Properly secured/locked | **X** Functioning | **X** Routinely sampled | **X** Good condition |
| ☐ All required wells located | ☐ Needs Maintenance | | ☐ N/A |

Remarks_____

## 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.).

The remedy was implemented in two phases:
Goals: (1) Implement Treatment Technologies to clean up contaminated source areas and source area groundwater;
(2) Monitored Natural Attenuation will reduce contaminant concentrations in the source area groundwater;
(3) Institutional Controls will restrict the use of contaminated groundwater; and
(4) Long-Term Monitoring will monitor MNA and the effectiveness.

**Phase I::2005 – 2006**: landfill areas were consolidated and permanently closed under state law with RIDEM oversight and following EPA's Presumptive Remedy for Municipal Landfills.

- Landfill Cap Final Design completed – March 2005
- Bidding and contract awarded – July 2005
- Construction began – August 2005
- Construction completed – June 2006

**Phase II: 2009-Source area Soils:** Source Area included ISCO of both source area soils and groundwater. In 2009, 2,100 cubic yards of VOC contaminated soil was treated with ICSO. These soils were treated to meet the RIDEM Cleanup Standard of 2ppm for PCE.

- 100% Design Report Submittal: September 15, 2008
- Soil Treatment - 2 Events (January & June) 2009
- Treatment Approval: July 21, 2009
- Demonstration of Compliance: August 21, 2009

**Source Area Groundwater:** Starting in the fall of 2009 source area groundwater is being treated by ISCO. First application occurred in September 2009. Second application will occur in the spring of 2010. If needed, a third application will be injected in the Spring of 2011.

- 100% Design Report Submittal (with RAWP and POP): February 26, 2009
- Pre-Construction kick-off: August 5, 2009
- Baseline GW Sampling: September 4-9, 2009
- Permanganate Injections: September 16-18, 2009
- Pre-Final Site Inspection: September 24, 2009
- Final Site Inspection: September 29, 2009
- Remedy Performance Monitoring Event #1: October 12-14, 2009
- Remedy Performance Monitoring Event #2: April19, 2010
- Permanganate Injections (Rd. 2): May 3, 2010

**Non-Source Area (Downgradient) Groundwater**: Downgradient groundwater is being treated by MNA.

**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.

**O&M Activities:**

**Long-Term Groundwater Monitoring** – Semi-annual groundwater sampling (see Long-Term Monitoring Plan for details)

**ISCO Applications** – Event #1 occurred October 2009; Event #2 Scheduled for May 2010; and Event #3 anticipated for Spring 2011

**Mowing of the Landfill Caps** – Annual mowing occurs in the later summer or early fall of each year.

**Semi-Annual Cap Inspection** – Semi-Annual Cap Inspection occurs concurrently with the groundwater sampling events.

| 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.<br>_Monitor access road has been repaired and regraded (see Photo #5).<br>_Drainage ditch adjacent to FA-5 is scheduled for silt removal and repair by URI (see _Photo #6). |
| **D.** | **Opportunities for Optimization** |
| | Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.<br>Will continue to evaluate ways to optimize groundwater treatment system however because the system is relatively new PRPs will run the current system as is. |

## INTERVIEW DOCUMENTATION FORM

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

| Name | Title/Position | Organization | Date |
|---|---|---|---|
| Jerome Sidio | Director, Facilities | URI | 4/23/10 |
| Jon Schock | Director of Public Services | Town of South Kingstown | 4-27-10 |
| Karl Kasper | Project Manager | WSC | 4/23/10 |
| Gary Jablonski | Principal Engineer | RIDEM | 04-23-10 |
| Jeff Crasnick | Town Engineer | Town of Narragansett | 4/28/10 |
| Anna Krakko | EPA RPM | EPA | 4/23/2010 |
| Richard Sugatt | EPA RPM Assessor | EPA | 4/23/2010 |


AREA A
AREA B
AREA C
FA2
FA4
FA5
EDGE OF CAP
LOTS SUBJECT TO INSTITUTIONAL CONTROLS
INSTITUTIONAL CONTROL PLAN
FIGURE 2-1

## SIGNIFICANT WEATHER EVENT

**Post-Closure Operations & Maintenance Plan**
**West Kingston Town Dump/URI Disposal Area**
**South Kingstown, RI**

**Storm Event:**

Approximate Start Time: 3/29/10
Approximate End Time: 3/31/10
Duration of storm event: 72 hrs hours
Precipitation from storm: ~1.0 inches

Date: 4-5-10
Inspector: Janelle Bonn
Signature: Janelle Bonn

| | NO | YES |
|---|---|---|
| Sediment ladden water flowing from Site into Wetland Pond A (Town site). | X | |
| Sediment visible in Wetland Pond A. | X | |
| Sediment ladden water flowing from Site into Wetland Pond E (URI site). | X | |
| Sediment visible in Wetland Pond E. | X | |

**Drainage Structures:** Note conditions observed.

Grass Channels: Some accumulated sediment observed south of EA5 in grass channel due to minor access road erosion in that area.

Rip Rap Channels: Good condition, free of debris and sediment. Channel north of EA5 currently under a couple of feet of standing water. Water is clear.

Detention Basin A (Town site) and Outlet Structure: Good condition. No accumulated sediment or cloudy, turbid water observed. Outlet structure in good condition, cage on manhole fell off - is currently under water.

Detention Basin B (URI Site) and Outlet Structure: Good condition. No accumulated sediment or cloudy, turbid water observed. Outlet structure in good condition.

Catch Basin 1 (Town Site, near Plains Road): Some grass accumulated on surface of catch basin, was removed by inspector.

Catch Basin 2 (Town Site, before Detention Basin A): Some grass and branches accumulated on surface of catch basin, was removed by inspector.

Other: Wetland ponds and detention basins appear free of sediment - water is clear and bottom can be seen. Drainage structures are unobscured.

**Locations of significant erosion:**

Landfill cap: None

Detention Basin A (Town site): None

Detention Basin B (URI Site): None

**Other Comments:** Erosion control blanket exposed on toe of EA2 south side - appears due to vehicle traffic. Exposure is minimal

**Photo 1: Access road damage, April 2010.**

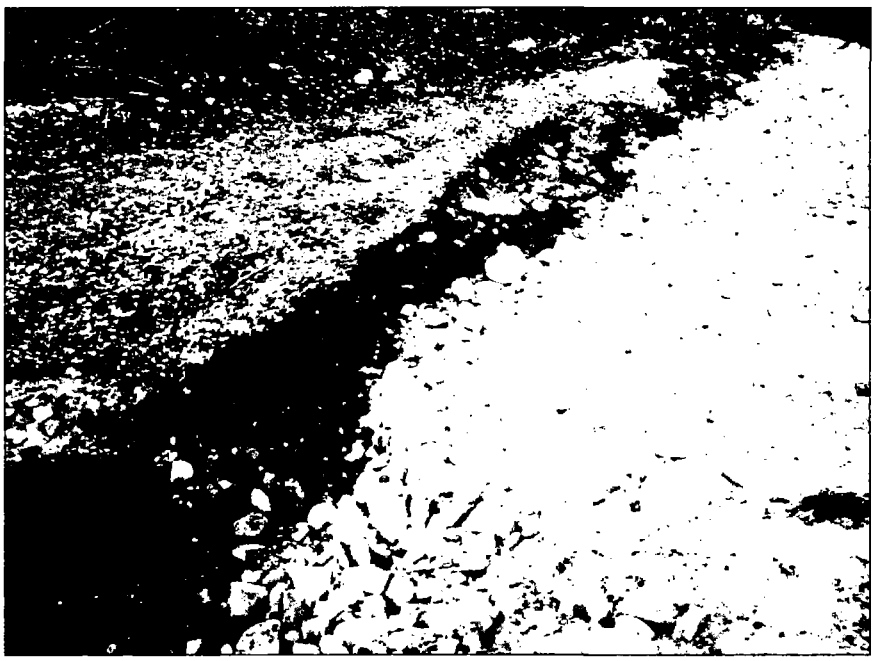

**Photo 2: Access road damage, April 2010.**

**Photo 3: FA-4 cap.**

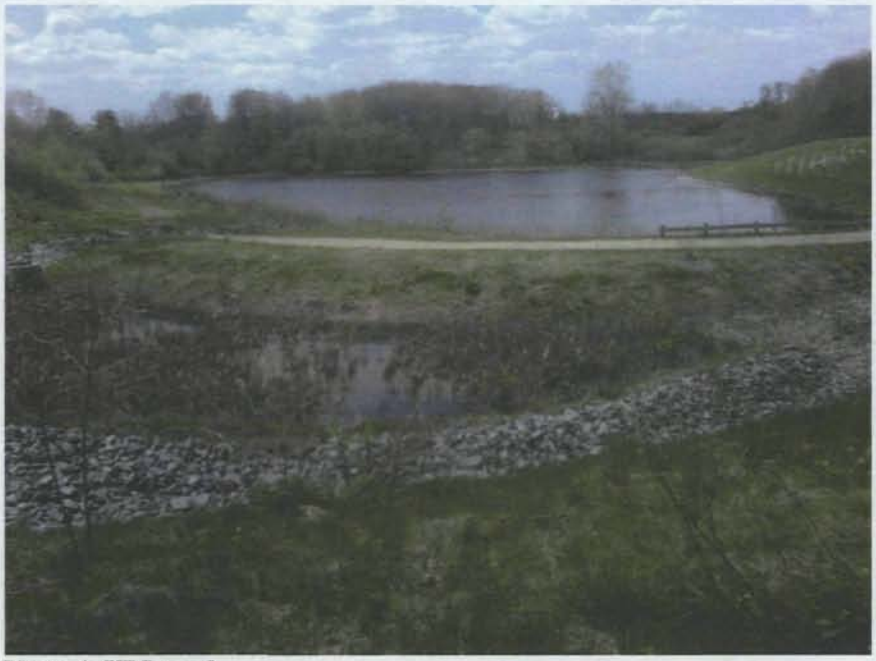

**Photo 4: URI pond.**

**Photo 5: Revegetated source area soil treatment zone.**

**Photo 6: Repaired and regraded access road.**

**Photo 7: Silt deposition within ditch.**

# ATTACHMENT 3: SITE INTERVIEW LIST

**SITE INTERVIEW LIST**

The following interviews were conducted as part of this Five-Year Review:

| Contact | Organization | Date | Issues, Suggestions, Etc. |
|---|---|---|---|
| Anna Krasko, Remedial Project Manager | USEPA | 4/23/2010 | Implement ICP |
| Richard Sugatt, Risk Assessor | USEPA | 4/23/2010 | Proposed change in TCE cancer slope factor |
| Gary J. Jablonski, Principal Engineer | RIDEM | 4/23/2010 | None |
| Jon Schock, Director of Public Services | PRP Representative – Town of South Kingstown | 4/23/2010 | None |
| Jerome Sidio, Director of Facilities | PRP Representative – URI | 4/23/2010 | None |
| Jeffrey Ceasrine, Town Engineer | PRP Representative – Town of Narragansett | 4/23/2010 | None |
| Karl Kasper, Project Manager | PRP Consultant – Woodard & Curran | 4/23/2010 | None |

# ATTACHMENT 4: APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

**Table 1**
**Identification of Chemical-Specific ARARs**
**West Kingston Town/URI Disposal Area Superfund Site – Record of Decision**

| Requirement | Status | Summary of Requirement | Action to be Taken to Comply with ARARs |
|---|---|---|---|
| **Groundwater** | | | |
| **Federal Regulatory Requirements** | | | |
| Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) (40 CFR Parts 141.60-66) | Relevant and Appropriate | MCLs have been promulgated for a number of common organic and inorganic contaminants. These levels regulate the concentrations of contaminants in public drinking water supplies, but may also be considered relevant and appropriate for groundwater aquifers that potentially could be used as a source of drinking water. | The selected remedy will comply with this ARAR. MCLs were used as the basis for groundwater cleanup levels. Treatment of source area groundwater is expected to reduce volatile organic compound (VOC) concentrations there. Additional reductions down to MCLs are expected to occur throughout the plume through monitored natural attenuation. |
| Non-Zero SDWA Maximum Contaminant Level Goals (MCLGs) (40 CFR Parts 141.50-55) | Relevant and Appropriate | MCLGs are health-based criteria at which no known or anticipated adverse health effects are expected. MCLGs are available for several organic and inorganic contaminants. Under the National Contingency Plan (NCP), an MCLG is relevant and appropriate with respect to a given contaminant only if the MCLG is above zero for that contaminant. | The selected remedy will comply with this ARAR. As part of the selected remedy, monitoring will ensure that there are no exceedances of any non-zero MCLGs. (The MCLGs for tetrachloroethene and trichloroethene are zero and therefore would not be an ARAR for these contaminants.) |
| U.S. Environmental Protection Agency Health Advisories (HAs) | To Be Considered | HAs are issued as non-regulatory guidance. HA values represent the concentration of contaminants in drinking water at which adverse health effects would not be expected to occur. HAs are established for one-day and ten-day exposure durations. | HAs were used during the risk assessment to evaluate non-carcinogenic effects for oral exposures of shorter durations and will be used, as appropriate, in any future risk evaluations for this Site. |
| Guidelines for Carcinogen Risk Assessment (March 2005) and Supplemental Guidance for Assessing Early-Life Exposure to Carcinogens (March 2005) (EPA/630/P-03/001B & EPA/630/R-03/003F) | To Be Considered | Provides guidance on conducting risk assessments involving carcinogens. | Until updated or replaced, these guidances will be used by EPA to evaluate all risk assessments on carcinogenicity conducted in the future at the Site. |
| **State Regulatory Requirements** | | | |
| Rhode Island Rules and Regulations for Groundwater Quality | Applicable | These rules set numerical criteria for contaminants in certain aquifers classified as potential drinking water sources (such as the aquifer at the Site), and require that such groundwater be maintained at a quality that does not have any reasonable potential to cause a violation of surface water quality standards. See Rule 11.2. | The selected remedy will comply with this ARAR. For PCE and TCE, the numerical criteria are identical to MCLs. Treatment of source area groundwater is expected to reduce volatile organic compound (VOC) concentrations there. Additional reductions down to MCLs are expected to occur throughout the plume through monitored natural attenuation. |

**Table 1**
**Identification of Chemical-Specific ARARs**
**West Kingston Town/URI Disposal Area Superfund Site – Record of Decision**

| Soil/Sediments | | | |
|---|---|---|---|
| **Federal Regulatory Requirements** | | | |
| EPA Risk Reference Doses (RfDs) | To Be Considered | RfDs are non-regulatory estimates of a daily exposure concentration that is likely to be without appreciable risk of deleterious effects during a lifetime exposure. | RfDs were used in developing the risk assessment and are cited as TBCs. They should be useful in future risk assessments of the Site. |
| EPA Carcinogen Assessment Group Cancer Slope Factors (CSFs) | To Be Considered | CSFs are non-regulatory estimates of the upper-bound probability of an individual developing cancer as a result of a lifetime exposure to a particular concentration of a potential carcinogen. | CSFs were used in developing the risk assessment and are cited as TBCs. They should be useful in future risk assessments of the Site. |
| **State Regulatory Requirements** | | | |
| RI Rules and Regulations for the Investigation and Remediation of Hazardous Material Releases, Section 8.02.B.i and .ii – Soil Objectives | Applicable | These rules establish direct exposure and leachability criteria for cleanup of soil contamination caused by of a release of hazardous material. | The selected remedy will comply with this ARAR. Treatment of source-area subsurface soil is expected to reduce contaminant concentrations there below the relevant criteria. |

**Table 2**
**Identification of Location-Specific ARARs**
**West Kingston Town/URI Disposal Area Superfund Site – Record of Decision**

| Requirement | Status | Summary of Requirement | Action to be Taken to Comply With ARARs |
|---|---|---|---|
| **Wetlands/Flood Plains** | | | |
| **Federal Regulatory Requirements** | | | |
| Wetlands Executive Order (Executive Order 11990, at 42 Fed. Reg. 26961); Statement of Procedures on Floodplains Management and Wetlands Protection (40 CFR Part 6, Appendix A) | Applicable | The Wetlands Executive Order and accompanying statement of procedures require federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance natural and beneficial values of wetlands. | The selected remedy will comply with this ARAR. The selected remedy is not expected to have any negative impact on wetlands; however, area wetlands will be monitored to ensure no negative impacts occur as a result of soil or groundwater treatment. |
| **State Regulatory Requirements** | | | |
| Rhode Island Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act | Applicable | These rules require that all wetlands and wetland functions be protected to the maximum extent possible, including by preventing pollutants, sediment, direct discharges of stormwater runoff, or any material foreign to a wetland or hazardous to life from entering any wetland. The rules also require that hazardous material remediations fully protect, replace, restore and/or mitigate harm to any affected wetlands. See Rules 6, 7 and 10. | The selected remedy will comply with this ARAR. The selected remedy is not expected to have any negative impact on wetlands; however, area wetlands will be monitored to ensure no negative impacts occur as a result of soil or groundwater treatment. |

**Table 3**
**Identification of Action-Specific ARARs**
**West Kingston Town/URI Disposal Area Superfund Site – Record of Decision**

| Requirement | Status | Summary of Requirement | Actions to be Taken to Comply with ARARs |
|---|---|---|---|
| **Groundwater** | | | |
| **Federal Regulatory Requirements** | | | |
| Underground Injection Control Regulations (40 CFR Part 144, Subpart G) | Applicable | These regulations forbid injections of fluids that allow movement of contaminants into certain potential drinking water aquifers, if the presence of these contaminants may cause a violation of certain drinking water standards and health-based standards, or may otherwise adversely affect the health of persons. | The selected remedy will comply with this ARAR. The aquifer already contains contaminants. Injections are expected to help eliminate rather than cause a violation of primary drinking water standards (MCLs), and byproducts are expected to be innocuous. Injection wells will be installed, operated and monitored consistent with the substantive requirements of this rule. |
| Resource Conservation and Recovery Act – Groundwater Monitoring Requirements (40 CFR part 264, subpart F) | Relevant and appropriate | Sets requirements for groundwater monitoring at facilities that treat, store or dispose of hazardous waste. | The selected remedy will comply with this ARAR. A groundwater monitoring plan consistent with these rules will be developed to ensure cleanup standards are met. |
| Final OSWER Monitored Natural Attenuation Policy (OSWER Dir.9200.4-17P) (4/99) | To Be Considered | Provides guidance on how EPA will implement policies on monitored natural attenuation. | This policy will be considered when designing and implementing MNA. |
| **State Regulatory Requirements** | | | |
| RI Underground Injection Control Program Rules and Regulations | Applicable | These rules forbid operation of injection wells that pollute or endanger groundwater quality. See Rule 5.03. | The selected remedy will comply with this ARAR. The injection of oxidants will improve rather than pollute or endanger groundwater quality. Injection wells will be installed, operated and monitored consistent with any substantive requirements of these rules. |
| RI Rules and Regulations for Groundwater Quality | Relevant and Appropriate | These rules prescribe design requirements for construction of monitoring wells, how monitoring shall be undertaken, and how wells shall be abandoned once monitoring is complete. See Rules 5.5 and 12 and Appendix 1. | The selected remedy will comply with this ARAR. A groundwater monitoring plan consistent with the substantive requirements of these rules will be developed to ensure cleanup standards are met. Monitoring wells will be installed and abandoned pursuant to the substantive requirements of these rules. |

**Table 3**
**Identification of Action-Specific ARARs**
**West Kingston Town/URI Disposal Area Superfund Site – Record of Decision**

| | | | |
|---|---|---|---|
| **Soil/Sediments** | | | |
| **State Regulatory Requirements** | | | |
| RI Rules and Regulations for Hazardous Waste Management; R.I. Gen L. 23-18.9-5; R.I. Gen. L. 23-19.1-18 | Applicable | These rules apply to generators and transporters of hazardous wastes. The statutes require disposal of solid waste and hazardous waste at licensed facilities. | The selected remedy will comply with this ARAR. All cuttings generated from construction of injection wells will be tested for hazardous characteristics and shipped off-site to the appropriate licensed facility, as necessary. Other excavations (e.g., construction of chemical feed system, soil removed preparatory to in-situ oxidation of contaminated soil) are expected to involve clean soil and will be regraded on site. |
| **Surface Water** | | | |
| **Federal Regulatory Requirements** | | | |
| Clean Water Act Ambient Water Quality Criteria (AWQC) (33 U.S.C. § 1251 *et seq.* and www.epa.gov/waterscience/criteria/ wqcriteria.html#C) | Relevant and Appropriate | CWA AWQCs are health- and ecological-based criteria developed for carcinogenic and non-carcinogenic compounds and water quality parameters. Health-based AWQC are set at levels protective of human health for two routes of exposure: (1) drinking water and consuming aquatic organisms; and (2) only consuming fish. Aquatic criteria are protective of aquatic life. | URI Pond will be monitored and AWQCs will be used as a means of measuring the performance of the groundwater remediation. |
| **State Regulatory Requirements** | | | |
| RI Water Quality Regulations | Relevant and Appropriate | These rules set ambient water quality criteria (AWQCs) applicable to surface waters in Rhode Island. These AWQCs may include numeric limits for chronic exposures to aquatic life, acute exposures to aquatic life, human consumption of water and aquatic organisms, and human consumption of aquatic organisms only. See Rule 8 They also forbid activities or discharges that would cause a violation of these criteria. See Rule 9. | Samples from URI Pond indicated an exceedance of the RI AWQC related to chronic PCE exposure to aquatic life. Although this exceedance does not pose an unacceptable risk at the Site, the Pond will be monitored and this AWQC will be used as a means of measuring the performance of the groundwater remediation. It is expected that the AWQC exceedance will be eliminated as the groundwater becomes cleaner. |
| **Air** | | | |
| **Federal Regulatory Requirements** | | | |
| Threshold Limit Values (TLVs) | To Be Considered | These are guidelines established by the American Conference of Governmental Industrial Hygienists. | TLVs may be used for assessing site inhalation risks for site remediation workers during construction activities conducted |

**Table 3**
**Identification of Action-Specific ARARs**
**West Kingston Town/URI Disposal Area Superfund Site – Record of Decision**

| | | | |
|---|---|---|---|
| | | They estimate concentrations of particulate matter that may be safely inhaled by workers on a daily basis. | under this alternative. |
| **State Regulatory Requirements** | | | |
| RI Air Pollution Control Regulation No. 5 - Fugitive Dust | Applicable | Requires reasonable precautions to prevent airborne particulate matter from traveling beyond the property boundary line. | The selected remedy will comply with this ARAR. Invasive or construction activities with the potential for generating significant dust will be performed in accordance with these rules. Dust suppression measures will be used during excavation, backfilling, and well installation activities, as necessary. |

# ATTACHMENT 5: NEWSPAPER NOTICE OF 5-YEAR REVIEW

**EPA Announces the Start of the Five Year Review of the Remedy at West Kingston/URI Disposal area Superfund site**

**Boston-** EPA announced today that the five year review of the remedy at the West Kingston/ URI Disposal Area Superfund site is underway. The purpose of the review is to ensure that the remedy that was implemented has remained effective and protective of human health and the environment.

**SITE NAME, LOCATION AND BRIEF DESCRIPTION**

The West Kingston Town Dump/University of Rhode Island (URI) Disposal Area Superfund Site (the Site) is located primarily on the eastern side of the Plains Road in South Kingstown, Washington County, Rhode Island. To the south of the Site is the University of Rhode Island Main Campus. To the west of the Site is Hundred Acre Pond.

The Site contains three main disposal areas, each with separate solid waste disposal histories. The first area is the West Kingston Town Dump, also know as the South Kingstown Landfill #2 (referred to as the Town Dump). It is on the southern part of the Site and is owned by the Town of South Kingstown. It is approximately 0.4 miles north of the URI campus. In the early 1950's, the Town of Narragansett, the Town of South Kingstown and URI began disposing of solid waste in this landfill. Disposal continued in at least some form until 1987. A pond called Tibbits Pond is located just upgradient from that disposal area.

The second area is the URI Disposal Area, also known as the URI Gravel Bank or Sherman Farm. It is north of the West Kingston Town Dump and is owned by URI. Waste was dumped here from approximately 1945 to 1987, particularly by the University of Rhode Island after the Town Dump closed n 1978. A small pond called URI Pond is located in this area, just south of the main disposal areas.

1/13/10
Narragansett Times

The third disposal area, a Former Drum Disposal Area, where a dozen rusted drums were discovered in 1989, is located uphill and east of the Town Dump and the URI Disposal area. This area is the primary source of the groundwater contamination of tetrachloroethene (PCE) and trichlorethene (TCE) that extends approximately 2,500 feet west of the Hundred Acre Pond.

The Town Dump and the URI disposal Area have each been capped with a RCRA impermeable cover system as part of a landfill closure administered by RIDEM and are being maintained and monitored as part of the remedy.

In 2006, EPA signed a Record of Decision to address contamination in the Former Drum Disposal Area.

The EPA Five Year Review will include the following:

- Evaluation of the contaminated soil and groundwater data beneath the drum disposal area to confirm that the remedy is progressing as intended. Both, soil and groundwater are being treated with permanganate, and oxidating agent, that has been mixed with the soil and is being injected below ground surface;
- Evaluation of on-going long term maintenance of the landfills closure and monitoring of the groundwater downgradient from the drum disposal area and around the landfills; and
- Evaluation of the progress toward installation of institutional controls in the form of deed restrictions to restrict the use of contaminated groundwater until restoration of drinking water standards is achieved, and to prohibit activities that would disturb remedy components.

Upon completion, the Five Year review report along with technical information about the site will be available for review in the information repository located at: South Kingstown Public Library, 1057 Kingstown Road, Peace Dale, RI 02879 ph. 401-783-4085, 401-789-1555 and EPA New England Records Center, 5 Post Office Square, Boston, MA (617) 918-1440

More information about the five year review, please call:

Anna Krasko, Remedial Project Manager
U.S. EPA
1 Postoffice Square
Boston, MA 02109-3912
(617) 918-1232
krasko.anna@epa.gov

Gary Jablonski, Project Manager
RIDEM
235 Promenade Street
Providence, RI 02908
401-222-2797 ext. 7148
gary.jablonski@DEM.RI.GOV

Or visit the EPA's West Kingston/URI Disposal Area web site at:

http://www.epa.gov/superfund/sites/index.htm

EPA Region 1, New England

1/15/10 Photo



## LEGAL NOTICES

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For more information about the five year review, please call:

Anna Krasko, Remedial Project Manager
US EPA
5 Post Office Square
Boston, MA 02109-3912
(617) 918-1232
krasko.anna@epa.gov

Gary Jablonski, Project Manager
RIDEM
235 Promenade Street
Providence, RI 02908
401-222-2797 ext. 7148
gary.jablonski@DEM.RI.GOV

Or visit the EPA's West Kingston/URI Disposal Area web site at:

http://www.epa.gov/superfund/sites/index.htm

STATE OF RHODE ISLAND
AND PROVIDENCE
PLANTATIONS
FAMILY COURT
JUVENILE CLERK'S OFFICE

**ADVERTISEMENT**

Providence County
DATE: 4 January, 2010

Notice to: The father of a child born to CATHERINE SOE born on 07-05-1998 and any and all parties in interest.

A case has been brought in

## ADVERTISEMENT FOR PROPOSALS/BIDS

The Chariho Regional School District hereinafter called the "Owner" will receive sealed proposals/bids for the following:

**Request For Proposals Campus 2010 Printing and Distribution of Contract Documents**

General proposals/bids

SUPREME COURT OF THE
STATE OF NEW YORK
COUNTY OF CAYUGA
Index No. 09-722
Date Filed: 05/29/09

NEW YORK LAND & LAKES DEVELOPMENT, LLC,
Plaintiff
- against -
THA KUY and SOKHODOM D. KUY, and "JOHN DOE #1" through "JANE DOE #10", the last 10 names being fictitious and unknown to the Plaintiff, the persons or parties intended being the occupants, tenants, persons or entities, if any, having or claiming an interest in or lien upon the mortgaged premises described in the verified complaint,
Defendants

SUMMONS AND NOTICE

Plaintiff designates Cayuga County as the place of trial. Venue is based upon the County in which the mortgaged premises is situated.

TO THE ABOVE NAMED DEFENDANTS:

YOU ARE HEREBY SUMMONED to answer the complaint in this action and to serve a copy of your answer, or, if the complaint is not served with this summons, to serve a notice of appearance on the attorney for the Plaintiff within twenty (20) days after the service of this summons, exclusive of the day of service (or within thirty (30) days after service is complete if this summons is not personally delivered to you within the State of New York). In case of your failure to appear or answer, judgment will be taken against you by default for the relief demanded in the complaint.

**NOTICE OF NATURE OF ACTION AND RELIEF SOUGHT**

**THE OBJECT** of the above captioned action is to foreclose a Mortgage securing an obligation in the original principal amount of $23,920.00 with interest thereon, recorded in the office of the Cayuga County Clerk on February 27, 2006, in Liber 2286 of Mortgages, Page 158, covering premises known as Lot #9 in Autumn Hills Subdivision, McDonald road, in Throop, New York (Section 100.00, Block 1, and Lot 7.19).

RPAPL Section 1320 Notice

NOTICE YOU ARE IN DANGER OF LOSING YOUR HOME

If you do not respond to this summons and complaint by serving a copy of the answer on the attorney for the mortgage company who filed this foreclosure proceeding against you and filing the answer with the court, a default judgment may be entered and you can lose your home. Speak to an attorney or go to the court where your case is pending for further information on how to answer the summons and protect your property.

YOU MUST RESPOND BY SERVING A COPY OF THE ANSWER ON THE ATTORNEY FOR THE PLAINTIFF (MORTGAGE COMPANY)

STATE OF RHODE ISLAND
**Probate Court of the City of Providence**

NOTICE OF MATTERS PENDING AND FOR HEARING IN SAID COURT

The Court will be held in session at City Hall on the dates specified in the notices below at 10:00 a.m. for hearing said matters.

**BROWN, GLADYS M., alias Gladys Myrtle Brown** - estate Glenn R. Covill (John J. Lanni, Esquire, 685 Warren Avenue, East Providence, Rhode Island, agent) has qualified as executor; creditors must file their claims in the office of the probate clerk within the time required by law beginning January 8, 2010.

**BUDLONG, MARIE, alias Marie Ann Budlong** - estate Jessica Budlong has qualified as administratrix; creditors must file their claims in the office of the probate clerk within the time required by law beginning January 8, 2010.

**CAMBIO, CARMELA** - estate Joseph Cambio and Rita Ricci have qualified as guardians; creditors must file their claims in the office of the probate clerk within the time required by law beginning January 8, 2010.

**CANALE, JOHN, alias Giovanni Canale** - estate Diana S. Donovan and Rosmarie Abbruzzese have qualified as guardians; creditors must file their claims in the office of the probate clerk within the time required by law beginning January 8, 2010.

**CAPASSO, NATALIE** - estate Stephanie L. Capasso has qualified as administratrix; creditors must file their claims in the office of the probate clerk within the time required by law beginning January 8, 2010.

**DELEON, OSCAR - FULL AGE** Appointment of guardian; for hearing January 19, 2010.

**ERICKSON, KENNETH D.** - estate Arlene Parisella has qualified as administratrix; creditors must file their claims in the office of the probate clerk within the time required by law beginning January 8, 2010.

**FOX, FRANCES, alias Frances R. Fox** - estate Jean A. Ito has qualified as executrix; creditors must file their claims in the office of the probate clerk within the time required by law beginning January 8, 2010.

**GILBERT, GRACIE YANNA** - estate Barbara H. Morin has qualified as guardian; creditors must file their claims in the office of the probate clerk within the time required by law beginning January 8, 2010.

**GOODLETT, MICHAEL** - estate Sharon Coachman and Shirley Goodlett (Charles D. Wick, Esquire, 1050 Main Street, East Greenwich, Rhode Island, agent for both) have qualified as administratrices; creditors must file their claims in the office of the probate clerk within the time required by law beginning January 8, 2010.

STATE OF RHODE ISLAND
PROBATE COURT OF THE
**TOWN OF NORTH PROVIDENCE**

NOTICE OF MATTERS PENDING AND FOR HEARING IN SAID COURT

THE COURT WILL BE IN SESSION AT TOWN HALL ON THE DATES SPECIFIED IN NOTICES BELOW AT 3:00 P.M.

**Gordon, Mabel. M. 7968** Estate of Peter O. Cimini of North Providence, RI has been appointed Executor; all creditors must file their claims in the office of the Probate Clerk within the time required by law beginning January 8, 2010.

**Gigliotti, Peter Sr. 7972** Estate of Ralph A. Gigliotti of Lincoln RI has been appointed Administrator; all creditors must file their claims in the Office of the Probate Clerk within the time required by law beginning January 8, 2010.

**Picard, Donna Lee 7967** Estate of R.J Connelly III, Esq. of Pawtucket has been appointed Guardian of Person and Real Estate; all creditors file their claims in the office of the Probate Clerk within the time required by law beginning January 8, 2010.

**Venava, Herbert Alfred aka Venava, Herbert A.** Estate of Administration Petition; for Hearing January 19, 2010.

**McGlone, Teddi A 7963** Estate of Susan Fagan of North Smithfield RI has qualified as Guardian of person; all creditors must file their claims in the office of the Probate Clerk within the time required by law beginning January 8, 2010.

**Shea, Robert Lawrence 7973** Estate of Robert E. Shea of Smithfield, RI has been appointed Executor; creditors must file their claims in the office of the Probate Clerk within the time required by law beginning January 8, 2010.

**Tammaro, Sharon Lynn 7975** Estate of Ronald D. Tammaro of Little Compton RI has been appointed Administrator; creditors must file their claims in the office of the Probate Clerk within the time required by law beginning January 8, 2010.

**Gloria. Pallotto 4448** Estate of Mario E. Pallotto of North Providence RI and Christine A. Baccari of Johnston RI have qualified as Co-Guardians; creditors must file their claims in the office of the Probate Clerk within the time required by Law beginning January 8, 2010.

Individuals requesting interpreter services for the hearing impaired must notify the office of the Probate Clerk at 232-0900 (Ext. 213) 72 hours in advance of the hearing date.

Mary Ann DeAngelus,
Town Clerk

## INVITATION TO BID

The Boys & Girls Clubs of Providence is soliciting sealed bids for Alterations and Renovations to the Wanskuck Clubhouse, 550 Branch Avenue, Providence, RI 02904.