FIFTH FIVE-YEAR REVIEW REPORT FOR IRON HORSE PARK SUPERFUND SITE OPERABLE UNITS 1, 2, 3, AND 4 NORTH BILLERICA, MASSACHUSETTS

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LIST OF ABBREVIATIONS & ACRONYMS

ALM	Adult Lead Methodology
AOC	Area Of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
ATV	All-Terrain Vehicle
AWQC	Ambient Water Quality Criteria
B&M	Boston and Maine
BLL	Blood Lead Level
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMR	Code of Massachusetts Regulations
CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
FYR	Five-Year Review
HQ	Hazard Quotient
ICs	Institutional Controls
ICL	Interim Cleanup Level
IEUBK	Integrated Exposure Uptake Biokinetic Model
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MNA	Monitored Natural Attenuation
MNR	Monitored Natural Recovery
NAUL	Notice of Activity and Use Limitation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NHANES	National Health and Nutrition Examination Survey
NPL	National Priorities List
NRWQC	National Recommended Water Quality Criteria
O&M	Operation and Maintenance
OLEM	Office of Land and Emergency Management
ORS	Office of Research and Standards
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
POTW	Publicly Owned Treatment Works
ppb	Parts Per Billion
RA	Remedial Action
RAO	Remedial Action Objectives
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SL	Screening Level
SWDA	Solid Waste Disposal Act
TCE	Trichloroethene

TSCA	Toxic Substances Control Act
TPH	Total Petroleum Hydrocarbons
UU/UE	Unlimited Use and Unrestricted Exposure
VC	Vinyl Chloride
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fifth FYR for the Iron Horse Park Superfund Site. The triggering action for this statutory review is the fourth FYR, which was signed on September 25, 2013. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of four operable units (OUs), and all four OUs will be addressed in this FYR. The remedy for OU-1, the B&M Wastewater Lagoons, initially was bioremediation, but was changed by an Explanation of Significant Differences (ESD) in 1997 to removal and off-site asphalt batching of contaminated soils. The OU-1 remedy was completed in 2003. The remedy for OU-2, the Shaffer Landfill, included capping of the landfill and long-term environmental monitoring. Construction of the OU-2 remedy was completed in 2003. The remedy for OU-3, the remaining source areas at the site, involves capping of landfills and contaminated soil at six different areas of concern (AOCs), as well as maintenance of a landfill cap at a seventh area of concern. Design of the OU-3 remedy is currently completed, with construction of the remedy under way. A remedy has been established for OU-4, which consists of site-wide surface water, sediment, and groundwater. Although some information regarding OU-4 will be presented in this FYR, this operable unit will not be the subject of a protectiveness finding.

The Iron Horse Park Superfund Site Five-Year Review was led by Don McElroy of EPA, Remedial Project Manager for the Iron Horse Park site, with support from AECOM, contractor to EPA Region I. The review began on 1/3/2018.

Site Background

The Iron Horse Park site, located in Billerica Massachusetts near the Tewksbury town line (Figure 1), is a 553-acre industrial complex which includes manufacturing and rail yard maintenance facilities, open storage areas, landfills, and former wastewater lagoons. A long history of activities at the site, beginning in 1913, has resulted in the contamination of soil, groundwater, sediment, and surface water. The Iron Horse Park site is bounded on the north by the MBTA railroad tracks, on the west by High Street and an auto auction facility, on the east by Gray Street, and on the south by a wetland, Pond Street, and the Middlesex Canal (Figure 2). The Middlesex Canal flows through the site to the east, where it joins Content Brook at the southeastern edge of the Shaffer Landfill. There are abundant wetlands at the site. Groundwater flows in both the overburden and bedrock at the Site and flow direction is generally from the southwest to the northeast. Investigation data indicate that overburden groundwater discharges to surface water at the Iron Horse Park site.

The Iron Horse Park Superfund Site was historically surrounded by residential properties and wetlands. This land use remains today and is expected to continue in the future. The majority of the site itself has been historically utilized for commercial and industrial purposes, with an emphasis on rail-related activities. The commercial and industrial uses at the site are expected to continue in the future.

The Iron Horse Park site was listed on the National Priorities List (NPL) in 1984. In 1984, prior to final placement on the NPL, EPA conducted a removal effort, capping a 13.3-acre asbestos landfill now in OU-3. This area had been used as a landfill for asbestos sludge and other asbestos mill wastes generated by the Johns-

Manville Products Corporation, which had a facility within Iron Horse Park. EPA capped this landfill in 1984 as part of an "Immediate Removal Action" under CERCLA.

Following an initial site-wide Remedial Investigation (Phase 1A RI; CDM, 1987), the site was divided into three OUs. Although part of the same NPL listing, each operable unit is essentially an independent site with separate usage and contamination histories. OU-1 - the B&M Wastewater Lagoons, consists of a former 15-acre wastewater lagoon area. A Record of Decision (ROD) selecting a bioremediation remedy to treat contaminated lagoon sediments and soils was issued for OU-1 on September 15, 1988. An ESD revising the remedy to treating the contaminated material via off-site asphalt batching was issued on October 1, 1997. OU-2 - the Shaffer Landfill, is a 60-acre landfill. A ROD selecting a cap reconstruction as the remedy was issued for OU-2 on June 27, 1991. A settlement to implement the landfill capping remedy at OU-2 was reached with responsible parties (OU-2 Settling Defendants) in the fall of 2000. An ESD modifying the remedy to remove leachate via extraction wells was issued on September 8, 2000. The Remedial Action (RA) work for OU-1 has been completed, while at OU-2, construction activities were completed in 2003 and operations and maintenance (O&M) is ongoing.

OU-3 consists of the remainder of the source areas at the site. A ROD selecting the source control remedy at OU-3 was issued on September 30, 2004 which includes the capping of landfills and contaminated soil areas at six different areas of concern and maintenance of a landfill cap at a seventh area of concern. A settlement to implement the source control remedy at OU-3 was reached with responsible parties (OU-3 Settling Defendants) in the fall of 2007. An ESD modifying the remedy to eliminate a regulatory requirement from the list of Applicable or Relevant and Appropriate Requirements (ARARs) was issued on June 19, 2009. A fourth operable unit, OU-4, consists of site-wide surface water, sediment, and groundwater. A ROD selecting the remedy for OU-4 was issued on July 25, 2011 which includes sediment removal from B&M Pond, monitored natural recovery of sediment in other areas, implementing stormwater controls to prevent re-contamination of sediment, and long-term monitoring of groundwater. The OU-4 remedial design is still being developed. Although some information regarding OU-4 will be presented in this review, this operable unit will not be the subject of a protectiveness finding since the remedial design has not been finalized.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Iron Horse Park		
EPA ID: MAD051787323		
Region: 1	**State:** MA	**City/County:** Billerica/Middlesex

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** No

REVIEW STATUS
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**
Author name (Federal or State Project Manager): Don McElroy
Author affiliation: EPA Region I
Review period: 1/3/2018 - 9/25/2018
Date of site inspection: 5/30/2018
Type of review: Statutory
Review number: 5
Triggering action date: 9/25/2013
Due date *(five years after triggering action date)*: 9/25/2018

II. RESPONSE ACTION SUMMARY

II.1.A Basis for Taking Action at OU-1

The B & M Wastewater Lagoons (OU-1) is an approximately 15-acre area which consisted of 5 unlined lagoons. The lagoons were constructed and put into operation in 1915. During operations (until 1992), the lagoons received industrial and sanitary wastewater and some stormwater from the Iron Horse Park industrial complex via a piping system. The lagoons were dredged numerous times, with the material being placed in soil stockpiles adjacent to the lagoons. A focused Remedial Investigation was conducted at OU-1 in 1988 to determine the nature and extent of contamination in and around the B&M Lagoons (Phase 1B RI; CDM, 1988).

Hazardous substances which have been released at OU-1 in the following media include:

Soil/Lagoon Sediment
Polycyclic Aromatic Hydrocarbons (PAHs)
Antimony
Arsenic
Cadmium
Chromium
Lead

II.1.B Response Actions at OU-1

The Remedial Action Objectives (RAOs; at the time of the ROD these were called "remedial response objectives") were developed in response to existing or future risks and were utilized to develop remedial alternatives to address those risks. The RAOs for OU-1 are:

- To protect human health and the environment by stopping the ongoing discharge to the lagoons;
- To protect human health and the environment by reducing current and future risks due to contaminant levels found in soils and sludges from the B&M Lagoons;
- To protect human health and the environment by reducing current and future risks due to releases of contaminants to groundwater, surface water and air; and
- Meet State and federal ARARs.

These RAOs and the risk-based cleanup levels for OU-1 are still valid for assumed commercial/industrial land use since the PAHs and metals exceeding CERCLA residential risk levels were removed from the site.

On September 15, 1988, EPA signed a ROD choosing the remedy for OU-1. The remedy included the following:

- Excavating lagoon sediments and contaminated soil piles to a constructed treatment cell;
- Treating the contaminated material from the lagoons by bioremediation;
- Returning the treated material to the lagoon area, covering it with clean soil, and establishing a vegetative cover;
- Establishing land use restrictions limiting disturbance of the treated material and cover soil without prior review by state and federal authorities; and,
- Decontaminating the lagoon system's piping and pumps.

In a Consent Decree (CD) which was entered on September 13, 1990, Boston and Maine (B&M, now PanAm Railways) agreed to perform the remedial design/remedial action (RD/RA). The CD also established the following performance standards for the bioremediation remedy:

- 60-80% removal (or $\leq$ 1 ppm) of total PAHs;
- 50-60% removal of total petroleum hydrocarbons (TPH); and
- nC_{17}/pristine ratios of $\leq$ 0.2.

TPH cleanup requirements were subsequently quantified (in July 1993), in alignment with Massachusetts requirements, at 5,000 ppm. This cleanup level is consistent with non-residential use

under State regulatory standards. TPH remediation is under State regulatory authority, rather than CERCLA.

In the fall of 1991, the first contaminated material was placed into the bioremediation treatment cell. In the fall of 1994, as required by the ROD, the lagoon system distribution piping was removed, decontaminated, and sent off-site for recycling. The treatment process for contaminated soils and sediments was significantly slower than predicted and had difficulty in achieving cleanup levels. In 1996, it was determined that bioremediation would not achieve the PAH cleanup criterion in a timely manner. As a result, EPA initiated an evaluation of alternatives to bioremediation which resulted in the issuance of an ESD revising the remedy. The ESD for OU1 was signed by EPA on October 1, 1997 (1997 ESD).

The revised remedy specified in the 1997 ESD includes the following:

- Excavation of contaminated material, and transport off-site to an asphalt batching plant for treatment;
- Implementation of protective measures during excavation and transport of contaminated material, to prevent the creation of excess dust and spillage; and
- Verification sampling to ensure that all material requiring treatment has been excavated and that any material left at the lagoons does not contain contamination above cleanup criteria (based on non-residential use). In addition, remaining contaminant concentrations have been shown to be below concentrations which would pose a residential risk (see Section V.1). Because no contamination remains in place above unrestricted use levels, this operable unit does not trigger FYR requirements, although Site-wide FYRs still need to be conducted to address other OUs at the Site.

Following the 1997 ESD, an Asphalt Batching Work Plan was prepared to document activities to be conducted to implement the revised remedy. These activities included:

- Targeting soil removal areas;
- Soil Disposal Characterization sampling;
- Test pit excavation; and
- Post-excavation confirmatory sampling.

Soil areas to be remediated were delineated based on a review and evaluation of historical soil characterization data, as well as data collected in the early fall of 1997. Data were also used to characterize soils for acceptance at a soil recycling facility. Soil removal activities were conducted in October and November 1997 and were documented in a February 1998 report entitled, “Soil Excavation and Asphalt Batching Report.”

In October 2000, additional soil excavation and confirmatory sampling were conducted. The purpose of this effort was to gather confirmatory samples to assess whether additional excavation was necessary and to evaluate potential risks associated with metals in soil. The results of the field work demonstrated that additional soil removal and re-sampling would be necessary.

In December 2001, the following activities were performed at the site:

- Limited additional excavation of soil piles;

- Collection of confirmatory soil samples for PAH and TPH; and
- Collection of limited confirmatory samples for lead.

The soils excavated in December 2001 were stockpiled at the site. In August 2002, the stockpiled soils were transported off-site for asphalt batching.

II.1.C Status of Implementation at OU-1

As noted in the previous section, remedial actions at OU-1 are complete.

II.1.D Systems Operations/Operation & Maintenance at OU-1

As documented in the Site Summary Report (ERM, 2003), confirmatory soil samples were collected and showed that soils with contaminants above cleanup requirements were removed from the site (it was later shown that the remaining contaminant concentrations were also below concentrations which would pose a residential risk). There are no O&M requirements at OU-1.

II.2.A Basis for Taking Action at OU-2

OU-2- Shaffer Landfill is an approximately 60-acre former landfill, which was used for disposal of residential and commercial waste for more than 30 years. Shaffer Landfill stopped receiving waste in 1986. The landfill, which consists of two lobes, is located on a 106-acre property which is bordered by Pond Street to the west, the railroad tracks to the north, Gray Street to the east, and the Middlesex Canal to the south. A focused Remedial Investigation was conducted at OU-2 in 1989 to determine the nature and extent of contamination in and around the Shaffer Landfill (Phase 1C RI; CDM, 1989).

Hazardous substances which have been detected at OU-2 in the following media include:

Groundwater	**Sediment**	**Surface Water**
Arsenic	acetone	barium
Benzene	toluene	mercury
1,2-Dichloroethane	PAHs	lead
1,2-Dichloroethene	arsenic	nickel
Ethylbenzene	lead	arsenic
Methylene Chloride	zinc	chromium
Pentachlorophenol		
Toluene		
1,1,2-Trichloroethane		
Trichloroethene		
Vinyl Chloride		
Xylene		

II.2.B Response Actions at OU-2

The RAOs for OU-2 which were utilized to develop remedial alternatives are:

- Prevent ingestion/direct contact with landfill waste contamination;
- Prevent migration of contamination via leachate which would result in groundwater

concentrations in excess of federal Maximum Contaminant Levels (MCLs), non-zero Maximum Contaminant Level Goals (MCLGs), proposed MCLs and MCLGs, and Massachusetts Groundwater Quality Standards;
- Prevent migration of contamination via leachate to surface waters and sediments to ensure that National Recommended Water Quality Criteria (NRWQCs) are not exceeded due to the landfill;
- Prevent damage and loss of wetlands caused by eroding soil from the landfill cap, and meet all federal and state wetlands protection ARARs;
- Prevent ingestion of water having contamination in excess of federal MCLs, non-zero MCLGs, proposed MCLs and MCLGs, and Massachusetts Groundwater Quality Standards; and
- Restore groundwater aquifer beyond the point of compliance to contaminant concentrations below federal MCLs, non-zero MCLGs, proposed MCLs and MCLGs, and Massachusetts Groundwater Quality Standards.

On June 27, 1991 EPA signed a ROD choosing the remedy for OU-2. The remedy, reconstructing the landfill cap, determined that reconstruction would be accomplished by:

- Removing the existing topsoil layer exposing the existing in-place low-permeability soil;
- Raising existing gas collection well heads as necessary up to reconstructed cap surface level and adding additional gas extraction wells;
- Adding additional low-permeability soil;
- Grading of low-permeability soil to:
    - Provide a 5% grade on the top of the landfill lobes, and
    - Provide a consistent smooth sub-grade on the landfill side slopes;
- Installing an impermeable textured membrane liner over the entire landfill area;
- Installing a 6-inch drainage layer on top of the textured membrane liner over the entire landfill area;
- Installing a non-woven filter fabric between the drainage and topsoil layers;
- Reinstalling the topsoil layer and adding additional topsoil to achieve a topsoil depth of 12 inches;
- Reinstalling an upgraded surface drainage system; and
- Reseeding of the disturbed areas.

The remedy also includes:

- Maintenance of cap, surface drainage system, and landfill gas collection/flare system. If necessary, improvements will be made based upon the protectiveness and effectiveness of these components;
- Monitoring of the gas collection/flare system;
- Monitoring of groundwater and surface water quality;
- Construction, operation, and maintenance of leachate collection facilities;
- Off-site treatment and disposal of leachate;
- Construction of site perimeter security fence;
- Institutional Controls, and
- Post Closure Plan.

Groundwater, beyond the groundwater compliance boundary for the landfill, is the only media for which interim cleanup levels were established in the ROD. Those interim cleanup levels are as follows:

Arsenic	50 ppb
Benzene	5 ppb
1,2-Dichloroethane	5 ppb
Methylene Chloride	5 ppb
Pentachlorophenol	1 ppb
1,1,2-Trichloroethane	3 ppb
Trichloroethene	5 ppb
Vinyl Chloride	2 ppb

The ROD contains discussion regarding the leachate collection facilities which conceptualize a toe-drain system constructed to collect liquid from above the groundwater table. During the Remedial Design process, the design of the leachate toe-drain system posed a number of difficulties, most importantly disagreement over the final elevation of the collection system. There was a dual concern that the toe-drain system: a) would be relatively ineffective in collecting leachate from above the groundwater table (as required by the ROD); and b) carried the risk of being inundated by an elevated groundwater table. The first issue would limit greatly the volume of leachate subject to removal while the second issue would potentially necessitate the collection, treatment and disposal of large volumes of relatively clean groundwater. To reach resolution, on September 8, 2000, EPA issued an ESD (2000 ESD) modifying the remedy. The 2000 ESD modified the remedy so that leachate would be removed via extraction wells directly from the interior of the landfill. Under the modified remedy, leachate would still be collected at a central location for treatment and disposal offsite.

The Remedial Design was approved by EPA in the fall of 2000. Also in the fall of 2000, a settlement, via a CD, was reached with the OU-2 Settling Defendants. Under the terms of the CD, the OU-2 Settling Defendants agreed to perform the Remedial Action at the Shaffer Landfill implementing the remedy selected in the ROD as modified by the 2000 ESD. Construction of the remedy at the Shaffer Landfill began in the spring of 2001. The Remedial Action Work Plan outlined a process whereby one of the landfill lobes would be capped in 2001 and the second lobe would be capped in 2002. Concurrent with the capping process, the other required elements of the remedy would be completed. These other elements included: installation of groundwater monitoring wells; wetland restoration activities; and initiation of periodic (groundwater and surface water) monitoring. The 2001 construction season proceeded as planned, with the substantial completion of construction activities on the first lobe of the landfill. In 2002, a design change which entailed capping a larger area, as well as the onset of wet fall/early winter weather, prevented completion of the second lobe. Construction of the landfill cap was completed in the summer of 2003. The OU-2 Settling Defendants, which performed the construction, submitted a final construction report in September 2003 (GeoSyntec, 2003), documenting the construction activities and demonstrating compliance with the requirements of the project. This report was reviewed and approved by EPA, certifying completion of construction. Institutional Controls (ICs) still have not been established for the landfill, although access is restricted by the OU-2 Settling Defendants and O&M activities do also note whether trespassing or other disturbance of the remedy has occurred.

Monitoring of groundwater shows that there are still groundwater contaminants beyond the landfill's compliance boundary at levels that exceed the ROD's ICLs (see Section IV), but there has not been sufficient data collected to show that groundwater cleanup standards can be achieved within a

reasonable time period. Also, it is unclear that the extent of the groundwater contaminantion exceeding cleanup standards has been fully defined (see Section IV).

II.2.C Status of Implementation at OU-2

As noted in the previous section, the landfill cap construction has been completed and O&M is ongoing to maintain the cap and the management of migration components of the remedy. Groundwater beyond the landfill's compliance boundary does not meet all ROD ICLs (see Section IV). Institutional controls remain to be implemented, although Site access restrictions are being maintained on property within the fenceline of the Site. No ICs are in place to prevent use of contaminated groundwater beyond the compliance boundary.

IC Summary Table

Table 1: Summary of Planned and/or Implemented ICs at OU-2

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater and Engineered controls (e.g., the landfill cap and associated features)	Yes	Yes	Being developed (landfill parcel and adjacent properties)	Protect landfill cap and associated features. Prevent use of groundwater within the groundwater compliance boundary for the landfill. Establish temporary ICs beyond the compliance boundary until groundwater cleanup standards are achieved	Notice of Activity and Use Limitation (NAUL) planned

II.2.D Systems Operations/Operation & Maintenance at OU-2

The Operation and Maintenance phase of the project began in the fall of 2003 (final plan approved January 9, 2004). This phase entailed inspection and maintenance of the landfill cap and associated features of the remedy, as well as monitoring of groundwater, burning of landfill gas (via the on-site flare) and collection and disposal of leachate. Leachate collection occurred on a limited basis. Pretreatment was not required prior to off-site disposal at a Publicly Owned Treatment Works (POTW). In addition, wetlands inspections and maintenance, and periodic monitoring of groundwater and surface water are also conducted. Under the terms of the CD, the OU-2 Settling Defendants are performing the bulk of the required O&M activities for a 40-year period, after which the Commonwealth of Massachusetts (the Commonwealth) will assume responsibility for O&M. The exceptions to this are: landfill soil gas migration monitoring; flare compliance monitoring, and surface water monitoring, which, as appropriate, are currently being conducted by the Commonwealth. In addition, in accordance with the CD, the Commonwealth will take over responsibility for groundwater monitoring activities in 2019 based on the determination that the remedy is "working properly and as designed" and a maximum number of years of monitoring by the PRPs.

Due to the reduction in landfill gas production over time, the on-site enclosed flare was having difficulty running continuously. In fall 2013, candlestick flares tied directly into a limited number of individual gas wells were installed and the flare was shut down on October 1, 2013. The candlestick flares are inspected monthly.

In 2014, solar panels were installed on both landfill lobes (covering an area of 25 acres) under an agreement with the OU-2 Settling Defendants. O&M of the solar array is not associated with landfill O&M.

II.3.A Basis for Taking Action for OU-3

OU-3 is characterized by numerous source areas, multiple property owners, a complex history and widespread environmental impacts to soils, sediment, surface water, and groundwater. During the Remedial Investigation/Feasibility Study (RI/FS) process for OU-3, EPA conducted a risk assessment for both human health and ecological receptors. Each potential source area (Area of Concern, or AOC) in OU-3 is unique and in fact each area underwent an independent risk assessment. Under current and future exposure scenarios, there are numerous areas where the EPA risk range is exceeded.

AOCs in OU-3 consist of the B&M Railroad Landfill (AOC1), the B&M Locomotive Shop Disposal Areas (AOC3) , the RSI Landfill (AOC2), the Old B&M Oil/Sludge Recycling Area (AOC4), the Contaminated Soils Area (AOC5), and the asbestos contamination areas (including the Asbestos Landfill [AOC6] and the Asbestos Lagoons [AOC7]). The medium of concern in OU-3 is surface and subsurface soil, while groundwater, surface water, and sediment are the primary media of concern in OU-4. A site-wide evaluation of depositional asbestos in soil was also performed as part of OU-4. Contaminants detected most frequently on site included volatile organic compounds, semi-volatile organic compounds, pesticides, polychlorinated biphenyls (PCBs), asbestos, and metals.

Extensive sampling was conducted during 1993 to evaluate the levels, extent, potential sources, and possible means of migration of contamination in the above-mentioned media and associated with a number of source areas around Iron Horse Park. Additional investigations, including a risk assessment, began in 1994. A Remedial Investigation (RI) was completed in the fall of 1997. A Feasibility Study (FS) was completed in May 2004 to evaluate potential alternatives for the remediation of this area. In addition, a Proposed Plan recommending a series of cleanup alternatives was completed in May 2004. The ROD selecting the remedies for the affected media was signed on September 30, 2004. This ROD, which addressed the source areas only, chose capping in place as the remedy for the various source areas. A focused evaluation of ecological exposures to surface water and sediment, and a re-evaluation of site-wide groundwater contamination, were deferred to OU-4. In September 2007, EPA reached a settlement with the OU-3 Settling Defendants, which requires the OU-3 Settling Defendants to implement the remedies chosen in the September 2004 ROD. Design of the remedy by responsible parties, with EPA oversight, has been completed for all AOCs. Construction of the remedies is completed for five out of seven AOCs.

Besides the need to cover landfilled materials, hazardous substances which have been released at OU-3 in the following media include:

Soil
Asbestos
Cadmium
Copper
Lead

II.3.B Response Actions for OU-3

The RAOs for OU-3 which were utilized to develop remedial alternatives are:

Human Health

- Soil - Prevent ingestion of lead from soil-derived dust at the B&M Locomotive Shop Disposal Areas, Old B&M Oil/Sludge Recycling Area, and Contaminated Soils Area that results in estimated maternal blood levels of greater than 4.2 ug/dL, a site-specific level protective of a 95th percentile fetal blood lead level of 10 ug/dL. This results in preventing exposure to lead soil concentrations greater than 1,736 mg/kg.
- Soil - Prevent exposure to asbestos at the Asbestos Landfill.
- Soil - Prevent exposure to asbestos at the Asbestos Lagoons.
- Groundwater - Limit migration of contaminants in the B&M Landfill, RSI Landfill, B&M Locomotive Shop Disposal Areas, Old B&M Oil/Sludge Recycling Area, Contaminated Soils Area, and Asbestos Lagoons into groundwater.

Ecological

- Protect short-tailed shrews and other small mammals from exposure to levels of metals associated with a Hazard Quotient (HQ) greater than 1 (cadmium) in soils at the B&M Railroad Landfill.
- Protect short-tailed shrews and other small mammals from exposure to levels of metals associated with a HQ greater than 1 (copper and lead) in soils at the B&M Locomotive Shop Disposal Areas.

These RAOs for OU-3 remain valid except for the lead soil concentration specified in the human health soil RAO. As will be discussed later, a revised lead screening level based on revised lead modeling parameters has been determined to be 1,000 mg/kg.

On September 20, 2004, EPA signed a ROD choosing the remedy for OU-3, which includes capping of landfills and contaminated soil areas at six different AOCs and maintenance of an existing landfill cap at a seventh AOC. The major components of this remedy include:

1. Capping of source areas at the following AOCs, with capping standards that apply:
   - B&M Railroad Landfill (AOC1) – Hazardous Waste Cap – *Region 1 Alternative Cap Design/Solid Waste Disposal Act (SWDA), Subtitle C*
   - RSI Landfill (AOC2), B&M Locomotive Shop Disposal Areas (AOC3) and the Asbestos Lagoons (AOC7) – Solid Waste Cap – *SWDA, Subtitle D*

- Old B&M Oil/Sludge Recycling Area (AOC4) and the Contaminated Soils Area (AOC5) – Solid Waste/Asphalt Cap – *MassDEP Landfill Technical Guidance Manual/Solid Waste Disposal Act (SWDA), Subtitle D*
-Asbestos Landfill (AOC6) – Maintenance of the existing *Toxic Substances Control Act (TSCA)* cap

2. Institutional Controls
3. Groundwater monitoring to assess effectiveness of source control actions.

Soil is the only media for which cleanup levels were established in the ROD. Those cleanup levels are as follows:

Lead	1,736 mg/kg (see discussion above and later in Section V, Question B, where this would now be 1,000 mg/kg) – Applicable at B&M Locomotive Shop Disposal Areas, Old B&M Oil/Sludge Recycling Area, and Contaminated Soils Area; based on commercial adult worker exposures
Cadmium	15.4 mg/kg – Applicable at B&M Railroad Landfill; based on ecological exposures
Copper	2213 mg/kg – Applicable at B&M Locomotive Shop Disposal Areas; based on ecological exposures
Lead	868 mg/kg – Applicable at B&M Locomotive Shop Disposal Areas; based on ecological exposures

II.3.C Status of Implementation for OU-3

In September 2007, EPA reached a settlement with OU-3 Settling Defendants requiring them to implement the remedies selected in the September 2004 ROD. Design of the remedy by the OU-3 Settling Defendants, with EPA oversight, is complete.

The five-year review performed in 2008 noted that "it may be appropriate to calculate and establish a new lead cleanup level based on the additional population statistics under EPA's adult lead methodology." This evaluation was first performed in 2009. At that time, a revised lead soil screening level of 1,107 mg/kg was calculated to replace the 1,736 mg/kg cleanup level noted above. Refer to Section V, Question B, for discussion on the most current update to this screening level (1,000 mg/kg).

AOC7 remedy construction (capping of the Asbestos Lagoons) was completed in 2010, as summarized in the Final Remedial Construction Report dated November 29, 2010 (W&C, 2010). Groundwater monitoring to assess effectiveness of the source control action has been ongoing. Recent monitoring data is included in Appendix D.3. AOC7 is currently in the O&M phase.

During the design process for AOC7, it was determined that a regulatory requirement (a provision of the TSCA regulations for transport and disposal of asbestos waste) was inappropriately included as an ARAR for AOC7 in the 2004 ROD. An ESD modifying the remedy to eliminate this ARAR was issued on June 19, 2009 (2009 ESD).

AOC4 and AOC5 remedy construction (capping of contaminated soil in the Old B&M Oil/Sludge Recycling Area and Contaminated Soils Area) was initiated in 2012 and completed in spring 2013, as summarized in the Final Remedial Construction Report dated September 25, 2014 (ERM, 2014).

AOC2 (capping of waste in the RSI Landfill) and AOC6 (cover erosion repair of the Asbestos Landfill) was initiated in 2016 and completed in summer 2017, as summarized in the Final Remedial Construction Report dated September 19, 2017 (ERM, 2017).

Work on AOC3 (B&M Locomotive Shop Disposal Areas; capping of waste) is planned for 2018, with work on AOC 1 (B&M Railroad Landfill) to follow soon thereafter.

IC Summary Table

Table 2: Summary of Planned and/or Implemented ICs at OU-3

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Engineered controls (e.g., the landfill cap and associated features), groundwater underneath caps	Yes	Yes	Being developed	Protect cap(s) and associated features at individual AOCs. Prevent use of groundwater under the caps.	Notice of Activity and Use Limitation (NAUL) planned

II.4.A Basis for Taking Action at OU-4

OU-4 of Iron Horse Park includes site-wide surface water, sediment, and groundwater (OU-4 does not include groundwater contamination associated with OU-2). With the many sources at the site (OU-1, OU-2, and OU-3), separate evaluation of these media was determined to be appropriate via development of a fourth operable unit. An Ecological Risk Assessment/Wetlands Remedial Investigation Addendum (ERA/WRIA; M&E, 2006a) was performed to more accurately determine the risk to ecological receptors exposed to contaminants in surface water and sediment throughout the site. Surface water exposures were not associated with significant ecological risk; however, a number of organics and metals were found to be associated with risk to benthic invertebrates in sediment. A Groundwater Data Evaluation report (M&E, 2006b) was generated in 2006 to provide a summary of groundwater sampling performed in the winter of 2005/2006. A Supplemental Human Health Risk Assessment (M&E, 2008) was performed to determine risk drivers associated with future groundwater use, which include miscellaneous organics and metals. A focused Feasibility Study was completed in 2010 (M&E, 2010), and a ROD selecting the remedies for the affected media was signed on July 25, 2011. This ROD chose excavation and disposal of contaminated sediment from B&M Pond, Monitored Natural Recovery (MNR) for other sediment exceeding cleanup levels, implementing storm water runoff controls, long-term groundwater monitoring, and institutional controls to prevent use of groundwater.

In 2014, EPA performed additional toxicity testing in B&M Pond to better determine the extent of cleanup. An ESD was signed on July 22, 2014 (2014 ESD) which refined the extent of cleanup in B&M Pond based on the toxicity testing results. The 2014 ESD also established that toxicity testing would be

used to delineate extent of remediation in B&M Pond, rather than cleanup levels. In October 2014, EPA reached a settlement with the OU-4 Settling Defendants, which requires the OU-4 Settling Defendants to implement the remedies chosen in the September 2011 ROD. Further pre-design investigations have been performed and design of the remedy by responsible parties, with EPA oversight, is anticipated to be completed in fall 2018.

Hazardous substances which have been released at OU-4 in the following media include:

Groundwater	**Sediment**
1,2-Dichloroethane	PAHs
1,4-Dichlorobenzene	PCBs
Benzene	4,4'-DDD
Carbon tetrachloride	Chromium
cis-1,3-Dichloropropene	Copper
Tetrachloroethene	Lead
Trichloroethene	Vanadium
Vinyl Chloride	Zinc
Atrazine	
Bis(2-choroethyl)ether	
Dibenz(a,h)anthracene	
Dieldrin	
Arsenic	
Cadmium	
Lead	
Manganese	

II.4.B Response Actions at OU-4

On July 25, 2011, EPA signed a ROD choosing the remedy for OU-4. The major components of this remedy include:

- Excavation of about 7,400 cubic yards of B&M Pond contaminated sediment;
- Dewatering, transport and disposal of contaminated sediments (either on or off-site);
- Treatment (if necessary) and discharge of sediment dewatering fluid and potential stabilization of sediment prior to disposal;
- Wetland mitigation as required;
- MNR in Unnamed Brook and other unexcavated sediments that exceed sediment cleanup levels;
- Implementing stormwater runoff controls to prevent sediment recontamination;
- Institutional Controls, including at least yearly compliance monitoring, to protect stormwater controls and to prevent disturbance of wetlands undergoing MNR (until sediment cleanup standards are achieved - approximately 20 years);
- Groundwater monitoring to confirm that contaminants do not migrate beyond the compliance boundary for the Site (including the installation of new wells to supplement the existing monitoring well network);
- Institutional Controls to prevent use of groundwater on Site and to protect components of the remedy, including at least yearly compliance monitoring; and
- Five-year reviews

The 2014 ESD reduced the volume of sediment excavation to approximately 1,000 cubic yards.

II.4.C. Status of Implementation at OU-4

As noted above, in October 2014, EPA reached a settlement with OU-4 Settling Defendants, which requires the OU-4 Settling Defendants to implement the remedies chosen in the September 2011 ROD. Further pre-design investigations have been performed and design of the remedy by responsible parties, with EPA oversight, is anticipated to begin in fall 2018. Since the remedy has not yet been implemented, the five-year review evaluations associated with the selected remedy will not be performed.

IC Summary Table

Table 3: Summary of Planned and/or Implemented ICs at OU-4

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater and remedy components	Yes	Yes	To be determined after remedy implementation	Prevent use of groundwater within the compliance boundary and protect remedy components.	Notice of Activity and Use Limitation (NAUL) planned

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the **last** five-year review as well as the recommendations from the **last** five-year review and the current status of those recommendations. Note that the OU-4 remedy has not yet been implemented, so there has not yet been a full five-year review evaluation associated with the selected remedy.

Table 4: Protectiveness Determinations/Statements from the 2013 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The remedy at OU-1 is protective of human health and the environment from risks from CERCLA contaminants. Review and approval of the Site Summary Report (ERM, 2003) was performed by EPA, confirming that the remedy for OU-1 was implemented as required in the ROD and as modified by the ESD. The assumptions used at the time of remedy selection are valid and no changes to cleanup levels are warranted.

OU #	Protectiveness Determination	Protectiveness Statement
2	Short-term Protective	The remedy at OU-2 currently protects human health and the environment, as exposure pathways that could result in unacceptable risks are being controlled. The landfill is fenced to prevent access. However, in order for the remedy to be protective in the long-term, institutional controls will be created and recorded to restrict inappropriate land uses (including use of groundwater) and protect the landfill cap and other components of the remedy. Operation and Maintenance activities have been initiated and will ensure that the landfill and associated components of the remedy remain in good condition. In addition, monitoring of groundwater and surface water will continue to assess the continued protectiveness of the capping remedy and progress towards attainment of groundwater cleanup levels beyond the landfill compliance boundary. There is no current use of groundwater in areas where groundwater cleanup standards still need to be attained.
3	Will be Protective	The remedy at OU-3 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas. At this time, remedy construction has been completed at one Area of Concern (AOC), initiated at two other AOCs, and not yet implemented at the four remaining AOCs. The Remedial Action Objectives (RAOs), Applicable or Relevant and Appropriate standards (ARARs) for the remedy established in the ROD and 2009 ESD, and established cleanup levels remain valid and protective. A revised human health lead in soil cleanup level was calculated by EPA, based on updated Adult Lead Methodology, prior to Remedial Design (RD). This revised cleanup level has been used during the RD/ Remedial Action (RA) phases of the project and will require an ESD for it to be applicable to the OU-3 remedy.

Table 5: Status of Recommendations from the 2013 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
2	Institutional controls restricting inappropriate land uses (including preventing the use of groundwater beyond the landfill's compliance boundary) and protecting the landfill cap and other components of the remedy need to be established.	Discussions between EPA, MassDEP, and the property owners should be re-started in 2014. Upon completion of discussions between the parties, institutional controls should be established at OU-2 by the end of 2015.	Ongoing	EPA is in discussion with MassDEP	
2	A future ESD would be required to incorporate the change to the arsenic MCL and the repromulgation of State Groundwater Quality Standards at 314 CMR 5.11.	The ESD to incorporate the change to the arsenic MCL and State Groundwater Quality Standards into the OU-2 remedy should be completed before the next five-year review.	Under Discussion	Not completed; planned for 2019	
2	The reduction in groundwater concentrations outside of the existing compliance boundary (edge of landfill) is progressing slowly.	Either evaluate refinement of the compliance boundary, including consideration of an exclusion area for offsite groundwater extraction, or potentially consider groundwater reclassification in the area.	Under Discussion	Not completed; further evaluation to follow this five-year review	

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
3	In 2009, EPA updated its Adult Lead Methodology which is used to establish soil cleanup levels for lead. A revised lead cleanup level was calculated based on this update. This revision will require an ESD to be applicable to the OU-3 remedy.	The ESD to incorporate the change to the lead cleanup level for the remedy should be completed before the next five-year review. It should be noted that the revised cleanup level has been informally applied during OU-3 remedy implementation.	Under Discussion	Recommended lead modeling parameters have since changed again (2016, 2017), resulting in a new revised cleanup level for lead.	

IV. FIVE-YEAR REVIEW PROCESS

As stated earlier, the OU-4 remedy has not yet been implemented, so the five-year review evaluations associated with the selected remedy will not be performed.

Community Notification, Involvement & Site Interviews

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date**.** Interviews regarding the entire Iron Horse Park site were performed on August 3 through August 8, 2018 with officials from Billerica, Massachusetts and MassDEP. Results of these interviews are summarized in Appendix A.2.

A public notice was made available by an EPA press release titled "EPA Begins Reviews of 24 New England Site Cleanups during Current Fiscal Year" announcing that EPA was beginning five-year reviews of 24 New England Site Cleanups during the Current Fiscal Year, on 2/16/2018, stating that there was a five-year review and inviting the public to submit any comments to the U.S. EPA. The results of the review and the report will be made available at the Site information repository located at Billerica Public Library, 15 Concord Road, Billerica, MA 01821 and on U.S. EPA's website at https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.cleanup&id=0100524.

Data Review

OU-1
No contaminated material above unrestricted use risk levels was left at OU-1 (see Section V.1). The implementation of the remedial action (which entails all cleanup activities) has been formally completed, as defined by review and approval of the Site Summary Report (ERM, 2003), which was submitted by the Settling Defendant. Confirmatory sampling results from the Site Summary Report have been included in Appendix B.2.

OU-2

Appendices C.2 and C.3 contain groundwater and surface water post-construction sampling results. The 2008 five-year review noted the presence of four analytes in groundwater (arsenic, benzene, trichloroethene [TCE], and vinyl chloride [VC]) at concentrations in excess of MCLs. As discussed in that report, many of the organics detected in groundwater around the landfill were observed to have decreasing concentrations. A review of the data in the 2013 five-year review confirmed this observation. TCE and VC were not detected above interim cleanup levels (ICLs). Benzene concentrations in ENSR-11B had been decreasing slightly, while concentrations in GZA-6A and GZA-3B had been fairly stable over those five years, slightly above the ICL of 5 ug/L.

A review of the data in the past five years shows some inconsistent results. There was one TCE detection at ENSR-11A in 2016 which was well above the MCL. At that same location, there were also high detections of VC (80 ug/L) and cis-1,2-dichloroethene (590 ug/L). None of those three analytes were detected in the other monitoring rounds between 2013 and 2017. Similarly, VC and cis-1,2-dichloroethene were detected once in ENSR-11B in 2017, but not in other monitoring rounds. Benzene concentrations in ENSR-11B continue to decline, with only two monitoring rounds showing detections slightly above the MCL. GZA-6A continues to show benzene detections slightly above the MCL, while GZA-3B no longer shows benzene detections above the MCL.

Arsenic concentrations have remained consistent, with exceedances of the ICL at multiple wells outside of the compliance boundary (edge of waste). Arsenic is often observed in water (both ground and surface) near landfills due to reducing conditions in the aquifer caused by the release of organics from landfill wastes. Since the OU-2 ROD was issued in 1991, the arsenic MCL has changed from 50 ppb to 10 ppb. The revised arsenic MCL will need to be incorporated into the OU-2 remedy through a future CERCLA decision document. It should be noted that arsenic detections in overburden wells downgradient of the landfill are likely to be discharging to area wetlands and arsenic has not been detected above the MCL in the bedrock well downgradient of the landfill heading towards Gray Street (MW-4B).

As discussed, many of the organics detected in groundwater around the landfill (outside of the compliance boundary) have been observed to have decreasing concentrations. Following further reduction of these organic concentrations, it is expected that arsenic concentrations will also begin to decrease. However, the time frame for this reduction could potentially be lengthy, based on historic observations. It should also be noted that, while there are no wells beyond the existing monitoring wells which would define the current extent of ICL exceedances, much of the groundwater discharges to local wetlands/surface water bodies.

Volatile organic compounds (VOCs), though sporadically detected in surface water, are present at low concentrations that do not exceed National Recommended Water Quality Criteria (NRWQC) for protection of human health; formerly designated as Ambient Water Quality Criteria, or AWQC, and would not pose a risk or hazard to human health.

OU-3

Appendix D.3 contains groundwater monitoring data collected at AOC7, along with a figure showing the monitoring locations. Review of the data shows that most analyte concentrations have been generally stable or decreasing. However, tetrachloroethene (PCE) and TCE concentrations have increased over the past five years in OW-9 (downgradient bedrock well), OW-10 (downgradient deep overburden well), OW-20 (side-gradient deep overburden well), MW-208D (side/upgradient deep

overburden well), OW-11 (downgradient shallow overburden well), and MW-208S (side/upgradient shallow overburden well). The originating source of these detections is unclear. However, these groundwater results will be utilized during future evaluations included as part of OU-4 where site-wide groundwater is being addressed.

Landfill gas monitoring performed at AOC7 (see Appendix D.3) shows minimal emissions/contaminants being discharged from the passive vents.

Groundwater (5 locations) and surface water (2 locations) monitoring was performed in June 2016 as part of an environmental monitoring program associated with the other source areas in OU-3. Appendix D.2 contains a monitoring location map and the results from this round of monitoring. In general, monitoring results were similar to the most-recent previous monitoring event performed in 2005.

Site Inspection

The inspection of the Site was conducted on 5/30/2018. In attendance were by Don McElroy of EPA, Remedial Project Manager for the Iron Horse Park site, with support from AECOM, contractor to EPA Region I. The purpose of the inspection was to assess the protectiveness of the remedy.

OU-1

Similar to previous inspections, there is still evidence of all-terrain vehicle (ATV) use. A Site Inspection Checklist was not completed for OU-1, as the PAH-contaminated soils were removed, there is no risk present for unrestricted use (see Section V.1), and there is no ongoing post-construction O&M.

OU-2

Remedial activities (summarized earlier) were completed in 2003. Photos of the OU-2 area are included in Appendix A.1. During the inspection, the landfill cover, security fence, and operational systems appeared to be functioning properly and are well-maintained. No evidence of trespassing was observed at the time of the site walkover. There was vegetative growth in some downchutes and swales which should be reduced further; however, no evidence of standing water or other impairments due to the vegetation were observed. The Site Inspection Checklist associated with OU-2 is included in Appendix C.4

OU-3

Photos of the OU-3 area are included in Appendix A.1 and show that, for some AOCs, site conditions have not changed significantly since previous investigation activities, while other AOCs have changed significantly. As construction for AOCs 2, 4, 5, 6, and 7 has been completed, a Site Inspection Checklist was utilized and is included for each of these AOCs in Appendix D.4.

At the Asbestos Lagoons (AOC7), the cover appears to be in good condition and boundary fencing is intact. There were multiple groundhog burrows observed which require maintenance. All other areas appear to be in good condition.

Since construction completion at the Contaminated Soils Area (AOC5), the area has been used to store lumber. Pavement is generally in good shape, with a few scuffed areas. Some drain grates were missing and require replacement/repair. Similarly, at the northern end of the pavement, gravel was previously placed there to protect against exposures to remaining soil. The gravel is missing and requires replacement.

The B&M Railroad Landfill (AOC1) remains well-vegetated. A large pile of covered soil now exists on the landfill, originating from the construction at AOCs 4 and 5 (contaminated surface soil which required removal prior to the placement of pavement). A pile of fencing and piping from the same construction effort also exists in this area. Since the last inspection, DirtGlue has been used to reduce dust generation, as the previous plastic cover was difficult to maintain. It appears that another application of DirtGlue might be appropriate based on observed conditions (crust no longer evident).

The B&M Locomotive Shop Disposal Areas (AOC3) were well-vegetated, with no obvious changes since the 2013 site walkover.

The RSI Landfill (AOC2) is now capped, with the cover appearing to be in good condition and boundary fencing intact. No concerns were observed.

There are two pavement-capped areas associated with the Old B&M Oil/Sludge Recycling Area (AOC4). The area outside of Cooperative Reserve's (current property owner) fencing had pavement completed in the spring of 2013 and now has lumber being stored on portions of the pavement. There is one edge of the pavement which has some damage, but the design shows that the edge was constructed to be a couple of feet beyond any remaining soil contamination. Regular inspections should continue to watch this area. The area inside of Cooperative Reserve's fencing appears to be in generally good shape, with a few cracks which should be sealed in the near future. There are currently pallets of lumber being stored on the cap, although they do not appear to be damaging the cap.

The Asbestos Landfill (AOC6) cap is well-vegetated and appears to still be protective. However, some of the vegetation is beginning to get large and should be removed to maintain cap integrity. Since the last five-year review, erosion areas have been repaired and the landfill is now partially covered with solar panels. ATV use of the area appears to be reduced due to the solar array. Fencing is intact.

V. TECHNICAL ASSESSMENT

V.1 OU-1 QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Yes. The review of documents, ARARs, risk assumptions, and the results of site inspections performed during the remedial action, indicate that the OU-1 remedy was performed as intended by the ROD as modified by the 1997 ESD. Since no contaminated material above cleanup levels was left at OU-1, there is no ongoing remedy to "function." The "construction" of the remedial action (which entails all cleanup activities) has been formally completed, as defined by review and approval of the Site Summary Report (ERM, 2003), which was submitted by the Settling Defendant. Confirmatory sampling results from the Site Summary Report have been included in Appendix B.2.

V.1 OU-1 QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

No. There have been some changes in exposure assumptions, toxicity factors, and risk assessment methods used to evaluate risk at OU-1. Current worker, future worker and future resident exposure to contaminated soil and sediment, are still valid, though conservative in the case of the future resident since residential land use is not anticipated.

Even though there have been changes in toxicity values and risk assessment methods since the OU-1 risk assessment, soils and sediments have been excavated and confirmatory sampling performed. The confirmatory sampling results and statistical evaluation performed in the 2003 Site Summary Report (see Appendix B.2) indicate maximum exposure point concentrations for contaminants of concern as follows:

- Total PAHs - 0.91 mg/kg;
- Lead - 320 mg/kg (average concentration = 50 mg/kg)
- Antimony - 2.2 mg/kg
- Arsenic - 5.3 mg/kg
- Cadmium - 0.37 mg/kg; and
- Chromium - 27 mg/kg.

For analytes other than total PAHs, exposure to these residual levels of contaminants would not pose a risk or hazard above EPA's risk management criteria for future commercial/industrial use of the site, based on a comparison to industrial risk-based concentrations developed by EPA (2018). EPA's risk-based concentrations have been developed using currently accepted risk assessment assumptions and methods, and using toxicity values that were selected following the hierarchy recommended by EPA (2003). Assuming that total PAHs are comprised of the most potent PAH, benzo(a)pyrene, the residual total PAH levels would also not pose a risk above EPA's risk management criteria, based on a comparison to the benzo(a)pyrene risk-based concentration for industrial land use. Even though future site use is unlikely to be residential, residual levels of PAHs (assumed to be benzo(a)pyrene) and metals (assuming the chromium exists as Cr^{+3}, as this is the typical state of chromium found in nature and the site was not known to handle Cr^{+6}) would not pose a risk or hazard above EPA's risk management guidelines to future residents, based on a comparison to residential risk-based concentrations developed by EPA (2018). Elevated levels of TPH which were present within the OU, regulated under State authority, were removed concurrently with the CERCLA cleanup.

With respect to lead, EPA's 2016 Office of Land and Emergency Management (OLEM) memorandum "Updated Scientific Considerations for Lead in Soil Cleanups" (OLEM Directive 9200.2-167; EPA, 2016a) indicates that there is sufficient evidence that adverse health effects are associated with blood lead levels (BLLs) at less than 10 µg/dL. The memo mentioned that several studies have observed "clear evidence of cognitive function decrements in young children with mean or group BLLs between 2 and 8 µg/dL." The cleanup level developed based on previous BLL of 10 µg/dL (400 mg/kg) may not be protective.

EPA's approach to evaluate potential lead risks is to limit exposure to residential and commercial soil lead levels such that a typical (or hypothetical) child or group of similarly exposed children would have an estimated risk of no more than 5% of the population exceeding a 5 µg/dL BLL. This is based on updated scientific information and is in agreement with the Lead Technical Review Workgroup's current support for using a BLL of 5 µg/dL as the level of concern in the Integrated Exposure Uptake

Biokinetic Model (IEUBK) and Adult Lead Methodology (ALM). A target BLL of 5 µg/dL reflects current scientific literature on lead toxicology and epidemiology that provides evidence that the adverse health effects of lead exposure do not have a threshold.

EPA's 2017 OLEM memorandum "Transmittal of Update to the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters" (OLEM Directive 9285.6-56; EPA, 2017) provides updates on the default baseline blood lead concentration and default geometric standard deviation input parameters for the Adult Lead Methodology. These updates are based on the analysis of the National Health and Nutrition Examination Survey (NHANES) 2009-2014 data, with recommended updated values for baseline blood lead concentration being 0.6 µg/dL and geometric standard deviation being 1.8.

Using updated default IEUBK and ALM parameters at a target BLL of 5 µg/dL, site-specific lead soil screening levels (SLs) of 200 ppm and 1,000 ppm are developed for residential and commercial/industrial exposures, respectively. As shown above, the average lead concentration in the confirmatory samples (50 mg/kg) is well below these values.

There are no currently complete groundwater exposure pathways since groundwater is not used at the site as a source of drinking water. OU-4 addresses potential groundwater exposure pathways and risks on a site-wide basis and a groundwater remedy has been established.

The RAOs and the risk-based cleanup levels for OU-1 are still valid for assumed commercial/industrial land use, but, as noted below, the PAHs and metals exceeding CERCLA residential risk levels were removed from the site.

The Remedy at OU-1 has been conducted as intended in the ROD, as amended by the 1997 ESD. The ROD for OU-1 cited a very limited list of ARARs. The ARARs cited had relevancy to conducting the remedial action and do not have current relevancy as all PAHs and metals above CERCLA risk levels for unrestricted use have been removed from the site (see next paragraph) and no further action under the OU-1 ROD is expected.

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (worker) and potential future exposures (worker and resident). Cleanup levels were developed based on assumed future commercial land use. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. When the remedy was changed from on-site bioremediation to excavation and off-site asphalt batching, all PAHs and metals exceeding CERCLA residential risk levels were removed from the site.

Because all material with contamination above cleanup levels set in the ROD and 1997 ESD have been removed from OU-1, and subsequent evaluation showed the cleanup achieved unrestricted use standards (so the ROD's IC requirements are no longer required), there is no "operating" or "functioning" remedy. The Site Summary Report (ERM, 2003) was submitted by the Settling Defendant, reviewed and approved by EPA, thereby certifying that the performance standards related to construction have been met.

V.1 OU-1 QUESTION C: Has any **other** information come to light that could call into question the protectiveness of the remedy?

No. No other information has come to light that could call into question the protectiveness of the remedy at OU-1.

V.2 OU-2 QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Yes. The review of documents, ARARs, risk assumptions, and the results of site inspections indicate that the OU-2 landfill capping component remedy has been designed and constructed as intended in the ROD, as modified by the 2000 ESD. The construction of the remedy has been formally completed, as defined by the review and approval of the Final Remedial Construction Report (GeoSyntec, 2003), which was submitted by the Settling Defendant. However, Institutional Controls, as required under the ROD, have not been established yet and groundwater beyond the compliance boundary for the landfill exceeds the ROD's cleanup standards.

Monthly O&M reports, which include review of landfill gas collection, the flare system, and leachate collection operations, have been reviewed as part of the five-year review of OU-2. As noted above, based on the reduction in landfill gas production causing intermittent operation of the enclosed flare, candlestick flares have been installed at various locations on the landfill and appear to have been operating properly since installation.

Wetlands mitigation performance standards were achieved as documented in the Wetland Mitigation Monitoring Report, Year 4, February 2007.

As noted earlier, the reduction in groundwater concentrations outside of the existing compliance boundary (edge of landfill) is progressing slowly. EPA guidance concerning groundwater cleanups has changed since the time of the ROD, so that the ROD's groundwater monitoring-only component to address the contaminated groundwater beyond the compliance boundary does not appear to be sufficient to achieve groundwater cleanup standards within a reasonable time period.

V.2 OU-2 QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

Yes for the landfill capping component of the remedy, but no for the groundwater component. Risk assessment methodology and toxicity values have changed since the risk assessment was performed for OU-2. However, because the landfill contents have been placed beneath an intact cap and surrounded by a security fence, there are no current exposures occurring to landfill waste. Institutional controls, preventing future land uses that would compromise the integrity of the current barriers to direct human contact, need to be implemented to assure remedy protectiveness in the future. In addition, the landfill gas system (now candlestick flares) and leachate collection system are functioning as designed, preventing the completion of exposure pathways between humans and ecological receptors and these

contaminated media. The exposure assumptions used at OU-2 for future use of groundwater, which assumes 70 years of consuming 2 liters per day of water, are still considered valid. Exposure (via dermal contact and incidental ingestion) by wading on a daily basis from June to September for contaminated sediment and surface water in the Middlesex Canal and Content Brook, was evaluated for children ages 6-15. No risk in excess of EPA's risk management criteria was shown to this receptor group. While still considered valid, this wetland area was also re-evaluated as part of OU-3 in a site-wide wetland evaluation. As presented in the Feasibility Study for OU-4 (M&E, 2010), there is no requirement for remedial action in the Middlesex Canal and Content Brook in the OU-2 area.

The groundwater cleanup levels established in the ROD are still valid, with the exception of arsenic. The MCL for arsenic is now 10 parts per billion (ppb). It should also be noted that the citation for the State groundwater standards cited in the ROD at 314 CMR 6.00 no longer exist and have been repromulgated by the State at 314 CMR 5.11. For State groundwater standards to apply to the OU-2 remedy, the revised regulations will need to be incorporated into the remedy with a future CERCLA decision document.

Note also that the federal citations for the location-specific ARARs related to protection of wetlands and floodplains have changed from 40 CFR Part 6 Appendix A to 44 CFR Part 9.

The RAOs for OU-2 remain valid. Note, however, that the arsenic MCL has changed to 10 ppb. In addition, an MCL has been finalized at 5 ppb for 1,1,2-trichloroethane, whereas the interim cleanup level was previously set at the MCLG (3 ppb). Note that the OU-2 ROD's 1,1,2-trichloroethane cleanup level that is based on the non-zero MCLG did not change. The ROD's cleanup level would still remain as the cleanup level for 1,1,2-trichloroethane (rather than the revised MCL). However, a future ESD would be required to incorporate the change to the arsenic MCL into the OU-2 remedy.

The ROD-established interim cleanup levels for groundwater have not been achieved outside the compliance boundary for the landfill. The present monitoring-only remedy for groundwater beyond the compliance boundary does not meet current EPA guidance standards requiring restoration of the groundwater to drinking water standards within a reasonable time period. Under the current ROD remedy there is no estimate, following EPA guidances standards for monitored natural attenuation (MNA) remedies, for determining when, or if, groundwater can achieve cleanup standards within a reasonable time period compared to an active groundwater treatment alternative.

PFOA/PFOS. In May 2016, EPA issued final lifetime drinking water health advisories for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), which identified a chronic oral reference dose (RfD) of $2x10^{-5}$ mg/kg-day for PFOA and PFOS (EPA, 2016b and EPA, 2016c). These RfD values should be used when evaluating potential risks from ingestion of contaminated groundwater at Superfund sites where PFOA and PFOS might be present based on site history. Potential estimated health risks from PFOA and PFOS, if identified, would likely increase total site risks due to groundwater exposure. It may be appropriate to sample and analyze for PFOA/PFOS to determine if this is an analyte of concern at OU-2, as this landfill accepted mixed industrial waste from unknown sources.

PFBS. Perfluorobutanesulfonic acid (PFBS) has a chronic oral RfD of 2E-02 mg/kg-day based on an EPA Provisional Peer Reviewed Toxicity Value (PPRTV) (USEPA, 2014). This RfD value should be used when evaluating potential risks from ingestion of contaminated groundwater at Superfund sites where PFBS might be present based on site history. Potential estimated health risks from PFBS, if identified, would likely increase total site risks due to groundwater exposure.

PFOA, PFOS, and PFBS belong to a group of compounds known as PFAS, which are used in a variety of industrial applications. Sampling is being suggested at OU-2 because PFAS compounds are commonly associated with landfills containing industrial and chemical waste. Sampling has not yet been done at the Site, but is being considered for the next FYR period. Nearby residences are connected to a municipal water source, therefore there would not be any current exposure to PFAS contamination if identified. These new toxicity values do not affect the current protectiveness of the remedy.

1,4-Dioxane. The compound 1,4-dioxane is often found in groundwater associated with landfills and has not historically been included in the OU-2 groundwater monitoring program. There is no federal or state MCL for 1,4-dioxane. There is toxicity information available to develop screening levels. It may be appropriate to sample and analyze for 1,4-dioxane to determine if this is an analyte of concern at OU-2.

With the exception of ARARs establishing interim groundwater cleanup levels (e.g., MCLs, non-zero MCLGs, federal risk-based standards and more stringent State groundwater standards), ARARs have been addressed appropriately during the construction and O&M of the landfill component of the remedy remedy. The closure/post-closure requirement to establish ICs on the landfill properties and the ROD's RAO to "Restore groundwater aquifer beyond the point of compliance to contaminant concentrations below federal MCLs, non-zero MCLGs, proposed MCLs and MCLGs, and Massachusetts Groundwater Quality Standards" has not been met.

V.2 OU-2 QUESTION C: Has any **other** information come to light that could call into question the protectiveness of the remedy?

No. No other information has come to light that could call into question the protectiveness of the remedy.

V.3 OU-3 QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Yes. Upon construction completion at all AOCs, the remedy will be protective. As described above, construction is completed at multiple AOCs (all functioning as intended). The construction of the AOC7 remedy (capping of waste in the Asbestos Lagoons) has been completed, as defined by the review and approval of the Final Remedial Construction Report (W&C, 2010), which was submitted on behalf of the OU-3 Settling Defendant addressing AOC7. AOC4 and AOC5 remedy construction (capping of contaminated soil in the Old B&M Oil/Sludge Recycling Area and Contaminated Soils Area) was completed in 2013, as summarized in the Final Remedial Construction Report dated September 25, 2014 (ERM, 2014). Construction of the AOC2 remedy (capping of waste in the RSI Landfill) and the AOC6 remedy (cover erosion repair of the Asbestos Landfill) was completed in 2017, as summarized in the Final Remedial Construction Report dated September 19, 2017 (ERM, 2017).

Construction of the remedy at the remaining AOCs (1 and 3) is anticipated to be complete by the next five-year review.

At this time, remedy construction has not been completed at all AOCs. However, as indicated above, multiple Final Remedial Construction Reports have been completed (which includes regulatory review and approval). The remedies for these AOCs were determined to have been designed and constructed as intended in the ROD. The design work completed to date at other AOCs has also been as intended in the ROD.

V.3 OU-3 QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

No. Exposure assumptions used at OU-3 for soil assumed 150 days per year of outdoor commercial use for 25 years. Youth trespasser (age 7 to 16) exposures to soil, sediment, and surface water were assumed to occur for 52 days per year (2 days per week for the warmest 6 months of the year) for 10 years. These assumptions remain valid, though assumptions used to evaluate dermal soil exposures (5800 cm^2 and 4100 cm^2 of skin contact for workers and trespassers, respectively; a dermal adherence factor of 1 mg/cm^2) are more conservative than those used currently. No soil risk or hazard above EPA risk management criteria was shown for commercial receptors except for soil lead at the B&M Locomotive Shop Disposal Areas, Old B&M Oil/Sludge Recycling Area, and Contaminated Soils Area for commercial workers. The original lead cleanup level for human health was based on EPA's adult lead methodology which, while still valid, has incorporated additional population statistics into the calculations since the original cleanup level was established. As the remedy involves capping at the three AOCs associated with lead cleanup level exceedances, changes to the cleanup level have limited impact on the protectiveness of the remedy. However, the extent of capping is partially based on comparison to the lead cleanup level for human health. Therefore, as described earlier, a revised lead screening level based on the additional population statistics has been calculated.

Ecological risks were identified for cadmium in soil at the B&M Railroad Landfill and for copper and lead in soil at the B&M Locomotive Shop Disposal Areas. Since the habitat conditions at the site have not substantially changed, the exposure assumptions used in developing the cleanup levels have not changed. Cleanup levels were developed to be protective of small mammals, as the primary receptors of concern. Although these levels are higher than conservative ecological screening level values for metals in soils (EPA Ecological Soil Screening Levels), the levels were based on assumptions consistent with site-specific conditions. These assumptions remain valid based on the habitat conditions at the site. The toxicity data used in developing the soil cleanup levels and the RAOs are also still valid. Capping of the AOCs will prevent contact with soils that contain cadmium, copper, and lead in excess of cleanup levels. Though surface water and sediment contaminant exposures for youth trespassers did not pose a risk or hazard in excess of EPA's risk management criteria, risk to ecological receptors exposed to contaminants in surface water and sediment was further evaluated as part of OU-4 (see Section II.4.A).

The September 2013 Fourth Five Year Review indicated that a revised human health lead in soil cleanup level was calculated by EPA, based on updated Adult Lead Methodology, prior to Remedial Design (RD). This revised cleanup level was used during the RD/RA phases of the project. The revised calculation for the lead-in-soil cleanup level was documented in Margaret McDonough's memo to Don McElroy, dated March 11, 2009 (Appendix D.2 of the 2013 Fourth Five Year Review) for OU-3. Since 2009, there have been further scientific updates on lead, as described below.

EPA's 2016 OLEM memorandum "Updated Scientific Considerations for Lead in Soil Cleanups" (OLEM Directive 9200.2-167; EPA, 2016a) indicates that there is sufficient evidence that adverse health effects are associated with BLLs at less than 10 µg/dL. The memo mentioned that several studies have observed "clear evidence of cognitive function decrements in young children with mean or group BLLs between 2 and 8 µg/dL." Any soil screening, action or cleanup level developed based on previous BLL of 10 µg/dL is now deemed not protective. Since the 2009 memo indicated a Remediation Goal of 1,107 mg/kg for lead based on target BLL of 10 µg/dL, this level is no longer deemed protective for commercial/industrial exposure.

EPA's approach to evaluate potential lead risks is to limit exposure to residential and commercial soil lead levels such that a typical (or hypothetical) child or group of similarly exposed children would have an estimated risk of no more than 5% of the population exceeding a 5 µg/dL BLL. This is based on updated scientific information and is in agreement with the Lead Technical Review Workgroup's current support for using a BLL of 5 µg/dL as the level of concern in the IEUBK and ALM. A target BLL of 5 µg/dL reflects current scientific literature on lead toxicology and epidemiology that provides evidence that the adverse health effects of lead exposure do not have a threshold.

EPA's 2017 OLEM memorandum "Transmittal of Update to the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters" (OLEM Directive 9285.6-56; EPA, 2017) provides updates on the default baseline blood lead concentration and default geometric standard deviation input parameters for the Adult Lead Methodology. These updates are based on the analysis of the NHANES 2009-2014 data, with recommended updated values for baseline blood lead concentration being 0.6 µg/dL and geometric standard deviation being 1.8.

Using updated default ALM parameters at a target BLL of 5 µg/dL, a new site-specific lead soil screening level of 1,000 mg/kg is developed for Iron Horse Park for commercial/industrial exposures.

A review of the lead data associated with the remedial actions performed at AOCs 4 and 5 show that there were a couple of soil locations at AOC5 which were outside of the capped area and at concentrations below the previous cleanup level (1,107 mg/kg), but above the proposed revised screening level (1,000 mg/kg). However, the average lead concentration of the perimeter samples outside the cap is well below 1,000 mg/kg (a map showing lead concentrations outside of the cap is included in Appendix D.5). Therefore, the remedy is still considered protective.

The RAOs for OU-3 remain valid except for the lead soil concentration specified in the human health soil RAO. As described above, a revised lead screening level based on the additional population statistics has been determined to be 1,000 mg/kg.

With respect to ARARs, the federal citations for the location-specific ARARs related to protection of wetlands and floodplains have changed from 40 CFR Part 6 Appendix A to 44 CFR Part 9. Otherwise, the ARARs established in the 2004 ROD and updated by the 2009 ESD are still appropriate and have been complied with to date.

V.3 OU-3 QUESTION C: Has any **other** information come to light that could call into question the protectiveness of the remedy?

No. No other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU-1

Issues and Recommendations Identified in the Five-Year Review:

OU(s): OU-2	**Issue Category: Institutional Controls**			
	Issue: Institutional controls restricting inappropriate land uses (including temporary ICs to prevent the use of groundwater beyond the landfill's compliance boundary until groundwater cleanup standards are achieved) and protecting the landfill cap and other components of the remedy need to be established.			
	Recommendation: Discussions between EPA, MassDEP, and the property owners are ongoing. Upon completion of discussions between the parties, institutional controls should be established at OU-2 by the end of 2019.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	12/31/2019

OU(s): OU-2	**Issue Category: Monitoring**			
	Issue: A future ESD would be required to incorporate the change to the arsenic MCL, the repromulgation of State Groundwater Quality Standards at 314 CMR 5.11, and update federal floodplain protection requirements.			
	Recommendation: A CERCLA decision document to incorporate the change to the arsenic MCL and State Groundwater Quality Standards into the OU-2 remedy and to update federal floodplain protection requirements should be completed before the next five-year review.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA		9/30/2022

OU(s): OU-2	Issue Category: Monitoring			
	Issue: Groundwater monitoring has not historically included analysis of PFAS, nor 1,4-dioxane, so it is unclear if these chemicals are of concern at OU-2.			
	Recommendation: Include analysis for PFAS and 1,4-dioxane in future groundwater monitoring rounds to determine if these chemicals are of concern at OU-2.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	9/30/2022

OU(s): OU-2	Issue Category: Remedy Performance			
	Issue: The extent of ICL exceedances in groundwater is not fully defined and the reduction in groundwater concentrations outside of the existing compliance boundary (edge of landfill) is progressing slowly.			
	Recommendation: Define the extent of ICL exceedances in groundwater and evaluate response options. Either (1) evaluate refinement of the compliance boundary, including consideration of an exclusion area for offsite groundwater extraction; (2) potentially consider groundwater reclassification in the area; or (3) conduct an MNA assessment to determine if groundwater beyond the compliance boundary can achieve groundwater cleanup standards within a reasonable time period. A future CERCLA decision document may be necessary.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State/PRP	EPA	9/30/2022

OU(s): OU-3	Issue Category: Operations and Maintenance			
	Issue: O&M housekeeping items need to be addressed in order to maintain protectiveness. Items include the following: gravel cover related to AOC5 is missing and needs to be replaced; asphalt cracks are getting larger at AOC4 (on Cooperative Reserve property) and need to be sealed; and vegetative growth at AOC6 is getting larger and may begin to compromise the cap.			
	Recommendation: Place gravel at AOC5 where missing; seal cracks at AOC4; and remove larger woody growth at AOC6.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	9/30/2019

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: OU-1	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:*
Protectiveness Statement: The remedy at OU-1 is protective of human health and the environment.		

Protectiveness Statement(s)		
Operable Unit: OU-2	*Protectiveness Determination:* Short-term Protective	*Planned Addendum Completion Date:*
Protectiveness Statement: The remedy at OU-2 currently protects human health and the environment, as exposure pathways that could result in unacceptable risks are being controlled. The landfill is fenced to prevent access and there is no current use of groundwater. However, in order for the remedy to be protective in the long-term, institutional controls will be created and recorded to restrict inappropriate land uses (including use of groundwater) and protect the landfill cap and other components of the remedy. Operation and Maintenance activities have been initiated and will ensure that the landfill and associated components of the remedy remain in good condition. In addition, monitoring of groundwater and surface water will continue to assess the continued protectiveness of the capping remedy and progress towards attainment of groundwater cleanup levels beyond the landfill compliance boundary. This includes incorporation of new monitoring parameters not previously evaluated. In addition, a CERCLA decision document is needed to update groundwater standards used during monitoring and to update federal floodplain protection requirements.		

Protectiveness Statement(s)		
Operable Unit: OU-3	*Protectiveness Determination:* Will be Protective	*Planned Addendum Completion Date:*
Protectiveness Statement: The remedy at OU-3 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		

VIII. NEXT REVIEW

The next five-year review report for the Iron Horse Park Superfund Site is required five years from the completion date of this review.

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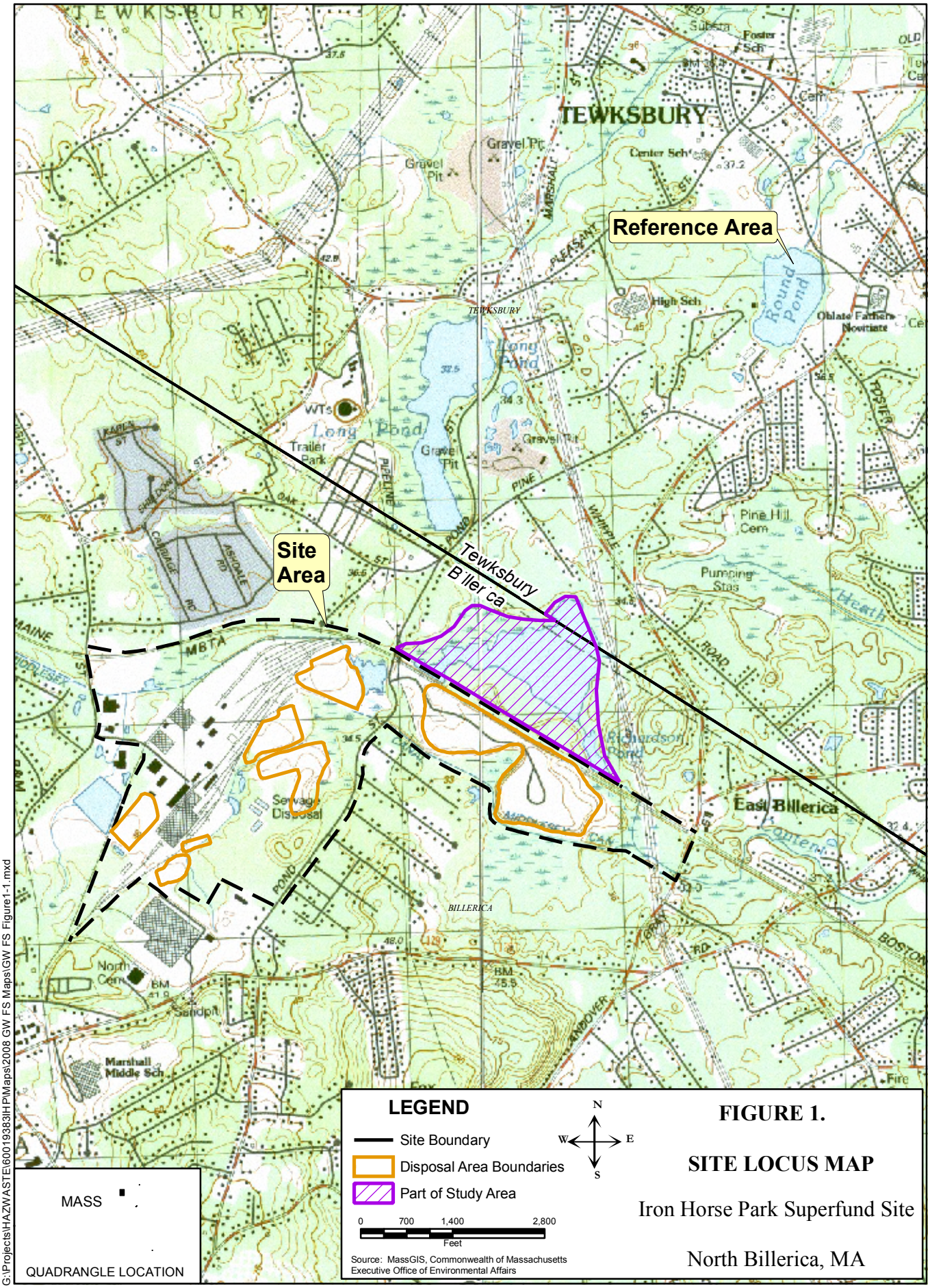
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FIGURES


Reference Area
Site Area
Tewksbury
Billerica
TEWKSBURY
BILLERICA
East Billerica
Round Pond
Long Pond
Trailer Park
Gravel Pit
Center Sch
High Sch
Oblate Fathers Novitiate
Pine Hill Cem
Pumping Sta
Sewage Disposal
North Cem
Marshall Middle Sch
MBTA
MAINE
PLEASANT ST
MARSHALL ST
WHIPPLE
PINE
FOSTER
ROAD
POND
BOSTON
ANDOVER
LEGEND
Site Boundary
Disposal Area Boundaries
Part of Study Area
N
W
E
S
0 700 1,400 2,800
Feet
Source: MassGIS, Commonwealth of Massachusetts Executive Office of Environmental Affairs
MASS
QUADRANGLE LOCATION
FIGURE 1.
SITE LOCUS MAP
Iron Horse Park Superfund Site
North Billerica, MA
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Contaminated Soils Area
West Middlesex Canal Group (AOC #8a)
BOSTON AND MAINE
Middlesex Canal
Barge Turnout
Middlesex Canal
Extent of Railroad Not Shown
M.B.T.A
B&M Railroad Landfill
B&M Pond
Richardson Pond
Richardson Pond Group (AOC # 8d)
General Latex and Chemical Corp.
Johns-Manville Outfall
B N Z Materials
Asbestos Lagoons
Unnamed Brook
Eastern Terminals (George McQuesten)
Wood Fabricators
RSI Landfill
Middlesex Canal
Shaffer
HIGH STREET
Asbestos Landfill
B&M Wastewater Lagoons
Landfill
Content Brook Wetland Group (AOC #8e)
Extent of Railroad Not Shown
M.B.T.A
Wetland 2 Group (AOC #8b)
Old B&M Oil/Sludge Recycling Area
M.B.T.A
A
B&M Locomotive Shop Disposal Areas (A and B)
POND STREET
Penn Culvert Co.
B
Man-made Canal
Brook
GRAY STREET
East Middlesex Canal Group (AOC #8c)

LEGEND

- Property Boundary
- Site Boundary
- Roads
- Railroad
- Disposal Area Boundary
- Approximate Location of Johns-Manville Outfall
- Surface Water
- Wetlands
- Lagoon
- Building
- Content Brook Wetland Group
- East Middlesex Canal Group
- Richardson Pond Group
- West Middlesex Canal Group
- Wetland 2 Group

N
W E
S

800 400 0 800
Feet

Locations for all features area approximate.
Extent of wetland and surface waters are limited to areas confirmed during wetlands reconnaissance on July 15, 1993 and November 8, 1994

Source: MassGIS, Commonwealth of Massachusetts
Executive Office of Environmental Affairs

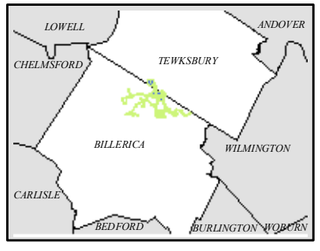


FIGURE 2

SITE MAP

Iron Horse Park Superfund Site
North Billerica, MA

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APPENDICES

Appendix A
Interview Summary and Site Walkover Photos

A.1 – Site Walkover Photos



OU-2: View of western lobe of Shaffer Landfill from eastern lobe



OU-3: AOC5 – Northern edge of paved area which is supposed to have gravel



OU-3: AOC5 – View of vegetated runoff filter strip



OU-3: AOC5 – Paved area extending into Eastern Terminals property



OU-3: AOC5 – Scarred/dented areas of pavement



OU-3: AOC5 – Drain with grate missing



OU-3: AOC4 – Views of asphalt outside of Cooperative Reserve; damage observed



OU-3: AOC4 – Views of asphalt inside of Cooperative Reserve; cracks observed



OU-3: AOC7 – View of landfill from entrance area

A.2 – Interview Summary

Iron Horse Park
2018 Five Year Review
Interview Summary

Interviewee: Rich Berube Title: Board of Health, Director
Type: Phone Date of Interview: August 7, 2018

1. What is your overall impression of the project?
   Progress is being made. Maybe not as fast as we would all like, but the progress is there.

2. What effects have site operations had on the surrounding community?
   None that I am aware of.

3. Are you aware of any community concerns at the site?
   Most recently, the tree removal associated with the solar project.

4. Are you aware of any events or incidents at the site?
   No.

5. Do you feel informed about the site?
   For the most part yes. While the AOC2 construction was occurring, communication slowed down as the project neared completion.

6. Do you have any comments, suggestions, or recommendations regarding site management?
   No.

Iron Horse Park
2018 Five Year Review
Interview Summary

Interviewee: Andrew Deslaurier Title: Billerica Selectman
Type: Phone Date of Interview: Aug 3, 2018

1. What is your overall impression of the project?
   It is routine. People are either informed, comfortable or both. Any issues that have come up about Iron Horse Park have been related to business activity, not Superfund activities.

2. What effects have site operations had on the surrounding community?
   None that I am aware of. There have been no inquiries

3. Are you aware of any community concerns at the site?
   No. None have been expressed.

4. Are you aware of any events or incidents at the site?
   No.

5. Do you feel informed about the site?
   I feel that I can be if need be. Again, there have been no inquiries recently.

6. Do you have any comments, suggestions, or recommendations regarding site management?
   An overall update to the Board of Selectmen would be great.

Iron Horse Park
2018 Five Year Review
Interview Summary

Interviewee: George Simolaris Title: Selectman
Type: Phone Date of Interview: August 6, 2018

1. What is your overall impression of the project?
   I am mainly concerned with the extensive tree cutting that occurred in preparation for the solar installation adjacent to Pond St.

2. What effects have site operations had on the surrounding community?
   Dust after the trees were removed.

3. Are you aware of any community concerns at the site?
   Dust, and greater land/soil exposure due to absence of trees.

4. Are you aware of any events or incidents at the site?
   No.

5. Do you feel informed about the site?
   Mostly.

6. Do you have any comments, suggestions, or recommendations regarding site management?
   Try to reserve a larger buffer zone between work on the site and the edge of the site.

Iron Horse Park
2018 Five Year Review
Interview Summary

Interviewee: Janet Waldron Title: Project Manager - MassDEP
Type: Phone Date of Interview: Aug 8, 2018

1. What is your overall impression of the project?
   It is slowly moving through the Superfund process.

2. What effects have site operations had on the surrounding community?
   None as far as I know.

3. Are you aware of any community concerns at the site?
   There was concern expressed when the solar facility at Shaffer Landfill (OU2) was proposed. Those issues have not been raised since the facility was constructed.

4. Are you aware of any events or incidents at the site?
   No.

5. Do you feel informed about the site?
   Yes, for the most part.
   I am not included in all email correspondence.

6. Do you have any comments, suggestions, or recommendations regarding site management?
   Institutional Controls should be moved forward and implemented at Iron Horse Park.
   MassDEP should copied on all correspondence, including emails.

Appendix B
Information Related to the OU-1 Review

B.1 – Documents Reviewed

Camp Dresser and McKee (CDM). July, 1987. *Draft Phase 1a Remedial Investigation for the Iron Horse site, Billerica, MA.* Report prepared for the U.S. Environmental Protection Agency.

Camp, Dresser & McKee (CDM). May, 1988. *Draft Phase 1B Remedial Investigation for the Boston and Maine Wastewater Lagoon Area, Iron Horse Park Site, Billerica, Massachusetts.*

Camp, Dresser & McKee (CDM). June, 1988. *Draft Feasibility Study for the Boston & Maine Wastewater Lagoon Area, Iron Horse Park Site, Billerica, Massachusetts.*

ENSR. January, 1991. *Final Pre-Design Evaluation Report, Iron Horse Park, North Billerica, MA.*

ENSR. February, 1992. *First Operable Unit 1991 Annual Report, Iron Horse Park, North Billerica, MA.*

ENSR. February, 1993. *First Operable Unit 1992 Annual Report, Iron Horse Park, North Billerica, MA.*

Environmental Resources Management (ERM). July 23, 1997. *Supplemental Feasibility Study, Iron Horse Park Superfund Site, Operable Unit 1 - Lagoon Areas.*

Environmental Resources Management (ERM). February, 1998. *Soil Excavation and Asphalt Batching Report, Iron Horse Park Superfund Site, Operable Unit 1 - Lagoon Areas, Billerica, Massachusetts.*

Environmental Resources Management (ERM). August, 2003. *Black Stained Layer Evaluation (draft), Iron Horse Park Superfund Site, Operable Unit 1 - Lagoon Areas.*

Environmental Resources Management (ERM), September 2, 2003. *Boston and Maine Railroad Site Summary Report, Iron Horse Park Superfund Site, Operable Unit 1 – Lagoon Areas.*

Metcalf & Eddy (M&E). September, 1998. *First Five-Year Review Report. Iron Horse Park Superfund Site, Boston & Maine Lagoons (OU-1), North Billerica, Massachusetts.*

United States Environmental Protection Agency. September 15, 1988. *Record of Decision. Boston & Maine Wastewater Lagoons, Iron Horse Park, North Billerica, Massachusetts.*

United States Environmental Protection Agency. 1990. *Consent Decree. Iron Horse Park Wastewater Lagoons.*

United States Environmental Protection Agency. October 1, 1997. *Final Explanation of Significant Differences, Boston & Maine Wastewater Lagoons, Operable Unit 1, Iron Horse Park Superfund Site.*

United States Environmental Protection Agency. June, 2001. *Comprehensive Five-Year Review Guidance.*

United States Environmental Protection Agency. September, 2003. *Second Five-Year Review Report for Iron Horse Park Superfund Site, Billerica, Massachusetts*.

United States Environmental Protection Agency. September, 2008. *Third Five-Year Review Report for Iron Horse Park Superfund Site, Billerica, Massachusetts*.

United States Environmental Protection Agency. September, 2013. *Fourth Five-Year Review Report for Iron Horse Park Superfund Site, Operable Units 1, 2, 3, and 4, North Billerica, Massachusetts*.

B.2 – Confirmatory Soil Sample Results

N

CLOSURE UNIT BOUNDARY

2001 CLOSURE SAMPLING LOCATION
PAH SAMPLE
TPH SAMPLE

2000 CLOSURE SAMPLING LOCATION
PAH SAMPLE
TPH SAMPLE

PRE-2000 SAMPLING LOCATION
PAH SAMPLE
TPH SAMPLE

AREA OF SOIL REMOVAL (2000)

AREA OF SOIL REMOVAL (1997)

② LAGOON STOCKPILE NUMBER

LEGEND

EDGE OF WATER
CHAIN LINK FENCE
STONEWALL
EDGE DIRT ROAD
EDGE OF WOODS
125 TOPOGRAPHIC CONTOUR (FEET)
OW OVERHEAD WIRE
EXPOSED LEDGE
UTILITY POLE
ELECTRIC POST
GROUNDWATER MONITORING WELL LOCATION
BOUNDARY OF PREPARED-BIO-TREATMENT CELL

Scale (1"=50')
25 0 25 50 100

Figure 2 - TPH and PAH Sampling Locations
B&M, Billerca, MA

ERM

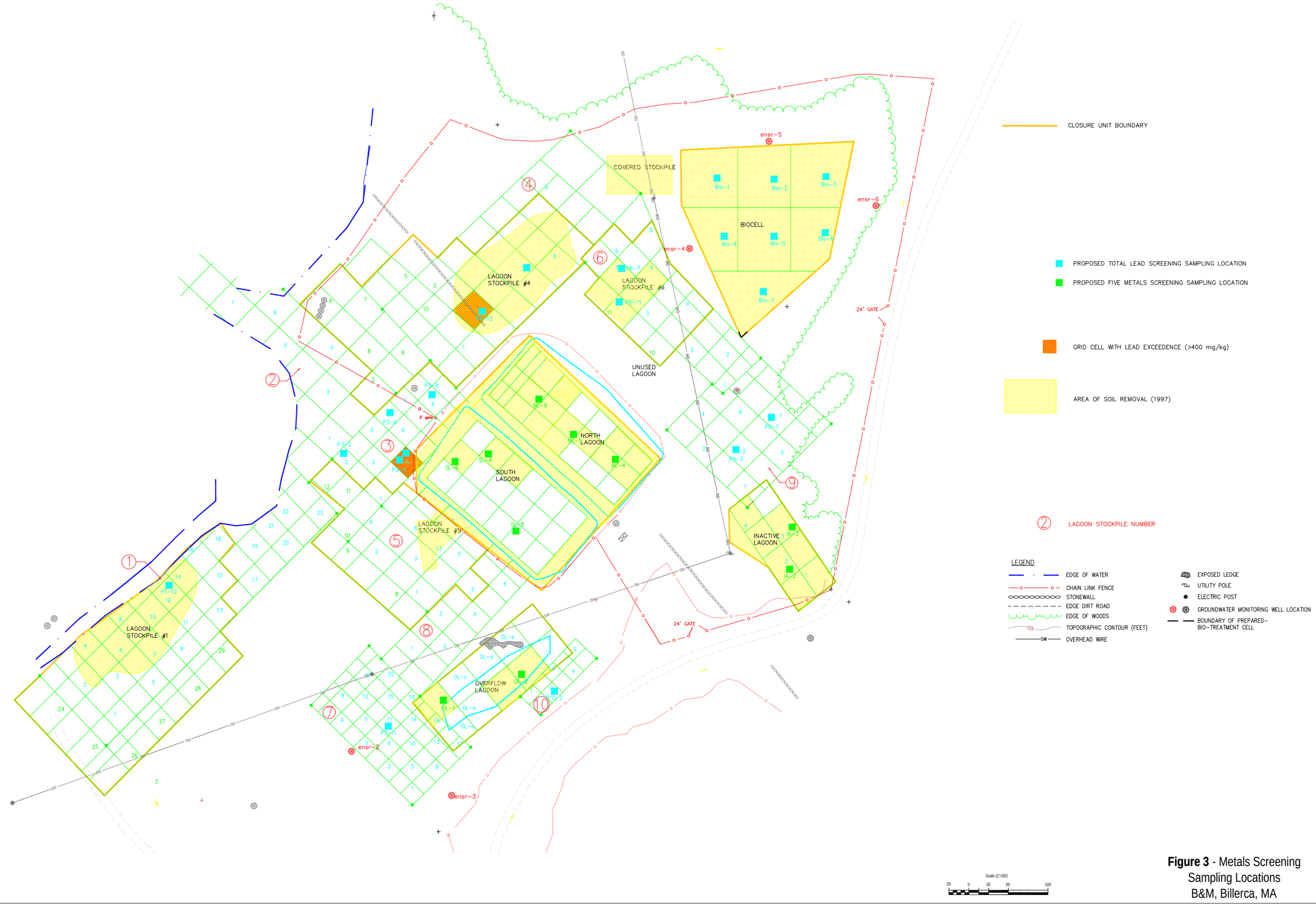


Figure 3 - Metals Screening Sampling Locations
B&M, Billerica, MA

Table 1
Fall 2000 TPH and PAH Soil Sampling Locations
Iron Horse Park Superfund Site
Billerica, Massachusetts

	October 2000 Sampling Locations			
Closure Unit	**Sampling Location**	**Depth (feet bgs)**	**Total TPH Samples**	**Total PAH Samples**
Lagoon Stockpile #1	P1-2	0-1	1	1
	P1-4	0-1 & 1-3	2	2
	P1-6	0-1 & 1-3	2	2
	P1-7	0-1	1	1
	P1-8	0-1	1	1
	P1-10	0-1 & 1-3	2	2
	P1-11	0-1	1	1
	P1-14	0-1 & 1-3	2	2
	P1-24	0-1	1	0
	P1-25	0-1	1	0
	P1-26	0-1	1	0
	P1-27	0-1	1	0
	P1-28	0-1	1	0
	P1-29	0-1	1	0
	Total TPH Samples		**18**	
	Total PAH Samples			**12**
Lagoon Stockpile #4	P4-2	0-1	1	0
	P4-3	0-1	1	1
	P4-3'	0-1 & 1-3	2	2
	P4-12	0-1 & 1-3	2	2
	P4-2'	0-1 & 1-3	2	2
	P4-13	0-1	1	1
	P4-14	0-1	1	1
	P4-15	0-1 & 1-3	2	2
	P2-2	0-1	1	0
	P2-5	0-1	1	0
	P2-6	0-1	1	0
	P2-8	0-1	1	0
	P2-9	0-1	1	0
	Total TPH Samples		**17**	
	Total PAH Samples			**11**
Lagoon Stockpile #5	P3-1	0-1 & 1-3	2	0
	P5-4	0-1 & 1-3	2	0
	P5-6	0-1	1	0
	P5-8	0-1	1	0
	P5-10	0-1	1	0
	P5-12	0-1 & 1-3	2	0
	P5-13	0-1 & 1-3	2	2
	P8-5	0-1 & 1-3	2	0
	Total TPH Samples		**13**	
	Total PAH Samples			**2**

Table 1
Existing and Proposed TPH and PAH Sampling Locations
Iron Horse Park Superfund Site
Billerica, Massachusetts

	October 2000 Sampling Locations			
Closure Unit	**Sampling Location**	**Depth (feet bgs)**	**Total TPH Samples**	**Total PAH Samples**
Lagoon Stockpile #6 /Biocell				
Lagoon Stockpile #6	P6-4	0-1 & 1-3	2	2
	P6-6	0-1 & 1-3	2	2
	P6-7	0-1 & 1-3	2	2
	P6-8	0-1 & 1-3	2	2
	P6-10	0-1	1	1
	P6-11	0-1 & 1-3	2	2
Biocell	BIO-1	0-1	1	1
	BIO-2	0-1	1	1
	BIO-3	0-1	1	1
	BIO-4	0-1	1	1
	BIO-5	0-1	1	1
	BIO-6	0-1	1	1
	BIO-7	0-1	1	1
	Total TPH Samples		**18**	
	Total PAH Samples			**18**
North & South Lagoons/Berms				
North Lagoon	NL-1	0-1	1	1
	NL-2	0-1	1	1
	NL-3	0-1	1	1
	NL-4	0-1	1	1
	NL-5	0-1 & 1-3	2	2
	NL-6	0-1	1	1
	NL-7	0-1	1	1
	NL-8	0-1 & 1-3	2	2
	NL-9	0-1	1	1
	NL-10	0-1	1	1
	NL-11	0-1	1	1
	NL-12	0-1 & 1-3	2	2
Middle Berm (Berm between North & South Lagoon)	MB-1	0-1 & 1-3	2	2
	MB-2	0-1 & 1-3	2	2
	MB-3	0-1 & 1-3	2	2
	MB-4	0-1 & 1-3	2	2
	MB-5	0-1 & 1-3	2	2
	MB-6	0-1 & 1-3	2	2
South Lagoon	SL-1	0-1	1	1
	SL-2	0-1 & 1-3	2	2
	SL-3	0-1 & 1-3	2	2
	SL-4	0-1 & 1-3	2	2
	SL-5	0-1 & 1-3	2	2
	SL-6	0-1	1	1
	SL-7	0-1 & 1-3	2	2
	Total TPH Samples		**39**	
	Total PAH Samples			**39**

Table 1
Existing and Proposed TPH and PAH Sampling Locations
Iron Horse Park Superfund Site
Billerica, Massachusetts

	October 2000 Sampling Locations			
Closure Unit	**Sampling Location**	**Depth (feet bgs)**	**Total TPH Samples**	**Total PAH Samples**
Overflow and Inactive Lagoons				
Overflow Lagoon	OL-1	0-1	1	1
	OL-2	0-1 & 1-3	2	2
	OL-3	0-1	1	1
	OL-4	0-1	1	1
Inactive Lagoon	IA-1	0-1	1	1
	IA-2	0-1	1	1
	IA-3	0-1 & 1-3	2	2
	IA-4	0-1	1	1
	Total TPH Samples		**10**	
	Total PAH Samples			**10**

Table 2
Fall 2000 Metals Screening Locations
Iron Horse Park Superfund Site
Billerica, Massachusetts

	October 2000 Sampling Locations		
Closure Unit	**Sampling Location**	**Depth (feet bgs)**	**Total Lead Samples**
Lagoon Stockpile #1			
	P1-12	0-1	1
	Total Lead Samples		**1**
Lagoon Stockpile # 3	P3-4	0-1 & 1-3	2
	P3-6	0-1 & 1-3	2
	P3-8	0-1 & 1-3	2
	P3-2	0-1 & 1-3	2
	Total Lead Samples		**8**
Lagoon Stockpile #4			
	P4-12	0 - 1	1
	Total Lead Samples		**1**
Lagoon Stockpile #6/Biocell			
Lagoon Stockpile # 6	P6-7	0-1	1
	P6-11	0-1	1
Biocell	Bio-1	0 - 1	1
	Bio-2	0 - 1	1
	Bio-3	0 - 1	1
	Bio-4	0 - 1	1
	Bio-5	0 - 1	1
	Bio-6	0 - 1	1
	Bio-7	0 - 1	1
	Total Lead Samples		**9**
Lagoon Stockpile # 7	P7-11	0-1	1
	Total Lead Samples		**1**
Lagoon Stockpile # 9	P9-3	0-1 & 1-3	2
	P9-7	0-1 & 1-3	2
	Total Lead Samples		**4**
Lagoon Stockpile # 10	P10-2	0-1 & 1-3	2
	Total Lead Samples		**2**

Table 2
Proposed Metals Screening Locations
Iron Horse Park Superfund Site
Billerica, Massachusetts

	October 2000 Sampling Location		
Closure Unit	**Sampling Location**	**Depth (feet bgs)**	**Total 5 Metals Samples**
North & South Lagoons			
North Lagoon	NL-4	0-1	1
	NL-5	0-1	1
	NL-9	0-1	1
South Lagoon	SL-4	0-1	1
	SL-6	0-1	1
	SL-8	0-1	1
	Total Five Metals		**6**
Overflow and Inactive Lagoons			
Overflow Lagoon	OL-1	0-1	1
	OL-2	0-1	1
Inactive Lagoon	IA-2	0-1	1
	IA-3	0-1	1
	Total Five Metals		**4**

Table 3
Summary of Closure Unit Statistics
Iron Horse Park Superfund Site
North Billerica, Massachusetts

	Statistics Summary							
	Polycyclic Aromatic Hydrocarbons (PAHs)				Total Petroleum Hydrocarbons (TPH)			
Closure Unit	**Arithmetic Avg**	**95% UCL**	**Maximum**	**Data Distribution**	**Arithmetic Avg**	**95% UCL**	**Maximum**	**Data Distribution**
Biocell	0.3	0.4	0.64		206	449	570	
Inactive Lagoon	0.21	0.74	0.31		144	3494	550	
Overflow Lagoon	0.54	0.684	0.79		460	1996	1300	
Stockpile #1	0.57	0.72	1.7	Use Normal	46	57	110	Use Normal
Stockpile # 4	0.47	0.91	2.00	Use Lognormal	804	1340	3200	
Stockpile #5	0.59	0.75	1.30	Normal	1779	3131	5200	Normal
Stockpile #6	0.28	0.5	0.5		92	130	310	
North & South Lagoons and Berms	0.37	0.59	0.98		531	814	2800	

Notes:
All values presented in milligrams per kilogram (mg/kg)
Total PAH Cleanup Goal = 1 mg/kg
TPH Cleanup Goal = 5,000 mg/kg
Data distribution analysis was not required or performed on Closure Units that do not contain samples exceeding cleanup goals

Table 4A
Summary of Organics in Soil
North and South Lagoons and Berms
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID							L0008962-17		L0008962-18		L0009079-04		L0008882-13		L0008882-19		L0008882-20		L0009079-02		L0009079-05	
Sampling Date		NL-a	NL-b	NL-c	NL-d	NL-e	**10/05/00**		**10/05/00**		**10/05/00**		**10/03/00**		**10/03/00**		**10/03/00**		**10/05/00**		**10/05/00**	
Location ID	**Units**						**NL-1-1-1-1**	**Q**	**NL-2-1-1**	**Q**	**NL-3-1-1**	**Q**	**NL-4-1-1**	**Q**	**NL-5-1-1**	**Q**	**NL-5-2-1**	**Q**	**NL-6-1-1**	**Q**	**NL-7-1-1**	**Q**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	1000	197	121	236	260	380		590		230		75		100		76		66		93	
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)																						
Acenaphthene	mg/kg						0.042	U	0.042	U		U		UJ	0.021	UJ	0.018	UJ	0.021	U	0.021	U
Fluoranthene	mg/kg						0.042	U	0.042	U	0.032		0.018	J	0.021	UJ	0.018	UJ	0.021	U	0.021	U
Naphthalene	mg/kg						0.042	U	0.042	U	R			UJ	0.021	UJ	0.018	UJ	R		R	
Benzo(a)anthracene	mg/kg						0.042	U	0.042	U		U		UJ	0.021	UJ	0.018	UJ	0.021	U	0.021	U
Benzo(a)pyrene	mg/kg						0.042	U	0.042	U		U		UJ	0.021	UJ	0.018	UJ	0.021	U	0.021	U
Benzo(b)fluoranthene	mg/kg						0.042	U	0.042	U		U		UJ	0.021	UJ	0.018	UJ	0.021	U	0.021	U
Benzo(k)fluoranthene	mg/kg						0.042	U	0.042	U		U		UJ	0.021	UJ	0.018	UJ	0.021	U	0.021	U
Chrysene	mg/kg						0.042	U	0.042	U		U		UJ	0.021	UJ	0.018	UJ	0.021	U	0.021	U
Acenaphthylene	mg/kg						0.042	U	0.042	U		U		UJ	0.021	UJ	0.018	UJ	0.021	U	0.021	U
Anthracene	mg/kg						0.042	U	0.042	U		U		UJ	0.021	UJ	0.018	UJ	0.021	U	0.021	U
Benzo(ghi)perylene	mg/kg						0.042	U	0.042	U	0.026			UJ	0.021	UJ	0.018	UJ	0.021	U	0.021	U
Fluorene	mg/kg						0.042	U	0.042	U	R			UJ	0.021	UJ	0.018	UJ	R		R	
Phenanthrene	mg/kg						0.042	U	0.042	U	0.031			UJ	0.021	UJ	0.018	UJ	R		R	
Dibenzo(a,h)anthracene	mg/kg						0.042	U	0.042	U		U		UJ	0.021	UJ	0.018	UJ	0.021	U	0.021	U
Indeno(1,2,3-cd)pyrene	mg/kg						0.042	U	0.042	U	0.021			UJ	0.021	UJ	0.018	UJ	0.021	U	0.021	U
Pyrene	mg/kg						0.042	U	0.042	U	0.028			UJ	0.021	UJ	0.018	UJ	R		R	
Total PAH Constituent Concentrations =		0.55	0.14	0.5	0.55	0.92	0.336		0.336		0.138		0.018		0.168		0.144		0.126		0.126	

Notes:

For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive therepresentative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
mg/kg = milligrams per kilogram
U-parameter not detected above specified detection limit; value in red represents one-half of the specified detection limit.
J-indicates an estimated detection
FD-5 duplicate of MB-3
FD 6/7 are field duplicates for Sample NL-8.

Table 4A
Summary of Organics in Soil
North and South Lagoons and Berms
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0008882-11		L0008882-12		L0008882-16		L0009079-08		L0009079-06		L0008882-14		L0008882-15		L0008835-01		L0008835-02		L0008835-03
Sampling Date		**10/03/00**		**10/03/00**		**10/03/00**		**10/05/00**		**10/05/00**		**10/03/00**		**10/03/00**		**10/02/00**		**10/02/00**		**10/02/00**
Location ID	**Units**	**NL-8-1-1**	**Q**	**NL-8-2-1**	**Q**	**NL-9-1-1**	**Q**	**NL-10-1-1**	**Q**	**NL-11-1-1**	**Q**	**NL-12-1-1**	**Q**	**NL-12-2-1**	**Q**	**MB-1-1-1**	**Q**	**MB-1-2-1**	**Q**	**MB-2-1-1**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	310		68		73		300		240		510		67		1600		950		2600
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)																				
Acenaphthene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ		U	0.021	U		UJ	0.021	UJ		U		U	
Fluoranthene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	0.089		0.021	U	0.078	J	0.021	UJ	0.15			U	0.065
Naphthalene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	R		R		0.022	J	0.021	UJ	0.086			U	0.097
Benzo(a)anthracene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	0.052		0.021	U	0.041	J	0.021	UJ	0.083			U	
Benzo(a)pyrene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	0.047		0.021	U	0.034	J	0.021	UJ	0.067			U	
Benzo(b)fluoranthene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	0.043		0.021	U	0.04	J	0.021	UJ	0.072			U	
Benzo(k)fluoranthene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	0.04		0.021	U	0.035	J	0.021	UJ	0.066			U	
Chrysene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	0.054		0.021	U	0.049	J	0.021	UJ	0.1			U	0.062
Acenaphthylene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ		U	0.021	U		UJ	0.021	UJ		U		U	
Anthracene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	0.022		0.021	U		UJ	0.021	UJ	0.067		0.055		0.054
Benzo(ghi)perylene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	0.056		0.021	U	0.038	J	0.021	UJ	0.087		0.027		0.061
Fluorene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	R		R			UJ	0.021	UJ		U		U	
Phenanthrene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	0.06		R		0.067	J	0.021	UJ	0.16		0.021		0.12
Dibenzo(a,h)anthracene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ		U	0.021	U		UJ	0.021	UJ		U		U	
Indeno(1,2,3-cd)pyrene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	0.046		0.021	U	0.034	J	0.021	UJ	0.073			U	
Pyrene	mg/kg	0.02	UJ	0.02	UJ	0.019	UJ	0.079		R		0.069	J	0.021	UJ	0.14			U	0.062
Total PAH Constituent Concentrations =		0.16		0.16		0.152		0.588		0.126		0.507		0.168		1.151		0.103		0.521

Notes:

For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive therepresentative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
mg/kg = milligrams per kilogram
U-parameter not detected above specified detection limit; value in red represents one-half of the specified detection limit.
J-indicates an estimated detection
FD-5 duplicate of MB-3
FD 6/7 are field duplicates for Sample NL-8.

Table 4A
Summary of Organics in Soil
North and South Lagoons and Berms
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID			L0008835-04		L0008835-05		L0008835-06		L0008835-14		L0008835-15		L0008835-10		L0008835-11		L0008835-12		L0008835-13			
Sampling Date			**10/02/00**		**10/02/00**		**10/02/00**		**10/03/00**		**10/03/00**		**10/03/00**		**10/03/00**		**10/03/00**		**10/03/00**		SL-a	SL-b
Location ID	**Units**	**Q**	**MB-2-2-1**	**Q**	**MB-3-1-1**	**Q**	**MB-3-2-1**	**Q**	**MB-4-1-1**	**Q**	**MB-4-2-1**	**Q**	**MB-5-1-1**	**Q**	**MB-5-2-1**	**Q**	**MB-6-2-1**	**Q**	**MB-6-1-1**	**Q**		
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg		570		1300		760		1000		300		910		1100		740		2200		275	141
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)																						
Acenaphthene	mg/kg	U		U		U		U		U		U		U		U		U		U		
Fluoranthene	mg/kg			U	0.11		0.023		0.099			U	0.066		0.043		0.079		0.14			
Naphthalene	mg/kg			U	0.068		0.031		0.076			U	0.072		0.043		0.056		0.14			
Benzo(a)anthracene	mg/kg	U		U	0.059			U	0.062			U	0.039		0.024		0.046		0.077			
Benzo(a)pyrene	mg/kg	U		U	0.056			U	0.058			U	0.032			U	0.045		0.063			
Benzo(b)fluoranthene	mg/kg	U		U	0.058			U	0.063			U	0.037		0.024		0.05		0.08			
Benzo(k)fluoranthene	mg/kg	U		U	0.046			U	0.06			U	0.034			U	0.048		0.075			
Chrysene	mg/kg			U	0.076		0.022		0.08			U	0.055		0.035		0.063		0.11			
Acenaphthylene	mg/kg	U		U		U		U		U		U		U		U		U		U		
Anthracene	mg/kg		0.024		0.037		0.044		0.064			U	0.053		0.051		0.031		0.11			
Benzo(ghi)perylene	mg/kg		0.023		0.081		0.043		0.1		0.042		0.053		0.045		0.059		0.11			
Fluorene	mg/kg	U		U		U		U		U		U		U		U		U		U		
Phenanthrene	mg/kg		0.025		0.09		0.036		0.1		0.022		0.086		0.058		0.083		0.16			
Dibenzo(a,h)anthracene	mg/kg	U		U		U		U		U		U		U		U		U		U		
Indeno(1,2,3-cd)pyrene	mg/kg	U		U	0.07		0.029		0.078		0.03		0.04		0.028		0.049		0.083			
Pyrene	mg/kg			U	0.1		0.022		0.095			U	0.06		0.039		0.072		0.13			
Total PAH Constituent Concentrations =			0.072		0.851		0.25		0.935		0.094		0.627		0.39		0.681		1.278		0.935	0.415

Notes:

For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive therepresentative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
mg/kg = milligrams per kilogram
U-parameter not detected above specified detection limit; value in red represents one-half of the specified detection limit.
J-indicates an estimated detection
FD-5 duplicate of MB-3
FD 6/7 are field duplicates for Sample NL-8.

Table 4A
Summary of Organics in Soil
North and South Lagoons and Berms
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0009079-03		L0008885-15		L0008885-16		L0008882-09		L0008882-10		L0009077-03		L0008885-12		L0008885-14		L0008885-10		L0008885-11	
Sampling Date		**10/05/00**		**10/04/00**		**10/04/00**		**10/03/00**		**10/03/00**		**10/06/00**		**10/04/00**		**10/04/00**		**10/03/00**		**10/04/00**	
Location ID	**Units**	**SL-1-1-1**	**Q**	**SL-2-1-1**	**Q**	**SL-2-2-1**	**Q**	**SL-3-1-1**	**Q**	**SL-3-2-1**	**Q**	**SL-4-1-1**	**Q**	**SL-5-1-1**	**Q**	**SL-5-2-1**	**Q**	**SL-6-1-1**	**Q**	**SL-7-1-1**	**Q**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	850		150		420		430		300		2800		350		340		230		240	
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)																					
Acenaphthene	mg/kg		U	0.021	U	0.022	U	0.021	UJ	0.021	UJ		U		U		U	0.021	U		U
Fluoranthene	mg/kg		U	0.021	U	0.022	U	0.021	UJ	0.021	UJ	0.044		0.22		0.069		0.021	U	0.031	
Naphthalene	mg/kg	R		0.021	U	0.022	U	0.021	UJ	0.021	UJ		U		U		U	0.021	U		U
Benzo(a)anthracene	mg/kg		U	0.021	U	0.022	U	0.021	UJ	0.021	UJ	0.024		0.1		0.035		0.021	U		U
Benzo(a)pyrene	mg/kg		U	0.021	U	0.022	U	0.021	UJ	0.021	UJ		U	0.077		0.024		0.021	U		U
Benzo(b)fluoranthene	mg/kg		U	0.021	U	0.022	U	0.021	UJ	0.021	UJ	0.032		0.056		0.023		0.021	U		U
Benzo(k)fluoranthene	mg/kg		U	0.021	U	0.022	U	0.021	UJ	0.021	UJ	0.025		0.076		0.024		0.021	U		U
Chrysene	mg/kg		U	0.021	U	0.022	U	0.021	UJ	0.021	UJ	0.035	J	0.097		0.032		0.021	U		U
Acenaphthylene	mg/kg		U	0.021	U	0.022	U	0.021	UJ	0.021	UJ		U		U		U	0.021	U		U
Anthracene	mg/kg	0.042		0.021	U	0.022	U	0.021	UJ	0.021	UJ	0.047		0.057		0.027		0.021	U		U
Benzo(ghi)perylene	mg/kg		U	0.021	U	0.022	U	0.021	UJ	0.021	UJ	0.036		0.051			U	0.021	U	0.024	
Fluorene	mg/kg	R		0.021	U	0.022	U	0.021	UJ	0.021	UJ		U		U		U	0.021	U		U
Phenanthrene	mg/kg	R		0.021	U	0.022	U	0.021	UJ	0.021	UJ	0.039		0.19		0.043		0.021	U		U
Dibenzo(a,h)anthracene	mg/kg		U	0.021	U	0.022	U	0.021	UJ	0.021	UJ		U		U		U	0.021	U		U
Indeno(1,2,3-cd)pyrene	mg/kg		U	0.021	U	0.022	U	0.021	UJ	0.021	UJ	0.031		0.056			U	0.021	U		U
Pyrene	mg/kg	R		0.021	U	0.022	U	0.021	UJ	0.021	UJ	0.063		0.18		0.057		0.021	U	0.029	
Total PAH Constituent Concentrations =		0.042		0.168		0.176		0.168		0.168		0.376		1.16		0.334		0.168		0.084	

Notes:

For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive therepresentative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
mg/kg = milligrams per kilogram
U-parameter not detected above specified detection limit; value in red represents one-half of the specified detection limit.
J-indicates an estimated detection
FD-5 duplicate of MB-3
FD 6/7 are field duplicates for Sample NL-8.

Table 4A
Summary of Organics in Soil
North and South Lagoons and Berms
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0008885-13		L0008835-07		L0008882-23		L0008882-24	
Sampling Date		**10/04/00**		**10/02/00**		**10/03/00**		**10/03/00**	
Location ID	**Units**	**SL-7-2-1**	**Q**	**FD-5**	**Q**	**FD-6**	**Q**	**FD-7**	**Q**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	120				340			
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)									
Acenaphthene	mg/kg	0.022	U		U			0.022	UJ
Fluoranthene	mg/kg	0.022	U	0.043				0.022	UJ
Naphthalene	mg/kg	0.022	U	0.032				0.022	UJ
Benzo(a)anthracene	mg/kg	0.022	U	0.029				0.022	UJ
Benzo(a)pyrene	mg/kg	0.022	U	0.026				0.022	UJ
Benzo(b)fluoranthene	mg/kg	0.022	U	0.023				0.022	UJ
Benzo(k)fluoranthene	mg/kg	0.022	U		U			0.022	UJ
Chrysene	mg/kg	0.022	U	0.035				0.022	UJ
Acenaphthylene	mg/kg	0.022	U		U			0.022	UJ
Anthracene	mg/kg	0.022	U	0.04				0.022	UJ
Benzo(ghi)perylene	mg/kg	0.022	U	0.039				0.022	UJ
Fluorene	mg/kg	0.022	U	0.022	U			0.022	UJ
Phenanthrene	mg/kg	0.022	U	0.045				0.022	UJ
Dibenzo(a,h)anthracene	mg/kg	0.022	U		U			0.022	UJ
Indeno(1,2,3-cd)pyrene	mg/kg	0.022	U	0.03				0.022	UJ
Pyrene	mg/kg	0.022	U	0.042				0.022	UJ
Total PAH Constituent Concentrations =		0.176		0.406				0.176	

Notes:

For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive therepresentative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
mg/kg = milligrams per kilogram
U-parameter not detected above specified detection limit; value in red represents one-half of the specified detection limit.
J-indicates an estimated detection
FD-5 duplicate of MB-3
FD 6/7 are field duplicates for Sample NL-8.

Table 4B
Statistical Analysis
North and South Lagoons and Berms
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Analytical Data

Grid / Perimeter Sample Number	NL-a	NL-b	NL-c	NL-d	NL-e	NL-1	NL-2	NL-3	NL-4	NL-5 (NL-5-1 / NL-5-2)	NL-6	NL-7	NL-8 (NL-8-1 / NL-8-2 / FD-6 / 7)	NL-9	NL-10	NL-11
PAH (mg/kg)	0.55	0.14	0.5	0.55	0.92	0.336	0.336	0.138	0.018	0.1560	0.126	0.126	0.165	0.152	0.588	0.126
TPH (mg/kg)	1000	197	121	236	260	380	590	230	75	88	66	93	265.0	73.0	300.0	240.0

Values in red represent 1/2 the MDL

LOGNORMAL DISTRIBUTION

Grid / Perimeter Sample Number	NL-a	NL-b	NL-c	NL-d	NL-e	NL-1	NL-2	NL-3	NL-4	NL-5 (NL-5-1 / NL-5-2)	NL-6	NL-7	NL-8 (NL-8-1 / NL-8-2)	NL-9	NL-10	NL-11
PAH (mg/kg)	-0.5978	-1.9661	-0.6931	-0.5978	-0.0834	-1.0906	-1.0906	-1.9805	-4.0174	-1.8579	-2.0715	-2.0715	-1.7998	-1.8839	-0.5310	-2.0715
TPH (mg/kg)	6.9078	5.2832	4.7958	5.4638	5.5607	5.9402	6.3801	5.4381	4.3175	4.4773	4.1897	4.5326	5.5797	4.2905	5.7038	5.4806

NORMAL DISTRIBUTION

Grid / Perimeter Sample Number	NL-a	NL-b	NL-c	NL-d	NL-e	NL-1	NL-2	NL-3	NL-4	NL-5 (NL-5-1 / NL-5-2)	NL-6	NL-7	NL-8 (NL-8-1 / NL-8-2)	NL-9	NL-10	NL-11
PAH (mg/kg)	0.55	0.14	0.5	0.55	0.92	0.336	0.336	0.138	0.018	0.156	0.126	0.126	0.165	0.152	0.588	0.126
TPH (mg/kg)	1000	197	121	236	260	380	590	230	75	88	66	93	265	73	300	240

Values in red represent 1/2 the MDL

Table 4B
Statistical Analysis
North and South Lagoons and Berms
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Analytical Data

Grid / Perimeter Sample Number	NL-12 (NL-12-1 / NL-12-2)	MB-1 (MB-1-1 / MB-1-2)	MB-2 (MB-2-1 / MB-2-2)	MB-3 (MB-3-1 / MB-3-2 / FD-5)	MB-4 (MB-4-1 / MB-4-2)	MB-5 (MB-5-1 / MB-5-2)	MB-6 (MB-6-1 / MB-6-2)	SL-a	SL-b	SL-1	SL-2 (SL-2-1 / SL-2-2)
PAH (mg/kg)	0.3375	0.627	0.2965	0.50	0.5145	0.5085	0.9795	0.935	0.415	0.042	0.172
TPH (mg/kg)	288.5	1275	1585	1030	650	1005.0	1470.0	275	141	850	285

Values in red represent 1/2 the MDL

LOGNORMAL DISTRIBUTION

Grid / Perimeter Sample Number	NL-12 (NL-12-1 / NL-12-2)	MB-1 (MB-1-1 / MB-1-2)	MB-2 (MB-2-1 / MB-2-2)	MB-3 (MB-3-1 / MB-3-2)	MB-4 (MB-4-1 / MB-4-2)	MB-5 (MB-5-1 / MB-5-2)	MB-6	SL-a	SL-b	SL-1	SL-2 (SL-2-1 / SL-2-2)
PAH (mg/kg)	-1.0862	-0.4668	-1.2157	-0.6885	-0.6646	-0.6763	-0.0207	-0.0672	-0.8795	-3.1701	-1.7603
TPH (mg/kg)	5.6647	7.1507	7.3683	6.9373	6.4770	6.9127	7.2930	5.6168	4.9488	6.7452	5.6525

NORMAL DISTRIBUTION

Grid / Perimeter Sample Number	NL-12 (NL-12-1 / NL-12-2)	MB-1 (MB-1-1 / MB-1-2)	MB-2 (MB-2-1 / MB-2-2)	MB-3 (MB-3-1 / MB-3-2)	MB-4 (MB-4-1 / MB-4-2)	MB-5 (MB-5-1 / MB-5-2)	MB-6	SL-a	SL-b	SL-1	SL-2 (SL-2-1 / SL-2-2)
PAH (mg/kg)	0.3375	0.627	0.2965	0.502333333	0.5145	0.5085	0.9795	0.935	0.415	0.042	0.172
TPH (mg/kg)	288.5	1275	1585	1030	650	1005	1470	275	141	850	285

Values in red represent 1/2 the MDL

Table 4B
Statistical Analysis
North and South Lagoons and Berms
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Analytical Data

Grid / Perimeter Sample Number	SL-3 (SL-3-1/SL-3-2)	SL-4	SL-5 (SL-5-1/SL-5-2)	SL-6	SL-7 (SL-7-1/SL-7-2)
PAH (mg/kg)	0.168	0.376	0.75	0.168	0.13
TPH (mg/kg)	365	2800	345	230	180

Values in red represent 1/2 the MDL

LOGNORMAL DISTRIBUTION

Grid / Perimeter Sample Number	SL-3 (SL-3-1/SL-3-2)	SL-4	SL-5 (SL-5-1/SL-5-2)	SL-6	SL-7 (SL-7-1/SL-7-2)	MEAN	STDEV	N	N-1	H Statistic	95% UCLt	Maximum Concentration	Lower of UCL and Max Conc.	
PAH (mg/kg)	-1.7838	-0.9782	-0.2917	-1.7838	-2.0402	-1.31	0.91	32	31	2.314	0.594	0.98	0.6	Use Lognormal UCL
TPH (mg/kg)	5.8999	7.9374	5.8435	5.4381	5.1930	5.79	0.98	32	31	2.393	813.625	2800	813.6	Use Lognormal UCL

NORMAL DISTRIBUTION

Grid / Perimeter Sample Number	SL-3 (SL-3-1/SL-3-2)	SL-4	SL-5 (SL-5-1/SL-5-2)	SL-6	SL-7 (SL-7-1/SL-7-2)	MEAN	STDEV	N	N-1	t Statistic	95% UCL	Maximum Concentration	Lower of UCL and Max Conc.
PAH (mg/kg)	0.168	0.376	0.747	0.168	0.13	0.37	0.27	32	31	1.6939	0.450	0.98	0.5
TPH (mg/kg)	365	2800	345	230	180	530.89	593.10	32	31	1.6939	708.49	2800	708.5

Values in red represent 1/2 the MDL

Table 5A
Summary of Organics in Soil - Lagoon Stockpile # 6
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID					L0008882-01		L0008882-02		L0008885-01		L0008885-02		L0008882-03		L0008882-04		L0008885-03
Sampling Date		**9**	**5**	**10**	**10/03/00**		**10/03/00**		**10/04/00**		**10/04/00**		**10/03/00**		**10/03/00**		**10/04/00**
Location ID	**Units**			**(P-90)**	**P6-4-1-1**	**Qual**	**P6-4-2-1**	**Qual**	**P6-6-1-1**	**Qual**	**P6-6-2-1**	**Qual**	**P6-7-1-1**	**Qual**	**P6-7-2-1**	**Qual**	**P6-8-1-1**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg				130		97		87		42	U	210		41	U	310
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)																	
Acenaphthene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U		UJ	0.018	UJ	
Fluoranthene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U	0.04	J	0.018	UJ	0.038
Naphthalene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U		UJ	0.018	UJ	
Benzo(a)anthracene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U	0.022	J	0.018	UJ	
Benzo(a)pyrene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U		UJ	0.018	UJ	
Benzo(b)fluoranthene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U	0.021	J	0.018	UJ	0.022
Benzo(k)fluoranthene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U	0.021	J	0.018	UJ	
Chrysene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U	0.026	J	0.018	UJ	0.025
Acenaphthylene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U		UJ	0.018	UJ	
Anthracene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U	0.024	J	0.018	UJ	
Benzo(ghi)perylene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U		UJ	0.018	UJ	0.022
Fluorene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U		UJ	0.018	UJ	
Phenanthrene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U	0.024	J	0.018	UJ	0.022
Dibenzo(a,h)anthracene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U		UJ	0.018	UJ	
Indeno(1,2,3-cd)pyrene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U		UJ	0.018	UJ	
Pyrene	mg/kg				0.022	UJ	0.021	UJ	0.021	U	0.021	U	0.036	J	0.018	UJ	0.034
Total PAH Constituent Concentrations =		0.5	0.5	0.5	0.176		0.168		0.168		0.168		0.214		0.144		0.163

Notes:
mg/kg = milligrams per kilogram
FD = Field duplicate; FD-8/9 is field duplicate for Sample P6-6.

For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive therepresentative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
U-parameter not detected above specified detection limit, value in red represents one-half of the specified detection limit.
J-indicates an estimated detection

Table 5A
Summary of Organics in Soil - Lagoon Stockpile # 6
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID			L0008885-04		L0009079-16		L0008882-05		L0008882-06		L0008885-20		L0008885-21	
Sampling Date			**10/04/00**		**10/06/00**		**10/03/00**		**10/03/00**		**10/04/00**		**10/04/00**	
Location ID	**Units**	**Qual**	**P6-8-2-1**	**Qual**	**P6-10-1-1**	**Qual**	**P6-11-1-1**	**Qual**	**P6-11-2-1**	**Qual**	**FD-8**	**Qual**	**FD-9**	**Qual**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg		42	U	73		60		42	U			42	U
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)														
Acenaphthene	mg/kg	U	0.021	U	0.021	U		UJ		UJ	0.021	U		
Fluoranthene	mg/kg		0.021	U	0.021	U	0.021	J	0.07	J	0.021	U		
Naphthalene	mg/kg	U	0.021	U	R			UJ		UJ	0.021	U		
Benzo(a)anthracene	mg/kg	U	0.021	U	0.021	U		UJ	0.049	J	0.021	U		
Benzo(a)pyrene	mg/kg	U	0.021	U	0.021	U		UJ	0.043	J	0.021	U		
Benzo(b)fluoranthene	mg/kg		0.021	U	0.021	U		UJ	0.038	J	0.021	U		
Benzo(k)fluoranthene	mg/kg	U	0.021	U	0.021	U		UJ	0.036	J	0.021	U		
Chrysene	mg/kg		0.021	U	0.021	U		UJ	0.045	J	0.021	U		
Acenaphthylene	mg/kg	U	0.021	U	0.021	U		UJ		UJ	0.021	U		
Anthracene	mg/kg	U	0.021	U	0.021	U		UJ		UJ	0.021	U		
Benzo(ghi)perylene	mg/kg		0.021	U	0.021	U		UJ	0.025	J	0.021	U		
Fluorene	mg/kg	U	0.021	U	R			UJ		UJ	0.021	U		
Phenanthrene	mg/kg		0.021	U	R			UJ	0.054	J	0.021	U		
Dibenzo(a,h)anthracene	mg/kg	U	0.021	U	0.021	U		UJ		UJ	0.021	U		
Indeno(1,2,3-cd)pyrene	mg/kg	U	0.021	U	0.021	U		UJ	0.027	J	0.021	U		
Pyrene	mg/kg		0.021	U	R			UJ	0.06	J	0.021	U		
Total PAH Constituent Concentrations =			0.168		0.126		0.021		0.447		0.168			

Notes:
mg/kg = milligrams per kilogram
FD = Field duplicate; FD-8/9 is field duplicate for Sample P6-6

For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive therepresentative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
U-indicates not detected and reported detection limit; value in red represents one-half of the specified detection limit.
J-indicates an estimated detection

Table 5B
Organics in Soil - Statistical Analyses for Lagoon Stockpile #6
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Analytical Data

Grid / Perimeter Sample Nu	9	5	10 (P-90)	P6-4 (P6-4-1 / P6-4-2)	P6-6 (P6-6-1 / P6-6-2 / FD-8 / 9))	P6-7 (P6-7-1 / P6-7-2)	P6-8 (P6-8-1 / P6-8-2)	P6-10	P6-11 (P6-11-1 / P6-11-2)
PAH (mg / kg)	0.5	0.5	0.5	0.172	0.168	0.179	0.166	0.126	0.234
TPH (mg / kg)	-	-	-	113.5	43	115.25	165.5	73	40.5

Constituent concentrations were averaged if more than one sample was collected from within a grid cell. Data from samples and their field duplicates were averaged.
Values shown in red represent one half of the analytical detection limit.

LOGNORMAL DISTRIBUTION

Grid / Perimeter Sample Nu	9	5	10 (P-90)	P6-4 (P6-4-1 / P6-4-2)	P6-6 (P6-6-1 / P6-6-2)	P6-7 (P6-7-1 / P6-7-2)	P6-8 (P6-8-1 / P6-8-2)	P6-10	P6-11 (P6-11-1 / P6-11-2)	MEAN	STDEV	N	N-1	H Statistic	95% UCLt	Maximum Concentration	Lower of UCL and Max Conc.	
PAH (mg / kg)	-0.6931	-0.6931	-0.6931	-1.7603	-1.7838	-1.7204	-1.7988	-2.0715	-1.4524	-1.41	0.56	9	8	2.309	0.5	0.5	0.5	Use Lognormal Distri
TPH (mg / kg)	-	-	-	4.7318	3.7612	4.7471	5.1090	4.2905	3.7013	4.39	0.57	6	5	2.892	199.4	165.5	165.5	

NORMAL DISTRIBUTION

Grid / Perimeter Sample Nu	9	5	10 (P-90)	P6-4 (P6-4-1 / P6-4-2)	P6-6 (P6-6-1 / P6-6-2 / FD-8 / 9))	P6-7 (P6-7-1 / P6-7-2)	P6-8 (P6-8-1 / P6-8-2)	P6-10	P6-11 (P6-11-1 / P6-11-2)	MEAN	STDEV	N	N-1	t Statistic	95% UCL	Maximum Concentration	Lower of UCL and Max Conc.	
PAH (mg / kg)	0.5	0.5	0.5	0.172	0.168	0.179	0.1655	0.126	0.234	0.28	0.17	9	8	1.8331	0.4	0.5	0.4	
TPH (mg / kg)	-	-	-	113.5	43	115.25	165.5	73	40.5	91.79	48.62	6	5	1.9432	130.4	165.5	130.4	Use Normal Distribut

Table 6
Summary of Organics in Soil - Overflow Lagoon
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID							L0008962-12		L0008885-17		L0008962-13		L0008962-11		L0008962-14	
Sampling Date		a	b	c	d	e	**10/05/00**		**10/04/00**		**10/05/00**		**10/05/00**		**10/05/00**	
Location ID	**Units**						**OL-1-1-1**	**Qual**	**OL-2-1-1**	**Qual**	**OL-2-2-1**	**Qual**	**OL-3-1-1**	**Qual**	**OL-4-1-1**	**Qual**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	172	223	119	62	85	530		650		250		1300		1200	
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)																
Acenaphthene	mg/kg						0.042	U		U	0.021	U		U	0.041	U
Fluoranthene	mg/kg						0.042	U	0.051		0.021	U	0.044		0.041	U
Naphthalene	mg/kg						0.042	U		U	0.021	U		U	0.041	U
Benzo(a)anthracene	mg/kg						0.042	U		U	0.021	U		U	0.041	U
Benzo(a)pyrene	mg/kg						0.042	U		U	0.021	U		U	0.041	U
Benzo(b)fluoranthene	mg/kg						0.042	U		U	0.021	U		U	0.041	U
Benzo(k)fluoranthene	mg/kg						0.042	U		U	0.021	U		U	0.041	U
Chrysene	mg/kg						0.042	U	0.041		0.021	U	0.042	J	0.041	U
Acenaphthylene	mg/kg						0.042	U		U	0.021	U	0.041		0.041	U
Anthracene	mg/kg						0.042	U		U	0.021	U		U	0.041	U
Benzo(ghi)perylene	mg/kg						0.042	U		U	0.021	U	0.054		0.041	U
Fluorene	mg/kg						0.042	U		U	0.021	U		U	0.041	U
Phenanthrene	mg/kg						0.042	U		U	0.021	U	0.042		0.041	U
Dibenzo(a,h)anthracene	mg/kg						0.042	U		U	0.021	U		U	0.041	U
Indeno(1,2,3-cd)pyrene	mg/kg						0.042	U	0.041		0.021	U	0.05		0.041	U
Pyrene	mg/kg						0.042	U	0.05		0.021	U	0.049		0.041	U
Total Constituent Concentrations =		0.78	0.79	0.7	0.69	0.71	0.336		0.183		0.168		0.322		0.328	

Notes:
mg/kg = milligrams per kilogram

For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive the representative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derive the PAH concentration.
U-parameter not detected above specified detection limit.

Table 7
Summary of Organics in Soil - Inactive Lagoon
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID			L0009079-07		L0008885-09		L0008835-16		L0008835-17		L0009079-01	
Sampling Date			**10/05/00**		**10/04/00**		**10/03/00**		**10/03/00**		**10/05/00**	
Location ID	**Units**	a	**IA-1-1-1**	**Qual**	**IA-2-1-1**	**Qual**	**IA-3-1-1**	**Qual**	**IA-3-2-1**	**Qual**	**IA-4-1-1**	**Qual**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	40	44		50		50		44	U	550	
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)												
Acenaphthene	mg/kg		0.022	U	0.021	U	0.021	U	0.022	U		U
Fluoranthene	mg/kg		0.022	U	0.021	U	0.021	U	0.022	U	0.078	
Naphthalene	mg/kg		R		0.021	U	0.021	U	0.022	U	R	
Benzo(a)anthracene	mg/kg		0.022	U	0.021	U	0.021	U	0.022	U	0.042	
Benzo(a)pyrene	mg/kg		0.022	U	0.021	U	0.021	U	0.022	U		U
Benzo(b)fluoranthene	mg/kg		0.022	U	0.021	U	0.021	U	0.022	U		U
Benzo(k)fluoranthene	mg/kg		0.022	U	0.021	U	0.021	U	0.022	U		U
Chrysene	mg/kg		0.022	U	0.021	U	0.021	U	0.022	U	0.051	
Acenaphthylene	mg/kg		0.022	U	0.021	U	0.021	U	0.022	U		U
Anthracene	mg/kg		0.022	U	0.021	U	0.021	U	0.022	U		U
Benzo(ghi)perylene	mg/kg		0.022	U	0.021	U	0.021	U	0.022	U		U
Fluorene	mg/kg		R		0.021	U	0.021	U	0.022	U	R	
Phenanthrene	mg/kg		R		0.021	U	0.021	U	0.022	U	0.049	
Dibenzo(a,h)anthracene	mg/kg		0.022	U	0.021	U	0.021	U	0.022	U		U
Indeno(1,2,3-cd)pyrene	mg/kg		0.022	U	0.021	U	0.021	U	0.022	U		U
Pyrene	mg/kg		R		0.021	U	0.021	U	0.022	U	0.071	
Total PAH Constituent Concentrations =		0.31	0.132		0.168		0.168		0.176		0.291	

Notes:
mg/kg = milligrams per kilogram

For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive the representative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
U-parameter not detected above specified detection limit.
J-indicates an estimated detection

Table 8
Summary of Organics in Soil - Biocell
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0009079-09		L0009079-10		L0009079-11		L0009079-12		L0009079-13		L0009079-14		L0009079-15	
Sampling Date		**10/06/00**		**10/06/00**		**10/06/00**		**10/06/00**		**10/06/00**		**10/06/00**		**10/06/00**	
Location ID	**Units**	**BIO-1-1-1**	**Qual**	**BIO-2-1-1**	**Qual**	**BIO-3-1-1**	**Qual**	**BIO-4-1-1**	**Qual**	**BIO-5-1-1**	**Qual**	**BIO-6-1-1**	**Qual**	**BIO-7-1-1**	**Qual**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	96		79		230		570		130		160		180	
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)															
Acenaphthene	mg/kg	0.011	U	0.011	U	0.0225	U	0.0225	U	0.011	U	0.0115	U	0.011	U
Fluoranthene	mg/kg	0.03		0.026		0.0225	U	0.096		0.044		0.043		0.073	
Naphthalene	mg/kg	R		R		R		R		R		R		R	
Benzo(a)anthracene	mg/kg	0.011	U	0.011	U	0.0225	U	0.053		0.024		0.024		0.035	
Benzo(a)pyrene	mg/kg	0.011	U	0.011	U	0.0225	U	0.052		0.022		0.023		0.033	
Benzo(b)fluoranthene	mg/kg	0.011	U	0.011	U	0.0225	U	0.046		0.026		0.031		0.036	
Benzo(k)fluoranthene	mg/kg	0.011	U	0.011	U	0.0225	U	0.057		0.022		0.0115	U	0.028	
Chrysene	mg/kg	0.011	U	0.011	U	0.0225	U	0.064		0.029		0.03		0.043	
Acenaphthylene	mg/kg	0.011	U	0.011	U	0.0225	U	0.0225	U	0.011	U	0.0115	U	0.011	U
Anthracene	mg/kg	0.011	U	0.011	U	0.0225	U	0.0225	U	0.011	U	0.0115	U	0.011	U
Benzo(ghi)perylene	mg/kg	0.011	U	0.011	U	0.0225	U	0.065		0.011	U	0.0115	U	0.029	
Fluorene	mg/kg	R		R		R		R		R		R		R	
Phenanthrene	mg/kg	R		R		R		0.067		0.026		R		0.045	
Dibenzo(a,h)anthracene	mg/kg	0.011	U	0.011	U	0.0225	U	0.0225	U	0.011	U	0.0115	U	0.011	U
Indeno(1,2,3-cd)pyrene	mg/kg	0.011	U	0.011	U	0.0225	U	0.053		0.011	U	0.0115	U	0.029	
Pyrene	mg/kg	0.027		0.024		R		0.088		0.041		0.042		0.065	
Total PAH Constituent Concentrations =		0.178		0.171		0.0225		0.731		0.3		0.2735		0.46	

Notes:
mg/kg = milligrams per kilogram
For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive the representative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.

Blank spaces indicate that parameters was not analyzed
U-parameter not detected above specified detection limit; value in red represents one-half of the specified detection limit.
J-indicates an estimated detection

Table 9A
Summary of Organics in Soil - Lagoon Stockpile #1
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID															L0008776-01		L0008776-02		L0008776-03		L0008776-04	
Sampling Date		P1-18	P1-15	P1-13	P1-29	P1-9	P1-28	P1-5	P1-27	P1-3	P1-1	P1-26	P1-25	P1-24	**10/02/00**		**10/02/00**		**10/02/00**		**10/02/00**	
Location ID	**Units**														**P1-4-1-1**	**Q**	**P1-4-2-1**	**Q**	**P1-6-1-1**	**Q**	**P1-6-2-1**	**Q**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	25	-	-	-	-	-	44	-	-	-		-		63	J	42	UJ	140	J	57	J
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)																						
Acenaphthene	mg/kg														0.022	UJ	0.021	UJ		UJ	0.021	UJ
Fluoranthene	mg/kg														0.022	UJ	0.021	UJ	0.06	J	0.021	UJ
Naphthalene	mg/kg														0.022	UJ	0.021	UJ		UJ	0.021	UJ
Benzo(a)anthracene	mg/kg														0.022	UJ	0.021	UJ	0.031	J	0.021	UJ
Benzo(a)pyrene	mg/kg														0.022	UJ	0.021	UJ	0.026	J	0.021	UJ
Benzo(b)fluoranthene	mg/kg														0.022	UJ	0.021	UJ	0.035	J	0.021	UJ
Benzo(k)fluoranthene	mg/kg														0.022	UJ	0.021	UJ	0.036	J	0.021	UJ
Chrysene	mg/kg														0.022	UJ	0.021	UJ	0.039	J	0.021	UJ
Acenaphthylene	mg/kg														0.022	UJ	0.021	UJ		UJ	0.021	UJ
Anthracene	mg/kg														0.022	UJ	0.021	UJ		UJ	0.021	UJ
Benzo(ghi)perylene	mg/kg														0.022	UJ	0.021	UJ	0.025	J	0.021	UJ
Fluorene	mg/kg														0.022	UJ	0.021	UJ		UJ	0.021	UJ
Phenanthrene	mg/kg														0.022	UJ	0.021	UJ	0.028	J	0.021	UJ
Dibenzo(a,h)anthracene	mg/kg														0.022	UJ	0.021	UJ		UJ	0.021	UJ
Indeno(1,2,3-cd)pyrene	mg/kg														0.022	UJ	0.021	UJ	0.025	J	0.021	UJ
Pyrene	mg/kg														0.022	UJ	0.021	UJ	0.054	J	0.021	UJ
Total PAH Constituent Concentrations =		1.7	0.5	0.5	0.73	0.5	0.77	1.1	0.7	0.5	0.5	0.5	1.28	0.75	0.176		0.168		0.359		0.168	

Notes:
mg/kg = milligrams per kilogram
For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive the representative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
U = parameter not detected above specified detection limit.
J = indicates an estimated detection
Q = Qualifier

Table 9A
Summary of Organics in Soil - Lagoon Stockpile #1
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0008776-05		L0008776-06		L0008776-07		L0008776-08		L0008962-01		L0008962-02		L0111678-05		L0008962-04		L0008962-05	
Sampling Date		**10/02/00**		**10/02/00**		**10/02/00**		**10/02/00**		**10/05/00**		**10/05/00**		**12/10/01**		**10/05/00**		**10/05/00**	
Location ID	**Units**	**P1-10-1-1**	**Q**	**P1-10-2-1**	**Q**	**P1-14-1-1**	**Q**	**P1-14-2-1**	**Q**	**P1-2-1-1**	**Q**	**P1-27-1-1**	**Q**	**P1-11-1-2**	**Q**	**P1-29-1-1**	**Q**	**P1-25-1-1**	**Q**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	89	J	60	J	79	J	44	UJ	42	U	43	UJ	44	U	43	U	110	
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)																			
Acenaphthene	mg/kg		UJ	0.021	UJ		UJ	0.022	UJ		U			0.023	U				
Fluoranthene	mg/kg	0.13	J	0.021	UJ	0.16	J	0.022	UJ	0.022				0.023	U				
Naphthalene	mg/kg		UJ	0.021	UJ		UJ	0.022	UJ		U			0.023	U				
Benzo(a)anthracene	mg/kg	0.064	J	0.021	UJ	0.073	J	0.022	UJ		U			0.023	U				
Benzo(a)pyrene	mg/kg	0.057	J	0.021	UJ	0.056	J	0.022	UJ		U			0.023	U				
Benzo(b)fluoranthene	mg/kg	0.061	J	0.021	UJ	0.094	J	0.022	UJ		U			0.023	U				
Benzo(k)fluoranthene	mg/kg	0.059	J	0.021	UJ	0.081	J	0.022	UJ		U			0.023	U				
Chrysene	mg/kg	0.072	J	0.021	UJ	0.094	J	0.022	UJ		U			0.023	U				
Acenaphthylene	mg/kg		UJ	0.021	UJ		UJ	0.022	UJ		U			0.023	U				
Anthracene	mg/kg	0.05	J	0.021	UJ		UJ	0.022	UJ		U			0.023	U				
Benzo(ghi)perylene	mg/kg		UJ	0.021	UJ	0.033	J	0.022	UJ		U			0.023	U				
Fluorene	mg/kg		UJ	0.021	UJ		UJ	0.022	UJ		U			0.023	U				
Phenanthrene	mg/kg	0.082	J	0.021	UJ	0.035	J	0.022	UJ		U			0.023	U				
Dibenzo(a,h)anthracene	mg/kg		UJ	0.021	UJ		UJ	0.022	UJ		U			0.023	U				
Indeno(1,2,3-cd)pyrene	mg/kg	0.0215	UJ	0.021	UJ	0.045	J	0.022	UJ		U			0.023	U				
Pyrene	mg/kg	0.11	J	0.021	UJ	0.14	J	0.022	UJ		U			0.023	U				
Total PAH Constituent Concentrations =		0.7065		0.168		0.811		0.176		0.022				0.184					

Notes:
mg/kg = milligrams per kilogram
For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive the representative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
U = parameter not detected above specified detection limit.
J = indicates an estimated detection
Q = Qualifier

Table 9A
Summary of Organics in Soil - Lagoon Stockpile #1
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0008962-06		L0008962-07		L0008962-08		L0008962-09		L0008962-10		L0008776-09		L0008962-21		L0008962-22	
Sampling Date		**10/05/00**		**10/05/00**		**10/05/00**		**10/05/00**		**10/05/00**		**10/02/00**		**10/05/00**		**10/05/00**	
Location ID	**Units**	**P1-28-1-1**	**Q**	**P1-26-1-1**	**Q**	**P1-8-1-1**	**Q**	**P1-7-1-1**	**Q**	**P1-24-1-1**	**Q**	**FD-1-2**	**Q**	**FD-11**	**Q**	**FD-12**	**Q**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	42	U	46		43	U	43	U	77		48	J	56	J		
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)																	
Acenaphthene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Fluoranthene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Naphthalene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Benzo(a)anthracene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Benzo(a)pyrene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Benzo(b)fluoranthene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Benzo(k)fluoranthene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Chrysene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Acenaphthylene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Anthracene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Benzo(ghi)perylene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Fluorene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Phenanthrene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Dibenzo(a,h)anthracene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Indeno(1,2,3-cd)pyrene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Pyrene	mg/kg					0.022	U	0.022	U			0.022	UJ			0.022	U
Total PAH Constituent Concentrations =						0.176		0.176				0.176				0.176	

Notes:
mg/kg = milligrams per kilogram
For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive the representative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
U = parameter not detected above specified detection limit.
J = indicates an estimated detection
Q = Qualifier

Table 9B
Statistical Analyses for Lagoon Stockpile #1
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Analytical Data

Grid / Perimeter Sample Number	P1-18	P1-15	P1-13	P1-29	P1-9	P1-28	P1-5	P1-27	P1-3	P1-1	P1-26	P1-25	P1-24	P1-4 (P1-4-1 / P1-4-2)	P1-6 (P1-6-1 / P1-6-2)	P1-10 (P1-10-1 / P1-10-2)	P1-14 (P1-14-1 / P1-14-2 / FD-1)	P1-2	P1-27 (P1-27 / FD-11)	P1-11	P1-29
PAH (mg/kg)	1.7	0.5	0.5	0.73	0.5	0.77	1.1	0.7	0.5	0.5	0.5	1.28	0.75	0.172	0.2635	0.43725	0.4935	0.022	-	0.184	-
TPH (mg/kg)	25	-	-	-	-	-	44	-	-	-	-	-	-	42	99	75	51	21.0	38.8	22.0	21.5

LOGNORMAL DISTRIBUTION

Grid / Perimeter Sample Number	P1-18	P1-15	P1-13	P1-29	P1-9	P1-28	P1-5	P1-27	P1-3	P1-1	P1-26	P1-25	P1-24	P1-4	P1-6	P1-10	P1-14	P1-2	P1-27	P1-11	P1-29
PAH (mg/kg)	0.5306	-0.6931	-0.6931	-0.3102	-0.6931	-0.2657	0.0953	-0.3567	-0.6931	-0.6931	-0.6931	0.2429	-0.2877	-1.7603	-1.3337	-0.8273	-0.7062	-3.8167	-	-1.6928	-
TPH (mg/kg)	3.2189	-	-	-	-	-	3.7842	-	-	-	-	-	-	3.7377	4.5901	4.3108	3.9220	3.0445	3.6584	3.0910	3.0681

NORMAL DISTRIBUTION

Grid / Perimeter Sample Number	P1-18	P1-15	P1-13	P1-29	P1-9	P1-28	P1-5	P1-27	P1-3	P1-1	P1-26	P1-25	P1-24	P1-4	P1-6	P1-10	P1-14	P1-2	P1-27	P1-11	P1-29
PAH (mg/kg)	1.7	0.5	0.5	0.73	0.5	0.77	1.1	0.7	0.5	0.5	0.5	1.275	0.75	0.172	0.2635	0.43725	0.4935	0.022	-	0.184	-
TPH (mg/kg)	25	-	-	-	-	-	44	-	-	-	-	-	-	42	98.5	74.5	50.5	21	38.8	22	21.5

Table 9B
Statistical Analyses for Lagoon Stockpile #1
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Analytical Data

Grid / Perimeter Sample Number	P1-25	P1-28	P1-26	P1-8 (P1-8/FD-12)	P1-7	P1-24
PAH (mg/kg)	-	-	-	0.176	0.176	-
TPH (mg/kg)	110	21.0	46	21.5	21.5	77.0

LOGNORMAL DISTRIBUTION

Grid / Perimeter Sample Number	P1-25	P1-28	P1-26	P1-8	P1-7	P1-24	MEAN	STDEV	N	N-1	H Statistic	95% UCLt	Maximum Concentration	Lower of UCL and Max Conc.	
PAH (mg/kg)	-	-	-	-1.7373	-1.7373	-	-0.86	0.94	21	20	2.607	1.1	1.7	1.1	
TPH (mg/kg)	4.7005	3.0445	3.8286	3.0681	3.0681	4.3438	3.65	0.59	16	15	2.149	64.1	110	64.1	Use Lognormal UCL

NORMAL DISTRIBUTION

Grid / Perimeter Sample Number	P1-25	P1-28	P1-26	P1-8	P1-7	P1-24	MEAN	STDEV	N	N-1	t Statistic	95% UCL	Maximum Concentration	Lower of UCL and Max Conc.	
PAH (mg/kg)	-	-	-	0.176	0.176	-	0.57	0.40	21	20	1.7207	0.720	1.7	0.72	Use Normal UCL
TPH (mg/kg)	110	21	46	21.5	21.5	77	45.93	29.20	16	15	1.7459	58.668	110	58.7	

Table 10A
Summary of Organics in Soil - Lagoon Stockpile #4
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID											L0111678-18		L0111678-17	
Sampling Date		P4-1	P4-2	P4-9	P4-8	P4-6	P4-7	P4-5	P4-10	P4-11	**12/11/01**		**12/11/01**	
Location ID	**Units**			(P-139 / P-147)	(P-142 / P-141)	(P-146)	(P-136)	(P-133)	(P-149 / P-150)	(P-152 / P-151)	**P4-2'-1-2**	**Q**	**P4-3'-1-2**	**Q**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg / kg										890		3200	
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC / MS)														
Acenaphthene	mg / kg										0.022	U	0.021	U
Fluoranthene	mg / kg										0.022	U	0.021	U
Naphthalene	mg / kg										0.022	U	0.021	U
Benzo(a)anthracene	mg / kg										0.022	U	0.021	U
Benzo(a)pyrene	mg / kg										0.022	U	0.021	U
Benzo(b)fluoranthene	mg / kg										0.022	U	0.021	U
Benzo(k)fluoranthene	mg / kg										0.022	U	0.021	U
Chrysene	mg / kg										0.022	U	0.021	U
Acenaphthylene	mg / kg										0.022	U	0.021	U
Anthracene	mg / kg										0.022	U	0.021	U
Benzo(ghi)perylene	mg / kg										0.022	U	0.021	U
Fluorene	mg / kg										0.022	U	0.021	U
Phenanthrene	mg / kg										0.022	U	0.021	U
Dibenzo(a,h)anthracene	mg / kg										0.022	U	0.021	U
Indeno(1,2,3-cd)pyrene	mg / kg										0.022	U	0.021	U
Pyrene	mg / kg										0.022	U	0.021	U
Total PAH Constituent Concentrations =		0.5	1.1	1.3	1	1.25	0.5	0.5	0.5	2	0.176		0.168	
											TPH data P4-2'-1-1 (L0008885-07 on 10 / 04 / 00)		TPH data P4-3'-1-1 L0008882-07 on 10 / 03 / 00	

Notes:
mg / kg = milligrams per kilogram
For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive the representative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
U = parameter not detected above specified detection limit
J = indicates an estimated detection

Table 10A
Summary of Organics in Soil - Lagoon Stockpile #4
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0009079-18		L0111678-13		L0111678-12		L0009079-17		L0111678-19		L0008885-06		L0009077-07	
Sampling Date		**10/06/00**		**12/10/01**		**12/10/01**		**10/06/00**		**12/11/01**		**10/04/00**		**10/06/00**	
Location ID	**Units**	**P4-3-1-1**	**Q**	**P4-12-1-2**	**Q**	**P4-13-1-2**	**Q**	**P4-14-1-1**	**Q**	**P4-15-1-2**	**Q**	**P4-15-2-1**	**Q**	**P2-2-1-1**	**Q**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	140		2000		2400		81		1500		240		98	U
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)															
Acenaphthene	mg/kg	0.022	U	0.021	U	0.021	U		U	0.021	U		U		
Fluoranthene	mg/kg	0.022	U	0.021	U	0.021	U	0.023		0.021	U	0.051			
Naphthalene	mg/kg	R		0.021	U	0.021	U	R		0.021	U		U		
Benzo(a)anthracene	mg/kg	0.022	U	0.021	U	0.021	U		U	0.021	U	0.024			
Benzo(a)pyrene	mg/kg	0.022	U	0.021	U	0.021	U		U	0.021	U		U		
Benzo(b)fluoranthene	mg/kg	0.022	U	0.021	U	0.021	U		U	0.021	U	0.022			
Benzo(k)fluoranthene	mg/kg	0.022	U	0.021	U	0.021	U		U	0.021	U		U		
Chrysene	mg/kg	0.022	U	0.021	U	0.021	U		U	0.021	U	0.03			
Acenaphthylene	mg/kg	0.022	U	0.021	U	0.021	U		U	0.021	U		U		
Anthracene	mg/kg	0.022	U	0.021	U	0.021	U		U	0.021	U		U		
Benzo(ghi)perylene	mg/kg	0.022	U	0.021	U	0.021	U		U	0.021	U		U		
Fluorene	mg/kg	R		0.021	U	0.021	U	R		0.021	U		U		
Phenanthrene	mg/kg	R		0.021	U	0.021	U	R		0.021	U	0.034			
Dibenzo(a,h)anthracene	mg/kg	0.022	U	0.021	U	0.021	U		U	0.021	U		U		
Indeno(1,2,3-cd)pyrene	mg/kg	0.022	U	0.021	U	0.021	U		U	0.021	U		U		
Pyrene	mg/kg	R		0.021	U	0.021	U	R		0.021	U	0.044			
Total PAH Constituent Concentrations =		0.132		0.168		0.168		0.023		0.168		0.205			
				TPH data P4-12-1-1		TPH data P4-13-1-1				TPH data P4-15-1-1					
				L0008882-17		L0009079-19				L0008885-05					
				10/3/2000		10/6/2000				10/4/2000					

Notes:
mg/kg = milligrams per kilogram
For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive the representative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
U = parameter not detected above specified detection limit
J = indicates an estimated detection

Table 10A
Summary of Organics in Soil - Lagoon Stockpile #4
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0009077-04		L0009077-09		L0009077-08		L0009077-06		L0111678-08		L0009079-21		L0009079-22		L0111678-07	
Sampling Date		**10/06/00**		**10/06/00**		**10/06/00**		**10/06/00**		**12/10/01**		**10/06/00**		**10/06/00**		**12/10/01**	
Location ID	**Units**	**P2-5-1-1**	**Q**	**P2-6-1-1**	**Q**	**P2-8-1-1**	**Q**	**P2-9-1-1**	**Q**	**P4-2-1-2**	**Q**	**FD-14**	**Q**	**FD-15**	**Q**	**P4-16-1-1**	**Q**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	150	U	76	U	96	U	120	U	420		100					
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)																	
Acenaphthene	mg/kg									0.021	U			0.022	U	0.021	U
Fluoranthene	mg/kg									0.021	U			0.022	U	0.021	U
Naphthalene	mg/kg									0.021	U			R		0.021	U
Benzo(a)anthracene	mg/kg									0.021	U			0.022	U	0.021	U
Benzo(a)pyrene	mg/kg									0.021	U			0.022	U	0.021	U
Benzo(b)fluoranthene	mg/kg									0.021	U			0.022	U	0.021	U
Benzo(k)fluoranthene	mg/kg									0.021	U			0.022	U	0.021	U
Chrysene	mg/kg									0.021	U			0.022	U	0.021	U
Acenaphthylene	mg/kg									0.021	U			0.022	U	0.021	U
Anthracene	mg/kg									0.021	U			0.022	U	0.021	U
Benzo(ghi)perylene	mg/kg									0.021	U			0.022	U	0.021	U
Fluorene	mg/kg									0.021	U			R		0.021	U
Phenanthrene	mg/kg									0.021	U			R		0.021	U
Dibenzo(a,h)anthracene	mg/kg									0.021	U			0.022	U	0.021	U
Indeno(1,2,3-cd)pyrene	mg/kg									0.021	U			0.022	U	0.021	U
Pyrene	mg/kg									0.021	U			R		0.021	U
Total PAH Constituent Concentrations =										0.168				0.132		0.168	

TPH data P4-2-1-1
L0009079-20
10/6/2000

Notes:
mg/kg = milligrams per kilogram
For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive the representative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
U = parameter not detected above specified detection limit
J = indicates an estimated detection

Table 10A
Summary of Organics in Soil - Lagoon Stockpile #4
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0111678-09		L0111678-11		L0111678-15		L0111678-16		L0111678-20		L0111678-21	
Sampling Date		**12/10/01**		**12/10/01**		**12/11/01**		**12/11/01**		**12/11/01**		**12/11/01**	
Location ID	**Units**	**P4-17-1-1**	**Q**	**P4-18-1-1**	**Q**	**P4-19-1-1**	**Q**	**P4-20-1-1**	**Q**	**P4-21-1-1**	**Q**	**P4-22-1-1**	**Q**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg												
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)													
Acenaphthene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Fluoranthene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Naphthalene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Benzo(a)anthracene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Benzo(a)pyrene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Benzo(b)fluoranthene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Benzo(k)fluoranthene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Chrysene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Acenaphthylene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Anthracene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Benzo(ghi)perylene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Fluorene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Phenanthrene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Dibenzo(a,h)anthracene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Indeno(1,2,3-cd)pyrene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Pyrene	mg/kg	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U	0.021	U
Total PAH Constituent Concentrations =		0.168		0.168		0.168		0.168		0.168		0.168	

Notes:
mg/kg = milligrams per kilogram
For PAHs, when all results reported as non-detections - the detection limits were summed and divided by two to derive the representative PAH concentration. Where positive results were combined with non-detects, only the positve detections were summed to derived the PAH concentration.
U = parameter not detected above specified detection limit
J = indicates an estimated detection

Table 10B
Statistical Analyses for Lagoon Stockpile #4
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Analytical Data

Grid / Perimeter Sample Number	P4-1	P4-2	P4-9 (P-139/P-147)	P4-8 (P-142/P-141)	P4-6 (P-146)	P4-7 (P-136)	P4-5 (P-133)	P4-10 (P-149/P-150)	P4-11 (P-152/P-151)	P4-2'-1-2	P4-2-1-2	P4-3'-1-2	P4-3-1-1	P4-12-1-2	P4-13-1-2
PAH (mg/kg)	0.5	1.1	1.3	1	1.25	0.5	0.5	0.5	2	0.088	0.168	0.17	0.132	0.168	0.168

LOGNORMAL DISTRIBUTION

Grid / Perimeter Sample Number	P4-1	P4-2	P4-9 (P-139/P-147)	P4-8 (P-142/P-141)	P4-6 (P-146)	P4-7 (P-136)	P4-5 (P-133)	P4-10 (P-149/P-150)	P4-11 (P-152/P-151)	P4-2'-1-2	P4-2-1-2	P4-3'-1-2	P4-3-1-1	P4-12-1-2	P4-13-1-2
PAH (mg/kg)	-0.693	0.095	0.262	0.000	0.223	-0.693	-0.693	-0.693	0.693	-2.430	-1.784	-1.784	-2.025	-1.784	-1.784

NORMAL DISTRIBUTION

Grid / Perimeter Sample Number	P4-1	P4-2	P4-9	P4-8	P4-6	P4-7	P4-5	P4-10	P4-11 (P-152/P-151)	P4-2'-1-2	P4-2-1-2	P4-3'-1-2	P4-3-1-1	P4-12-1-2	P4-13-1-2
PAH (mg/kg)	0.5	1.1	1.3	1	1.25	0.5	0.5	0.5	2	0.088	0.168	0.168	0.132	0.168	0.168

Table 10B
Statistical Analyses for Lagoon Stockpile #4
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Analytical Data

Grid / Perimeter Sample Number	P4-14-1-1	P4-15-1-2	P2-2-1-1	P2-5-1-1	P2-6-1-1	P2-8-1-1	P2-9-1-1	P4-16-1-1	P4-17-1-1	P4-18-1-1	P4-19-1-1	P4-20-1-1	P4-21-1-1	P4-22-1-1
PAH (mg/kg)	0.023	0.168	-	-	-	-	-	0.168	0.168	0.168	0.168	0.168	0.168	0.168

LOGNORMAL DISTRIBUTION

Grid / Perimeter Sample Number	P4-14-1-1	P4-15-1-2	P2-2-1-1	P2-5-1-1	P2-6-1-1	P2-8-1-1	P2-9-1-1	P4-16-1-1	P4-17-1-1	P4-18-1-1	P4-19-1-1	P4-20-1-1	P4-21-1-1	P4-22-1-1	MEAN	STDEV	N
PAH (mg/kg)	-3.772	-1.784	-	-	-	-	-	-1.784	-1.784	-1.784	-1.784	-1.784	-1.784	-1.784	-1.30	1.03	24

NORMAL DISTRIBUTION

Grid / Perimeter Sample Number	P4-14-1-1	P4-15-1-2	P2-2-1-1	P2-5-1-1	P2-6-1-1	P2-8-1-1	P2-9-1-1	P4-16-1-1	P4-17-1-1	P4-18-1-1	P4-19-1-1	P4-20-1-1	P4-21-1-1	P4-22-1-1	MEAN	STDEV	N
PAH (mg/kg)	0.023	0.168	-	-	-	-	-	0.168	0.168	0.168	0.168	0.168	0.168	P4-22-1-1	0.47	0.56	23

Table 10B
Statistical Analyses for Lagoon Stockpile #4
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Analytical Data

Grid / Perimeter Sample Number
PAH (mg/kg)

LOGNORMAL DISTRIBUTION

Grid / Perimeter Sample Number	N-1	H Statistic	95% UCLt	Maximum Concentration	Lower of UCL and Max Conc.	
PAH (mg/kg)	23	3.087	0.907	2.0	0.9	Use Lognormal UCL

NORMAL DISTRIBUTION

Grid / Perimeter Sample Number	N-1	t Statistic	95% UCL	Maximum Concentration	Lower of UCL and Max Conc.
PAH (mg/kg)	22	1.7459	0.672	2	0.7

Table 11A
Summary of Organics in Soil - Lagoon Stockpile # 5
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID														L0008776-12		L0008776-13		L0008776-14		L0008776-15
Sampling Date					8				9		10		12	**10/02/00**		**10/02/00**		**10/02/00**		**10/02/00**
Location ID	**Units**	5	5	1	(P-37)	3	2	6	(P-34)	4	(P-28/P-29)	1	(P-32)	**P3-1-1-1**	**Q**	**P3-1-2-1**	**Q**	**P5-4-1-1**	**Q**	**P5-4-2-1**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg													5100	J	5300	J	4800	J	2800
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)																				
Acenaphthene	mg/kg																			
Fluoranthene	mg/kg																			
Naphthalene	mg/kg																			
Benzo(a)anthracene	mg/kg																			
Benzo(a)pyrene	mg/kg																			
Benzo(b)fluoranthene	mg/kg																			
Benzo(k)fluoranthene	mg/kg																			
Chrysene	mg/kg																			
Acenaphthylene	mg/kg																			
Anthracene	mg/kg																			
Benzo(ghi)perylene	mg/kg																			
Fluorene	mg/kg																			
Phenanthrene	mg/kg																			
Dibenzo(a,h)anthracene	mg/kg																			
Indeno(1,2,3-cd)pyrene	mg/kg																			
Pyrene	mg/kg																			
Total Constituent Concentrations =		1.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.2	0.97	1.2	0.5							

Notes:
mg/kg = milligrams per kilogram
FD-Field duplicate; FD-4 is field duplicate for Sample P5-13
For non-detect PAH results, the detection limits were summed and divided by two to derive representative PAH concentrations. Only the positve detections were summed to derived the PAH concentration (e.g. detection limits for non-detects were not included).

U = parameter not detected above specified detection limit
J = indicates an estimated detection

Table 11A
Summary of Organics in Soil - Lagoon Stockpile # 5
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID			L0111678-03			L0111678-04		L0009239-05			L0009077-02		L0009077-05		L0009239-01
Sampling Date			**12/10/01**			**12/10/01**		**10/13/00**			**10/06/00**		**10/06/00**		**10/12/00**
Location ID	**Units**	**Q**	**P5-5-1-2**	**Q**	**Q**	**P5-6-1-2**	**Q**	**P5-6-1'-1**	**Q**	**Q**	**P5-8-1-1**	**Q**	**P5-10-1-1**	**Q**	**P5-12-1'-1**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	J				1400		2100			90	U	59	U	41
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)															
Acenaphthene	mg/kg			U		0.021	U		U						0.021
Fluoranthene	mg/kg			U		0.021	U	0.082							0.021
Naphthalene	mg/kg		0.024			0.021	U	0.056							0.021
Benzo(a)anthracene	mg/kg			U		0.021	U	0.045							0.021
Benzo(a)pyrene	mg/kg			U		0.021	U		U						0.021
Benzo(b)fluoranthene	mg/kg			U		0.021	U		U						0.021
Benzo(k)fluoranthene	mg/kg			U		0.021	U	0.046							0.021
Chrysene	mg/kg			U		0.021	U	0.059							0.021
Acenaphthylene	mg/kg			U		0.021	U		U						0.021
Anthracene	mg/kg			U		0.021	U		U						0.021
Benzo(ghi)perylene	mg/kg		0.022			0.021	U	0.067							0.021
Fluorene	mg/kg			U		0.021	U	R							0.021
Phenanthrene	mg/kg		0.031			0.021	U	0.099							0.021
Dibenzo(a,h)anthracene	mg/kg			U		0.021	U		U						0.021
Indeno(1,2,3-cd)pyrene	mg/kg			U		0.021	U		U						0.021
Pyrene	mg/kg			U		0.021	U	0.075							0.021
Total Constituent Concentrations =			0.08			0.17		0.53							0.17
						TPH data P5-6-1-1									TPH data P5-12-1-1
Notes:						L0009077-01 on									L0009239-01 on
mg/kg = milligrams per kilogram						10/6/2000									10/12/2000

FD-Field duplicate; FD-4 is field duplicate for Sample P5-13
For non-detect PAH results, the detection limits were summed and divided by two to derive representative PAH concentrations. Only the positve detections were summed to derived the PAH concentration (e.g. detection limits for non-detects were not included).

U = parameter not detected above specified detection limit
J = indicates an estimated detection

Table 11A
Summary of Organics in Soil - Lagoon Stockpile # 5
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID			L0009239-02		L0111678-02		L0008835-08		L0008962-15		L0008962-16	
Sampling Date			**10/12/00**		**12/10/01**		**10/03/00**		**10/05/00**		**10/05/00**	
Location ID	**Units**	**Q**	**P5-12-2'-1**	**Q**	**P5-13-2-2**	**Q**	**FD-4**	**Q**	**P8-5-1-1**	**Q**	**P8-5-2-1**	**Q**
Total Petroleum Hydrocarbons (TPH) by Method 418.1	mg/kg	U	40	U	42	U	2300		3400		3300	
Polycyclic Aromatic Hydrocarbons (PAH) by Method 8270M with SIM (GC/MS)												
Acenaphthene	mg/kg	U	0.016	U	0.021	U						
Fluoranthene	mg/kg	U	0.016	U	0.021	U						
Naphthalene	mg/kg	U	R		0.021	U						
Benzo(a)anthracene	mg/kg	U	0.016	U	0.021	U						
Benzo(a)pyrene	mg/kg	U	0.016	U	0.021	U						
Benzo(b)fluoranthene	mg/kg	U	0.016	U	0.021	U						
Benzo(k)fluoranthene	mg/kg	U	0.016	U	0.021	U						
Chrysene	mg/kg	U	0.016	U	0.021	U						
Acenaphthylene	mg/kg	U	0.016	U	0.021	U						
Anthracene	mg/kg	U	0.016	U	0.021	U						
Benzo(ghi)perylene	mg/kg	U	0.016	U	0.021	U						
Fluorene	mg/kg	U	R		0.021	U						
Phenanthrene	mg/kg	U	R		0.021	U						
Dibenzo(a,h)anthracene	mg/kg	U	0.016	U	0.021	U						
Indeno(1,2,3-cd)pyrene	mg/kg	U	0.016	U	0.021	U						
Pyrene	mg/kg	U	R		0.021	U						
Total Constituent Concentrations =			0.096		0.17							

Notes:
mg/kg = milligrams per kilogram
FD-Field duplicate; FD-4 is field duplicate for Sample P5-13
For non-detect PAH results, the detection limits were summed and divided by two to derive representative PAH concentrations. Only the positve detections were summed to derived the PAH concentration (e.g. detection limits for non-detects were not included).

U = parameter not detected above specified detection limit
J = indicates an estimated detection

Table 11B
Statistical Analyses for Lagoon Stockpile #5
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Analytical Data

Grid / Perimeter Sample Number	5	5	1	8 (P-37)	3	2	6	9 (P-34)	4	10 (P-28 / P-29)	1	12 (P-32)	P3-1-1-1 P3-1-2-1	P5-4-1-1 P5-4-2-1	P5-5-1-2	P5-6-1-2 P5-6-1'-1	P5-8-1-1
PAH (mg/kg)	1.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.2	0.97	1.2	0.5	-	-	0.077	0.3485	-
TPH (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	5200	3800.0	-	1750.0	45.0

LOGNORMAL DISTRIBUTION

Grid / Perimeter Sample Number	5	5	1	8 (P-37)	3	2	6	9	4	10	1	12	P3-1-1-1 P3-1-2-1	P5-4-1-1 P5-4-2-1	P5-5-1-2	P5-6-1-2 P5-6-1'-1	P5-8-1-1
PAH (mg/kg)	0.2624	-0.6931	-0.6931	-0.6931	-0.6931	-0.6931	-0.6931	-0.6931	0.1823	-0.0305	0.1823	-0.6931	-	-	-2.5639	-	-
TPH (mg/kg)													8.5564	8.2428	-	7.4674	3.8067

NORMAL DISTRIBUTION

Grid / Perimeter Sample Number	5	5	1	8 (P-37)	3	2	6	9 (P-34)	4	10 (P-28 / P-29)	1	12 (P-32)	P3-1-1-1 P3-1-2-1	P5-4-1-1 P5-4-2-1	P5-5-1-2	P5-6-1-2 P5-6-1'-1	P5-8-1-1
PAH (mg/kg)	1.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.2	0.97	1.2	0.5	-	-	0.077	0.3485	-
TPH (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	5200	3800	-	1750	45

Table 11B
Statistical Analyses for Lagoon Stockpile #5
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Analytical Data

Grid / Perimeter Sample Number	P5-10-1-1	P5-12-1'-1 P5-12-2'-1	P5-13-2-2	P8-5-1-1 P8-5-2-1
PAH (mg/kg)	-	0.132	0.168	-
TPH (mg/kg)	29.5	20.3	42.0	3350.0

LOGNORMAL DISTRIBUTION

Grid / Perimeter Sample Number	P5-10-1-1	P5-12-1'-1 P5-12-2'-1	P5-13-2-2	P8-5-1-1 P8-5-2-1	MEAN	STDEV	N	N-1	H Statistic	95% UCLt	Maximum Concentration	Lower of UCL and Max Conc.
PAH (mg/kg)	-	-2.0250	-1.7838	-	-0.75	0.81	15	14	2.443	1.115	1.3	1.1
TPH (mg/kg)	3.384	3.01	3.74	8.1167	5.79	2.49	8	7	6.418	3121317.681	5200	5200.0

NORMAL DISTRIBUTION

Grid / Perimeter Sample Number	P5-10-1-1	P5-12-1'-1 P5-12-2'-1	P5-13-2-2	P8-5-1-1 P8-5-2-1	MEAN	STDEV	N	N-1	t Statistic	95% UCL	Maximum Concentration	Lower of UCL and Max Conc.	
PAH (mg/kg)	-	0.132	0.168	-	0.59	0.38	16	15	1.7531	0.754	1.3	0.8	Use Normal Distribution
TPH (mg/kg)	29.5	20.25	42	3350	1779.59	2085.13	8	7	1.8331	3130.965	5200	3131.0	Use Normal Distribution

Table 12
Summary of Metals in Soil
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0008777-01		L0008777-02		L0008777-03		L0008777-04		L0008777-05		L0111679-01		L0008777-07		L0008838-01		L0008838-02	
Sampling Date		**10/02/00**		**10/02/00**		**10/02/00**		**10/02/00**		**10/02/00**		**12/10/01**		**10/02/00**		**10/02/00**		**10/02/00**	
Location ID	**Units**	**FD-3**	**Q**	**P3-2-1-1**	**Q**	**P3-2-2-1**	**Q**	**P3-6-1-1**	**Q**	**P3-6-2-1**	**Q**	**P3-4-1-2**	**Q**	**P3-4-2-1**	**Q**	**P9-7-1-1**	**Q**	**P9-7-2-1**	**Q**
Total Metals																			
Antimony	mg/kg																		
Arsenic	mg/kg																		
Cadmium	mg/kg																		
Chromium	mg/kg																		
Lead	mg/kg	8.6	J	8.1	J	2.5	J	43	J	2.3	J	8.6		260	J	20		3.2	

Notes:

mg/kg = milligrams per kilogram

FD=Field Duplicate

Blank space indicate that parameter was not analyzed

U = not detected above specified detection limit

J = indicates an estimated detection

Table 12
Summary of Metals in Soil
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0008838-03		L0008838-04		L0008838-07		L0008883-01		L0008883-02		L0008883-03		L0008883-04		L0111679		L0008883-07	
Sampling Date		**10/02/00**		**10/02/00**		**10/03/00**		**10/03/00**		**10/03/00**		**10/03/00**		**10/03/00**		**12/11/01**		**10/03/00**	
Location ID	**Units**	**P9-3-1-1**	**Q**	**P9-3-2-1**	**Q**	**IA-3-1-1**	**Q**	**P6-7-1-1**	**Q**	**P6-11-1-1**	**Q**	**NL-4-1-1**	**Q**	**NL-9-1-1**	**Q**	**P4-12-1-2**		**NL-5-1-1**	**Q**
Total Metals																			
Antimony	mg/kg					2.1	U					2	U	2.1	U			2	U
Arsenic	mg/kg					4.4						1.9		3.8				2.8	
Cadmium	mg/kg					0.209	U					0.203	U	0.208	U			0.204	U
Chromium	mg/kg					11						13		11				10	
Lead	mg/kg	100		56		32		22		6.2		3.4		12		5.4		8.3	

Notes:

mg/kg = milligrams per kilogram

FD=Field Duplicate

Blank space indicate that parameter was not analyzed

U = not detected above specified detection limit

J = indicates an estimated detection

Table 12
Summary of Metals in Soil
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0008886-01		L0008886-02		L0008886-03		L0008886-04		L0008886-05		L0008886-06		L0008886-07		L0008970-01		L0008970-02	
Sampling Date		**10/04/00**		**10/04/00**		**10/04/00**		**10/04/00**		**10/03/00**		**10/04/00**		**10/04/00**		**10/04/00**		**10/04/00**	
Location ID	**Units**	**P3-8-1-1**	**Q**	**P3-8-2-1**	**Q**	**IA-2-1-1**	**Q**	**P1-12-1-1**	**Q**	**SL-6-1-1**	**Q**	**OL-2-1-1**	**Q**	**FD-10**	**Q**	**OL-1-1-1**	**Q**	**P10-2-1-1**	**Q**
Total Metals																			
Antimony	mg/kg					2.1	U			2	U	2	U	2	U	2	U		
Arsenic	mg/kg					4.1				4.3		1.9	J	2.1	J	3.9			
Cadmium	mg/kg					0.21	U			0.2	U	0.23		0.26		0.37			
Chromium	mg/kg					6.8	J			7.7	J	21	J	23	J	27			
Lead	mg/kg	320		240		7.5		66		18		40		42		38		71	

Notes:

mg/kg = milligrams per kilogram

FD=Field Duplicate

Blank space indicate that parameter was not analyzed

U = not detected above specified detection limit

J = indicates an estimated detection

Table 12
Summary of Metals in Soil
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0008970-03		L0009078-01		L0009078-02		L0009078-03		L0009080-01		L0009080-02		L0009080-03		L0009080-04		L0009080-05	
Sampling Date		**10/04/00**		**10/06/00**		**10/06/00**		**10/06/00**		**10/06/00**		**10/06/00**		**10/06/00**		**10/06/00**		**10/06/00**	
Location ID	**Units**	**P10-2-2-1**	**Q**	**SL-8-1-1**	**Q**	**SL-4-1-1**	**Q**	**P7-11-1-1**	**Q**	**BIO-1-1-1**	**Q**	**BIO-2-1-1**	**Q**	**BIO-3-1-1**	**Q**	**BIO-4-1-1**	**Q**	**BIO-5-1-1**	**Q**
Total Metals																			
Antimony	mg/kg			2.1	U	2.2	U												
Arsenic	mg/kg			4.4		5.3													
Cadmium	mg/kg			0.21	U	0.32													
Chromium	mg/kg			8.6		18													
Lead	mg/kg	18		40		68		150		9.6		16		34		90		21	

Notes:

mg/kg = milligrams per kilogram

FD=Field Duplicate

Blank space indicate that parameter was not analyzed

U = not detected above specified detection limit

J = indicates an estimated detection

Table 12
Summary of Metals in Soil
Iron Horse Park Superfund Site
North Billerica, Massachusetts

Laboratory Sample ID		L0009080-06		L0009080-07		L0009080-08	
Sampling Date		**10/06/00**		**10/06/00**		**10/06/00**	
Location ID	**Units**	**BIO-6-1-1**	**Q**	**BIO-7-1-1**	**Q**	**FD-13**	**Q**
Total Metals							
Antimony	mg/kg						
Arsenic	mg/kg						
Cadmium	mg/kg						
Chromium	mg/kg						
Lead	mg/kg	24		24		13	

	Minimum Concentration	**Average Concentration**	**Maximum Concentration**	**Cleanup Goal**
	mg/kg	mg/kg	mg/kg	mg/kg
Antimony	2.0	2.05	2.20	31
Arsenic	1.9	3.54	5.30	17
Cadmium	0.2	0.24	0.37	39
Chromium	6.8	14.3	27.0	390
Lead	2.3	50.0	320.0	400

Notes:

mg/kg = milligrams per kilogram

FD=Field Duplicate

Blank space indicate that parameter was not analyzed

U = not detected above specified detection limit

J = indicates an estimated detection

Appendix C
Information Related to the OU-2 Review

C.1 – Documents Reviewed

Action Environmental Solutions, PLLC (AES). Various dates. Quarterly/Semi-annual Landfill Monitoring Reports.

Brown and Caldwell. April, 2003. *Project Operations Plan for Post-Construction Monitoring activities at the Shaffer Landfill, Billerica, Massachusetts*.

Camp, Dresser & McKee (CDM). November, 1989. *Phase IC Remedial Investigation Report for the Shaffer Landfill, Iron Horse Park Site, Billerica, Massachusetts*.

Camp, Dresser & McKee (CDM). January, 1991. *Final Draft Phase IC Feasibility Study for the Shaffer Landfill, Iron Horse Park Site, Billerica, Massachusetts*.

De Maximis, Inc. Various dates. Monthly Progress Reports.

Environmental Compliance Services, Inc. (ECS). Various dates. Quarterly Gas Migration and Semi-Annual Surface Water Sampling Monitoring Summary Reports.

ENSR Consulting & Engineering. November 17, 1995. Memorandum from Robert Kirsch and David Lang to Loyda Rivera and Karen McGuire regarding the Operation of the leachate collection system.

ENSR Consulting & Engineering. October, 1999. *Final (100%) Design Deliverable for Shaffer Landfill.*

ENSR Consulting & Engineering. October, 1999. *Final Demonstration of Compliance Plan For Shaffer Landfill*.

GeoSyntec Consultants. August, 2003. *Final Remedial Construction Report. Iron Horse Park Superfund Site, Operable Unit Two, Shaffer Landfill, Billerica, Massachusetts*

Green Environmental. November 15, 2006. October 2006 Surface Water Sampling & Landfill Gas Monitoring Summary, Shaffer Landfill O&M, Billerica, MA.

Normandeau Associates. February, 2005. *Wetland Mitigation Monitoring Report, Year 2 - 2004, Shaffer Landfill Superfund Site, Billerica, MA.*

Normandeau Associates. February, 2007. *Wetland Mitigation Monitoring Report, Year 4 (Final) - 2004, Shaffer Landfill Superfund Site, Billerica, MA.*

United States Environmental Protection Agency. June 27, 1991. *Record of Decision, Shaffer Landfill Operable Unit, Iron Horse Park, Billerica, Massachusetts.*

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United States Environmental Protection Agency. 2001. *Shaffer Landfill RD/RA Consent Decree*.

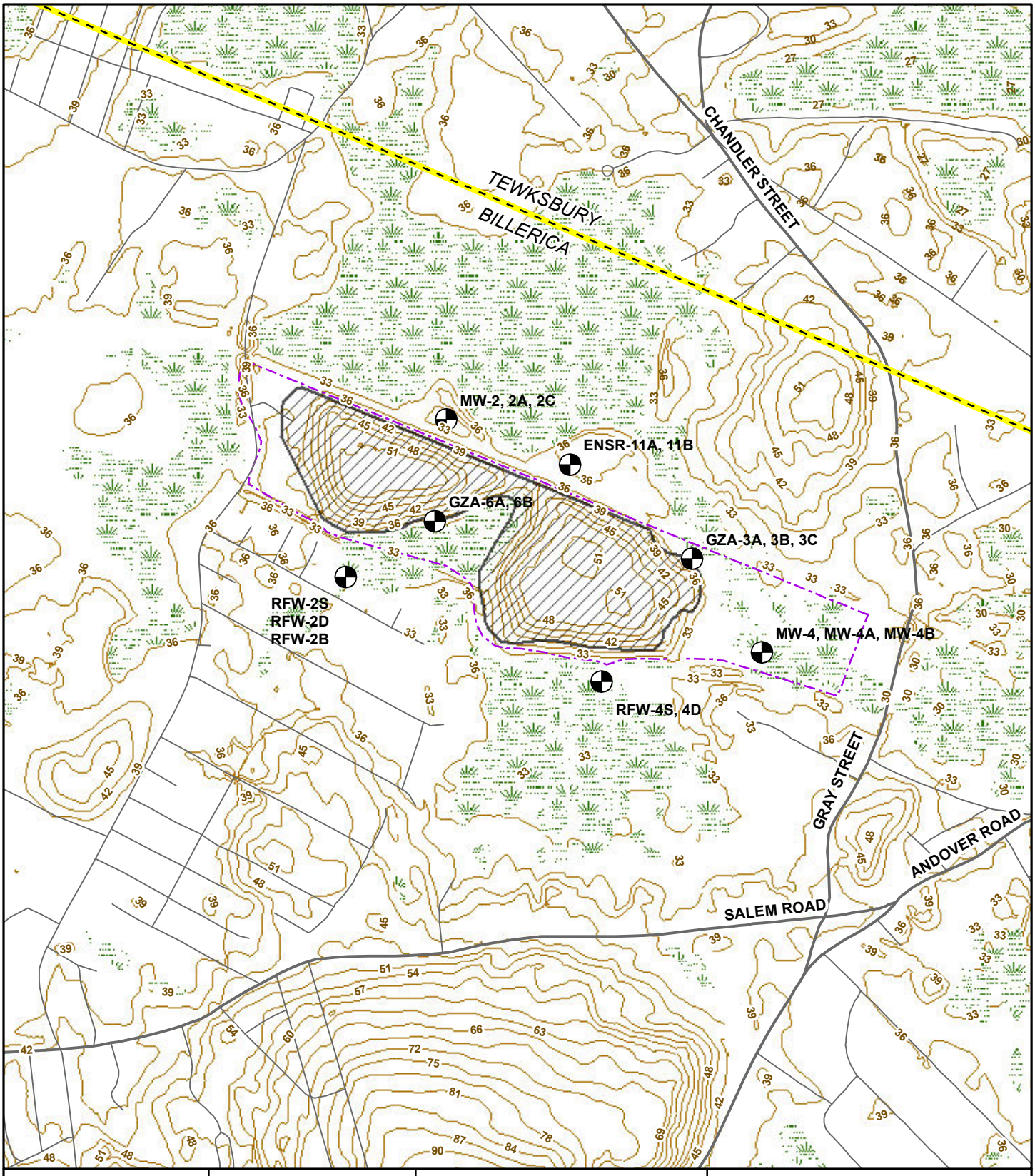
United States Environmental Protection Agency. June, 2001. *Comprehensive Five-Year Review Guidance.*

United States Environmental Protection Agency. September, 2003. *Second Five-Year Review Report for Iron Horse Park Superfund Site, Billerica, Massachusetts*.

United States Environmental Protection Agency. September, 2008. *Third Five-Year Review Report for Iron Horse Park Superfund Site, Billerica, Massachusetts*.

United States Environmental Protection Agency. September, 2013. *Fourth Five-Year Review Report for Iron Horse Park Superfund Site, Operable Units 1, 2, 3, and 4, North Billerica, Massachusetts*.

C.2 – Groundwater Monitoring Results



AECOM

Drawn:	BC	9/11/2013
Approved:	NT	9/11/2013
Project #:	60282276	

Map Location



Legend

- Monitoring Well
- SiteBoundary
- Landfill
- Contour (Meters)
- Town Boundary

0 500 1,000 Feet

N

FIGURE 1:
GROUNDWATER MONITORING LOCATIONS

SHAFFER LANDFILL
BILLERICA, MASSACHUSETTS

G:\Projects\HAZWASTE\60282276IHP\Maps\Shaffer Landfill - GW Locations.mxd

Aerial Photography Date: April 2011

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A
Sample Date:	MCL/ICL	10/31/2013	5/14/2014	10/29/2014	10/21/2015	10/13/2016	10/27/2017
Inorganics-Metals (ug/l)							
Antimony	6	3.5 J	6.0 J	2.2 U	1.3 U	1.5 J	60 U
Arsenic	**10/50**	8.5	7.8	8.2	11.2	13	16.3
Barium	2000	42.6	32.5	32.9 E	38.6	54.8	314
Beryllium	4	0.169 U	0.386 J	0.169 U	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.236 J	0.12 U	0.12 U	5 U
Cadmium, dissolved	NA	0.155 U	0.071 U	0.107 J	0.12 U	0.3 J	5 U
Chromium	100	0.896 J	0.403 U	0.403 U	3.1 J	0.909 J	10 U
Copper	1300	2.5 J	3.0 U	3.0 U	1.9 U	1.9 U	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		18800	13700	14000	16500	16500	20300
Lead	15	0.079 U	0.061 U	0.061 U	0.271 U	0.74	1 U
Lead, dissolved	NA	0.034 J	0.061 U	0.061 U	0.271 U	0.66	1 U
Magnesium	NA	13500	8970	8360	6520	7970	20700
Manganese (remove)		1410	988	920	894	951	57.2
Mercury	2	0.032 U	0.032 U	0.024 U	0.04 U	0.04 U	0.2 U
Nickel	NA	0.531 U	0.508 U	0.508 U	0.838 J	1.3 J	41.7
Selenium	50	0.96 J	0.234 J	0.744 J	0.64 J	1.9	22.6
Silver	NA	0.24 U	0.385 U	1.0 J	0.54 U	0.54 U	10 U
Thallium	2	0.064 U	0.031 U	0.031 U	0.024 U	0.3	1 U
Zinc	NA	2.1 J	4.5 U	4.5 U	6.2 U	6.2 U	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	16	25 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	55	25 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.4	25 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	3 J
1,2-Dibromo-3-chloropropane	NA	0.061 U	0.062 U	0.063 U	0.063 U	0.063 U	0.063 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	1.1 J
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	0.44 J	25 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
1,4-Dichlorobenzene	75	5.0 U	5.0 U	5.0 U	5.0 U	0.37 J	3.9 J
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Acetone	NA	3.0 J	10 U	1.6 J	10 U	5.5 J	12 J
Benzene	**5/5**	0.67 J	5.0 U	5.0 U	5.0 U	1.3 J	4.7 J
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Chlorobenzene	100	0.32 J	5.0 U	5.0 U	0.34 J	2.1 J	5.2 J
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Chloroform	NA	0.44 J	5.0 U	5.0 U	5.0 U	9.6	25 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	590 D	25 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A
Sample Date:		10/31/2013	5/14/2014	10/29/2014	10/21/2015	10/13/2016	10/27/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	0.89J	2.1 J	11 J
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.5 J
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	1.4 J
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	0.22J	25 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	0.21 J	5.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	9.4	25 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	150	25 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	80	25 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B
Sample Date:	MCL/ICL	10/31/2013	5/14/2014	10/29/2014	10/21/2015	10/13/2016	10/26/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.0 U	4.8 J	2.2 U	1.3 U	5.0 U	60 U
Arsenic	**10/50**	16.2	15.4	14.5	16.1	9.5	14.4
Barium	2000	335	301	308 E	323	323	47.1
Beryllium	4	0.169 U	0.485 J	0.169 U	0.12 U	0.2 J	3 U
Cadmium	5	0.155 U	0.071 U	0.46 J	0.12 U	0.3 J	5 U
Cadmium, dissolved	NA	0.155 U	0.071 U	0.385 J	0.12 U	0.12 U	5 U
Chromium	100	2.5 J	0.53 J	0.447 J	1.2 J	2.1 J	10 U
Copper	1300	2.3 J	3.0 U	3.1 J	1.9 U	0.619 U	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		22000	19300	19900	21800	18400	17100
Lead	15	0.079 U	0.115 J	0.097 J	0.271 U	0.74	1 U
Lead, dissolved	NA	0.033 U	0.061 U	0.061 U	0.419 J	0.66	1 U
Magnesium	NA	22700	21100	20700	20100	18200	8040
Manganese (remove)		48.2	45.5	47.5	50.1	44.9	976
Mercury	2	0.032 U	0.032 U	0.024 U	0.04 U	0.04 U	0.2 U
Nickel	NA	54.1	47.8	47.5	47.7	38.9 J	40 U
Selenium	50	20.2	19.8	13.1	20.200	1.9	1.3 J
Silver	NA	0.24 U	0.385 U	0.97 J	0.54 U	0.463 U	10 U
Thallium	2	0.064 U	0.031 U	0.031 U	0.024 U	0.3	1 U
Zinc	NA	0.971 J	4.5 U	6.0 J	6.2 U	3.7 J	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.3
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	35
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	3.1 J
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	2.9 J	3.5 J	3.1 J	3.3 J	2.7 J	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.060 U	0.061 U	0.059 U	0.059 U	0.059 U	0.059 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	0.95 J	1.1 J	0.92 J	0.95 J	0.97 J	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	0.44 J	0.45 J	0.37 J	0.37 J	0.43 J	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	4.1 J	4.5 J	4.1 J	4.1 J	3.8 J	0.24 J
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	0.25 J	5.0 U	5.0 U	5.0 U	0.21 J	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	7.0 J	3.4 J	4.6 J	2.1 J	6.6 J	1.6 J
Benzene	**5/5**	5.3	4.9 J	4.9 J	5.1	4.7 J	0.72 J
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	5.3	5.8	5.5	5.3	5.3	0.71 J
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	0.58 J	0.41 J	0.47 J	0.47 J	5.0 U	5.2
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	190 D
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B
Sample Date:		10/31/2013	5/14/2014	10/29/2014	10/21/2015	10/13/2016	10/26/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	11	13	12	11	12	1.1 J
m,p-Xylenes	10000	6.5	6.5	6.1	5.4	5.6	5.0 U
Naphthalene	NA	1.3 J	2.2 J	1.9 J	2.6	2.3 BJ	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	0.55 J	0.69 J	0.62 J	0.6 J	0.54 J	5.0 U
o-Xylene	10000	1.5	1.6 J	1.7 J	1.8 J	1.6 J	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	0.82 J	0.75 J	0.64 J	0.51 J	0.58 J	0.21 J
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.3 J
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	88

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A
Sample Date:	MCL/ICL	10/29/2013	5/13/2014	10/27/2014	10/19/2015	10/11/2016	10/23/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.0 U	4.9 J	2.9 J	1.3 U	5.0 U	60 U
Arsenic	**10/50**	4	2.4	4.2	5	5.4	3.6
Barium	2000	4660	3900	4300	4290	4140	4070
Beryllium	4	0.169 U	0.169 U	0.169 U	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	1.5 J	0.12 U	1.0 J	5 U
Cadmium, dissolved	NA	0.417 J	0.071 U	1.5 J	0.12 U	0.7 J	5 U
Chromium	100	1.6 J	0.403 U	1.6 J	0.297 J	2.0 J	10 U
Copper	1300	2.0 J	3.0 U	6.7 J	1.9 U	0.8 J	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		69500	76900	17700	72800	83300	56200 E
Lead	15	225	140	140	188	170	177
Lead, dissolved	NA	5.8	4.9	20.5	10.5	21	11
Magnesium	NA	20300	18100	17700	18300	17700	15100
Manganese (remove)		342	313	329	321	330	290
Mercury	2	0.032 U	0.024 U	0.116 J	0.04 U	0.04 U	0.2 U
Nickel	NA	7.9 J	4.0 J	3.2 J	6.1 J	8.8 J	40 U
Selenium	50	3.6	2.9	2.8	3.100	1.9	2.8
Silver	NA	0.24 U	2.2 J	4.3 J	4.3 J	0.463 U	10 U
Thallium	2	0.064	0.031 U	0.094 J	0.024 U	0.3	1 U
Zinc	NA	3.6 J	11.5 J	9.8 J	10.1 J	16.3 J	14.3 J
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	0.5 J	0.57 J	0.51 J	0.51 J	0.3 J	0.48 J
1,2-Dibromo-3-chloropropane	NA	0.061 U	0.061 U	0.061 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	0.29 J	0.34 J	0.37 J	0.33 J	0.36 J	0.35 J
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	0.21 J	0.22 J	0.22 J	5.0 U	0.23 J
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	1.6 J	1.7 J	1.6 J	1.6 J	1.6 J	1.7 J
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	1.1 J	0.9 J	5.0 U	0.95 J	5.0 U	5.0 U
2-Chlorotoluene	NA	0.38 J	5.0 U	5.0 U	5.0 U	0.42 J	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	5.1 J	10 U	3.5 J	1.9 J	8.5 J	3.9 J
Benzene	**5/5**	6.5	6	5.9	5.9	5.4	5.5
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	4.9 J	5.1	5.3	4.8 J	5.0 U	5.2
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	0.39 J	0.35 J	0.44 J	5.0 U	5.0 U	0.24 J
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A
Sample Date:		10/29/2013	5/13/2014	10/27/2014	10/19/2015	10/11/2016	10/23/2017
	MCL/ICL						
Ethylbenzene	700	10	9.6	9.7	9	4.9 JJ	7.4
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	2.6 J	3.2 J	2.9 J	2.7 J	3.1 J	2.9 J
m,p-Xylenes	10000	4.1 J	4.1 J	4.3 J	4.0 J	2.7 J	3.7 J
Naphthalene	NA	0.98 BJ	1.0 BJ	0.91 J	1.0 J	0.93 BJ	1.6 J
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	0.73 J	0.91 J	0.93 J	0.82 J	0.88 J	0.84 J
o-Xylene	10000	0.47 J	0.46 J	0.61 J	0.47 J	0.42 J	0.52 J
Pentachlorophenol	**1/1**	0.47 U	0.56 U	0.56 U	0.56 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	0.46 J	0.47 J	0.38 J	0.38 J	0.34 J	0.47 J
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B
	Sample Date:	10/29/2013	5/13/2014	10/27/2014	10/19/2015	10/11/2016	10/23/2017
	MCL/ICL						
Inorganics-Metals (ug/l)							
Antimony	6	2.0 U	2.7 J	2.2 U	1.3 U	5.0 U	60 U
Arsenic	**10/50**	0.942 J	1.2	0.625 J	1.2	1.3	1 U
Barium	2000	28.9	29.9	27.4	26.8	32.3	34.1
Beryllium	4	0.169 U	0.242 J	0.204 J	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.099 J	0.239 J	0.141 J	0.2 J	5 U
Cadmium, dissolved	NA	0.265 J	0.071 U	0.286 J	0.229 J	0.2 J	5 U
Chromium	100	0.169 U	0.403 U	0.4703 U	0.48 J	0.27 U	10 U
Copper	1300	1.2 J	3.0 U	3.1 J	1.9 U	0.619 U	20 U
Cyanide (mg/l)	200	0.01U	0.01U	0.01U	0.01U	0.01U	0.01U
Iron (remove)		717	982	415	628	556	311 E
Lead	15	0.079 U	0.086 J	0.087 J	0.271 U	0.74	1 U
Lead, dissolved	NA	0.08 J	0.076 J	0.061 U	0.271 U	0.66	1 U
Magnesium	NA	6290	5340	4760	4350	4980	5250
Manganese (remove)		1310	1010	903	915	1020	960
Mercury	2	0.032 U	0.024 U	0.024 U	0.04 U	0.04 U	0.2 U
Nickel	NA	5.5 J	7.2 J	7.2 J	6.7 J	14.0 J	40 U
Selenium	50	.208 U	0.395 J	0.615 J	0.41 J	1.9	2 U
Silver	NA	0.24 U	0.385 U	0.385 U	1.0 J	0.463 U	10 U
Thallium	2	0.026 U	0.031 U	0.053 J	0.052 J	0.3	1 U
Zinc	NA	2.9 J	8.3 J	8.9 J	6.2 U	4.7 J	8.3 J
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.061 U	0.06 U	0.064 U	0.064 U	0.064 U	0.064 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B
	Sample Date:	10/29/2013	5/13/2014	10/27/2014	10/19/2015	10/11/2016	10/23/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-2	MW-2	MW-2	MW-2	MW-2	MW-2
Sample Date:	MCL/ICL	10/31/2013	5/14/2014	10/29/2014	10/22/2015	10/13/2016	10/27/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.8 J	4.2 J	2.6 J	1.3 U	5.0 U	60 U
Arsenic	**10/50**	2.9	2.5	3.4	4.1	3.2	3.5
Barium	2000	10.8 J	11 J	13.6	13.9 J	13.5 J	14.8
Beryllium	4	0.169 U	0.364 J	0.246 J	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.439 J	0.411 J	0.3 J	5 U
Cadmium, dissolved	NA	0.157 J	0.071 U	0.124 J	0.12 U	0.12 U	5 U
Chromium	100	0.169 U	0.403 U	0.403 U	0.288 J	0.27 U	10 U
Copper	1300	1.2 J	3.0 U	3.0 U	2.1 J	0.619 U	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		413	324	400	585	473	515
Lead	15	0.143 J	0.087 J	0.09 J	0.62 J	0.74	1 U
Lead, dissolved	NA	0.062 J	0.117 J	0.061 U	0.349 J	0.66	1 U
Magnesium	NA	13300	12100	11300	11700	11400	13000
Manganese (remove)		1310	1220	1220	1270	1230	1320
Mercury	2	0.032 U	0.032 U	0.024 U	1.0 U	0.04 U	0.2 U
Nickel	NA	0.531 U	0.508 U	0.724 J	0.933 J	1.1 U	40 U
Selenium	50	1.2 J	1.5 J	1.9 J	1.4 J	1.9	1.4 J
Silver	NA	0.378 J	0.385 U	0.385 U	0.54 U	0.463 U	10 U
Thallium	2	0.064 U	0.031 U	0.039 J	0.024 U	0.3	1 U
Zinc	NA	1.9 J	4.5 U	4.9 J	7.9 J	2.6 J	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	1.3 J	1.3 J	1.2 J	1.4 J	1.4 J	1.2 J
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.061 U	0.058 U	0.06 U	0.06 U	0.06 U	0.06 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	0.2 BJ
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	10 U	10 U	10 U	10 U	3.1 J	3.4 J
Benzene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	0.29 J	0.3 J	0.32 J	0.32 J	5.0 U	0.36 J
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	0.35 J	0.3 J	5.0 U	5.0 U	0.43 J	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2
	Sample Date:	10/31/2013	5/14/2014	10/29/2014	10/22/2015	10/13/2016	10/27/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A
Sample Date:	MCL/ICL	10/31/2013	5/14/2014	10/29/2014	10/22/2015	10/13/2016	10/27/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.0 U	5.1 J	2.2 U	1.3 U	2.5 J	60 U
Arsenic	**10/50**	135	135	125	136	130	144
Barium	2000	169	152	151 E	159	161	153
Beryllium	4	0.169 U	0.466 J	0.206 J	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.334 J	0.127 J	0.12 U	5 U
Cadmium, dissolved	NA	0.155 U	0.071 U	0.373 J	0.12 U	0.2 J	5 U
Chromium	100	0.169 U	0.403 U	0.403 U	0.24 U	0.24 U	10 U
Copper	1300	1.8 J	3.0 U	3.0 U	1.9 U	2.1 J	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		17300	15800	16300	17700	17000	17300
Lead	15	0.112 J	0.061 U	0.137 J	1	0.74	1 U
Lead, dissolved	NA	0.033 U	0.061 U	0.25 J	1.1	0.66	1 U
Magnesium	NA	12300	11100	10700	11100	11300	11400
Manganese (remove)		211	193	216	243	237	249
Mercury	2	0.627	0.032 U	0.024 U	0.04 U	0.04 U	0.2 U
Nickel	NA	0.531 U	1.1 J	1.9 J	2.6 J	2.5 J	40 U
Selenium	50	0.937 J	0.427 J	1.0 J	0.514 J	1.9	2 U
Silver	NA	0.24 U	0.385 U	1.1 J	0.54 U	0.54 U	10 U
Thallium	2	0.064 U	0.031 U	0.031 U	0.024 U	0.3	1 U
Zinc	NA	0.834 J	4.5 U	4.5 U	6.2 U	6.2 U	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.061 U	0.06 U	0.059 U	0.059 U	0.059 U	0.059 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	0.39 J	0.28 J	0.3 J	0.29 J	0.35 J	0.35 BJ
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	2.0 J	1.6 J	10 U	10 U	2.4 J	2 J
Benzene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	0.36 J	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	0.84 J	0.9 J	0.73 J	0.76 J	0.88 J	0.97 J
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A
	Sample Date:	10/31/2013	5/14/2014	10/29/2014	10/22/2015	10/13/2016	10/27/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	NA	0.32 J	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-2C	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C
Sample Date:	MCL/ICL	10/31/2013	5/14/2014	10/29/2014	10/22/2016	10/13/2016	10/27/2017
Inorganics-Metals (ug/l)							
Antimony	6	20 U	4.2 J	2.2 U	1.3 U	2.9 J	60 U
Arsenic	**10/50**	119	163	66.2 E	323	180	170
Barium	2000	59.6	63.4	63.4	69.8	66	64.2
Beryllium	4	0.169 U	0.34 J	0.239 J	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.271 J	0.12 U	0.12 U	5 U
Cadmium, dissolved	NA	0.155 U	0.071 U	0.221 J	0.12 U	0.12 U	5 U
Chromium	100	0.226 J	0.403 U	0.403 U	0.401 J	0.795 J	10 U
Copper	1300	0.993 U	3.0 U	3.0 U	1.9 U	3.4 J	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		14900	17600	18000	40000	24500	31400
Lead	15	0.162 J	0.089 J	0.061 U	2.7	0.74	1 U
Lead, dissolved	NA	0.036 J	0.061 U	0.061 U	0.835 J	0.66	1 U
Magnesium	NA	7870	8380	8280	9170	8500	9570
Manganese (remove)		213	280	412	971	1200	2170
Mercury	2	0.061 J	0.032 U	0.024 U	0.043 J	0.04 U	0.2 U
Nickel	NA	0.531 U	0.508 U	0.744 J	1.8 J	1.3 J	40 U
Selenium	50	0.293 J	0.987 J	0.947 J	0.852 J	1.9	2 U
Silver	NA	0.24 U	0.385 U	1.4 J	0.54 U	0.54 U	10 U
Thallium	2	0.137 J	0.031 U	0.056 J	0.127 J	0.3	0.17 J
Zinc	NA	1.5 J	4.5 U	5.2 J	9.0 J	6.2 J	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.061U	0.06 U	0.059 U	0.059 U	0.059 U	0.059 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	5.0 U	0.33 J	0.36 J	0.32 J	0.49 J	5.0 U
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	10 U	1.6 J	10 U	10 U	4.4 J	10 U
Benzene	**5/5**	5.0 U	0.31 J	0.34 J	0.33 J	0.44 J	0.35 J
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	0.39 J	0.72 J	0.64 J	0.7 J	1.3 J	0.86 J
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	0.3 J	0.3 J	0.39 J	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	0.22 J	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C
	Sample Date:	10/31/2013	5/14/2014	10/29/2014	10/22/2016	10/13/2016	10/27/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	0.25 J	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B
Sample Date:	MCL/ICL	10/30/2013	5/13/2014	10/28/2014	10/21/2015	10/12/2016	10/24/2017
Inorganics-Metals (ug/l)							
Antimony	6	4.5 J	3.9 J	2.2 U	1.3 U	2.6 J	60 U
Arsenic	**10/50**	2.7	3	2.5	2.2	3.1	2.6
Barium	2000	55.1	51	51.7 E	53.9	54.5	60.3
Beryllium	4	0.169 U	0.355 J	0.218 J	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.266 J	0.281 J	0.24 U	5 U
Cadmium, dissolved	NA	0.224 J	0.071 U	0.158 J	0.163 J	0.12 U	5 U
Chromium	100	0.233 J	0.403 U	0.403 U	0.24 U	0.24 U	10 U
Copper	1300	0.993 U	3.0 U	3.0 U	1.9 U	1.9 U	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		12400	10800	11000	12200	11000	11600
Lead	15	0.079 U	0.101 J	0.094 J	4.6	0.74	1 U
Lead, dissolved	NA	0.118 J	0.061 U	0.061 U	0.805 J	0.66	1 U
Magnesium	NA	10100	8800	8680	8880	8950	10100
Manganese (remove)		464	401	411	420	423	449
Mercury	2	0.032 U	0.024 U	0.024 U	0.04 U	0.04 U	0.2 U
Nickel	NA	0.531 U	0.508 U	0.508 U	0.755 U	0.755 U	40 U
Selenium	50	0.208 U	0.213 U	0.213 U	0.177 U	1.9	2 U
Silver	NA	0.24 U	0.385 U	0.081 J	0.54 U	0.54 U	10 U
Thallium	2	0.064 U	0.031 U	0.081 J	0.031 J	0.3	1 U
Zinc	NA	0.995 J	4.5 U	7.3 J	6.2 U	6.2 U	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.060 U	0.059 U	0.063 U	0.063 U	0.063 U	0.063 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	10 U	10 U	10 U	10 U	1.4 J	1.82 J
Benzene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B
	Sample Date:	10/30/2013	5/13/2014	10/28/2014	10/21/2015	10/12/2016	10/24/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D
Sample Date:	MCL/ICL	10/30/2013	5/13/2014	10/28/2014	10/21/2015	10/12/2016	10/24/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.6 J	3.9 J	2.2 U	1.3 U	2.8 J	60 U
Arsenic	**10/50**	0.324 U	0.211 U	0.211 U	0.359 U	1	1 U
Barium	2000	83.4	90.8	83.5	96	86.3	169
Beryllium	4	0.169 U	0.278 J	0.277 J	0.12 U	0.12 U	3 U
Cadmium	5	0.181 J	0.164 J	0.392 J	0.194 J	0.211 J	5 U
Cadmium, dissolved	NA	0.472 J	0.126 J	0.327 J	0.264 J	0.299 J	5 U
Chromium	100	0.407 J	0.403 U	0.403 U	0.251 J	0.24 U	10 U
Copper	1300	0.993 U	3.0 U	3.0 U	2.2 J	2.8 J	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		13.3 J	10 U	10 U	8.7 J	8.7 U	100 UB
Lead	15	0.079 U	0.097 J	0.061 U	0.659 J	0.74	1 U
Lead, dissolved	NA	0.036 J	0.061 U	0.061 U	0.326 J	0.66	1 U
Magnesium	NA	7770	7750	6930	7580	6462	9510
Manganese (remove)		119	130	109	107	91.8	51.1
Mercury	2	0.032 U	0.024 U	0.034 J	0.046 J	0.04 U	0.2 U
Nickel	NA	0.531 U	2.2 J	2.3 J	3.5 J	2.6 J	40 U
Selenium	50	0.297 J	0.213 U	0.901 J	0.469 J	1.9	2 U
Silver	NA	0.24 U	0.385 U	0.385 U	0.54 U	0.54 U	10 U
Thallium	2	0.064 U	0.032 J	0.034 J	0.039 J	0.3	1 U
Zinc	NA	1.6 J	4.5 U	5.2 J	6.2 U	6.2 U	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.061U	0.062 U	0.061 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	10 U	10 U	10 U	10 U	10 U	3.5 J
Benzene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D
	Sample Date:	10/30/2013	5/13/2014	10/28/2014	10/21/2015	10/12/2016	10/24/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	NA	5.0 U	0.22 BJ	0.22 BJ	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S
Sample Date:	MCL/ICL	10/30/2013	5/13/2014	10/28/2014	10-21-2015	10/12/2016	10/24/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.0 U	3.9 J	2.9 J	1.3 U	2.2 J	60 U
Arsenic	**10/50**	0.324 U	0.211 U	0.211 U	0.359 U	1	1 U
Barium	2000	74.1	63.4	77.8 E	121	110	148
Beryllium	4	0.169 U	0.512 J	0.219 J	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.201 J	0.688 J	0.12 U	5 U
Cadmium, dissolved	NA	0.23 J	0.071 U	0.403 U	0.22 J	0.12 U	5 U
Chromium	100	0.557 J	0.403 U	0.071 U	0.0281 J	0.273 J	10 U
Copper	1300	0.993 U	3.0 U	3.0 U	1.9 U	2.5 J	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		9.9	14.3	12.8 J	11.1 J	8.7 U	100 UB
Lead	15	0.079 U	0.143 J	0.078 J	0.563 J	0.74	1 U
Lead, dissolved	NA	0.053 J	0.136 U	0.061 U	0.271 U	0.66	1 U
Magnesium	NA	3100	2590	2760	3660	3040	5420
Manganese (remove)		359	363	232	225	236	712
Mercury	2	0.032 U	0.024 U	0.034 J	0.04 U	0.04 U	0.2 U
Nickel	NA	0.531 U	1.2 J	2.0 J	1.7 J	3.3 J	40 U
Selenium	50	0.124 U	0.48 J	0.487 J	0.224 J	1.9	2 U
Silver	NA	0.24 U	0.385 U	0.385 U	0.54 U	0.54 U	10 U
Thallium	2	0.064 U	0.031 U	0.073 J	0.099 J	0.3	0.195 J
Zinc	NA	2.2 J	4.5 U	13.3 J	6.2 U	6.2 U	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.061U	0.06 U	0.062 U	0.062 U	0.062 U	0.062 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	10 U	10 U	10 U	10 U	3.3 J	2.2 J
Benzene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S
Sample Date:		10/30/2013	5/13/2014	10/28/2014	10-21-2015	10/12/2016	10/24/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A
Sample Date:	MCL/ICL	10/29/2013	5/12/2014	10/27/2014	10/20/2015	10/11/2016	10/23/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.0 U	5.3 J	2.3 J	1.3 U	5.0 U	60 U
Arsenic	**10/50**	25.2	8.2	5.3	14	29	31.9
Barium	2000	62.4	35.7	35.7	43.4	91.3	77.3
Beryllium	4	0.169 U	0.169 U	0.169 U	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.071 U	0.12 U	0.196 U	5 U
Cadmium, dissolved	NA	0.168 J	0.071 U	0.071 U	0.071 U	0.2 J	5 U
Chromium	100	0.169 U	0.472 J	0.403 U	0.252 J	0.27 U	10 U
Copper	1300	1.8 J	3.0 U	4.5 J	1.9 U	1.3 J	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		3330	1150	343	2610	11300	5740
Lead	15	0.082 J	0.082 J	0.061 U	0.271 U	0.74	1 U
Lead, dissolved	NA	0.041 J	0.065 J	0.061 U	0.271U	0.66	1 U
Magnesium	NA	7630	4210	3280	3170	7620	7830
Manganese (remove)		460	154	139	485	1140	702
Mercury	2	0.032 U	0.024 U	0.024 U	0.04 U	0.04 U	0.2 U
Nickel	NA	0.531 U	1.2 J	0.526 J	1.3 J	5.7 J	40 U
Selenium	50	0.265 J	0.213 U	0.233 J	0.177 U	1.9	2 U
Silver	NA	0.24 U	0.385 U	0.385 U	0.953J	0.463 U	10 U
Thallium	2	0.086 J	0.11 J	0.14 J	0.149 J	0.3	0.204 J
Zinc	NA	2.9 J	4.7 J	4.5 J	6.2 U	7.0 J	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.061 U	0.061 U	0.064 U	0.064 U	0.064 U	0.064 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	0.28 J	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	0.48 J	5.0 U	5.0 U	5.0 U	0.26 J	0.48 J
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	1.3 J	10 U	10 U	10 U	2.7 J	10 U
Benzene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	0.4 J	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	0.32 J	5.0 U	5.0 U	5.0 U	5.0 U	0.49 J
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	0.27 J
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A
	Sample Date:	10/29/2013	5/12/2014	10/27/2014	10/20/2015	10/11/2016	10/23/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B
Sample Date:	MCL/ICL	10/29/2013	5/12/2014	10/27/2014	10/20/2016	10/11/2016	10/23/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.0 U	3.8 J	2.2 U	1.3 U	5.0 U	60 U
Arsenic	**10/50**	763	659	716	796	720	879
Barium	2000	108	64.8	52.1	43.6	55.8	63.8
Beryllium	4	0.169 U	0.189 J	0.184 J	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.131 J	0.12 U	0.196 U	5 U
Cadmium, dissolved	NA	0.155 U	0.071 U	0.2 J	0.12 U	0.2 J	5 U
Chromium	100	0.169 U	0.403 U	0.403 U	0.403 U	0.27 U	10 U
Copper	1300	1.1 J	3.0 U	3.0 U	1.9 U	0.619 U	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		25300	18000	17000	15900	18000	19300
Lead	15	0.079 U	0.061 U	0.061 U	0.271 U	0.74	1 U
Lead, dissolved	NA	0.143 J	0.115 J	0.061 U	0.271 U	0.66	1 U
Magnesium	NA	14100	9860	8690	7630	9150	10500
Manganese (remove)		601	485	476	497	609	652
Mercury	2	0.032 U	0.024 U	0.024 U	0.04 U	0.04 U	0.2 U
Nickel	NA	13.6 J	3.9 J	2.9 J	2.4 J	9.2 I	40 U
Selenium	50	5.7 J	2.2	1.7 J	0.756 J	1.9	2.1
Silver	NA	0.24 U	0.385 U	1.1 J	1.6 J	0.463 U	10 U
Thallium	2	0.064 U	0.031 U	0.031 U	0.024 U	0.3	1 U
Zinc	NA	0.403 U	4.5 U	4.5 U	6.2 U	4.7 J	8.2 J
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	0.25 BJ	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.061 U	0.062 U	0.061 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	0.93 J	0.49 J	0.35 J	5.0 U	0.41 J	0.38 J
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	3.6 J	1.6 J	1.2 J	0.57 J	1.2 J	1.4 J
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	4.2 J	10.U	1.6 J	10 U	5.3 J	1.5 J
Benzene	**5/5**	3.2 J	1.6 J	1.3 J	0.71 J	1.7 J	1.9 J
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	0.28 J	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	5.6	2.3 J	1.5 J	0.58 J	1.5 J	1.9 J
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	0.25 J	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B
	Sample Date:	10/29/2013	5/12/2014	10/27/2014	10/20/2016	10/11/2016	10/23/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	0.38 J	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	0.24 BJ	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.5 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	0.33 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C
Sample Date:	MCL/ICL	10/29/2013	5/12/2014	10/27/2014	10/20/2015	10/11/2016	10/23/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.0 U	4.6 J	3.0 J	1.3 U	5.0 U	60 U
Arsenic	**10/50**	222	220	246	235	200	244
Barium	2000	8.1 J	8.6 J	8.0 J	7.5 J	10.3 J	52.4
Beryllium	4	0.169 U	0.22 J	0.223 J	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.148 J	0.12 U	0.196 U	5 U
Cadmium, dissolved	NA	0.155 U	0.071 U	0.08 J	0.12 U	0.196 U	5 U
Chromium	100	0.709 J	0.561 J	0.403 U	0.915 J	0.8 J	3.8 J
Copper	1300	0.993 U	3.0 U	3.2 J	1.9 U	0.619 U	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		32.2 J	23.1 J	22.1 J	10.9 J	15.3 J	355 E
Lead	15	0.079 U	0.076 J	0.061 U	0.271 U	0.74	0.422 J
Lead, dissolved	NA	0.033 U	0.061 U	0.061 U	0.271 U	0.66	1 U
Magnesium	NA	2970	2560	2900	3090	2850	3540
Manganese (remove)		323	283	335	343	330	401
Mercury	2	0.032 U	0.024 U	0.024 U	0.04 U	0.04 U	0.2 U
Nickel	NA	0.531 U	0.508 U	0.508 U	0.755 U	7.6 J	40 U
Selenium	50	0.224 J	0.213 U	0.333 J	0.177 U	1.9	2 U
Silver	NA	0.24 U	0.385 U	0.385 U	0.844 J	0.463 U	10 U
Thallium	2	0.064 U	0.031 U	0.031 U	0.024 U	0.3	1 U
Zinc	NA	0.794 J	4.5 U	6.6 J	6.2 U	1.8 J	14.1 J
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.062 U	0.061 U	0.65 U	0.65 U	0.65 U	0.65 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	12	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C
	Sample Date:	10/29/2013	5/12/2014	10/27/2014	10/20/2015	10/11/2016	10/23/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-4	MW-4	MW-4	MW-4	MW-4	MW-4
Sample Date:	MCL/ICL	10/30/2013	5/13/2014	10/28/2014	10/19/2015	10/12/2016	10/26/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.0 U	4.0 J	2.2 U	1.3 U	3.1 J	60 U
Arsenic	**10/50**	171	92.6	109	181	180	167
Barium	2000	135	129	114	142	153	78.9
Beryllium	4	0.169 U	0.286 J	0.169 U	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.238 J	0.12 U	0.12 U	5 U
Cadmium, dissolved	NA	0.155 U	0.071 U	0.071 U	0.12 U	0.12 U	5 U
Chromium	100	1.5 J	0.504 J	1.4 J	1.5 J	1 J	10 U
Copper	1300	0.933 U	3.0 U	3.3 J	1.9 U	2.2 J	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		20700	13500	14800	20300	21100	11700
Lead	15	0.177 J	0.414 J	0.245 J	0.271 U	0.74	1 U
Lead, dissolved	NA	0.048 J	0.063 J	0.061 U	0.271 U	0.66	1 U
Magnesium	NA	7640	6700	6290	9320	21100	6420
Manganese (remove)		1010	1380	1180	839	11000	429
Mercury	2	0.032 U	0.024 U	0.024 U	0.04 U	0.04 U	0.2 U
Nickel	NA	10.7 J	5.5 JU	9.5 J	11.7 J	11 J	40 U
Selenium	50	4.6	3.1	2.6	4.300	1.9	3
Silver	NA	0.24 U	0.385 U	1.3 J	1.3 J	0.54 U	10 U
Thallium	2	0.064 U	0.031 U	0.049 J	0.024 U	0.3	1 U
Zinc	NA	0.403 U	4.5 U	5.8 J	6.2 U	6.2 U	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.061U	0.062 U	0.062 U	0.062 U	0.062 U	0.062 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	0.67 J	0.41 J	0.49 J	0.69 J	0.77 J	0.38 J
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	2.4 J	1.4 J	1.7 J	2.5 J	2.7 J	1.3 J
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	1.3 J	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	4.7 J	10 U	2.6 J	3.2 J	7.8 J	1.7 J
Benzene	**5/5**	0.55 J	0.91 J	0.3 J	5.0 U	0.35 J	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	2.4 J	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	3.7 J	2.2 J	2.4 J	3.4 J	3.6 J	1.7 J
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	0.27 J	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4
	Sample Date:	10/30/2013	5/13/2014	10/28/2014	10/19/2015	10/12/2016	10/26/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	0.57 J	0.52 J	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	0.21 J	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	0.24 J	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A
Sample Date:	MCL/ICL	10/30/2013	5/13/2014	10/28/2014	10/19/2015	10/12/2016	10/26/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.0 U	3.4 J	2.2 U	1.3 U	2.8 J	60 U
Arsenic	**10/50**	87.7	66	98.3	105	110	102
Barium	2000	149	75.4	160	174	216	126
Beryllium	4	0.169 J	0.591 J	0.32 J	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.196 J	0.12 U	0.12 U	5 U
Cadmium, dissolved	NA	0.155 U	0.071	0.221 J	0.12 U	0.12 U	5 U
Chromium	100	0.917 J	4.8 J	2.1 J	1.1 J	0.708 J	3.4 J
Copper	1300	0.933 U	3.0 U	3.8 J	2.2 J	3.8 J	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		12300	7930	13000	13800	14300	11300
Lead	15	0.83 J	1	0.493 J	0.684 J	0.74	0.75 J
Lead, dissolved	NA	0.036 J	0.061 U	0.061 U	0.271 U	0.66	1 U
Magnesium	NA	12600	6950	12600	13100	14700	10400
Manganese (remove)		486	279	500	546	616	461
Mercury	2	0.032 U	0.024 U	0.024 U	0.04 U	0.04 U	0.2 U
Nickel	NA	5.0 J	5.6 J	8.6 J	8.8 J	10.7 J	40 U
Selenium	50	3.1	1.0 J	3.4	3.500	1.9	3.1
Silver	NA	0.24 U	0.385 U	1.0 J	1.0 J	0.54 U	10 U
Thallium	2	0.064 U	0.031	0.031 U	0.092J	0.3	1 U
Zinc	NA	2.4 J	7.2 J	7.9 J	6.2 U	7.9 J	12.1 J
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.062 U	0.062 U	0.059 U	0.059 U	0.059 U	0.059 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	0.5 J	5.0 U	0.55 J	5.0 U	0.67 J	0.39 J
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	1.7 J	0.72 J	1.9 J	5.0 U	2.3 J	1.4 J
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	3.6 J	10 U	1.7 J	5.0 U	9.7 J	1.5 J
Benzene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	2.5 J	2.5 J	3.0 J	5.0 U	3.4 J	1.8 J
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	0.26 J	0.26 J	5.0 U	5.0 U	0.27 J	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A
	Sample Date:	10/30/2013	5/13/2014	10/28/2014	10/19/2015	10/12/2016	10/26/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	0.4 J	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	0.24 J	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B
Sample Date:	MCL/ICL	10/30/2013	5/13/2014	10/28/2014	10/19/2015	10/12/2016	10/27/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.0 U	3.2 J	2.2 U	1.3 U	2.0 J	60 U
Arsenic	**10/50**	0.324 U	0.211 U	0.211 U	0.5 J	1	1 U
Barium	2000	22.1	21.4	21.2	23.4	23.7 J	23.8
Beryllium	4	0.169 U	0.379 J	0.372 J	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	1.2 J	0.12 U	0.12 U	5 U
Cadmium, dissolved	NA	0.155 U	0.071 U	0.071 U	0.12 U	0.12 U	5 U
Chromium	100	0.847 J	0.403 U	0.403 U	0.24 U	0.398 J	10 U
Copper	1300	1.9 J	3.0 U	3.0 U	2.6 J	3.3 J	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		309	274	208	169	223	287
Lead	15	0.124 J	0.147 J	0.115 J	0.271 U	0.74	1 U
Lead, dissolved	NA	0.092 J	0.085 J	0.061 U	0.271 U	0.66	1 U
Magnesium	NA	1580	1500	1380	1300	1320	1470
Manganese (remove)		34.9	31.1	23.9	22.8	29.3	35.5
Mercury	2	0.032 U	0.024 U	0.024 U	0.04 U	0.04 U	0.2 U
Nickel	NA	0.531 U	0.508 U	0.508 U	0.755 U	0.755 U	40 U
Selenium	50	0.208 U	0.325 J	0.244 J	0.427 J	1.9	2 U
Silver	NA	0.24 U	0.385 U	0.385 U	0.807 J	0.54 U	10 U
Thallium	2	0.064 U	0.031 U	0.031 U	0.024 U	0.3	1 U
Zinc	NA	1.6 J	5.3 J	4.8 J	6.2 U	6.2 U	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.061 U	0.06 U	0.061 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	5.0 U	5.0 U	5.0 U	0.58 J	5.0 U	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	5.0 U	5.0 U	5.0 U	2.0 J	5.0 U	5.0 U
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	10 u	10 U	10 U	10 U	1.7 J	10 U
Benzene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	5.0 U	5.0 U	5.0 U	2.9 J	5.0 U	5.0 U
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B
	Sample Date:	10/30/2013	5/13/2014	10/28/2014	10/19/2015	10/12/2016	10/27/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	0.4 J	5.0 U	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D
Sample Date:	MCL/ICL	10/29/2013	5/12/2014	10/28/2014	10/20/2015	10/11/2016	10/24/2017
Inorganics-Metals (ug/l)							
Antimony	6	2.0 U	4.3 J	2.2 U	1.3 U	5.0 U	60 U
Arsenic	**10/50**	6.3	10.6	6.8	8.6	6.8	15.9
Barium	2000	25.1	35.3	34.3 E	39.6	34.2	32.9
Beryllium	4	0.169 U	0.359 J	0.279 J	0.12 U	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.116 J	0.12 U	0.196 U	5 U
Cadmium, dissolved	NA	0.155 U	0.476 J	0.101 J	0.12 U	0.196 U	5 U
Chromium	100	0.189 J	0.403 U	0.403 U	0.24 U	0.27 U	10 U
Copper	1300	0.933 U	3.0 U	3.0 U	1.9 U	0.619 U	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		5260	9620	7430	7060	4350	8090
Lead	15	0.070 U	0.077 J	0.061 U	0.271 U	0.74	1 U
Lead, dissolved	NA	0.033 U	0.076 J	0.061 U	0.271 U	0.66	1 U
Magnesium	NA	6740	7110	7050	8540	7900	7620
Manganese (remove)		169	292	256	186	165	146
Mercury	2	0.032 U	0.024 U	0.024 U	0.56 J	0.04 U	0.2 U
Nickel	NA	0.531	0.508 U	0.508 U	0.755 U	1.1 U	40 U
Selenium	50	0.208 U	0.29 J	0.213 U	0.177 U	1.9	2 U
Silver	NA	0.24 U	0.385 U	0.544 J	1.1 J	0.463 U	10 U
Thallium	2	0.064 U	0.031 U	0.031 U	0.024 U	0.3	1 U
Zinc	NA	0.403 U	4.5 U	5.1 J	6.2 U	2.0 J	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.061 U	0.06 U	0.064 U	0.064 U	0.064 U	0.064 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	10 U	10 U	10 U	1.3 J	10 U	10 U
Benzene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D
	Sample Date:	10/29/2013	5/12/2014	10/28/2014	10/20/2015	10/11/2016	10/24/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S
Sample Date:		10/29/2013	5/12/2014	10/28/2014	10/20/2015	10/11/2016	10/24/2017
	MCL/ICL						
Inorganics-Metals (ug/l)							
Antimony	6	2.3 J	4.5 J	2.2 U	1.3 U	5.0 U	60 U
Arsenic	**10/50**	30.7	66.1	11.2	1760 *	95	137
Barium	2000	12 J	19.6 J	31.8 E	27.5	20.8	21.8
Beryllium	4	0.169 U	0.249 J	0.195 J	0.304 J	0.12 U	3 U
Cadmium	5	0.155 U	0.071 U	0.127 J	0.12 U	0.196 U	5 U
Cadmium, dissolved	NA	0.155 U	0.071 U	0.071 U	0.12 U	0.196 U	5 U
Chromium	100	0.179 J	0.403 U	0.403 U	1.8 J	0.27 U	10 U
Copper	1300	0.933 U	3.0 U	3.0 U	1.9 U	0.619 U	20 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Iron (remove)		6360	12600	975	60100	9460	12300
Lead	15	0.079 U	0.185 J	0.061 U	3.6	0.74	1 U
Lead, dissolved	NA	0.033 U	0.198 J	0.061 U	0.271 U	0.66	1 U
Magnesium	NA	6790	8140	7620	8460	8440	9410
Manganese (remove)		107	113	88	175	159	149
Mercury	2	0.032 U	0.024 U	0.024 U	0.04 U	0.04 U	0.2 U
Nickel	NA	0.531 U	0.508 U	0.606 J	0.755 U	1.1 U	40 U
Selenium	50	0.208U	0.213 U	0.319 J	0.394 J	1.9	2 U
Silver	NA	0.24 U	0.479 J	0.385 U	2.1 J	0.463 U	10 U
Thallium	2	0.064 U	0.031 U	0.043 J	0.24 U	0.3	1 U
Zinc	NA	0.674 J	4.5 U	6.5 J	6.2 U	4.3 J	20 U
Organics (ug/l)							
1,1,1,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	**5/3**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	7	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	NA	0.061 U	0.061 U	0.062 U	0.062 U	0.062 U	0.062 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	600	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3,5-Trimethylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	75	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,2-Dichloropropane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone (MEK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ispropyltoluene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	NA	10 U	10 U	10 U	2.5 J	1.5 J	2.4 J
Benzene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromobenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromochloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
CFC-12	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorodibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	70	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromomethane	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichloromethane	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Iron Horse Park OU-2 - Historical Groundwater Results

	Well:	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S
	Sample Date:	10/29/2013	5/12/2014	10/28/2014	10/20/2015	10/11/2016	10/24/2017
	MCL/ICL						
Ethylbenzene	700	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloro-1,3-butadiene	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylenes	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
N-Propylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	10000	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	**1/1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.05 U
Sec-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
tert-Butylbenzene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene (PCE)	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	1000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	**5/5**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	**2/2**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Notes

Laboratory qualifiers (i.e., not data validation qualifiers)

B = Between the instrument detection limit and the reporting limit (inorganics)

U = Undetected

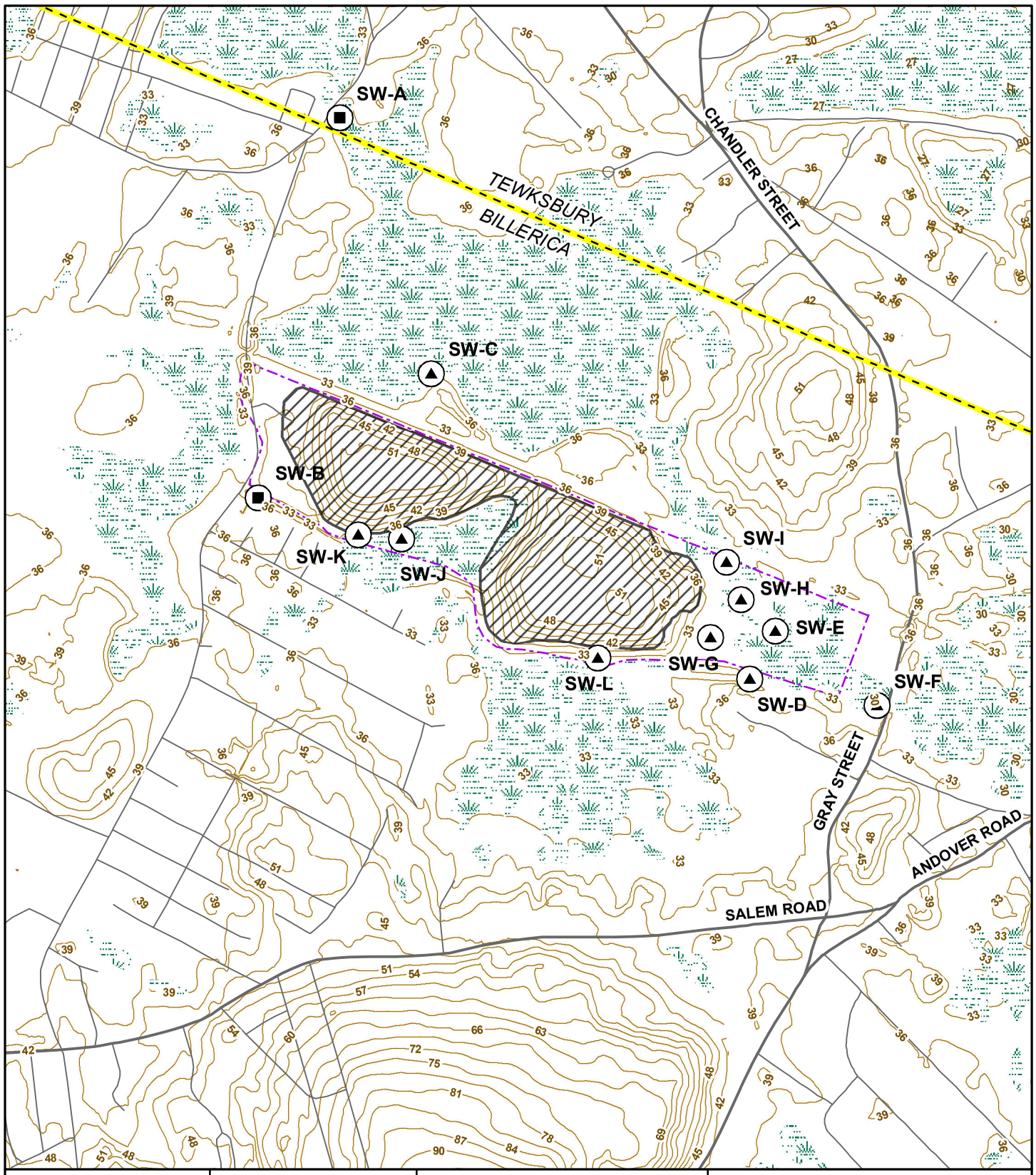
J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

Shaded cells exceed MCLs/ICLs

C.3 – Surface Water Monitoring Results



AECOM

Drawn:	BC	9/12/2013
Approved:	NT	9/12/2013
Project #:	60282276	

FIGURE 5:
SURFACE WATER MONITORING LOCATIONS

SHAFFER LANDFILL
BILLERICA, MASSACHUSETTS

G:\Projects\HAZWASTE\60282276IHP\Maps\Shaffer Landfill - SW Locations.mxd

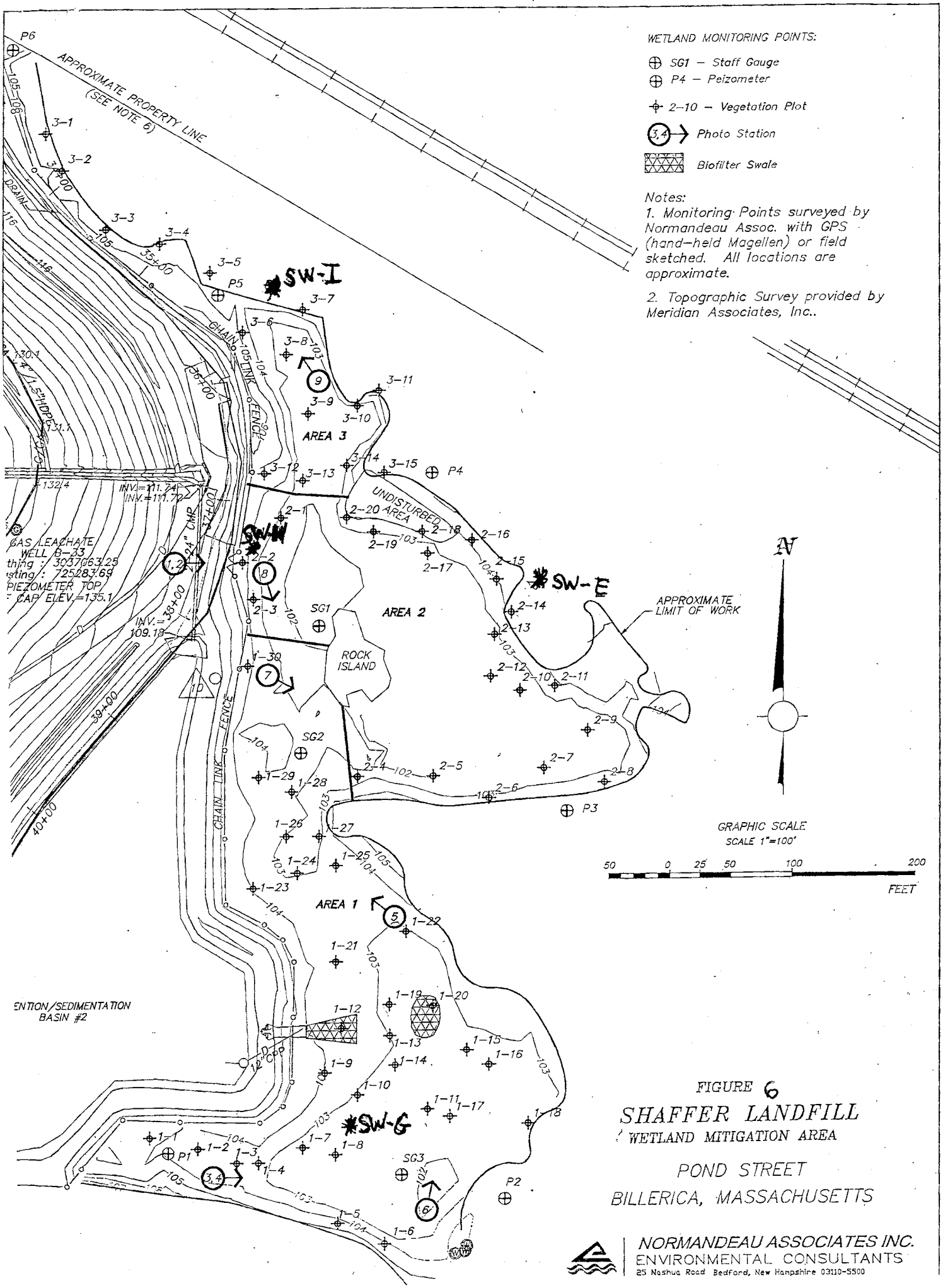


FIGURE 6

SHAFFER LANDFILL

WETLAND MITIGATION AREA

POND STREET

BILLERICA, MASSACHUSETTS

NORMANDEAU ASSOCIATES INC.
ENVIRONMENTAL CONSULTANTS
25 Nashua Road Bedford, New Hampshire 03110-5500

Shaffer Landfill Surface Water Sampling

SW-A		Round 21	Round 22	Round 23	Round 24	Round 25	Round 26	Round 27
		Oct-13	May-14	Oct-14	Apr-15	Oct-15	Oct-16	Sep-17
Alkalinity (as $CaCO_3$)	mg/l	46	23	24	16	39	52	26
COD	mg/l	22	20 U	38	35	43	28	27
Chloride	mg/l	104	117	136	126	152	127	130
Iron (total)	mg/l	0.288	0.591	0.591	0.516	0.97	0.445	0.75
Manganese (total)	mg/l	0.767	0.186	0.289	0.156	0.544	0.293	0.428
Nitrogen, nitrate (as N)	mg/l	0.09	0.06	0.21	0.04	0.05	0.38	0.03 U
TDS	mg/l	172	608	264	312	312	296	338
Sulfate	mg/l	2 U	11	8	2 U	2 U	16	2 U
pH	s.u.	8.66	7.01	6.97	7.32	7.35	9.23	7.49
Temp	^{o}C	10.62	14.8	11.57	14.12	8.76	9.8	17.26
Specific Cond.	uS/cm	191	404	348	378	434	387	521
DO	mg/l	11.38	9.54	6.65	10.00	4.87	54.35	6.26
ORP	mV	36.5	246	142.4	106	23.2	111	100.7
turbidity	NTU	31	4.7	3.41	110	7.6	9.5	5.5
Antimony	ug/l	6 U	6 U	6 U	6 U	6 U	6 U	6 U
Arsenic	ug/l	5 U	5 U	5 U	5 U	5 U	16	5 U
Barium	ug/l	34	27	32	25	43	35	43
Beryllium	ug/l	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	2.2 U
Cadmium (dissolved)	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	2.2 U
Calcium	ug/l	NS	NS	NS	NS	NS	NS	4570
Chromium (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	ug/l	10	9 U	9 U	9 U	9 U	9 U	30
Cyanide	ug/l							
Lead (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Lead (dissolved)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ug/l	767	2,360	3,320	3,080	4,560	3,210	1050
Mercury	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	ug/l	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Selenium	ug/l	5 U	13	9	5 U	5 U	20	5 U
Silver	ug/l	3 U	3.4 U	3.4 U	3.4 U	3 U	3.4 U	6
Thallium	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Zinc	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	35
Toluene	ug/l	5.2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U
Pentachlorophenol (not detected)								

The only organics presented are those which were detected in one of the sampling rounds.

U - Not detected; value presented is reporting limit

NS - not sampled/analyzed

Shaffer Landfill Surface Water Sampling

SW-B		Round 21	Round 22	Round 23	Round 24	Round 25	Round 26	Round 27
		Oct-13	May-14	Oct-14	Apr-15	Oct-15	Oct-16	Sep-17
Alkalinity (as $CaCO_3$)	mg/l	63	51	48	47	68	42	43
COD	mg/l	24	20 U	20 U	24	20 U	20 U	20 U
Chloride	mg/l	115	84	81	123	96	105	125
Iron (total)	mg/l	0.193	0.811	1.74	1.01	3.62	1.21	4.19
Manganese (total)	mg/l	0.486	0.133	0.502	0.236	0.809	0.392	0.873
Nitrogen, nitrate (as N)	mg/l	0.10	0.09	0.16	0.11	0.04	0.46	0.07
TDS	mg/l	228	512	204	304	408	184	339
Sulfate	mg/l	7	11	11	12	2 U	27	2 U
pH	s.u.	6.94	7.06	6.66	7.06	7.29	6.90	7.08
Temp	^{o}C	10.43	16.34	10.42	12.96	7.59	8.74	16.42
Specific Cond.	uS/cm	354	353	138	385	178	259	532
DO	mg/l	5.00	7.19	2.43	5.81	6.46	4.39	1.67
ORP	mV	55.0	50.5	115.3	108	40.1	113	122.5
turbidity	NTU	14.9	3.3	3.27	2.53	25.9	9.8	8.1
Antimony	ug/l	6 U	6	6	6 U	6 U	7	44
Arsenic	ug/l	5 U	5 U	5 U	5 U	5 U	14	8
Barium	ug/l	50	30	51	46	68	41	81
Beryllium	ug/l	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	26
Cadmium (dissolved)	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	2.2 U
Calcium	ug/l	NS	NS	NS	NS	NS	NS	6130
Chromium (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	ug/l	11	9 U	9 U	9 U	9 U	9 U	130
Cyanide	ug/l							
Lead (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	59
Lead (dissolved)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ug/l	2800	2130	3220	3780	4210	2580	1270
Mercury	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	ug/l	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Selenium	ug/l	5 U	13	15	5 U	5 U	7	5 U
Silver	ug/l	3 U	3.4 U	3.4 U	3.4 U	3 U	3.4 U	3.4 U
Thallium	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Zinc	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	195
VOCs (none detected)								
Pentachlorophenol (not detected)								

The only organics presented are those which were detected in one of the sampling rounds.

U - Not detected; value presented is reporting limit

NS - not sampled/analyzed

Shaffer Landfill Surface Water Sampling

SW-C1		Round 21	Round 22	Round 23	Round 24	Round 25	Round 26	Round 27
		Oct-13	May-14	Oct-14	Apr-15	Oct-15	Oct-16	Sep-17
Alkalinity (as $CaCO_3$)	mg/l	79	66	64	54	69	52	55
COD	mg/l	37	20 U	49	25	20 U	29	21
Chloride	mg/l	66	67	43	94	90	103	90
Iron (total)	mg/l	5.84	4.63	2.46	1.34	5.74	0.828	10.3
Manganese (total)	mg/l	0.649	0.36	0.174	0.0423	0.899	0.648	0.875
Nitrogen, nitrate (as N)	mg/l	0.08	0.09	0.12	0.10	0.03 U	0.34	0.03 U
TDS	mg/l	176	588	188	196	340	220	252
Sulfate	mg/l	3	2 U	10	5	2 U	10	2 U
pH	s.u.	7.14	7.04	7.21	7.71	7.71	7.13	8.07
Temp	^{o}C	8.54	13.82	10.22	12.24	7.13	9.61	15.22
Specific Cond.	uS/cm	267	292	190	313	327	276	367
DO	mg/l	7.15	4.66	6.54	6.68	3.11	4.02	2.84
ORP	mV	56.1	144	82.0	138	-53	10	53
turbidity	NTU	35	1.8	14.4	2.93	18.8	10.9	20.3
Antimony	ug/l	6 U	6 U	6 U	6 U	6 U	6 U	22
Arsenic	ug/l	5	5 U	5 U	5 U	5	14	30
Barium	ug/l	25	39	34	49	60	28	60
Beryllium	ug/l	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	12
Cadmium (dissolved)	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	2.2 U
Calcium	ug/l	NS	NS	NS	NS	NS	NS	5230
Chromium (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	ug/l	12	11	9 U	9 U	9 U	9 U	60
Cyanide	ug/l							
Lead (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	25
Lead (dissolved)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ug/l	2480	2310	2730	3250	3990	2380	1010
Mercury	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	ug/l	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Selenium	ug/l	5 U	6	9	5 U	5 U	20	5 U
Silver	ug/l	3 U	3.4 U	3.4 U	3.4 U	3 U	3.4 U	3.4 U
Thallium	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Zinc	ug/l	20 U	20 U	20 U	20 U	20 U	24	89
VOCs (none detected)								
Pentachlorophenol (not detected)								

The only organics presented are those which were detected in one of the sampling rounds.

U - Not detected; value presented is reporting limit

NS - not sampled/analyzed

Shaffer Landfill Surface Water Sampling

SW-D		Round 21	Round 22	Round 23	Round 24	Round 25	Round 26	Round 27
		Oct-13	May-14	Oct-14	Apr-15	Oct-15	Oct-16	Sep-17
Alkalinity (as $CaCO_3$)	mg/l	58	47	40	40	67	21	43
COD	mg/l	20 U	20 U	20 U	20 U	28	33	20 U
Chloride	mg/l	122	88	86	122	112	103	105
Iron (total)	mg/l	1.22	0.857	1.72	0.915	2.27	0.859	2.81
Manganese (total)	mg/l	0.354	0.0915	0.338	0.168	0.629	0.358	0.955
Nitrogen, nitrate (as N)	mg/l	0.24	0.22	0.32	0.22	0.1	1.08	0.18
TDS	mg/l	284	460	228	248	420	288	334
Sulfate	mg/l	9	12	8	13	8	66	8
pH	s.u.	7.88	7.06	7.25	7.66	7.58	7.21	7.55
Temp	^{o}C	11.72	15.54	13.25	14.52	9.24	8.97	15.52
Specific Cond.	uS/cm	8	344	893	395	939	276	506
DO	mg/l	10.85	8.9	2.42	8	9.76	6.54	6.73
ORP	mV	104	343	47.5	61	3.9	28	9.5
turbidity	NTU	8.2	1.9	4.24	9.64	9.3	57.0	6.7
Antimony	ug/l	6 U	6 U	6 U	6 U	6 U	6 U	22
Arsenic	ug/l	5 U	5 U	5 U	5 U	5 U	20	10
Barium	ug/l	43	32	47	43	59	41	83
Beryllium	ug/l	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	8
Cadmium (dissolved)	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	2.2 U
Calcium	ug/l	NS	NS	NS	NS	NS	NS	6000
Chromium (total)	ug/l	10 U	10	10 U	10 U	10 U	10 U	10 U
Copper	ug/l	10	9 U	9 U	9 U	9 U	9 U	30
Cyanide	ug/l							
Lead (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	15
Lead (dissolved)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ug/l	3080	2150	3150	3520	5230	3080	1360
Mercury	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	ug/l	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Selenium	ug/l	5 U	18	14	5 U	5 U	14	5 U
Silver	ug/l	3 U	3.4 U	3.4 U	3.4 U	3 U	3.4 U	3.4 U
Thallium	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Zinc	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	51
VOCs (none detected)								
Pentachlorophenol (not detected)								

The only organics presented are those which were detected in one of the sampling rounds.

U - Not detected; value presented is reporting limit

NS - not sampled/analyzed

Shaffer Landfill Surface Water Sampling

SW-F		Round 21	Round 22	Round 23	Round 24	Round 25	Round 26	Round 27
		Oct-13	May-14	Oct-14	Apr-15	Oct-15	Oct-16	Sep-17
Alkalinity (as $CaCO_3$)	mg/l	79	43	37	34	60	2	46
COD	mg/l	20 U	20 U	33	32	40	20	20 U
Chloride	mg/l	115	92	99	113	114	1	115
Iron (total)	mg/l	1.62	0.746	1.27	1.29	3.86	0.795	3.10
Manganese (total)	mg/l	0.748	0.0794	0.244	0.179	0.750	0.430	1.09
Nitrogen, nitrate (as N)	mg/l	0.77	0.26	0.35	0.23	0.54	0.03	0.26
TDS	mg/l	188	1560	216	256	408	264	333
Sulfate	mg/l	7	12	8	9	2 U	13	8
pH	s.u.	7.10	7.11	6.88	7.23	7.28	7.28	7.11
Temp	^{o}C	10.44	17.89	10.57	16.18	9.29	9.29	16.43
Specific Cond.	uS/cm	384	372	290	382	384	384	508
DO	mg/l	6.98	10.19	6.98	10.05	9.42	9.42	3.97
ORP	mV	76.2	558	120.8	48	11.4	11.4	125.1
turbidity	NTU	10.1	2.8	2.67	2.1	37.4	5.3	7.5
Antimony	ug/l	6 U	6 U	6 U	6 U	6 U	6 U	14
Arsenic	ug/l	5 U	5 U	5 U	5 U	7	19	20
Barium	ug/l	41	24	40	37	54	44	72
Beryllium	ug/l	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	5
Cadmium (dissolved)	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	2.2 U
Calcium	ug/l	NS	NS	NS	NS	NS	NS	5690
Chromium (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	ug/l	11	9 U	9 U	9 U	9 U	11	20
Cyanide	ug/l							
Lead (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Lead (dissolved)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ug/l	3540	2110	3320	3330	4980	3450	1340
Mercury	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	ug/l	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Selenium	ug/l	5 U	12	9	5 U	5 U	14	5 U
Silver	ug/l	3 U	3.4 U	3.4 U	3.4 U	3 U	3.4 U	3.4 U
Thallium	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Zinc	ug/l	20 U	20 U	20 U	20 U	20 U	24	35
VOCs (none detected)								
Pentachlorophenol (not detected)								

The only organics presented are those which were detected in one of the sampling rounds.

U - Not detected; value presented is reporting limit

NS - not sampled/analyzed

SW-G		Round 21 Oct-13	Round 22 May-14	Round 23 Oct-14	Round 24 Apr-15	Round 25 Oct-15	Round 26 Oct-16	Round 27 Sep-17
Alkalinity (as $CaCO_3$)	mg/l	450	483	438	318	327	135	361
COD	mg/l	77	20 U	170	72	103	64	589
Chloride	mg/l	186	92	170	115	116	118	125
Iron (total)	mg/l	8.75	1.54	15.7	5.14	21.6	0.338	36.7
Manganese (total)	mg/l	0.206	0.176	0.799	0.258	0.316	0.095	0.33
Nitrogen, nitrate (as N)	mg/l	0.12	0.11	0.14	0.28	0.12	24.26	0.06
TDS	mg/l	252	1632	380	436	440	296	590
Sulfate	mg/l	2 U	2 U	58	2 U	2 U	7	36
pH	s.u.	7.16	7.08	6.94	7.29	7.19	6.93	7.14
Temp	^oC	9.26	21.64	9.86	16.17	9.52	9.4	14.25
Specific Cond.	uS/cm	1019	1219	972	837	845	506	1072
DO	mg/l	6.86	6.41	7.05	5.14	7.55	17.44	2.11
ORP	mV	-55.5	245	-62	59	-97	80	-88.1
turbidity	NTU	26.8	7.5	15.1	6.72	77.1	22.7	35.1
Antimony	ug/l	6 U	6 U	6 U	6 U	6 U	6 U	26
Arsenic	ug/l	87	102	137	61	173	27	440
Barium	ug/l	89	100	145	81	135	59	217
Beryllium	ug/l	4 U	4 U	4 U	4 U	4 U	4 U	5 U
Cadmium	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	4
Cadmium (dissolved)	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	3
Calcium	ug/l	NS	NS	NS	NS	NS	NS	36900
Chromium (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	ug/l	10	9 U	9 U	9 U	9 U	9 U	9 U
Cyanide	ug/l							
Lead (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	11
Lead (dissolved)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ug/l	9,710	7,190	12,800	9,420	12,900	5,710	16,000
Mercury	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	ug/l	40 U	40 U	40 U	40 U	40 U	40 U	47
Selenium	ug/l	5 U	5 U	11	5 U	5 U	10	5 U
Silver	ug/l	3 U	3.4 U	3.4 U	3.4 U	3 U	3.4 U	3.4 U
Thallium	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Zinc	ug/l	20 U	20 U	20 U	20 U	20 U	20 U	40
Acetone	ug/l	5.0 U	10.0	5.0 U	5.0 U	5.0 U	5.0 U	7
Benzene	ug/l	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U
Chlorobenzene	ug/l	2.3	2.1	1.0 U	1.0 U	1.0 U	1.0 U	1 U
1,4-Dichlorobenzene	ug/l	2.1	2.4	1.0 U	2.4	1.0 U	1.0 U	1
Toluene	ug/l	1.0 U	1.0 U	1.0 U	1.0 U	2.8	1.0 U	1 U
Tetrahydrofuran	ug/l	40	35	42	19	23	1.0 U	37
Ethyl ether (diethyl ether)	ug/l	1.0 U	4.9	5.5	2.6	2.9	1.0 U	1 U
Pentachlorophenol (not detected)								

The only organics presented are those which were detected in one of the sampling rounds.

U - Not detected; value presented is reporting limit

NS - not sampled/analyzed

SW-H		Round 21 Oct-13	Round 22 May-14	Round 23 Oct-14	Round 24 Apr-15	Round 25 Oct-15	Round 26 Oct-16	Round 27 Sep-17
Alkalinity (as $CaCO_3$)	mg/l	530	314	329	284	325	156	267
COD	mg/l	99	50	47	58	348	182	53
Chloride	mg/l	222	123	154	141	161	137	120
Iron (total)	mg/l	2.73	0.978	2.82	1.94	29.1	8.97	2.78
Manganese (total)	mg/l	0.127	0.0656	0.222	0.119	1.07	0.471	0.100
Nitrogen, nitrate (as N)	mg/l	0.25	0.73	0.16	0.23	0.21	16.3	0.19
TDS	mg/l	216	1136	248	372	540	364	491
Sulfate	mg/l	2 U	2 U	9	2 U	2 U	55	8
pH	s.u.	7.12	7.37	7.06	7.56	7.09	7.10	6.67
Temp	^{o}C	12.81	19.88	10.71	17.06	10.38	8.91	16.41
Specific Cond.	uS/cm	1253	948	266	846	789	489	764
DO	mg/l	6.64	8.59	6.35	11.52	4.59	8.61	2.44
ORP	mV	-5.0	372	59.5	163	-74	97	162.1
turbidity	NTU	21.8	6.5	7.84	9.16	184	57.0	41.2
Antimony	ug/l	6 U	6	6 U	6 U	6 U	6 U	19
Arsenic	ug/l	89	25	72	68	174	221	140
Barium	ug/l	81	53	80	59	216	56	85
Beryllium	ug/l	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	4
Cadmium (dissolved)	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	2.2 U
Calcium	ug/l	NS	NS	NS	NS	NS	NS	6990
Chromium (total)	ug/l	10 U	10 U	10 U	10 U	20	10 U	10 U
Copper	ug/l	9 U	9 U	9 U	9 U	49	27	9 U
Cyanide	ug/l							
Lead (total)	ug/l	10 U	10 U	10 U	10 U	90	58	10 U
Lead (dissolved)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ug/l	10400	6840	10700	9180	16300	7650	3490
Mercury	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	ug/l	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Selenium	ug/l	5 U	16	11	5 U	5 U	7	5 U
Silver	ug/l	3 U	3.4 U	3.4 U	3.4 U	3 U	3.4 U	3.4 U
Thallium	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Zinc	ug/l	20 U	20 U	20 U	20 U	140	46	20 U
Acetone	ug/l	5.0 U	6.2	5.0 U	5.0 U	5.0 U	5.0 U	6
Benzene	ug/l	1.1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	ug/l	3.3	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1.4-Dichlorobenzene	ug/l	3.5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	ug/l	2.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrahydrofuran	ug/l	63	14	20	14	13	1.0 U	7
Ethyl ether (diethyl ether)	ug/l	2.7	1.1	1.4	1.0 U	1.0 U	1.0 U	1 U
Pentachlorophenol (not detected)								

The only organics presented are those which were detected in one of the sampling rounds.

U - Not detected; value prue presented is reporting limit

NS - not sampled/analyzesampled/analyzed

SW-I		Round 21	Round 22	Round 23	Round 24	Round 25	Round 26	Round 27
		Oct-13	May-14	Oct-14	Apr-15	Oct-15	Oct-16	Sep-17
Alkalinity (as $CaCO_3$)	mg/l	150	152	86	60	312	36	138
COD	mg/l	27	128	33	44	88	66	180
Chloride	mg/l	92	78	118	101	143	186	100
Iron (total)	mg/l	2.72	23.3	12.4	11.7	6.37	47.9	330
Manganese (total)	mg/l	0.564	0.437	0.609	0.705	0.317	2.79	1.29
Nitrogen, nitrate (as N)	mg/l	0.12	0.08	0.17	0.09	0.05	0.46	0.11
TDS	mg/l	320	656	312	312	472	376	250
Sulfate	mg/l	2 U	2 U	32	2 U	2 U	152	363
pH	s.u.	7.24	6.8	7.05	7.52	7.46	6.64	6.26
Temp	^{o}C	8.79	18.19	10.03	14.72	11.79	8.18	15.97
Specific Cond.	uS/cm	409	501	201	385	829	278	394
DO	mg/l	4.05	1.88	9.08	6.23	7.30	1.59	4.37
ORP	mV	-20.5	168	128.5	35	-45	102.6	50.2
turbidity	NTU	77.5	5.2	1.48	18.88	32	158.9	59.2
Antimony	ug/l	6 U	6 U	6 U	6 U	6 U	6 U	44
Arsenic	ug/l	7	112	48	39	100	308	2650
Barium	ug/l	38	62	61	47	73	64	233
Beryllium	ug/l	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	ug/l	2 U	3	2.2 U	2.2 U	2 U	2 U	7
Cadmium (dissolved)	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	3	2.2 U
Calcium	ug/l	NS	NS	NS	NS	NS	NS	6000
Chromium (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	ug/l	11	9 U	9 U	9 U	9 U	9 U	9 U
Cyanide	ug/l							
Lead (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	33
Lead (dissolved)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ug/l	5,410	4,690	6,000	4,600	11,400	5,380	240
Mercury	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	ug/l	40 U	40 U	40 U	40 U	40 U	40 U	238
Selenium	ug/l	5 U	5 U	6	5 U	5 U	5 U	5 U
Silver	ug/l	3 U	3.4 U	3.4 U	3.4 U	3 U	3.4 U	3.4 U
Thallium	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Zinc	ug/l	20 U	20 U	20 U	30	20 U	321	89
Chlorobenzene	ug/l	1.0 U	1.0 U	1.0 U	1.0 U	1.8	1.0 U	1 U
1.4-Dichlorobenzene	ug/l	1.0 U	1.0 U	1.0 U	1.0 U	1.7	1.0 U	1 U
Tetrahydrofuran	ug/l	1.4	1.0 U	1.0 U	1.0 U	26	1.0 U	1 U
Ethyl ether (diethyl ether)	ug/l	1.0 U	1.0 U	1.0 U	1.0 U	2.9	1.0 U	1 U
Pentachlorophenol (not detected)								

The only organics presented are those which were detected in one of the sampling rounds.

U - Not detected; value presented is reporting limit

NS - not sampled/analyzed

SW-J		Round 21	Round 22	Round 23	Round 24	Round 25	Round 26	Round 27
		Oct-13	May-14	Oct-14	Apr-15	Oct-15	Oct-16	Sep-17
Alkalinity (as $CaCO_3$)	mg/l	52	64	32	58	27	99	34
COD	mg/l	20 U	21	24	35	65	51	193
Chloride	mg/l	104	84	59	108	127	54	65
Iron (total)	mg/l	2.40	0.769	1.44	0.783	1.26	0.246	24.7
Manganese (total)	mg/l	0.033	0.0171	0.205	0.0538	0.069	0.033	0.354
Nitrogen, nitrate (as N)	mg/l	0.08	0.06	0.17	0.03	0.05	1.26	0.27
TDS	mg/l	304	1376	236	312	444	252	350
Sulfate	mg/l	3	12	18	2 U	69	83	148
pH	s.u.	6.76	6.93	7.05	7.48	7.35	6.45	6.61
Temp	^{o}C	7.66	17.28	9.97	11.32	6.65	8.96	15.18
Specific Cond.	uS/cm	290	375	367	364	418	287	396
DO	mg/l	5.07	7.1	0.64	6.29	3.89	4.1	1.16
ORP	mV	113	421	-71.1	29	50	45	280.1
turbidity	NTU	21.9	2.7	20.8	2.03	23.8	88.0	30.1
Antimony	ug/l	6 U	6 U	6 U	6 U	6 U	6 U	20
Arsenic	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	20
Barium	ug/l	60	35	43	42	80	55	234
Beryllium	ug/l	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	3
Cadmium (dissolved)	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	2.2 U
Calcium	ug/l	NS	NS	NS	NS	NS	NS	10700
Chromium (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	ug/l	9 U	9 U	9 U	9 U	9 U	13	9 U
Cyanide	ug/l							
Lead (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	23
Lead (dissolved)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ug/l	2420	2540	2330	3710	5030	4220	1650
Mercury	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	ug/l	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Selenium	ug/l	5 U	13	7	5 U	5 U	5 U	5 U
Silver	ug/l	3 U	3.4 U	3.4 U	3.4 U	3 U	3.4 U	3.4 U
Thallium	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Zinc	ug/l	20 U	20 U	20 U	30	80	107	353
Acetone	ug/l	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5
Pentachlorophenol (not detected)								

The only organics presented are those which were detected in one of the sampling rounds.

U - Not detected; value presented is reporting limit

NS - not sampled/analyzed

SW-K1		Round 21	Round 22	Round 23	Round 24	Round 25	Round 26	Round 27
		Oct-13	May-14	Oct-14	Apr-15	Oct-15	Oct-16	Sep-17
Alkalinity (as $CaCO_3$)	mg/l	52	66	49	51	55	73	34
COD	mg/l	22	25	40	63	50	42	128
Chloride	mg/l	96	79	62	96	107	105	145
Iron (total)	mg/l	1.23	0.191	0.528	1.47	1.99	1.73	11.4
Manganese (total)	mg/l	0.132	0.0112	0.0951	0.0875	0.724	0.393	0.854
Nitrogen, nitrate (as N)	mg/l	0.14	0.11	0.22	0.07	0.04	0.59	0.03 U
TDS	mg/l	260	500	192	14	338	220	332
Sulfate	mg/l	8	13	36	248	2 U	2 U	40
pH	s.u.	6.78	7.05	6.81	7.56	7.70	6.57	6.71
Temp	^{o}C	8.53	18.77	9.55	13.54	9.80	7.79	16.07
Specific Cond.	uS/cm	333	366	231	336	356	247	467
DO	mg/l	4.99	7.41	3.52	7.17	13.42	5.51	4.64
ORP	mV	200	427	158.2	158	83	81	151.8
turbidity	NTU	7.2	5.3	1.0	6.94	34.2	22.0	38.1
Antimony	ug/l	6 U	7	6 U	6 U	6 U	6 U	15
Arsenic	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	10
Barium	ug/l	39	25	26	42	54	42	103
Beryllium	ug/l	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	3
Cadmium (dissolved)	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	2.2 U
Calcium	ug/l	NS	NS	NS	NS	NS	NS	7040
Chromium (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	ug/l	9 U	9 U	9 U	9 U	9 U	9 U	9 U
Cyanide	ug/l							
Lead (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	17
Lead (dissolved)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ug/l	2740	2390	3130	3610	4380	2970	1380
Mercury	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	ug/l	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Selenium	ug/l	5 U	14	8	5 U	5 U	5 U	5 U
Silver	ug/l	3 U	3.4 U	3.4 U	3.4 U	3 U	3.4 U	3.4 U
Thallium	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Zinc	ug/l	20 U	60	30	80	20	40	49
VOCs (none detected)								
Pentachlorophenol (not detected)								

The only organics presented are those which were detected in one of the sampling rounds.

U - Not detected; value presented is reporting limit

NS - not sampled/analyzed

Shaffer Landfill Surface Water Sampling

SW-L		Round 21	Round 22	Round 23	Round 24	Round 25	Round 26	Round 27
		Oct-13	May-14	Oct-14	Apr-15	Oct-15	Oct-16	Sep-17
Alkalinity (as $CaCO_3$)	mg/l	53	68	40	40	51	31	45
COD	mg/l	20 U	20 U	24	25	43	40	20 U
Chloride	mg/l	138	94	87	121	119	110	120
Iron (total)	mg/l	2.00	0.739	1.62	0.774	3.06	1.24	2.54
Manganese (total)	mg/l	0.440	0.0753	0.359	0.174	0.577	0.416	0.904
Nitrogen, nitrate (as N)	mg/l	0.12	0.09	0.18	0.10	0.12	1.24	0.13
TDS	mg/l	124	760	160	260	8	232	345
Sulfate	mg/l	8	13	20	13	408	42	9
pH	s.u.	6.83	6.67	6.95	7.66	7.62	7.62	6.81
Temp	^{o}C	10.31	17.00	11.12	14.26	9.08	9.08	15.98
Specific Cond.	uS/cm	363	376	264	408	379	379	474
DO	mg/l	6.44	9.23	16.48	8.38	5.67	5.67	4.33
ORP	mV	195.2	477	134.7	120	6	6	154.2
turbidity	NTU	11.6	1.9	1.63	1.77	76	42.9	8.8
Antimony	ug/l	6 U	6 U	6 U	6 U	6 U	6 U	24
Arsenic	ug/l	5 U	5 U	5 U	5 U	5 U	5 U	10
Barium	ug/l	51	35	47	44	59	44	79
Beryllium	ug/l	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Cadmium	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	8
Cadmium (dissolved)	ug/l	2 U	2.2 U	2.2 U	2.2 U	2 U	2.2 U	2.2 U
Calcium	ug/l	NS	NS	NS	NS	NS	NS	5570
Chromium	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	ug/l	9 U	9 U	9 U	9 U	9 U	9 U	120
Cyanide	ug/l							
Lead (total)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	46
Lead (dissolved)	ug/l	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Magnesium	ug/l	2,960	2,400	3,210	3,580	4,580	3,660	1230
Mercury	ug/l	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	ug/l	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Selenium	ug/l	7	11	8	5 U	5	5 U	5 U
Silver	ug/l	3 U	3.4 U	3.4 U	3.4 U	3 U	3.4 U	3.4 U
Thallium	ug/l	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Zinc	ug/l	20 U	60	20 U	20 U	20 U	21	174
VOCs (none detected)								
Pentachlorophenol (not detected)								

The only organics presented are those which were detected in one of the sampling rounds.

U - Not detected; value presented is reporting limit

NS - not sampled/analyzed

C.4 – Site Inspection Checklist

Five-Year Review Site Inspection Checklist

("N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: Iron Horse Park OU-2	**Date of inspection:** May 30, 2018
Location and Region: N. Billerica, MA; Region I	**EPA ID:** MAD051787323
Agency, office, or company leading the five-year review: USEPA/AECOM	**Weather/temperature:** Clear/70°F
Remedy Includes: (Check all that apply) X Landfill cover/containment X Access controls □ Institutional controls □ Groundwater pump and treatment □ Surface water collection and treatment □ Other_____ _____ □ Monitored natural attenuation □ Groundwater containment □ Vertical barrier walls	
Attachments: □ Inspection team roster attached □ Site map attached	
II. INTERVIEWS	
Interviews were performed by USEPA and are included separately.	

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	**O&M Documents**			
	☐ O&M manual	☐ Readily available	☐ Up to date	☐ N/A
	☐ As-built drawings	☐ Readily available	☐ Up to date	☐ N/A
	☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A
	Remarks: Not reviewed			
2.	**Site-Specific Health and Safety Plan**	☐ Readily available	☐ Up to date	☐ N/A
	☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☐ N/A
	Remarks: Not reviewed			
3.	**O&M and OSHA Training Records**	☐ Readily available	☐ Up to date	☐ N/A
	Remarks: Not reviewed			
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
5.	**Gas Generation Records**	X Readily available	X Up to date	☐ N/A
	Remarks: Reviewed gas well monitoring prior to site visit			
6.	**Settlement Monument Records**	X Readily available	X Up to date	☐ N/A
	Remarks: Reviewed records prior to site visit			
7.	**Groundwater Monitoring Records**	X Readily available	X Up to date	☐ N/A
	Remarks: Reviewed records prior to site visit			
8.	**Leachate Extraction Records**	X Readily available	X Up to date	☐ N/A
	Remarks: Reviewed records of leachate levels prior to site visit			
9.	**Discharge Compliance Records**			
	☐ Air	☐ Readily available	☐ Up to date	X N/A
	☐ Water (effluent)	☐ Readily available	☐ Up to date	X N/A
10.	**Daily Access/Security Logs**	☐ Readily available	☐ Up to date	☐ N/A
	Remarks: Not reviewed			

IV. O&M COSTS

1. **O&M Organization**

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

2. **O&M Cost Records**

Not Reviewed

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

Describe costs and reasons: None noted during review of monthly reports and during_____
_____discussion with EPA Remedial Project Manager_____
_____
_____
_____
_____

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

A. Fencing

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

Remarks: Minor damage which doesn't need repair. Historic damage has been repaired immediately upon discovery.

B. Other Access Restrictions

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

Remarks_____
_____

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) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
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
ICs being developed_____
_____
_____
_____

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

D. General

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

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** ☐ Location shown on site map X Roads adequate ☐ N/A
Remarks_____
_____

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS X Applicable ☐ N/A

A. Landfill Surface

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

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** X Grass X 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_____
_____

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

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

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

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

3. **Bench Overtopped** ☐ Location shown on site map X 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_____
☐ No evidence of excessive growth
X Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____

Remarks: There is some growth which should be removed, but there is no evidence of standing water.

D. Cover Penetrations X Applicable ☐ N/A

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

Remarks: Covers not locked, but there has been no evidence of trespassing at the site

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

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

4. **Leachate Extraction Wells**
☐ Properly secured/locked X Functioning ☐ Routinely sampled X Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____ Covers not locked, but there has been no evidence of trespassing at the site
_____

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

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

1. **Gas Treatment Facilities**
   X Flaring ☐ Thermal destruction ☐ Collection for reuse
   X Good condition ☐ Needs Maintenance
   Remarks____Candlestick flares now used. Operate intermittently. Enclosed flare no longer in operation._____

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

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

F. Cover Drainage Layer X Applicable ☐ N/A

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

   Remarks: Not inspected

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

   Remarks: Not inspected

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

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

   Remarks: Siltation was observed. Detention basin still appears to be functioning properly.

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** ☐ Location shown on site map X Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

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 ☐ Applicable X N/A

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

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

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

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

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

C. Treatment System ☐ Applicable X 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_____
   _____

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

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

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

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

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

D. Monitoring Data

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

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

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

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.).

This source control remedy appears to be operating as designed.

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.

The landfill cover and gas and leachate collection systems are well-maintained. Monitoring continues to be performed and submitted in a timely fashion.

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.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

With some contaminant concentrations observed to be lower at some locations, it may be possible to reduce the number of sampling locations in the future.

Appendix D
Information Related to the OU-3 Review

D.1 – Documents Reviewed

Environmental Resources Management (ERM). Various dates. Monthly Progress Reports.

ERM, 2014. Final Remedial Construction Report, AOC 4 and 5, Iron Horse Park Superfund Site, Operable Unit 3, Billerica, Massachusetts. September 25, 2014.

ERM, 2017. Final Remedial Construction Report, AOCs 2 and 6, Iron Horse Park Superfund Site, Operable Unit 3, Billerica, Massachusetts. September 19, 2017.

Golden Environmental Consultants, Inc. (GEC). January 11, 2007. *Final Report – Soil Capping, Iron Horse Park Superfund Site OU3, Cooperative Reserve Supply, Inc.*

Metcalf & Eddy (M&E). September, 1997. *Remedial Investigation Final Report - Iron Horse Park Superfund Site, 3rd Operable Unit, North Billerica, Massachusetts.*

Metcalf & Eddy (M&E). June, 2004. *Feasibility Study Final Report, Iron Horse Park Superfund Site, 3rd Operable Unit, North Billerica, Massachusetts.*

Metcalf & Eddy (M&E). September, 2006. *Ecological Risk Assessment / Wetlands Remedial Investigation Addendum (ERA/WRIA), Iron Horse Park Superfund Site, Operable Unit 4, North Billerica, Massachusetts.*

Metcalf & Eddy (M&E). September, 2006. *Groundwater Data Evaluation Report, Iron Horse Park Superfund Site, Operable Unit 4, North Billerica, Massachusetts.*

Metcalf & Eddy (M&E). February, 2008. *Supplemental Human Health Risk Assessment, Iron Horse Park Superfund Site, Operable Unit 4, North Billerica, Massachusetts*.

Metcalf & Eddy|AECOM (M&E), 2010. *Draft Final Feasibility Study, Iron Horse Park Superfund Site, Operable Unit 4, North Billerica, Massachusetts*. October 2010.

United States Environmental Protection Agency. September, 2004. *Record of Decision Summary, Iron Horse Park, OU3.*

United States Environmental Protection Agency. June, 2001. *Comprehensive Five-Year Review Guidance.*

United States Environmental Protection Agency. September, 2008. *Third Five-Year Review Report for Iron Horse Park Superfund Site, Billerica, Massachusetts*.

United States Environmental Protection Agency. September, 2013. *Fourth Five-Year Review Report for Iron Horse Park Superfund Site, Operable Units 1, 2, 3, and 4, North Billerica, Massachusetts*.

Woodard & Curran (W&C). Various dates. Operation and Maintenance Reports.

Woodard & Curran (W&C). Various dates. Monthly Progress Reports.

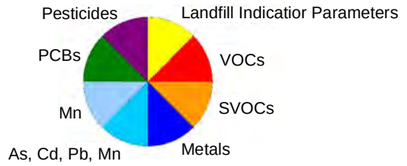
D.2 – Monitoring Results – Multiple Source Areas



Legend

- MW-214S — Shallow Overburden Well
- MW-214D — Deep Overburden Well
- MW-214B — Bedrock Well
- AOC Boundary
- Iron Horse Park Site Boundary

Sample Analysis Plan



Surface Water Sampling Location

(3 on-site locations. Background location SW-RP located in Round Pond is not located on this figure. See figure 4 for approximate location.)

SOURCES:
Color Ortho Imagery of site (2009) provided by WSP-Sells. Regional Color Ortho Imagery (April 2008) provided by The Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs

N

0 250 500 1,000 Feet

1:6,000

Figure 3 - Groundwater and Surface Water Sampling and Analysis Program

Iron Horse Park Superfund Site
Operable Unit 3
Billerica, Massachusetts

ERM

G:\Graphics\Clients\Panam\Iron Horse Park\MXDS\Iewide\February 2011\GW-Program-withPieCharts.mxd - 02/16/2011 - KPT

Table 2
Summary of Groundwater Analytical Data
PANAM-Iron Horse Park Facility
Billerica, Massachusetts

Analyte	Unit	2015 EPA MCL	2010 RB PRG	MA-GW-1	Location ID Sample Date Sample Type MA-GW-3	OW-26 21-Jan-16 N	OW-26 21-Jan-16 FD	OW-36 21-Jan-16 N	OW-36 21-Jan-16 FD	MW-204S 22-Jan-16 N	MW-301S 21-Jan-16 N	MW-301S 21-Jan-16 FD
Landfill Indicator Parameters												
Alkalinity, Total as CaCO3	mg/L	NS	NS	NS	NS	109		35.1	34.9	14.7		
Nitrate as N	µg/L	10,000	NS	NS	NS	*< 100*		1,170	1,170	30 J		
Total dissolved solids	µg/L	NS	NS	NS	NS	510,000		130,000	130,000	2,800,000		
Chloride	µg/L	NS	NS	NS	NS	240,000		29,000	30,000	1,600,000		
Calcium	µg/L	NS	NS	NS	NS	45,000		20,100	20,200	186,000		
Cyanide	µg/L	200	NS	200	30	4 J		*< 5*	1 J	1 J		
Iron	µg/L	NS	NS	NS	NS	72.8		119	192	21,600		
Manganese	µg/L	NS	300	NS	NS	26.71		6.30	13.77	**14,750**		
Sodium	µg/L	NS	NS	NS	NS	130,000		17,000	17,300	642,000		
Sulfate	µg/L	NS	NS	NS	NS	9,600 J		14,000	15,000	26,000		
Chemical oxygen demand	µg/L	NS	NS	NS	NS	41,000		*< 20,000*	*< 20,000*	170,000		
Metals												
Arsenic	µg/L	10	10	10	900	**28.70**		0.93	1.14	2.44	**11.43**	**11.92**
Cadmium	µg/L	5	5	5	4	*< 0.20*		*< 0.20*	*< 0.20*	2.15	*< 0.20*	*< 0.20*
Lead	µg/L	NS	15	15	10	*< 1.00*		0.45 J	1.58	**11.23**	*< 1.00*	*< 1.00*
Manganese	µg/L	NS	300	NS	NS						**615.2**	**643.6**
PCBs												
Aroclor 1016	µg/L	0.5	NS	NS	10			*< 0.250*	*< 0.250*			
Aroclor 1221	µg/L	0.5	NS	NS	10			*< 0.250*	*< 0.250*			
Aroclor 1232	µg/L	0.5	NS	NS	10			*< 0.250*	*< 0.250*			
Aroclor 1242	µg/L	0.5	NS	NS	10			*< 0.250*	*< 0.250*			
Aroclor 1248	µg/L	0.5	NS	NS	10			*< 0.250*	*< 0.250*			
Aroclor 1254	µg/L	0.5	NS	NS	10			*< 0.250*	*< 0.250*			
Aroclor 1260	µg/L	0.5	NS	NS	10			*< 0.250*	*< 0.250*			
Aroclor 1262	µg/L	0.5	NS	NS	10			*< 0.250*	*< 0.250*			
Aroclor 1268	µg/L	0.5	NS	NS	10			*< 0.250*	*< 0.250*			
Total PCBs	µg/L	0.5	NS	0.5	10			*< 0.250*	*< 0.250*			
Pesticides												
4,4'-DDD	µg/L	NS	NS	0.2	50	*< 0.040*	*< 0.040*	*< 0.040*				
4,4'-DDE	µg/L	NS	NS	0.05	400	*< 0.040*	*< 0.040*	*< 0.040*				
4,4'-DDT	µg/L	NS	NS	0.3	1	*< 0.040*	*< 0.040*	*< 0.040*				
Aldrin	µg/L	NS	NS	0.5	30	*< 0.020*	*< 0.020*	*< 0.020*				
alpha-BHC/HCH	µg/L	NS	NS	NS	NS	*< 0.020*	*< 0.020*	*< 0.020*				
alpha-Chlordane	µg/L	2	NS	2	2	*< 0.020*	*< 0.020*	*< 0.020*				
gamma-Chlordane	µg/L	NS	NS	NS	NS	*< 0.020*	*< 0.020*	*< 0.020*				
Chlordane	µg/L	2	NS	2	2	*< 0.200*	*< 0.200*	*< 0.200*				
beta-BHC/HCH	µg/L	NS	NS	NS	NS	*< 0.020*	*< 0.020*	*< 0.020*				
delta-BHC/HCH	µg/L	NS	NS	NS	NS	*< 0.020*	*< 0.020*	*< 0.020*				
Dieldrin	µg/L	NS	0.01	0.1	0.5	*< 0.040*	*< 0.040*	*< 0.040*				
Endosulfan I (Alpha)	µg/L	NS	NS	10	2	*< 0.020*	*< 0.020*	*< 0.020*				
Endosulfan II (Beta)	µg/L	NS	NS	10	2	*< 0.040*	*< 0.040*	*< 0.040*				
Endosulfan sulfate	µg/L	NS	NS	NS	NS	*< 0.040*	*< 0.040*	*< 0.040*				
Endrin	µg/L	2	NS	2	5	*< 0.040*	*< 0.040*	*< 0.040*				
Heptachlor	µg/L	0.4	NS	0.4	1	*< 0.020*	*< 0.020*	*< 0.020*				
Heptachlor epoxide	µg/L	0.2	NS	0.2	2	*< 0.020*	*< 0.020*	*< 0.020*				
gamma-BHC/HCH (Lindane)	µg/L	0.2	NS	0.2	4	*< 0.020*	*< 0.020*	*< 0.020*				
Endrin aldehyde	µg/L	0.2	NS	NS	NS	*< 0.040*	*< 0.040*	*< 0.040*				
Endrin ketone	µg/L	NS	NS	NS	NS	*< 0.040*	*< 0.040*	*< 0.040*				
Chlorinated camphene/ Toxaphene	µg/L	NS	NS	NS	NS	*< 0.200*	*< 0.200*	*< 0.200*				
Methoxychlor	µg/L	40	NS	40	10	*< 0.200*	*< 0.200*	*< 0.200*				
SVOCs												
1,2,4,5-Tetrachlorobenzene	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
1,2,4,5-Tetrachlorobenzene	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
1,2,4-Trichlorobenzene	µg/L	70	NS	70	50,000	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
1,2-Dichlorobenzene	µg/L	NS	NS	600	2,000	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
1,3-Dichlorobenzene	µg/L	NS	NS	100	50,000	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
1,4-Dichlorobenzene	µg/L	NS	NS	5	8,000	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
1,4-Dioxane	µg/L	NS	NS	0.3	50,000	0.105 J		*< 0.142*	*< 0.167*	*< 0.15*		
2,2-Oxybis(1-chloropropane)	µg/L	NS	NS	30	50,000	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
2,4,5-Trichlorophenol	µg/L	NS	NS	200	3,000	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
2,4,6-Trichlorophenol	µg/L	NS	NS	10	500	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
2,4-Dichlorophenol	µg/L	NS	NS	10	2,000	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
2,4-Dimethylphenol	µg/L	NS	NS	60	50,000	*< 2.00*		*< 2.08*	*< 2.27*	*< 2.04*		
2,4-Dinitrophenol	µg/L	NS	NS	200	20,000	*< 5.00*		*< 5.21*	*< 5.68*	*< 5.10*		
2,4-Dinitrotoluene	µg/L	NS	NS	30	50,000	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
2,6-Dinitrotoluene	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
2-Chloronaphthalene	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
2-Chlorophenol	µg/L	NS	NS	10	7,000	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
2-Methylnaphthalene	µg/L	NS	NS	10	20,000	0.00106 J		*< 0.0100*	*< 0.0104*	0.00160 J		
2-Nitroaniline	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
2-Nitrophenol	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
3,3'-Dichlorobenzidine	µg/L	NS	NS	80	2,000	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
3-Nitroaniline	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
4-Bromophenyl phenyl ether	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
4-Chloro-3-methylphenol	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
4-Chlorophenyl phenyl ether	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
4-Nitrophenol	µg/L	NS	NS	NS	NS	*< 2.50*		*< 2.60*	*< 2.84*	*< 2.55*		
Acenaphthene	µg/L	NS	NS	20	10,000	0.00496 J		*< 0.0100*	*< 0.0104*	0.00201 J		
Acenaphthylene	µg/L	NS	NS	30	40	*< 0.0100*		*< 0.0100*	*< 0.0104*	*< 0.0104*		
Acetophenone	µg/L	NS	NS	NS	NS	*< 1.00*		*< 1.04*	*< 1.14*	*< 1.02*		
Aniline	µg/L	NS	NS	NS	NS	*< 1.00*		*< 1.04*	*< 1.14*	*< 1.02*		
Anthracene	µg/L	NS	NS	60	30	0.00240 J		*< 0.0100*	0.00228 J	*< 0.0104*		
Atrazine	µg/L	3	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
Azobenzene	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
Benzidine	µg/L	NS	NS	NS	NS	*< 100*		*< 104*	*< 114*	*< 102*		
Benzo(a)anthracene	µg/L	NS	NS	1	1,000	*< 0.0100*		*< 0.0100*	0.00331 J	*< 0.0104*		
Benzo(a)pyrene	µg/L	0.2	NS	0.2	500	*< 0.0100*		*< 0.0100*	0.00321 J	*< 0.0104*		
Benzo(b)fluoranthene	µg/L	NS	NS	1	400	*< 0.0100*		*< 0.0100*	0.00462 J	*< 0.0104*		
Benzo(g,h,i)perylene	µg/L	NS	NS	50	20	*< 0.0100*		*< 0.0100*	0.00414 J	*< 0.0104*		
Benzo(k)fluoranthene	µg/L	NS	NS	1	100	*< 0.0100*		*< 0.0100*	0.00486 J	*< 0.0104*		
Benzyl alcohol	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
Benzyl butyl phthalate	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
Biphenyl	µg/L	NS	NS	0.9	50,000	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
Bis(2-chloroethoxy)methane	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
Bis(2-ethylhexyl)phthalate	µg/L	NS	NS	6	50,000	*< 0.500*		*< 0.521*	*< 0.568*	0.130 J		
Carbazole	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
Chrysene	µg/L	NS	NS	2	70	0.000969 J		*< 0.0100*	0.00452 J	*< 0.0104*		
Dibenzo(a,h)anthracene	µg/L	NS	0.1	0.5	40	*< 0.0100*		*< 0.0100*	0.00343 J	*< 0.0104*		
Dibenzofuran	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
Dibutyl phthalate	µg/L	NS	NS	NS	NS	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		
Dichloroethyl ether	µg/L	NS	0.5	30	50,000	*< 0.500*		*< 0.521*	*< 0.568*	*< 0.510*		

Table 2
Summary of Groundwater Analytical Data
PANAM-Iron Horse Park Facility
Billerica, Massachusetts

Analyte	Unit	2015 EPA MCL	2010 RB PRG	MA-GW-1	Location ID Sample Date Sample Type MA-GW-3	OW-26 21-Jan-16 N	OW-26 21-Jan-16 FD	OW-36 21-Jan-16 N	OW-36 21-Jan-16 FD	MW-204S 22-Jan-16 N	MW-301S 21-Jan-16 N	MW-301S 21-Jan-16 FD
Diethyl phthalate	µg/L	NS	NS	2,000	9,000	< 0.500		< 0.521	< 0.568	< 0.510		
Dimethyl phthalate	µg/L	NS	NS	300	50,000	< 0.500		< 0.521	< 0.568	< 0.510		
Dinitro-o-cresol	µg/L	NS	NS	30,000	50,000	< 2.00		< 2.08	< 2.27	< 2.04		
Di-n-octyl phthalate	µg/L	NS	NS	NS	NS	< 1.00		< 1.04	< 1.14	< 1.02		
Fluoranthene	µg/L	NS	NS	90	200	< 0.0100		< 0.0100	0.00477 J	< 0.0104		
Fluorene	µg/L	NS	NS	30	40	0.00342 J		< 0.0100	< 0.0104	< 0.0104		
Hexachlorobenzene	µg/L	1	NS	1	6,000	< 0.500		< 0.521	< 0.568	< 0.510		
Hexachlorobutadiene	µg/L	8	NS	0.6	3,000	< 0.500		< 0.521	< 0.568	< 0.510		
Hexachlorocyclopentadiene	µg/L	50	NS	NS	NS	< 0.500		< 0.521	< 0.568	< 0.510		
Hexachloroethane	µg/L	NS	NS	8	50,000	< 0.500		< 0.521	< 0.568	< 0.510		
Indeno(1,2,3-cd)pyrene	µg/L	NS	NS	0.5	100	0.000560 J		0.000577 J	0.00423 J	< 0.0104		
Isophorone	µg/L	NS	NS	NS	NS	< 0.500		< 0.521	< 0.568	< 0.510		
Naphthalene (SIM)	µg/L	NS	NS	140	20,000	0.00278 J		< 0.0100	< 0.0104	0.00338 J		
Nitrobenzene	µg/L	NS	NS	NS	NS	< 0.500		< 0.521	< 0.568	< 0.510		
n-Nitrosodimethylamine	µg/L	NS	NS	0.01	50,000	< 0.500		< 0.521	< 0.568	< 0.510		
n-Nitrosodi-n-propylamine	µg/L	NS	NS	NS	NS	< 0.500		< 0.521	< 0.568	< 0.510		
n-Nitrosodiphenylamine	µg/L	NS	NS	NS	NS	< 0.500		< 0.521	< 0.568	< 0.510		
o-Cresol	µg/L	NS	NS	NS	NS	< 0.500		< 0.521	< 0.568	< 0.510		
p-Chloroaniline	µg/L	NS	NS	20	300	< 0.500		< 0.521	< 0.568	< 0.510		
p-Cresol	µg/L	NS	NS	NS	NS	< 0.500		< 0.521	< 0.568	< 0.510		
Pentachlorophenol	µg/L	1	NS	1	200	< 2.00		< 2.08	< 2.27	< 2.04		
Phenanthrene	µg/L	NS	NS	40	10,000	0.00600 J		< 0.0100	0.00277 J	< 0.0104		
Phenol	µg/L	NS	NS	1,000	2,000	< 0.500		< 0.521	< 0.568	< 0.510		
p-Nitroaniline	µg/L	NS	NS	NS	NS	< 0.500		< 0.521	< 0.568	< 0.510		
Pyrene	µg/L	NS	NS	60	20	0.00853 J		< 0.0100	0.00418 J	< 0.0104		
Pyridine	µg/L	NS	NS	NS	NS	< 0.500		< 0.521	< 0.568	< 0.510		
VOCs												
1,1,1,2-Tetrachloroethane	µg/L	NS	NS	5	50,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
1,1,1-Trichloroethane	µg/L	200	NS	200	20,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
1,1,2,2-Tetrachloroethane	µg/L	NS	NS	2	50,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
1,1,2-Trichloroethane	µg/L	5	NS	5	50,000	< 0.75		< 0.75	< 0.75	< 0.75	< 0.75	
1,1-Dichloroethane	µg/L	NS	NS	70	20,000	< 0.75		< 0.75	< 0.75	< 0.75	< 0.75	
1,1-Dichloroethene	µg/L	7	NS	7	30,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
1,1-Dichloropropene	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
1,2,3-Trichlorobenzene	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
1,2,3-Trichloropropane	µg/L	NS	NS	NS	NS	< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	
1,2,4,5-Tetramethylbenzene	µg/L	NS	NS	NS	NS	< 2.0		< 2.0	< 2.0	< 2.0	< 2.0	
1,2,4-Trichlorobenzene	µg/L	70	NS	70	50,000	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
1,2,4-Trimethylbenzene	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
1,2-Dibromo-3-chloropropane	µg/L	0.2	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
1,2-Dibromo-3-chloropropane (by GC)	µg/L	0.2	NS	NS	NS	< 0.010		< 0.010	< 0.010	< 0.010	< 0.010	
1,2-Dichlorobenzene	µg/L	NS	NS	600	2,000	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
1,2-Dichloroethane	µg/L	NS	5	5	20,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
1,2-Dichloroethene	µg/L	NS	NS	NS	NS	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
1,2-Dichloropropane	µg/L	NS	NS	5	50,000	< 1.8		< 1.8	< 1.8	< 1.8	< 1.8	
1,3,5-Trimethylbenzene	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
1,3-Dichlorobenzene	µg/L	NS	NS	100	50,000	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
1,3-Dichloropropane	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
1,3-Dichloropropene	µg/L	NS	NS	0.4	200	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
1,4-Dichlorobenzene	µg/L	NS	NS	5	8,000	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
1,4-Dichlorobutane	µg/L	NS	NS	NS	NS	< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	
2,2-Dichloropropane	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
2-Butanone	µg/L	NS	NS	4,000	50,000	< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	
2-Hexanone	µg/L	NS	NS	NS	NS	< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	
4-Chlorotoluene	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
4-Ethyltoluene	µg/L	NS	NS	NS	NS	< 2.0		< 2.0	< 2.0	< 2.0	< 2.0	
4-Isopropyltoluene	µg/L	NS	NS	NS	NS	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
4-Methyl-2-pentanone	µg/L	NS	NS	350	50,000	< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	
Acetone	µg/L	NS	NS	6,300	50,000	< 5.0		< 5.0	< 5.0	1.7 J	1.6 J	
Acrolein	µg/L	NS	NS	NS	NS	< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	
Acrylonitrile	µg/L	NS	NS	NS	NS	< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	
Benzene	µg/L	5	5	5	10,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
Bromobenzene	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
Bromodichloromethane	µg/L	NS	NS	3	50,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
Bromoform	µg/L	NS	NS	4	50,000	< 2.0		< 2.0	< 2.0	< 2.0	< 2.0	
Carbon disulfide	µg/L	NS	NS	NS	NS	0.50 J		0.32 J	0.31 J	0.32 J	0.49 J	
Carbon tetrachloride	µg/L	5	5	5	5,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
Chlorobenzene	µg/L	100	NS	100	1,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
Chlorobromomethane	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
Chloroethane	µg/L	NS	NS	NS	NS	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	
Chloroform	µg/L	NS	NS	70	20,000	< 0.75		< 0.75	< 0.75	< 0.75	< 0.75	
cis-1,2-Dichloroethene	µg/L	70	NS	70	50,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
cis-1,3-Dichloropropene	µg/L	NS	0.49	0.4	200	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
Cyclohexane	µg/L	NS	NS	NS	NS	< 10		< 10	< 10	< 10	< 10	
Dibromochloromethane	µg/L	NS	NS	2	50,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
Dibromomethane	µg/L	NS	NS	NS	NS	< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	
Ethyl acetate	µg/L	NS	NS	NS	NS	< 10		< 10	< 10	< 10	< 10	
Ethyl ether	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
Ethyl methacrylate	µg/L	NS	NS	NS	NS	< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	
Ethylbenzene	µg/L	700	NS	700	5,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
Ethylene dibromide	µg/L	0.05	NS	0.02	50,000	< 2.0		< 2.0	< 2.0	< 2.0	< 2.0	
Ethylene dibromide (by GC)	µg/L	0.05	NS	0.02	50,000	< 0.010		< 0.010	< 0.010	< 0.010	< 0.010	
Ethyl-tert-butyl ether	µg/L	NS	NS	NS	NS	< 2.0		< 2.0	< 2.0	< 2.0	< 2.0	
Freon 11	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
Freon 113	µg/L	NS	NS	NS	NS	< 10		< 10	< 10	< 10	< 10	
Freon 12	µg/L	NS	NS	NS	NS	< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	
Hexachlorobutadiene	µg/L	8	NS	0.6	3,000	< 0.50		0.24 J	< 0.50	< 0.50	< 0.50	
Isopropyl ether	µg/L	NS	NS	NS	NS	< 2.0		< 2.0	< 2.0	< 2.0	< 2.0	
Isopropylbenzene (Cumene)	µg/L	NS	NS	NS	NS	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
Methyl bromide	µg/L	NS	NS	10	800	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	
Methyl chloride	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
Methyl tert-butyl ether	µg/L	NS	NS	70	50,000	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	
Methylcyclohexane	µg/L	NS	NS	NS	NS	< 10		< 10	< 10	< 10	< 10	
Methylene chloride	µg/L	NS	NS	5	50,000	< 3.0		< 3.0	< 3.0	< 3.0	< 3.0	
Naphthalene	µg/L	NS	NS	140	20,000	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
n-Butylbenzene	µg/L	NS	NS	NS	NS	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
n-Propylbenzene	µg/L	NS	NS	NS	NS	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
o-Chlorotoluene (2-chlorotoluene)	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
p-Diethylbenzene	µg/L	NS	NS	NS	NS	< 2.0		< 2.0	< 2.0	< 2.0	< 2.0	
sec-Butylbenzene	µg/L	NS	NS	NS	NS	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	
Styrene	µg/L	100	NS	100	6,000	< 1.0		< 1.0	< 1.0	< 1.0	< 1.0	
tert-Amyl Methyl Ether	µg/L	NS	NS	NS	NS	< 2.0		< 2.0	< 2.0	< 2.0	< 2.0	
tert-Butylbenzene	µg/L	NS	NS	NS	NS	< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	
Tetrachloroethene	µg/L	5	5	5	30,000	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	

Table 2
Summary of Groundwater Analytical Data
PANAM-Iron Horse Park Facility
Billerica, Massachusetts

Analyte	Unit	2015 EPA MCL	2010 RB PRG	MA-GW-1	Location ID Sample Date Sample Type MA-GW-3	OW-26 21-Jan-16 N	OW-26 21-Jan-16 FD	OW-36 21-Jan-16 N	OW-36 21-Jan-16 FD	MW-204S 22-Jan-16 N	MW-301S 21-Jan-16 N	MW-301S 21-Jan-16 FD
Tetrahydrofuran	µg/L	NS	NS	NS	NS	*< 5.0*		*< 5.0*	*< 5.0*	*< 5.0*	*< 5.0*	
Toluene	µg/L	1,000	NS	1,000	40,000	*< 0.75*		*< 0.75*	*< 0.75*	*< 0.75*	*< 0.75*	
trans-1,2-Dichloroethene	µg/L	100	NS	100	50,000	*< 0.75*		*< 0.75*	*< 0.75*	*< 0.75*	*< 0.75*	
trans-1,3-Dichloropropene	µg/L	NS	NS	0.4	200	*< 0.50*		*< 0.50*	*< 0.50*	*< 0.50*	*< 0.50*	
trans-1,4-Dichlorobutene	µg/L	NS	NS	NS	NS	*< 2.5*		*< 2.5*	*< 2.5*	*< 2.5*	*< 2.5*	
Trichloroethene	µg/L	5	5	5	5,000	*< 0.50*		*< 0.50*	*< 0.50*	*< 0.50*	*< 0.50*	
Vinyl acetate	µg/L	NS	NS	NS	NS	*< 5.0*		*< 5.0*	*< 5.0*	*< 5.0*	*< 5.0*	
Vinyl chloride	µg/L	2	2	2	50,000	*< 1.0*		*< 1.0*	*< 1.0*	*< 1.0*	*< 1.0*	
o-Xylene	µg/L	10,000	NS	NS	5,000	*< 1.0*		*< 1.0*	*< 1.0*	*< 1.0*	*< 1.0*	
Xylenes, m/p	µg/L	10,000	NS	NS	5,000	*< 1.0*		*< 1.0*	*< 1.0*	*< 1.0*	*< 1.0*	
Xylenes, Total	µg/L	10,000	NS	10,000	5,000	*< 1.0*		*< 1.0*	*< 1.0*	*< 1.0*	*< 1.0*	

Notes:
< = Compound not detected at concentrations above the laboratory reporting detection limit. The laboratory reporting detection limit is shown.
Bold and shaded cells: Compound exceeds applicable regulatory criteria
Empty cells = Not analyzed
GC = Gas chromatograph
J = The analyte was positively identified; concentration is approximate
PCBs = Polychlorinated biphenyls
mg/L = milligrams per liter
NS = No Standard
SVOCs: Semi-volatile organic compounds
µg/L = micrograms per liter
VOCs = Volatile organic compounds
2015 EPA MCL = US Environmental Protection Agency Maximum Contaminant Limit
2010 RB PRG = Preliminary Remediation Goals (PRGs) for groundwater, Risk Based - Ingestion/Dermal/Inhalation from AECOM Draft Feasibility Study, October 2010 - Appendix A, Table 8.
MA-GW-1 = MCP, 310 CMR 40, Groundwater Stds Category GW-1.
MA-GW-3 = MCP, 310 CMR 40, Groundwater Stds Category GW-3.

Table 3
Summary of Surface Water Analytical Data
PANAM-Iron Horse Park Facility
Billerica, Massachusetts

Analyte	Unit	EPA RWQC FW AALC 2012	EPA RWQC FW CALC 2012	EPA RWQC HH CCO 2015	EPA RWQC HH CCWO 2015	Location ID Sample Date Sample Type MA SWQS CLASS B 2013	SW-A2 20-Jan-16 N	SW-A3 20-Jan-16 N
Landfill Indicator Parameters								
Alkalinity, Total as CaCO3	mg/L	NS	20,000	NS	NS	NS	25.6	92.0
Nitrate as N	µg/L	0.32	0.32	NS	NS	NS	**582**	**476**
Total dissolved solids	µg/L	NS	NS	NS	250,000	NS	**570,000**	**670,000**
Chloride	µg/L	860,000	230,000	NS	NS	NS	**330,000**	**310,000**
Calcium	µg/L	NS	NS	NS	NS	NS	22,600	71,600
Cyanide	µg/L	22	5.2	400	4	NS	*< 5*	*< 5*
Iron	µg/L	NS	1,000	NS	NS	NS	871	470
Manganese	µg/L	NS	NS	100	50	NS	**581.4**	**240.8**
Sodium	µg/L	NS	NS	NS	NS	NS	176,000	156,000
Sulfate	µg/L	NS	NS	NS	NS	NS	19,000	40,000
Chemical oxygen demand	µg/L	NS	NS	NS	NS	NS	34,000	46,000
Metals								
Arsenic	µg/L	340	150	0.14	0.018	NS	**0.87**	*< 0.50*
Barium	µg/L	NS	NS	NS	1,000	NS	77.15	82.56
Cadmium	µg/L	2	0.25	0.005	0.005	NS	**0.22**	*< 0.20*
Chromium	µg/L	570	74	0.1	0.1	NS	*< 2.00*	*< 2.00*
Copper	µg/L	NS	NS	NS	1,300	NS	2.41	14.37
Lead	µg/L	65	2.5	NS	NS	NS	1.19	**2.63**
Mercury	µg/L	1.4	0.77	NS	NS	NS	*< 0.20*	*< 0.20*
Selenium	µg/L	NS	NS	4,200	170	NS	*< 5.00*	*< 5.00*
Silver	µg/L	NS	NS	NS	NS	NS	*< 0.40*	*< 0.40*
Zinc	µg/L	120	120	26,000	7,400	NS	27.60	30.36
VOCs								
1,1,1,2-Tetrachloroethane	µg/L	NS	NS	NS	NS	NS	*< 0.50*	*< 0.50*
1,1,1-Trichloroethane	µg/L	NS	NS	200,000	10,000	NS	*< 0.50*	*< 0.50*
1,1,2,2-Tetrachloroethane	µg/L	NS	NS	3	0.2	NS	*< 0.50*	*< 0.50*
1,1,2-Trichloroethane	µg/L	NS	NS	8.9	0.55	NS	*< 0.75*	*< 0.75*
1,1-Dichloroethane	µg/L	NS	NS	NS	NS	NS	*< 0.75*	*< 0.75*
1,1-Dichloroethene	µg/L	NS	NS	20,000	300	NS	*< 0.50*	*< 0.50*
1,1-Dichloropropene	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
1,2,3-Trichlorobenzene	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
1,2,3-Trichloropropane	µg/L	NS	NS	NS	NS	NS	*< 5.0*	*< 5.0*
1,2,4,5-Tetramethylbenzene	µg/L	NS	NS	NS	NS	NS	*< 2.0*	*< 2.0*
1,2,4-Trichlorobenzene	µg/L	NS	NS	0.076	0.071	NS	*< 2.5*	*< 2.5*
1,2,4-Trimethylbenzene	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
1,2-Dibromo-3-chloropropane	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
1,2-Dibromo-3-chloropropane (by GC)	µg/L	NS	NS	NS	NS	NS	*< 0.011*	*< 0.011*
1,2-Dichlorobenzene	µg/L	NS	NS	3,000	1,000	NS	*< 2.5*	*< 2.5*
1,2-Dichloroethane	µg/L	NS	NS	650	9.9	NS	*< 0.50*	*< 0.50*
1,2-Dichloroethene	µg/L	NS	NS	NS	NS	NS	*< 0.50*	*< 0.50*
1,2-Dichloropropane	µg/L	NS	NS	31	0.9	NS	*< 1.8*	*< 1.8*
1,3,5-Trimethylbenzene	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
1,3-Dichlorobenzene	µg/L	NS	NS	10	7	NS	*< 2.5*	*< 2.5*
1,3-Dichloropropane	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
1,3-Dichloropropene	µg/L	NS	NS	NS	NS	NS	*< 0.50*	*< 0.50*
1,4-Dichlorobenzene	µg/L	NS	NS	900	300	NS	*< 2.5*	*< 2.5*
1,4-Dichlorobutane	µg/L	NS	NS	NS	NS	NS	*< 5.0*	*< 5.0*
2,2-Dichloropropane	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
2-Butanone	µg/L	NS	NS	NS	NS	NS	*< 5.0*	*< 5.0*
2-Hexanone	µg/L	NS	NS	NS	NS	NS	*< 5.0*	*< 5.0*
4-Chlorotoluene	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
4-Ethyltoluene	µg/L	NS	NS	NS	NS	NS	*< 2.0*	*< 2.0*
4-Isopropyltoluene	µg/L	NS	NS	NS	NS	NS	*< 0.50*	*< 0.50*
4-Methyl-2-pentanone	µg/L	NS	NS	NS	NS	NS	*< 5.0*	*< 5.0*
Acetone	µg/L	NS	NS	NS	NS	NS	*< 5.0*	*< 5.0*
Acrolein	µg/L	3	3	400	3	NS	*< 5.0*	*< 5.0*
Acrylonitrile	µg/L	NS	NS	7	0.061	NS	*< 5.0*	*< 5.0*
Benzene	µg/L	NS	NS	58	2.1	NS	*< 0.50*	*< 0.50*
Bromobenzene	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
Bromodichloromethane	µg/L	NS	NS	27	0.95	NS	*< 0.50*	*< 0.50*
Bromoform	µg/L	NS	NS	120	7	NS	*< 2.0*	*< 2.0*
Carbon disulfide	µg/L	NS	NS	NS	NS	NS	*< 5.0*	*< 5.0*
Carbon tetrachloride	µg/L	NS	NS	5	0.4	NS	*< 0.50*	*< 0.50*
Chlorobenzene	µg/L	NS	NS	800	100	NS	*< 0.50*	*< 0.50*
Chlorobromomethane	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
Chloroethane	µg/L	NS	NS	NS	NS	NS	*< 1.0*	*< 1.0*
Chloroform	µg/L	NS	NS	2,000	60	NS	*< 0.75*	*< 0.75*
cis-1,2-Dichloroethene	µg/L	NS	NS	NS	NS	NS	*< 0.50*	*< 0.50*
cis-1,3-Dichloropropene	µg/L	NS	NS	NS	NS	NS	*< 0.50*	*< 0.50*
Cyclohexane	µg/L	NS	NS	NS	NS	NS	*< 10*	*< 10*
Dibromochloromethane	µg/L	NS	NS	21	0.8	NS	*< 0.50*	*< 0.50*
Dibromomethane	µg/L	NS	NS	NS	NS	NS	*< 5.0*	*< 5.0*
Ethyl acetate	µg/L	NS	NS	NS	NS	NS	*< 10*	*< 10*
Ethyl ether	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
Ethyl methacrylate	µg/L	NS	NS	NS	NS	NS	*< 5.0*	*< 5.0*
Ethylbenzene	µg/L	NS	NS	130	68	NS	*< 0.50*	*< 0.50*
Ethylene dibromide	µg/L	NS	NS	NS	NS	NS	*< 2.0*	*< 2.0*
Ethylene dibromide (by GC)	µg/L	NS	NS	NS	NS	NS	*< 0.011*	*< 0.011*
Ethyl-tert-butyl ether	µg/L	NS	NS	NS	NS	NS	*< 2.0*	*< 2.0*
Freon 11	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
Freon 113	µg/L	NS	NS	NS	NS	NS	*< 10*	*< 10*
Freon 12	µg/L	NS	NS	NS	NS	NS	*< 5.0*	*< 5.0*
Hexachlorobutadiene	µg/L	NS	NS	0.01	0.01	NS	*< 0.50*	*< 0.50*
Isopropyl ether	µg/L	NS	NS	NS	NS	NS	*< 2.0*	*< 2.0*
Isopropylbenzene (Cumene)	µg/L	NS	NS	NS	NS	NS	*< 0.50*	*< 0.50*
Methyl bromide	µg/L	NS	NS	10,000	100	NS	*< 1.0*	*< 1.0*
Methyl chloride	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
Methyl tert-butyl ether	µg/L	NS	NS	NS	NS	NS	*< 1.0*	*< 1.0*
Methylcyclohexane	µg/L	NS	NS	NS	NS	NS	*< 10*	*< 10*
Methylene chloride	µg/L	NS	NS	1,000	20	NS	*< 3.0*	*< 3.0*
Naphthalene	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
n-Butylbenzene	µg/L	NS	NS	NS	NS	NS	*< 0.50*	*< 0.50*
n-Propylbenzene	µg/L	NS	NS	NS	NS	NS	*< 0.50*	*< 0.50*
o-Chlorotoluene (2-chlorotoluene)	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
p-Diethylbenzene	µg/L	NS	NS	NS	NS	NS	*< 2.0*	*< 2.0*
sec-Butylbenzene	µg/L	NS	NS	NS	NS	NS	*< 0.50*	*< 0.50*
Styrene	µg/L	NS	NS	NS	NS	NS	*< 1.0*	*< 1.0*
tert-Amyl Methyl Ether	µg/L	NS	NS	NS	NS	NS	*< 2.0*	*< 2.0*
tert-Butylbenzene	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
Tetrachloroethene	µg/L	NS	NS	29	10	NS	*< 0.50*	*< 0.50*
Tetrahydrofuran	µg/L	NS	NS	NS	NS	NS	*< 5.0*	*< 5.0*
Toluene	µg/L	NS	NS	520	57	NS	*< 0.75*	*< 0.75*
trans-1,2-Dichloroethene	µg/L	NS	NS	4,000	100	NS	*< 0.75*	*< 0.75*
trans-1,3-Dichloropropene	µg/L	NS	NS	NS	NS	NS	*< 0.50*	*< 0.50*
trans-1,4-Dichlorobutene	µg/L	NS	NS	NS	NS	NS	*< 2.5*	*< 2.5*
Trichloroethene	µg/L	NS	NS	7	0.6	NS	*< 0.50*	*< 0.50*

Table 3
Summary of Surface Water Analytical Data
PANAM-Iron Horse Park Facility
Billerica, Massachusetts

Analyte	Unit	EPA RWQC FW AALC 2012	EPA RWQC FW CALC 2012	EPA RWQC HH CCO 2015	EPA RWQC HH CCWO 2015	Location ID Sample Date Sample Type MA SWQS CLASS B 2013	SW-A2 20-Jan-16 N	SW-A3 20-Jan-16 N
Vinyl acetate	µg/L	NS	NS	NS	NS	NS	< *5.0*	< *5.0*
Vinyl chloride	µg/L	NS	NS	1.6	0.022	NS	< *1.0*	< *1.0*
o-Xylene	µg/L	NS	NS	NS	NS	NS	< *1.0*	< *1.0*
Xylenes, m/p	µg/L	NS	NS	NS	NS	NS	< *1.0*	< *1.0*
Xylenes, Total	µg/L	NS	NS	NS	NS	NS	< *1.0*	< *1.0*

Notes:
< = Compound not detected at concentrationsabove the laboratory reporting detection limit.The laboratory reporting detection limit is shown.
Bold and Shaded Values = Compound exceeds applicable regulatory criteria
Empty cells = Not analyzed
GC = Gas chromatograph
NS = No Standard
µg/L = micrograms per liter
mg/L = milligrams per liter
VOCs = Volatile Organic Compounds

EPA RWQC FW AALC 2012 = USEPA Recommended Water Quality Criteria - Freshwater Acute Aquatic Life Criteria, 2012. Nitrate value from USEPA Ecoregional Nutrient Criteria for Lakes and Reservoirs, June 2002. Note: Cd, Cr, Pb, Zn hardness dependent. A standard for copper will be calculated using the Biotic Ligand Model once additional data have been collected.

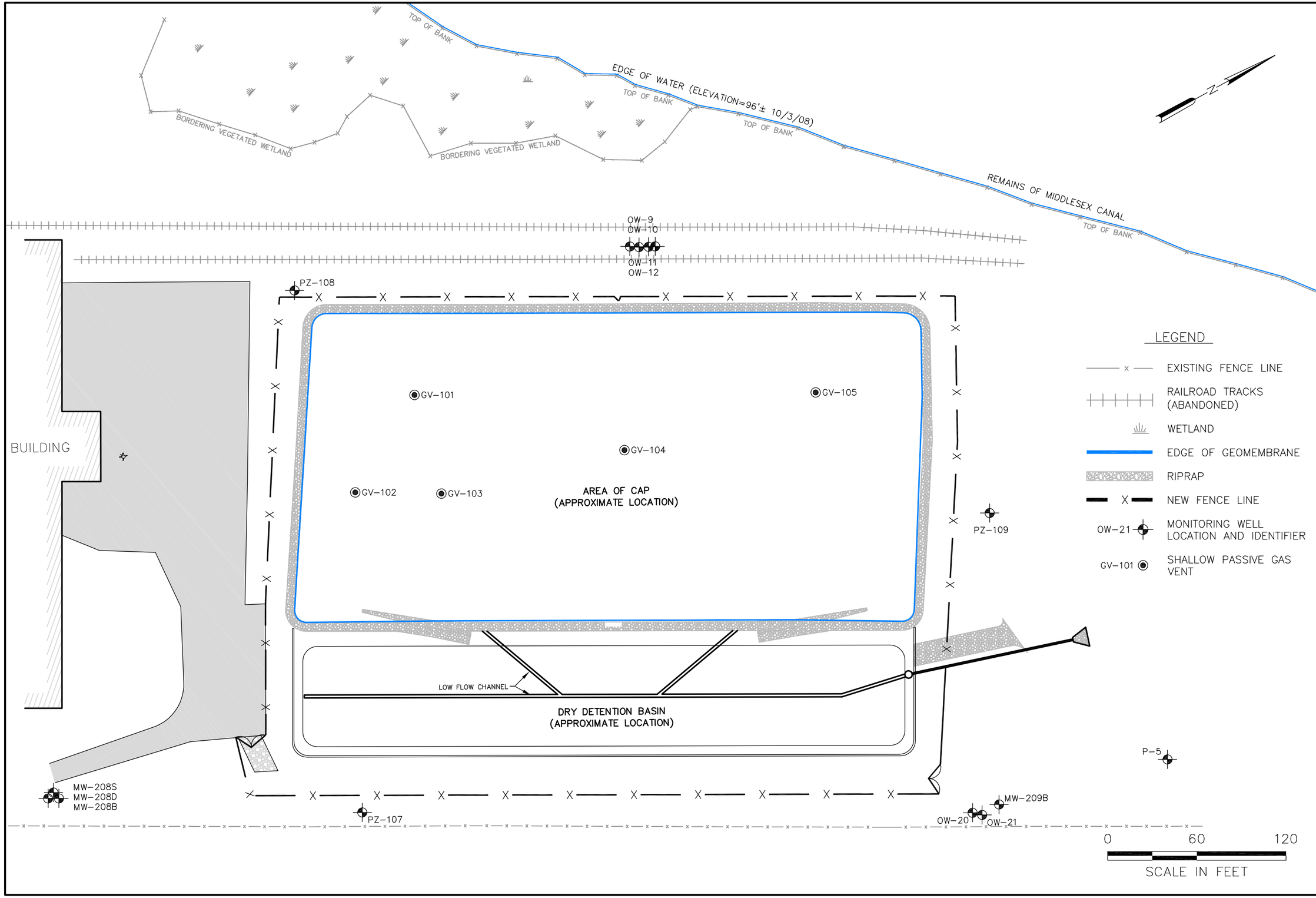
EPA RWQC FW CALC 2012 = USEPA Recommended Water Quality Criteria - Freshwater Chronic Aquatic Life Criteria, 2012. Nitrate value from USEPA Ecoregional Nutrient criteria for Lakes and Reservoirs, June 2002. Note: Cd, Cr, Pb, Zn hardness dependent. A standard for copper will be calculated using the Biotic Ligand Model once additional data have been collected.

EPA RWQC HH CCO 2015 = United States Environmental Protection Agency National Recommended Water Quality Criteria - Human Health Criteria for the Consumption of Organisms only, 2015.

EPA RWQC HH CCWO 2015 = United States Environmental Protection Agency National Recommended Water Quality Criteria - Human Health Criteria for the Consumption of Water and Organisms, 2015.

MA SWQS CLASS B 2013 = Massachusetts Surface Water Quality Standards - Class B (December, 2013).

D.3 – Monitoring Results – AOC7



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COMMITMENT & INTEGRITY DRIVE RESULTS

WOODARD & CURRAN

PASSIVE GAS VENT AND MONITORING WELL LOCATIONS

DESIGNED BY: ALW
DRAWN BY: EVR
CHECKED BY:
Figure 3-1.dwg

IRON HORSE PARK SUPERFUND SITE
OPERABLE UNIT 3, AREA OF CONCERN 7
BILLERICA, MASSACHUSETTS

OPERATION AND MAINTENANCE

JOB NO: 221780
DATE: DECEMBER 2012
SCALE: AS NOTED

FIGURE 3-1

Table 4-2
Groundwater Field Chemistry Data
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, Massachusetts

Pre- vs Post-Construction	Date	Time	DTW *(ft. bpvc)*	Temp *(˚C)*	Spec. Cond. *(mS/cm)*	DO *(mg/L)*	pH	ORP *(mV)*	Turbidity *(NTU)*
BEDROCK WELLS									
OW-9									
Pre-Construction Baseline	4/23/09	1155	4.02	12.79	4.660	0.20	5.00	-125	1.65
	7/27/09	1205	4.1	15.13	5.643	0.08	5.09	-5.6	0.52
	10/28/09	852	4.08	12.32	6.025	0.06	4.96	120.1	3.15
	1/20/10	1500	4.89	10.81	5.799	0.24	5.03	14.6	0.34
Post-Construction O&M	5/1/12	1425	4.41	11.90	6.030	0.04	5.22	99.5	0.31
	10/1/12	1255	5.90	13.25	6.396	0.12	5.36	-34.5	2.96
	4/30/13	1155	8.98	14.57	6.618	0.64[i]	5.22	45.1	8.05
	10/7/13	1045	5.04	14.70	6.573	0.17	5.32	-32.1	2.12
	4/21/14	1325	4.30	13.00	6.436	0.14	5.08	106.1	10.05
	10/6/14	1240	5.20	15.93	6.968	0.15	5.16	-43.6	4.66
	10/19/15	1445	5.52	11.59	6.470	0.28	4.94	32.7	3.61
	10/26/16	1115	4.87	14.02	6.615	0.09	5.23	78.1	3.36
	10/9/17	1420	5.55	17.63	6.091	0.19	5.17	41.6	36.8
MW-208B									
Pre-Construction Baseline	4/23/09	1240	4.95	11.32	0.392	0.35	7.79	8	0.00
	7/27/09	1635	4.97	15.73	0.391	0.14	6.52	-68.4	0.40
	10/29/09	1220	4.91	12.29	0.389	0.31	6.88	-58.2	0.00
	1/22/10	927	5.97	10.50	0.388	0.13	7.01	101.5	0.32
Post-Construction O&M	5/2/12	1245	5.51	11.90	0.412	0.11	7.02	-21.8	0.58
	10/3/12	1120	6.75	13.39	0.404	0.09	6.73	-118.6	0.30
	5/2/13	945	5.92	12.28	0.426	0.48	6.85	-11.6	0.75
	10/7/13	1345	5.79	17.54	0.391	0.11	6.70	-35.2	2.06
	4/23/14	1010	5.04	11.00	0.410	0.00	6.99	-35.4	1.39
	10/7/14	1515	5.78	14.61	0.411	3.06	6.93	13.7	0.48
	10/19/15	1320	6.14	12.45	0.416	0.47	6.88	-295.0[i]	1.48
	10/27/16	1223	4.85	13.43	0.435	0.15	7.27	-17.3	2.12
	10/10/17	1425	6.10	16.49	0.415	0.14	7.03	-27.6	1.89
MW-209B									
Pre-Construction Baseline	4/20/09	1155	6.75	10.14	0.779	0.37	5.75	12	2.57
	7/28/09	1045	5.86	12.42	0.646	0.18	6.68	-41	1.38
	10/29/09	1220	5.41	11.89	0.716	0.10	6.45	-12.7	0.84
	1/21/10	1004	6.26	9.00	0.707	0.16	6.74	0.0	0.20
Post-Construction O&M	5/3/12	1235	6.22	11.10	0.710	0.00	6.74	-47.3	2.93
	10/2/12	1235	7.41	12.88	0.636	0.10	6.26	-66.4	0.53
	5/1/13	925	10.40	10.75	0.734	0.37	6.65	-70.2	2.63
	10/8/13	1250	6.26	15.08	0.610	0.10	6.31	-21.0	0.46
	4/22/14	950	5.54	10.60	0.676	0.03	6.83	-73.4	1.74
	10/7/14	955	5.95	14.70	1.318	0.25	6.80	-82.6	2.13
	10/20/15	1205	6.38	12.24	0.708	0.31	6.87	-28.6	1.45
	10/27/16	950	5.34	12.51	0.810	0.61	7.09	-0.4	3.51
	10/10/17	1010	6.75	14.85	0.774	0.11	6.83	-36.2	1.12

Table 4-2
Groundwater Field Chemistry Data
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, Massachusetts

Pre- vs Post-Construction	Date	Time	DTW *(ft. bpvc)*	Temp *(˚C)*	Spec. Cond. *(mS/cm)*	DO *(mg/L)*	pH	ORP *(mV)*	Turbidity *(NTU)*
DEEP OVERBURDEN WELLS									
OW-10									
Pre-Construction Baseline	4/22/09	1345	3.65	12.00	0.622	0.26	6.04	152	0.00
	7/27/09	1540	3.71	15.18	0.606	0.09	5.23	-13.6	0.22
	10/28/09	1338	3.64	12.52	0.721	0.12	5.15	122.1	3.72
	1/20/10	1500	4.50	10.43	0.421	0.14	5.32	37.9	0.22
Post-Construction O&M	5/1/12	1155	4.01	11.70	0.643	0.10	5.44	220.9	1.03
	10/1/12	1540	5.41	13.41	1.083	0.09	5.42	-112.5	0.16
	4/30/13	1425	4.71	13.19	0.518	1.30[i]	5.24	117.8	10.09
	10/7/13	1045	4.72	14.32	0.261	0.18	5.42	158.3	0.38
	4/21/14	1150	3.89	12.60	0.675	0.17	5.34	248.5	6.30
	10/6/14	1050	4.82	14.90	0.272	0.20	5.49	103.3	0.77
	10/19/15	1610	5.15	11.53	0.832	0.30	4.90	80.1	0.52
	10/26/16	1250	4.50	12.93	0.920	0.07	5.23	84.4	1.70
	10/9/17	1305	5.12	14.67	0.956	0.08	5.09	97.8	1.95
OW-20									
Pre-Construction Baseline	4/20/09	1520	5.07	9.89	0.714	0.33	6.00	44	0.83
	7/28/09	1435	4.80	12.81	0.541	0.08	6.07	24.2	0.00
	10/29/09	1105	4.47	11.36	0.523	0.18	5.82	47.3	0.13
	1/21/10	1025	5.40	9.05	0.541	0.20	6.03	44.7	0.28
Post-Construction O&M	5/3/12	955	4.87	10.90	0.658	0.40	5.91	5.6	1.07
	10/3/12	925	6.59	13.28	0.627	0.33	6.37	-13.7	2.75
	5/1/13	1030	5.58	11.74	0.554	0.44[i]	6.03	45	2.16
	10/7/13	1220	6.19	15.58	0.528	0.06	6.67	-45.2	3.89
	4/22/14	950	4.87	10.30	0.478	0.21	6.07	20.2	1.39
	10/7/14	1000	4.78	14.21	0.477	0.04	6.07	83.3	0.47
	10/20/15	1410	5.88	13.22	0.575	0.18	5.87	-221.3[i]	3.06
	10/27/16	935	5.20	11.94	0.907	0.12	5.75	132.3	3.31
	10/10/17	1015	5.97	17.83	0.673	0.21	5.84	35.4	3.04
MW-208D									
Pre-Construction Baseline	4/23/09	910	3.84	11.11	0.195	0.44	6.57	217	0.00
	7/27/09	1515	4.09	14.16	0.212	0.11	5.30	-67.6	0.61
	10/28/09	1500	4.37	12.19	0.220	0.04	5.60	133.7	2.67
	1/22/10	950	4.97	9.89	0.194	0.13	5.78	193.2	0.33
Post-Construction O&M	5/2/12	1405	4.27	12.30	0.360	0.06	5.90	197.3	0.59
	10/3/12	1125	6.11	14.32	0.391	0.23	6.26	-49.6	4.25
	5/2/13	958	5.11	12.63	0.373	1.42[i]	5.81	58.4	0.23
	10/8/13	1000	5.20	15.88	0.327	0.11	5.49	-13	0.11
	4/23/14	1125	4.38	11.30	0.377	0.25	5.87	205.2	0.71
	10/7/14	1445	5.43	16.60	0.651	0.14	5.91	155.2	0.34
	10/19/15	1155	5.33	12.95	0.509	0.35	5.84	-299.3[i]	1.07
	10/27/16	1345	4.59	14.20	0.803	0.30	6.00	91.2	0.69
	10/9/17	1120	5.41	16.08	0.662	0.09	5.85	60.4	1.93

Table 4-2
Groundwater Field Chemistry Data
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, Massachusetts

Pre- vs Post-Construction	Date	Time	DTW *(ft. bpvc)*	Temp *(˚C)*	Spec. Cond. *(mS/cm)*	DO *(mg/L)*	pH	ORP *(mV)*	Turbidity *(NTU)*
SHALLOW OVERBURDEN WELLS									
OW-11									
Pre-Construction Baseline	4/22/09	1140	3.79	12.00	0.258	0.31	6.68	24	1.04
	7/27/09	1655	3.91	14.53	0.327	0.06	6.03	-8.7	0.52
	10/28/09	1011	3.80	12.52	0.299	0.05	5.90	6.3	3.38
	1/20/10	1135	4.61	10.43	0.224	0.14	6.10	-45.5	0.61
Post-Construction O&M	5/1/12	1200	4.25	11.60	0.188	0.09	6.06	-19.6	2.68
	10/1/12	1315	6.13	13.55	0.204	0.32	5.14	40.7	1.72
	4/30/13	1405	4.88	13.23	0.235	0.38	5.91	-11.8	3.66
	10/8/13	1120	4.87	14.35	0.238	0.19	6.02	37.1	2.21
	4/21/14	1300	4.06	12.60	0.307	0.00	5.96	27.4	2.83
	10/6/14	1220	4.98	14.81	0.332	0.38	5.44	10.8	1.21
	10/19/15	1105	5.32	12.28	0.316	0.36	5.96	12.9	20.4
	10/26/16	1125	4.65	13.86	0.434	0.09	6.02	1129 [i]	2.82
	10/9/17	1425	5.24	14.60	0.379	0.08	6.05	-44.7	3.97
OW-12									
Pre-Construction Baseline	4/22/09	1040	5.05	10.68	0.373	0.30	7.32	-188	4.04
	7/28/09	845	6.10	13.97	0.379	0.04	7.19	-177.2	1.11
	10/28/09	1136	5.54	12.91	0.413	0.03	7.00	-136.4	3.91
	1/20/10	1130	5.70	8.71	0.370	0.08	7.14	-264.9	2.84
Post-Construction O&M	5/2/12	1055	6.44	10.59	0.642	0.37	7.08	-162.5	1.67
	10/2/12	935	8.00	14.22	0.542	0.18	6.29	-129.2	0.90
	4/30/13	1155	6.48	11.34	0.538	0.23	7.07	-113.8	8.54
	10/7/13	1215	6.19	15.58	0.528	0.06	6.67	-45.2	3.89
	4/21/14	1115	4.90	10.40	0.483	0.00	7.29	-131.9	4.35
	10/6/14	1045	4.90	17.50	0.444	0.28	6.83	-131.3	2.14
	10/19/15	1255	6.01	13.56	0.556	0.28	6.92	-97	3.02
	10/26/16	1425	4.18	13.57	0.598	0.22	6.97	-95.6	6.06
	10/9/17	13.1	5.90	17.97	0.603	0.16	6.93	-148.2	4.75
OW-21									
Pre-Construction Baseline	4/20/09	1145	4.71	6.42	0.052	0.79	5.70	7	4.09
	7/28/09	1200	4.39	14.21	0.079	0.13	5.94	-86.3	1.97
	10/29/09	930	4.11	13.23	0.125	0.11	5.46	42.8	1.79
	1/21/10	1145	5.00	7.48	0.080	0.12	5.70	-36.7	0.77
Post-Construction O&M	5/3/12	1030	4.47	9.30	0.154	0.03	6.13	182	1.09
	10/2/12	1335	6.42	16.89	0.138	0.35	4.53	53.3	0.91
	5/1/13	935	5.25	8.93	NM	4.47 [i]	4.96	25.6	2.42
	10/8/13	1130	5.29	17.41	0.086	0.10	4.93	-9.7	0.76
	4/22/14	1125	4.55	9.10	0.065	6.47	6.07	244.8	8.02
	10/7/14	1105	5.51	15.82	0.136	0.02	5.66	82.2	0.61
	10/20/15	1210	5.56	15.22	0.154	0.24	5.93	-277.3 [i]	1.68
	10/27/16	1110	4.84	14.82	0.186	0.10	5.99	196.4	3.88
	10/10/17	1130	5.65	18.12	0.158	0.09	6.17	29.5	3.68

Table 4-2
Groundwater Field Chemistry Data
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, Massachusetts

Pre- vs Post-Construction	Date	Time	DTW *(ft. bpvc)*	Temp *(˚C)*	Spec. Cond. *(mS/cm)*	DO *(mg/L)*	pH	ORP *(mV)*	Turbidity *(NTU)*
MW-208S									
Pre-Construction Baseline	4/23/09	1040	4.10	10.25	0.149	0.28	6.86	9	0.00
	7/27/09	1233	4.34	15.53	0.177	0.08	5.41	-99	1.91
	10/29/09	955	4.50	13.08	0.188	0.27	5.90	-48.2	0.26
	1/22/10	1105	5.20	10.45	0.152	0.14	5.93	36.4	4.00
Post-Construction O&M	5/2/12	1410	4.63	11.48	0.276	0.33	5.86	-13.0	15.20
	10/3/12	1230	6.36	15.77	0.269	0.13	6.53	-86.5	0.39
	5/2/13	1100	5.37	12.57	0.482	0.57	5.73	6.2	2.46
	10/8/13	1000	5.56	15.47	0.283	0.16	5.96	28.2	3.90
	4/23/14	1015	4.68	10.20	0.245	0.13	6.00	3.6	12.60
	10/7/14	1305	5.71	16.40	0.658	0.17	6.04	0.9	0.47
	10/19/15	1045	5.58	13.81	0.422	0.50	5.91	-298.3[i]	2.43
	10/27/16	1345	4.83	15.53	0.362	0.08	5.89	81.2	4.10
	10/9/17	1125	5.65	17.30	0.366	0.09	5.91	-58.2	2.72
P-5									
Pre-Construction Baseline	4/20/09	1450	3.88	6.23	0.118	0.42	5.10	10	1.12
	7/28/09	1421	3.29	15.18	0.110	0.25	6.21	-118.1	4.20
	10/30/09	1332	3.17	11.24	0.105	0.07	5.70	51.3	4.56
	1/21/10	1144	3.85	4.86	0.115	0.10	6.11	-58.4	2.59
Post-Construction O&M	5/2/12	1050	3.22	8.80	0.105	0.11	6.22	8.1	5.73
	10/2/12	1115	5.00	14.68	0.221	0.44	5.97	-8.7	33.1
	5/1/13	1100	4.07	8.47	0.157	0.30	5.86	3.3	10.8
	10/8/13	1345	4.13	14.59	0.189	0.21	6.15	-11.2	2.96
	4/22/14	1125	3.39	7.50	0.145	0.06	6.26	2	4.61
	10/7/14	1250	4.21	13.76	0.226	0.47	5.79	22.2	5.27
	10/20/15	1040	4.39	11.60	0.216	0.72	6.37	-26.3	1.61
	10/27/16	1220	3.43	12.49	0.239	0.10	6.11	48.1	13.40
	10/10/17	1105	4.60	15.84	0.215	0.64	6.19	-33.1	10.70
PZ-107									
Pre-Construction Baseline	4/23/09	1340	3.10	7.97	0.459	0.27	7.05	-119	1.10
	7/28/09	909	3.61	15.84	0.590	0.17	6.77	-138.1	1.73
	10/29/09	1425	3.71	13.33	0.655	0.16	7.17	-106.5	1.24
	1/21/10	1420	4.41	6.41	0.535	0.30	7.21	-122.6	1.91
Post-Construction O&M	5/3/12	1200	3.86	9.39	0.828	0.02	7.05	-95.2	3.76
	10/3/12	925	5.32	16.49	0.668	0.09	7.14	-191.2	1.20
	5/1/13	1445	4.66	9.09	0.598	0.27	7.05	-113.2	2.81
	10/7/13	1400	4.70	17.70	0.521	0.19	7.19	-123.4	0.86
	4/22/14	1435	3.69	8.10	0.535	0.15	7.27	-127.7	6.75
	10/6/14	1445	4.75	16.44	0.579	0.10	7.18	-224.2	3.15
	10/20/15	1030	5.13	15.18	0.578	0.36	6.98	-290.6	2.02
	10/26/16	1505	3.88	14.73	0.646	0.07	7.02	-52.2	4.33
	10/10/17	1305	4.95	17.74	0.516	0.05	7.06	-154.5	1.48

Table 4-2
Groundwater Field Chemistry Data
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, Massachusetts

Pre- vs Post-Construction	Date	Time	DTW *(ft. bpvc)*	Temp *(˚C)*	Spec. Cond. *(mS/cm)*	DO *(mg/L)*	pH	ORP *(mV)*	Turbidity *(NTU)*
PZ-108									
Pre-Construction Baseline	4/23/09	900	2.67	7.99	0.592	0.33	6.92	-78	1.61
	7/28/09	1032	3.57	17.49	0.707	0.12	6.70	-133.8	1.36
	10/30/09	928	3.77	13.54	0.641	0.18	6.85	-102.5	5.29
	1/22/10	1052	4.31	5.96	0.641	0.12	7.07	-106.1	0.34
Post-Construction O&M	5/2/12	1225	3.70	11.39	0.548	0.31	7.13	-120.1	0.80
	10/2/12	900	5.86	18.49	0.808	0.11	7.27	-187.9	0.00
	5/1/13	1300	4.87	11.05	0.969	0.44	7.07	-116.8	3.86
	10/7/13	1225	5.07	18.89	0.371	0.59	7.23	-114.0	1.79
	4/22/14	1335	3.77	9.60	0.431	0.00	7.31	-98.6	6.22
	10/6/14	1450	5.30	17.60	0.448	0.76	6.68	-105.1	0.76
	10/19/15	1505	5.55	16.04	0.475	0.27	7.13	-275.4	1.34
	10/26/16	1355	4.36	16.22	0.487	0.08	7.11	-75.6	3.54
	10/10/17	1415	5.65	18.46	0.367	0.15	7.12	-147.0	1.07
PZ-109									
Pre-Construction Baseline	4/22/09	1345	6.26	8.88	0.976	0.41	6.79	-103	5.27
	7/28/09	1146	6.57	15.76	0.701	0.09	6.55	-144.4	--
	10/29/09	1510	5.9	13.67	0.693	0.07	6.83	-69.3	3.6
	1/21/10	1435	6.95	8.63	0.642	0.09	6.85	-155.9	2.54
Post-Construction O&M	5/2/12	915	6.33	9.70	1.270	0.06	6.85	-118.5	2.11
	10/2/12	1040	7.82	15.32	0.528	0.09	6.93	-145.3	0.81
	5/1/13	1230	7.16	10.53	0.926	0.56[i]	6.89	-55.1	9.24
	10/9/13	940	7.13	15.28	0.479	0.15	7.13	-106.6	2.66
	4/22/14	1305	6.45	10.50	0.831	0.18	6.91	-72.2	9.75
	10/7/14	1115	7.22	15.30	0.864	0.27	7.24	-116.2	1.37
	10/20/15	1350	7.51	13.60	0.674	0.30	7.29	-109.7	2.48
	10/27/16	1043	6.82	13.66	0.768	0.25	7.00	-73.9	3.39
	10/10/17	1255	7.50	15.97	0.601	0.07	7.19	-113.5	2.95

Notes:

i. Anomalous measurement is attributed to meter malfunction and is not considered representative of actual conditions.

1. Units as noted above: feet below top of pvc (ft bpvc); degrees Celcius (°C); millisiemens per centimeter (mS/cm); milligrams per liter (mg/L); millivolts (mV); nephelometric turbidity units (NTU).

2. Measurements recorded after low-flow stabilization, immediately prior to sample collection.

Table 4-3
Volatile Organic Compound Analytical Data Summary (Detections Only)
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,4-Dichlorobenzene	1,4-Dioxane	2-Butanone	Acetone	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	Ethylbenzene	Isopropylbenzene	Methyl tert butyl ether	Naphthalene	n-Propylbenzene	o-Xylene	p/m-Xylene	p-Isopropyltoluene	Tetrachloroethene	Trichloroethene
		PAL	200	70	7	15	600	5	5	6.1	4000	6300	5	100	70	700	0.5	70	140	0.5	10000	10000	0.5	5	5
		MDL	0.05	0.09	0.1	0.06	0.06	0.09	0.11	0.33	0.41	0.54	0.05	0.05	0.05	0.05	0.25	0.05	0.21	0.04	0.05	0.07	0.06	0.14	0.12
		QL	1	1	1	1	1	1	1	2	10	10	1	1	1	1	0.5	1	2	0.5	1	2	0.5	1	1
BEDROCK WELLS																									
OW-9	Pre-Cap Construction	4/23/2009	<0.5	**4.6**	**1.6**	<2.5	NT	**2.4**	NT	<250	<5	<5	<0.5	**0.83**	**0.9**	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	**4.7**	**3.5**
		7/27/2009	<0.5	**5**	**1.8**	<2.5	NT	**2.6**	NT	<250	<5	<5	<0.5	**0.82**	**0.82**	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	**4**	**3.5**
		10/28/2009	<0.5	**5.2**	**1.8**	<2.5	NT	**2.9**	NT	<250	<5	<5	<0.5	**0.89**	**0.92**	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	**4.6**	**3.9**
		1/20/2010	<1	**4.3**	**1.4**	<2	**1.2**	**2.3**	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	<5	<2	<1	<2	<2	**4.9**	**3.2**
	Post-Cap Construction	5/1/2012	<1	**4.1**	**1.8**	<1	**1**	<1	NT	**3.1**	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**4.4**	**3.4**
		10/1/2012	<1	**3.1**	**1.5**	<1	NT	<1	NT	<2	<20	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**4.9**	**3.8**
		4/30/2013	<1	**3.8**	**1.8**	<1	**1**	**2**	<1	**3**	<10	<10	<1	<1	<1	<1	<0.5	<1	<2 UJK	<0.5	<1	<2	<0.5	**5.7**	**3.9**
		10/7/2013	<1	**3.4**	**1.8**	<1	**1.1**	**1.9**	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**5.8**	**3.9**
		4/21/2014	<1	**3.7**	**1.5**	<1	<1	**1.8**	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**5.4**	**3.7**
		10/6/2014	<1	**3.7**	**2.2**	<1	**1.1**	**2.3**	<1	**4.2**	<10 UJ	<10	<1	<1	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	**5.9**	**4.4**
		10/19/2015	<1	**3.2**	**1.6**	<1	<1	**1.8**	<1	**3.2**	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**4.1**	**3.1**
		10/26/2016	<1	**4.1**	**1.7**	<1	<1	**2**	<1	**2.9**	<10	<10	<1	**1.2**	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**6.2**	**3.6**
		10/9/2017	<1	**5.4**	**2.3**	<1	<1	**1.5**	<1	<2	<10	<10	<1	**2**	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**9.7**	**4.6**
MW-208B	Pre-Cap Construction	4/23/2009	<0.5	<0.75	<0.5	<2.5	NT	**1.4**	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/27/2009	<0.5	<0.75	<0.5	<2.5	NT	**1.7**	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/29/2009	<0.5	<0.75	<0.5	<2.5	NT	**1.8**	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/22/2010	<1	<1	<1	<2	NT	**1.5**	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/3/2012	<1	<1	<1	<1	NT	**1.2**	NT	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<5 UJ	<0.5	<1	<2	<0.5	<1	<1
		5/2/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/7/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/23/2014	<1	<1	<1	<1	<1	**1.1**	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/7/2014	<1	<1	<1	<1	<1	**1.5**	<1	<2	<10 UJ	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	<1	<1
		10/19/2015	<1	<1	<1	<1	<1	**1**	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/27/2016	<1	<1	<1	<1	<1	**1.2**	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/10/2017	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2UJ	<0.5	<1	<2	<0.5	<1	<1
MW-209B	Pre-Cap Construction	4/20/2009	<0.5	**1.9**	<0.5	<2.5	NT	**10**	NT	<250	<5	<5	<0.5	**0.86**	**0.63**	<0.5	<0.5	**1.9**	NT	<0.5	<1	<1	<0.5	**1.9**	<0.5
		7/28/2009	<0.5	**1.7**	<0.5	<2.5	NT	**12**	NT	<250	<5	<5	<0.5	<0.5	**0.56**	<0.5	<0.5	**1.8**	<2.5	<0.5	<1	<1	<0.5	**0.79**	<0.5
		10/29/2009	<0.5	**1.3**	<0.5	<2.5	NT	**17**	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	**0.64**	<0.5
		1/21/2010	<1	**1.4**	<1	<2	NT	**12**	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/3/2012	<1	**1.1**	<1	<1	NT	**13**	NT	**2.9**	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/2/2012	<1	<1	<1	<1	NT	**14**	NT	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<5 UJ	<0.5	<1	<2	<0.5	<1	<1
		5/1/2013	<1	**1.2**	<1	<1	<1	**11**	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2 UJK	<0.5	<1	<2	<0.5	<1	<1
		10/8/2013	<1	<1	<1	<1	<1	**12**	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/22/2014	<1	**1.1**	<1	<1	<1	**10**	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/7/2014	<1	<1	<1	<1	<1	**14**	<1	**2.3**	<10 UJ	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	<1	<1
		10/19/2015	<1	<1	<1	<1	<1	**12**	<1	**3.7**	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/27/2016	<1	**1**	<1	<1	<1	**13**	<1	**2.3**	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/10/2017	<1	**1.1**	<1	<1	<1	**11**	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2UJ	<0.5	<1	<2	<0.5	<1	<1

Table 4-3
Volatile Organic Compound Analytical Data Summary (Detections Only)
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,4-Dichlorobenzene	1,4-Dioxane	2-Butanone	Acetone	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	Ethylbenzene	Isopropylbenzene	Methyl tert butyl ether	Naphthalene	n-Propylbenzene	o-Xylene	p/m-Xylene	p-Isopropyltoluene	Tetrachloroethene	Trichloroethene
		PAL	200	70	7	15	600	5	5	6.1	4000	6300	5	100	70	700	0.5	70	140	0.5	10000	10000	0.5	5	5
		MDL	0.05	0.09	0.1	0.06	0.06	0.09	0.11	0.33	0.41	0.54	0.05	0.05	0.05	0.05	0.25	0.05	0.21	0.04	0.05	0.07	0.06	0.14	0.12
		QL	1	1	1	1	1	1	1	2	10	10	1	1	1	1	0.5	1	2	0.5	1	2	0.5	1	1
DEEP OVERBURDEN WELLS																									
OW-10	Pre-Cap Construction	4/22/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/27/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/28/2009	<0.5	<0.75	<0.5	<2.5	NT	**0.53**	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/20/2010	<1	<1	<1	<2	NT	<1	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/1/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/1/2012	<1	<1	<1	<1	NT	<1	NT	<2	<20	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/30/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2 UJK	<0.5	<1	<2	<0.5	<1	<1
		10/7/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/21/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/6/2014	<1	<1	<1	<1	<1	<1	<1	**2.2**	<10 UJ	<10	<1	<1	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	<1	<1
		10/19/2015	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/26/2016	**8.7**	**15**	**4.5**	<1	<1	<1	<1	<2	<10	<10	<1	**7.1**	**2**	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**30**	**5.4**
		10/9/2017	**6**	**19**	**4.8**	<1	<1	<1	<1	<2	<10	<10	<1	**7.8**	**2**	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**41**	**7.2**
OW-20	Pre-Cap Construction	4/20/2009	<0.5	**1.8**	**0.64**	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	**1.2**	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	**4.4**	**0.66**
		7/28/2009	<0.5	**2.1**	**0.64**	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	**1.1**	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	**3.8**	**0.57**
		10/29/2009	<0.5	**1.6**	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	**0.88**	**0.7**	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	**3.3**	**0.71**
		1/21/2010	<1	**1.3**	<1	<2	NT	<1	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	<5	<2	<1	<2	<2	**3.2**	<1
	Post-Cap Construction	5/3/2012	<1	**1.6**	<1	<1	NT	<1	NT	<2	<10	<10 UJ	<1	**1.9**	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**2.4**	<1
		10/3/2012	<1	**3.9**	<1	<1	NT	<1	NT	<2	<10	<10	<1	**6**	<1	<1	<0.5	<1	<5 UJ	<0.5	<1	<2	<0.5	**7.6**	**1.1**
		5/1/2013	<1	**4.2**	<1	<1	<1	<1	<1	<2	<10	<10	<1	**4.9**	<1	<1	<0.5	<1	<2 UJK	<0.5	<1	<2	<0.5	**6.3**	**1**
		10/9/2013	<1	**3.1**	<1	<1	<1	<1	<1	<2	<10	<10	<1	**3.4**	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**4.8**	<1
		4/22/2014	<1	**7.1**	**1.2**	<1	<1	<1	<1	<2	<10	<10	<1	**5.1**	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**10**	**1.4**
		10/7/2014	<1	**4.5**	**1.1**	<1	<1	<1	<1	<2	<10 UJ	<10 UJ	<1	**5.2**	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	**11**	**1.5**
		10/19/2015	**5.6**	**16**	**6.1**	<1	<1	<1	<1	<2	<10	<10	<1	**9.6**	**3.1**	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**36**	**5.2**
		10/27/2016	**1.6**	**13**	**3.7**	<1	<1	<1	<1	<2	<10	<10	<1	**5.6**	**4.4**	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**21**	**5.4**
		10/10/2017	<1	**9.7**	**2.6**	<1	<1	<1	<1	<2	<10	<10	<1	**3**	**4.5**	<1	<0.5	<1	<2UJ	<0.5	<1	<2	<0.5	**12**	**4**
MW-208D	Pre-Cap Construction	4/23/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/27/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/28/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/22/2010	<1	<1	<1	<2	NT	<1	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/3/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<5 UJ	<0.5	<1	<2	<0.5	<1	<1
		5/2/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/8/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/23/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/7/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10 UJ	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	<1	<1
		10/19/2015	**1**	**53**	**9.1**	<1	<1	<1	**1**	<2	<10	<10	<1	**20**	**4.2**	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**61**	**12**
		10/27/2016	<1	**16**	**3.7**	<1	<1	<1	<1	<2	<10	<10	<1	**4**	**2.9**	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**26**	**6.3**
		10/9/2017	<1	**11**	**2.3**	<1	<1	<1	<1	<2	<10	<10	<1	**3.8**	**2.3**	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**20**	**5.4**

Table 4-3
Volatile Organic Compound Analytical Data Summary (Detections Only)
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,4-Dichlorobenzene	1,4-Dioxane	2-Butanone	Acetone	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	Ethylbenzene	Isopropylbenzene	Methyl tert butyl ether	Naphthalene	n-Propylbenzene	o-Xylene	p/m-Xylene	p-Isopropyltoluene	Tetrachloroethene	Trichloroethene
		PAL	200	70	7	15	600	5	5	6.1	4000	6300	5	100	70	700	0.5	70	140	0.5	10000	10000	0.5	5	5
		MDL	0.05	0.09	0.1	0.06	0.06	0.09	0.11	0.33	0.41	0.54	0.05	0.05	0.05	0.05	0.25	0.05	0.21	0.04	0.05	0.07	0.06	0.14	0.12
		QL	1	1	1	1	1	1	1	2	10	10	1	1	1	1	0.5	1	2	0.5	1	2	0.5	1	1
SHALLOW OVERBURDEN WELLS																									
OW-11	Pre-Cap Construction	4/22/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/27/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/28/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/20/2010	<1	<1	<1	<2	NT	<1	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/1/2012	<1	<1	<1	<1	NT	<1	NT	<2 J	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/1/2012	<1	<1	<1	<1	NT	<1	NT	<2	<20	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/30/2013	<1	<1	<1	<1	<1	<1	<1	<2 UJK	<10	<10	<1	<1	<1	<1	<0.5	<1	<2 UJL	<0.5	<1	<2	<0.5	<1	<1
		10/8/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/21/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/6/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10 UJ	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	<1	<1
		10/19/2015	<1	**1.2**	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**1.2**	<1
		10/26/2016	<1	**22**	**4.1**	<1	<1	<1	<1	<2	<10	<10	<1	**11**	**2.4**	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**29**	**7.2**
		10/9/2017	<1	**17**	**3.3**	<1	<1	<1	<1	<2	<10	<10	<1	**8**	**2.6**	<1	<0.5	<1	<2UJ	<0.5	<1	<2	<0.5	**24**	**8.5**
OW-12	Pre-Cap Construction	4/22/2009	<1.2	<1.9	<1.2	<6.2	<6.2	<1.2	<6.2	<620	<12	<12	<1.2	<1.2	<1.2	<1.2	<1.2	<2.5	**6.3**	<1.2	<2.5	<2.5	<1.2	<1.2	<1.2
		7/28/2009	<0.5	<0.75	<0.5	**6.6**	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.2**	**12**	**0.56**	**2.1**	**1.6**	**2.9**	<0.5	<0.5
		10/28/2009	<0.5	<0.75	<0.5	**4.8**	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	**2**	**4**	<0.5	**1.8**	<1	**0.66**	<0.5	<0.5
		1/20/2010	<1	<1	<1	**2.8**	NT	<1	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	NT	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	**1.8**	NT	<1	NT	<2	<10	<10 UJ	<1	<1	<1	<1	<0.5	**2.2**	NT	<0.5	<1	<2	<0.5	<1	<1
		10/2/2012	<1	<1	<1	**1.4**	NT	<1	NT	<2	<10	<10	<1	<1	<1	<1	<0.5	**2.5**	NT	<0.5	<1	<2	<0.5	<1	<1
		4/30/2013	<1	<1	<1	**1.3**	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	**2.8**	<2 UJK	<0.5	<1	<2	<0.5	<1	<1
		10/7/2013	<1	<1	<1	**1.8**	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	**2.6**	<2	<0.5	<1	<2	<0.5	<1	<1
		4/21/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/6/2014	<1	<1	<1	**1.9**	<1	<1	<1	<2	<10 UJ	<10	<1	<1	<1	<1	<0.5	**2.1**	**2.2 J**	<0.5	<1	<2	<0.5	<1	<1
		10/19/2015	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	**1.1**	<2	<0.5	<1	<2	<0.5	<1	<1
		10/26/2016	<1	**2.3**	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	**2.5**
		10/9/2017	<1	**1.3**	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
OW-21	Pre-Cap Construction	4/20/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/28/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/29/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/21/2010	<1	<1	<1	<2	NT	<1	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/3/2012	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/2/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<5 UJ	<0.5	<1	<2	<0.5	<1	<1
		5/1/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2 UJK	<0.5	<1	<2	<0.5	<1	<1
		10/8/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/22/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/7/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10 UJ	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	<1	<1
		10/19/2015	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/27/2016	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/10/2017	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2UJ	<0.5	<1	<2	<0.5	<1	<1

Table 4-3
Volatile Organic Compound Analytical Data Summary (Detections Only)
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,4-Dichlorobenzene	1,4-Dioxane	2-Butanone	Acetone	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	Ethylbenzene	Isopropylbenzene	Methyl tert butyl ether	Naphthalene	n-Propylbenzene	o-Xylene	p/m-Xylene	p-Isopropyltoluene	Tetrachloroethene	Trichloroethene
		PAL	200	70	7	15	600	5	5	6.1	4000	6300	5	100	70	700	0.5	70	140	0.5	10000	10000	0.5	5	5
		MDL	0.05	0.09	0.1	0.06	0.06	0.09	0.11	0.33	0.41	0.54	0.05	0.05	0.05	0.05	0.25	0.05	0.21	0.04	0.05	0.07	0.06	0.14	0.12
		QL	1	1	1	1	1	1	1	2	10	10	1	1	1	1	0.5	1	2	0.5	1	2	0.5	1	1
MW-208S	Pre-Cap Construction	4/23/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	**0.56**	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/27/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/29/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/22/2010	<1	<1	<1	<2	NT	<1	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	NT	<0.5	<1	<2	<0.5	<1	<1
		10/3/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<5 UJ	<0.5	<1	<2	<0.5	<1	<1
		5/2/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/8/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/23/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/7/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10 UJ	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	<1	<1
		10/19/2015	<1	**13**	**2.7**	<1	<1	<1	<1	<2	<10	<10	<1	**9.4**	**1.4**	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	**19**	**4.4**
		10/27/2016	<1	**9.1**	**2.4**	<1	<1	<1	<1	<2	<10	<10	<1	**4**	**1.4**	**2.2**	**1**	<1	<2	**1.6**	<1	**2.9**	<0.5	**12**	**4.4**
		10/9/2017	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	**1.2**
P-5	Pre-Cap Construction	4/20/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/28/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/29/2009	<0.5	<0.75	<0.5	<2.5	<2.5	<0.5	<2.5	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/21/2010	<1	<1	<1	<2	NT	<1	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/2/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<5 UJ	<0.5	<1	<2	<0.5	<1	<1
		5/1/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2 UJK	<0.5	<1	<2	<0.5	<1	<1
		10/8/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/22/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/7/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10 UJ	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	<1	<1
		10/19/2015	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/27/2016	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/10/2017	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2UJ	<0.5	<1	<2	<0.5	<1	<1
PZ-107	Pre-Cap Construction	4/23/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	**1.1**	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/28/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/29/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	**0.77**	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/21/2010	<1	<1	<1	<2	NT	<1	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	NT	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/3/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	NT	<0.5	<1	<2	<0.5	<1	<1
		10/3/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	NT	<0.5	<1	<2	<0.5	<1	<1
		5/1/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2 UJK	<0.5	<1	<2	<0.5	<1	<1
		10/7/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/22/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/6/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10 UJ	<10	<1	<1	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	<1	<1
		10/19/2015	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/26/2016	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/10/2017	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2JJ	<0.5	<1	<2	<0.5	<1	<1

Table 4-3
Volatile Organic Compound Analytical Data Summary (Detections Only)
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,4-Dichlorobenzene	1,4-Dioxane	2-Butanone	Acetone	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	Ethylbenzene	Isopropylbenzene	Methyl tert butyl ether	Naphthalene	n-Propylbenzene	o-Xylene	p/m-Xylene	p-Isopropyltoluene	Tetrachloroethene	Trichloroethene
		PAL	200	70	7	15	600	5	5	6.1	4000	6300	5	100	70	700	0.5	70	140	0.5	10000	10000	0.5	5	5
		MDL	0.05	0.09	0.1	0.06	0.06	0.09	0.11	0.33	0.41	0.54	0.05	0.05	0.05	0.05	0.25	0.05	0.21	0.04	0.05	0.07	0.06	0.14	0.12
		QL	1	1	1	1	1	1	1	2	10	10	1	1	1	1	0.5	1	2	0.5	1	2	0.5	1	1
PZ-108	Pre-Cap Construction	4/23/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/28/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/30/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5 UJ	<0.5	<0.5	**0.68**	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/22/2010	<1	<1	<1	<2	NT	<1	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	NT	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/2/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<5 UJ	<0.5	<1	<2	<0.5	<1	<1
		5/1/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2 UJK	<0.5	<1	<2	<0.5	<1	<1
		10/7/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/22/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/6/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10 UJ	<10	<1	<1	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	<1	<1
		10/19/2015	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/26/2016	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/10/2017	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
PZ-109	Pre-Cap Construction	4/22/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/28/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/29/2009	<0.5	<0.75	<0.5	<2.5	NT	<0.5	NT	<250	<5	<5	<0.5	<0.5	<0.5	**0.64**	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/21/2010	<1	<1	<1	<2	NT	<1	NT	<250	<5	<5	<1	<1	<1	<1	<2	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/2/2012	<1	<1	<1	<1	NT	<1	NT	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<5 UJ	<0.5	<1	<2	<0.5	<1	<1
		5/1/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	**18**	<1	<1	<1	<1	<0.5	<1	<2 UJK	<0.5	<1	<2	<0.5	<1	<1
		10/9/2013	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		4/22/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/7/2014	<1	<1	<1	<1	<1	<1	<1	<2	<10 UJ	<10 UJ	<1	<1	<1	<1	<0.5	<1	<2 UJ	<0.5	<1	<2	<0.5	<1	<1
		10/19/2015	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/27/2016	<1	<1	<1	<1	<1	<1	<1	<2	**12**	<10	<1	<1	<1	<1	<0.5	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/10/2017	<1	<1	<1	<1	<1	<1	<1	<2	<10	<10	<1	<1	<1	<1	<0.5	<1	<2UJ	<0.5	<1	<2	<0.5	<1	<1

Notes:
1. PAL = Project Action Limit
2. MDL = Method Detection Limit
3. QL = Quantitation Limit
4. PAL, MDL, and QL values are from Quality Assurance Project Plan (QAPP) Table 6-4, as revised on 4/12/12
5. All results are presented in units of micrograms per liter (ug/L)
6. JH, J+, JL, J-, JK, or J = Result is qualified as estimated based on data validation; biased high (JH or J+), biased low (JL or J-), or bias unknown (JK or J).
7. UJL, UJK, or UJ = Result is qualified as not detected based on data validation; biased low (UJL) or unknown (UJ or UJK).
8. Yellow highlighted cells indicate an exceedance of the Project Action Limit
9. Values in bold indicate an exceedance of the laboratory Quantitation Limit

Table 4-4
Metals Analytical Data Summary
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
		PAL	200	6	10	2,000	4	5	5,000	100	50	1,300	300	15	5,000	840	2	100	35,000	50	100	5,000	2	30	500
		MDL	26	0.16	0.34	0.36	0.03	0.026	88	0.38	0.053	0.16	26	0.12	37	0.3	0.04	0.12	460	2.5	0.16	1,900	0.15	3.1	5.1
		QL	50	1	0.4	10	0.4	0.5	150	1	1	5	50	1	150	1	0.1	5	2,000	5	0.5	2,000	0.2	5	10
BEDROCK WELLS																									
OW-9	Pre-Cap Construction	4/23/2009	800	<50	<5	116	<5	<4	370,000	<10	434	<10	1,800	<10	81,000	28,100	<0.2	333	20,000	<10	<7	510,000	<20	<10	151
		7/27/2009	870	<2	5	116	4	<4	390,000	<10	442	<10	1,500	<10	82,000	27,600	<0.2	334	20,000	<10	<7	510,000	<2	<10	207
		10/28/2009	760	<50	6	128	<5	<4	420,000	<10	483	<10	2,000	<10	91,000	30,100	<0.2	361	22,000	<10	<7	540,000	<20	<10	205
		1/20/2010	800	<2	5	116	<4	<4	370,000	<10	474	<10	1,200	<10	76,000	27,800	<0.2	359	20,000	<10	<7	510,000	<2	<10	250
	Post-Cap Construction	5/1/2012	890	<1	1.1	120	3.4	1	440	<1	510	12	740	<1	89,000	29,000	<0.1	370	22,000	<5	<0.5	680,000	<0.2	<5	340
		10/1/2012	910	<1	0.8	120	5	1.4	430,000	<1	590	13	740	<1	89,000	30,000	<0.1	350	22,000	<5	<0.5	670,000	<0.2	<5	280
		4/30/2013	1,100	<1	1 JK	110	3.6	1	410,000	<1	570	21	560	<1	86,000	31,000	<0.1 UJL	360	22,000	<5	<0.5	710,000	<0.2	<5 UJL	300
		10/7/2013	1,600	<1	1.1	110	3.1	<0.5	440,000	<1	460	8.6	860	<1	83,000	27,000	<0.1	330	26,000	<5	<0.5	740,000	<0.2	<5	300
		4/21/2014	930	<1	1.1	100	3.8	0.97	420,000	<1	450	10	510	<1	81,000	28,000	<0.1	310	22,000	<5	<0.5	720,000	<0.2	<5	310
		10/6/2014	980	<1	0.99	110	3.3	<0.5	420,000	<1	490	12	650	<1	84,000	28,000	<0.1	320	24,000	<5	<0.5	790,000	<0.2	<5	320
		10/19/2015	1,100	<1	1	110	3	2.1	360,000	<1	550	22	480	<1	70,000	38,000	<0.1	320	24,000	<5	<0.5	680,000	<0.2	<5	290
		10/26/2016	1,100	<1	0.77	94	3.9	2.4	340,000	<1	410	<5	490	<1	67,000	27,000	<0.1	270	20,000	<5	<0.5	810,000	<0.2	<5	350
		10/9/2017	2,000	<1	<0.4	97	2.8	12	330,000	2.3	450	61	1,000	3.6	65,000	20,000	<0.1	320	19,000	<5	0.68	760,000	<0.2	<5	420
MW-208B	Pre-Cap Construction	4/23/2009	<100	<50	<5	19	<5	<4	36,000	<10	<20	<10	15,000	<10	7,500	178	<0.2	<25	3,800	<10	<7	18,000	<20	<10	<50
		7/27/2009	<100	<2	<5	18	<4	<4	37,000	<10	<20	<10	210	<10	7,600	185	<0.2	<25	3,700	<10	<7	17,000	<2	<10	<50
		10/29/2009	<100	<50	<5	18	<5	<4	38,000	<10	<20	<10	250	<10	7,900	192	<0.2	<25	3,700	<10	<7	17,000	<20	<10	<50
		1/22/2010	<100	<2	5	20	<4	<4	38,000	<10	<20	<10	250	<10	8,500	188	<0.2	<25	4,100	<10	<7	18,000	<2	<10	<50
	Post-Cap Construction	5/2/2012	<50	<1	2	18	<0.4	<0.5	40,000	<1	5.8	<5	240	<1	8,400	190	<0.1	<5	3,900	<5	<0.5	18,000	<0.2	<5	<10
		10/3/2012	<50	<1	2	18	<0.4	<0.5	40,000	<1	5.6	<5	230	<1	8,300	190	<0.1	<5	3,800	<5	<0.5	17,000	<0.2	<5	<10
		5/2/2013	<50	<1	2.4 JK	19	<0.4	<0.5	36,000	<1	7.3	<5	330	<1	8,600	220	<0.1	<5	3,400	<5	<0.5	16,000	<0.2	<5	<10
		10/7/2013	52	<1	2.1	15	<0.4	<0.5	41,000	<1	6.7	<5	360	<1	8,100	180	<0.1	<5	3,700	<5	<0.5	18,000	<0.2	<5	<10
		4/23/2014	<50	<1	2.3	16	<0.4	<0.5	37,000	<1	7.3	<5	290	<1	7,400	180	<0.1	<5	3,300	<5	<0.5 UJ	15,000	<0.2	<5	<10
		10/7/2014	<50	<1	1.8	17	<0.4	<0.5	40,000	<1	6.8	<5	260	<1	8,600	190	<0.1	<5	3,700	<5	<0.5	18,000	<0.2	<5	<10
		10/19/2015	<50	<1	2.4	18	<0.4	<0.5	41,000	<1	8.1	<5	380	<1	8,700	210	<0.1	<5	3,900	<5	<0.5	17,000	<0.2	<5	<10
		10/27/2016	<50	<1	2.7	16	<0.4	<0.5	39,000	<1	8.5	<5	500	<1	8,000	180	<0.1	<5	3,600	<5	<0.5	17,000	<0.2	<5	<10
		10/10/2017	<50	<1	1.8	16	<2	<0.5	41,000	<1	7.7	<5	450	<1	8,400	160	<0.1	<5	3,800	<5	<0.5	18,000	<0.2	<5	<10
MW-209B	Pre-Cap Construction	4/20/2009	<100	<50	5	45	<5	<4	55,000	<10	<20	<10	3,800	<10	22,000	1,230	<0.2	<25	7,200	<10	<7	28,000	<20	<10	<50
		7/28/2009	<100	<2	<5	47	<4	<4	57,000	<10	<20	<10	3,000	<10	22,000	1,170	<0.2	<25	7,200	<10	<7	28,000	<2	<10	<50
		10/29/2009	<100	<50	6	47	<5	<4	57,000	<10	<20	<10	4,200	<10	22,000	1,160	<0.2	<25	7,000	<10	<7	27,000	<20	<10	<50
		1/21/2010	<100	<2	7	44	<4	<4	56,000	<10	<20	<10	4,300	<10	22,000	1,130	<0.2	<25	6,400	<10	<7	28,000	<2	<10	<50
	Post-Cap Construction	5/3/2012	<50	<1	4.3	43	<0.4	<0.5	64,000	<1	1.9	<5	1,900	<1	25,000	1,300	<0.1	<5	7,300	<5	<0.5	29,000	<0.2	<5	<10
		10/2/2012	<50	<1	4.2	41	<0.4	<0.5	58,000	<1	1.8	<5	1,600	<1	23,000	1,200	<0.1	<5	6,600	<5	<0.5	25,000	<0.2	<5	<10
		5/1/2013	<50	<1	5.6 JK	47	<0.4	<0.5	57,000	<1	2.1	<5	2,600	<1	23,000	1,500	<0.1 UJL	<5	6,600	<5	<0.5	27,000	<0.2	<5 UJL	<10
		10/8/2013	75	<1	4.7	41	<0.4	<0.5	59,000	<1	1.8	<5	2,300	<1	22,000	1,200	<0.1	<5	6,600	<5	<0.5	26,000	<0.2	<5	<10
		4/22/2014	<50	<1	4.9	45	<0.4	<0.5	60,000	<1	1.7	<5	3,800	<1	22,000	1,200	<0.1	<5	6,500	<5	<0.5	27,000	<0.2	<5	<10
		10/7/2014	<50	<1	4.9	41	<0.4	<0.5	62,000	<1	2.1	<5	3,000	<1	24,000	1,100	<0.1	<5	7,000	<5	<0.5	28,000	<0.2	<5	<10
		10/19/2015	<50	<1	4.6	45	<0.4	<0.5	62,000	<1	1.9	<5	1,800	<1	23,000	1,400	<0.1	<5	7,900	<5	<0.5	27,000	<0.2	<5	<10
		10/27/2016	100	<1	4	45	<0.4	<0.5	67,000	<1	1.7	<5	1,900	<1	26,000	1,400	<0.1	<5	7,000	<5	<0.5	28,000	<0.2	<5	<10
		10/10/2017	<50	<1	3.1	47	<2	<0.5	66,000	<1	1.7	<5	1,900	<1	26,000	1,400	<0.1	<5	6,900	<5	<0.5	28,000	<0.2	<5	<10
DEEP OVERBURDEN WELLS																									
OW-10	Pre-Cap Construction	4/22/2009	670	<50	<5	24	<5	<4	37,000	<10	39	<10	150	<10	7,600	2,500	<0.2	28	3,000	<10	<7	61,000	<20	<10	60
		7/27/2009	600	<2	<5	25	<4	<4	38,000	<10	37	<10	180	<10	7,700	2,480	<0.2	27	2,900	<10	<7	58,000	<2	<10	51
		10/28/2009	690	<50	<5	27	<5	<4	45,000	<10	44	<10	220	<10	9,100	2,970	<0.2	32	3,200	<10	<7	64,000	<20	<10	<50
		1/20/2010	490	<2	<5	21	<4	<4	26,000	<10	<20	<10	120	<10	5,500	1,770	<0.2	<25	<2500	<10	<7	38,000	<2	<10	<50
	Post-Cap Construction	5/1/2012	910	<1	<0.4	28	1	<0.5	45	<1	35	6.4	120	<1	9,400	2,800	<0.1	27	3,200	<5	<0.5	66,000	<0.2	<5	52
		10/1/2012	950	<1	<0.4	37	1.4	0.59	63,000	<1	53	5.1	180	<1	13,000	4,100	<0.1	40	4,100	<5	<0.5	94,000	<0.2	<5	68
		4/30/2013	760	<1	<0.4 UJK	33	0.72	<0.5	34,000	<1	19	5.4	140	<1	7,400	2,000	<0.1 UJL	16	2,800	<5	<0.5	46,000	<0.2	<5 UJL	35
		10/7/2013	180	<1	<0.4	17	<0.4	<0.5	190	<1	3.1	<5	130	<1	3,600	1,100	<0.1	<5	<2000	<5	<0.5	23,000	<0.2	<5	<10
		4/21/2014	910	<1	0.47	33	0.9	<0.5	44,000	<1	27	6	120	<1	9,000	2,900	<0.1	22	3,200	<5	<0.5	55,000	<0.2	<5	49
		10/6/2014	170	<1	<0.4	21	<0.4	<0.5	21,000	<1	2.8	<5	150	<1	4,300	1,200	<0.1	<5	<2000	<5	<0.5	26,000	<0.2	<5	11
		10/19/2015	1,200	<1	<0.4	43	1.1	0.55	57,000	<1	30	8.3	160	<1	12,000	4,100	<0.1	25	4,400	<5	<0.5	67,000	<0.2	<5	54
		10/26/2016	950	<1	<0.4	36	0.86	0.6	60,000	<1	23	14	160	<1	12,000	4,400	<0.1	18	3,700	<5	<0.5	73,000	<0.2	<5	49
		10/9/2017	1,000	<1	<0.4	48	0.81	0.58	63,000	<1	28	7.5	260	<1	13,000	4,500	<0.1	22	3,800	<5	<0.5	87,000	<0.2	<5	42

Table 4-4
Metals Analytical Data Summary
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
		PAL	200	6	10	2,000	4	5	5,000	100	50	1,300	300	15	5,000	840	2	100	35,000	50	100	5,000	2	30	500
		MDL	26	0.16	0.34	0.36	0.03	0.026	88	0.38	0.053	0.16	26	0.12	37	0.3	0.04	0.12	460	2.5	0.16	1,900	0.15	3.1	5.1
		QL	50	1	0.4	10	0.4	0.5	150	1	1	5	50	1	150	1	0.1	5	2,000	5	0.5	2,000	0.2	5	10
OW-20	Pre-Cap Construction	4/20/2009	<100	<50	**15**	**57**	<5	<4	**28,000**	<10	**21**	<10	**12,000**	<10	**5,000**	**2,390**	<0.2	<25	**5,500**	<10	<7	**76,000**	<20	<10	<50
		7/28/2009	<100	<2	**13**	**48**	<4	<4	**23,000**	<10	<20	<10	**8,400**	<10	**4,400**	**2,010**	<0.2	<25	**4,700**	<10	<7	**74,000**	<2	<10	<50
		10/29/2009	<100	<50	**14**	**42**	<5	<4	**21,000**	<10	<20	<10	**8,200**	<10	**3,900**	**1,770**	<0.2	<25	**4,200**	<10	<7	**59,000**	<20	<10	<50
		1/21/2010	<100	<2	**18**	**43**	<4	<4	**21,000**	<10	<20	<10	**8,000**	<10	**4,100**	**1,760**	<0.2	<25	**4,500**	<10	<7	**63,000**	<2	<10	<50
	Post-Cap Construction	5/3/2012	<50	<1	**13**	**52**	<0.4	<0.5	**33,000**	<1	**19**	<5	**10,000**	<1	**5,900**	**2,700**	<0.1	**10**	**4,500**	<5	<0.5	**63,000**	<0.2	<5	<10
		10/3/2012	<50	<1	**10**	**45**	<0.4	<0.5	**25,000**	<1	**17**	<5	**6,000**	<1	**4,900**	**2,000**	<0.1	**10**	**3,900**	<5	<0.5	**69,000**	<0.2	<5	<10
		5/1/2013	<50	<1	**12 JK**	**42**	<0.4	<0.5	**21,000**	<1	**15**	<5	**5,400**	<1	**4,100**	**1,700**	<0.1 UJL	**8.7**	**3,700**	<5	<0.5	**67,000**	<0.2	<5 UJL	<10
		10/9/2013	<50	<1	**10**	**34**	<0.4	<0.5	**19,000**	<1	**13**	<5	**5,200**	<1	**4,000**	**1,600**	<0.1	**7.2**	**3,700**	<5	<0.5	**57,000**	<0.2	<5	<10
		4/22/2014	<50	<1	**11**	**36**	<0.4	<0.5	**21,000**	<1	**13**	<5	**5,600**	<1	**4,000**	**1,500**	<0.1	**7.4**	**3,600**	<5	<0.5	**62,000**	<0.2	<5	<10
		10/7/2014	<50	<1	**11**	**33**	<0.4	<0.5	**20,000**	<1	**12**	<5	**5,400**	<1	**3,900**	**1,300**	<0.1	**7.5**	**3,500**	<5	<0.5	**56,000**	<0.2	<5	<10
		10/19/2015	<50	<1	**9.7**	**46**	<0.4	<0.5	**26,000**	<1	**17**	<5	**5,900**	<1	**5,000**	**2,200**	<0.1	**10**	**5,000**	<5	<0.5	**64,000**	<0.2	<5	<10
		10/27/2016	**55**	<1	**8.6**	**71**	<0.4	<0.5	**41,000**	<1	**27**	<5	**7,800**	<1	**7,700**	**3,500**	<0.1	**16**	**4,900**	<5	<0.5	**92,000**	<0.2	<5	<10
		10/10/2017	<50	<1	**6.8**	**63**	<0.4	<0.5	**32,000**	<1	**25**	<5	**4,800**	<1	**6,400**	**2,500**	<0.1	**14**	**4,700**	<5	<0.5	**89,000**	<0.2	<5	<10
MW-208D	Pre-Cap Construction	4/23/2009	<100	<50	<5	**30**	<5	<4	**16,000**	<10	<20	<10	<50	<10	**3,200**	**1,630**	<0.2	<25	<2500	<10	<7	**15,000**	<20	<10	<50
		7/27/2009	<100	<2	<5	**31**	<4	<4	**18,000**	<10	<20	<10	<50	<10	**3,400**	**1,600**	<0.2	<25	<2500	<10	<7	**14,000**	<2	<10	<50
		10/28/2009	<100	<50	<5	**31**	<5	<4	**19,000**	<10	<20	<10	<50	<10	**3,800**	**1,770**	<0.2	<25	<2500	<10	<7	**15,000**	<20	<10	<50
		1/22/2010	<100	<2	<5	**35**	<4	<4	**18,000**	<10	<20	<10	<50	<10	**4,400**	**1,760**	<0.2	<25	<2500	<10	<7	**14,000**	<2	<10	<50
	Post-Cap Construction	5/2/2012	<50	<1	**0.4**	**55**	<0.4	<0.5	**31,000**	<1	**1.3**	<5	<50	<1	**6,800**	**2,900**	<0.1	<5	**2,700**	<5	<0.5	**22,000**	<0.2	<5	<10
		10/3/2012	<50	<1	<0.4	**52**	<0.4	<0.5	**32,000**	<1	**1.4**	<5	<50	<1	**6,700**	**2,700**	<0.1	<5	**2,700**	<5	<0.5	**22,000**	<0.2	<5	<10
		5/2/2013	<50	<1	<0.4 UJK	**53**	<0.4	<0.5	**26,000**	<1	**1**	<5	<50	<1	**6,400**	**2,100**	<0.1	<5	**2,300**	<5	<0.5	**21,000**	<0.2	<5	<10
		10/8/2013	<50	<1	<0.4	**56**	<0.4	<0.5	**32,000**	<1	**1.3**	<5	<50	<1	**6,600**	**2,500**	<0.1	<5	**2,700**	<5	<0.5	**24,000**	<0.2	<5	<10
		4/23/2014	<50	<1	<0.4	**63**	<0.4	<0.5	**32,000**	<1	**1.1**	<5	<50	<1	**6,300**	**2,500**	<0.1	<5	**2,500**	<5	<0.5 UJ	**23,000**	<0.2	<5	<10
		10/7/2014	**54**	<1	<0.4	**53**	<0.4	<0.5	**28,000**	<1	<1	<5	<50	<1	**5,800**	**2,100**	<0.1	<5	**2,600**	<5	<0.5	**32,000**	<0.2	<5	<10
		10/19/2015	<50	<1	<0.4	**89**	<0.4	<0.5	**35,000**	<1	**1.2**	<5	<50	<1	**6,300**	**3,000**	<0.1	<5	**3,800**	<5	<0.5	**47,000**	<0.2	<5	<10
		10/27/2016	<50	<1	**0.58**	**150**	<0.4	**0.8**	**45,000**	<1	<1	<5	<50	<1	**7,800**	**4,400**	<0.1	<5	**4,300**	<5	<0.5	**67,000**	**0.32**	<5	<10
		10/9/2017	<50	<1	<0.4	**120**	<0.4	<0.5	**45,000**	<1	**2**	<5	**62**	<1	**8,100**	**4,100**	<0.1	<5	**3,900**	<5	<0.5	**60,000**	**0.24**	<5	<10
SHALLOW OVERBURDEN WELLS																									
OW-11	Pre-Cap Construction	4/22/2009	<100	<50	**26**	<10	<5	<4	**16,000**	<10	<20	<10	**5,400**	<10	**2,200**	**1,140**	<0.2	<25	<2500	<10	<7	**25,000**	<20	<10	<50
		7/27/2009	<100	<2	**24**	**13**	<4	<4	**18,000**	<10	<20	<10	**5,800**	<10	**2,500**	**1,250**	<0.2	<25	<2500	<10	<7	**33,000**	<2	<10	<50
		10/28/2009	<100	<50	**310**	**10**	<5	<4	**13,000**	<10	<20	<10	**6,600**	<10	**1,600**	**824**	<0.2	<25	<2500	<10	<7	**36,000**	<20	<10	<50
		1/20/2010	<100	<2	**30**	<10	<4	<4	**10,000**	<10	<20	<10	**4,200**	<10	**1,400**	**692**	<0.2	<25	<2500	<10	<7	**30,000**	<2	<10	<50
	Post-Cap Construction	5/1/2012	<50	<1	**36**	<10	<0.4	<0.5	**18**	<1	**3.9**	<5	**7,800**	<1	**2,100**	**990**	<0.1	<5	<2000	<5	<0.5	**9,900**	<0.2	<5	<10
		10/1/2012	<50	<1	**32**	<10	<0.4	<0.5	**20,000**	<1	**2.8**	<5	**7,600**	<1	**2,300**	**1,100**	<0.1	<5	<2000	<5	<0.5	**9,500**	<0.2	<5	<10
		4/30/2013	<50	<1	**36 JK**	<10	<0.4	<0.5	**20,000**	<1	**4**	<5	**8,000**	<1	**2,600**	**1,300**	<0.1 UJL	<5	<2000	<5	<0.5	**11,000**	<0.2	<5 UJL	<10
		10/8/2013	<50	<1	**30**	**11**	<0.4	<0.5	**24,000**	<1	**4.2**	<5	**8,700**	<1	**3,300**	**1,400**	<0.1	<5	<2000	<5	<0.5	**11,000**	<0.2	<5	<10
		4/21/2014	<50	<1	**28**	**13**	<0.4	<0.5	**26,000**	<1	**5.5**	<5	**10,000**	<1	**3,800**	**1,500**	<0.1	<5	**2,200**	<5	<0.5	**14,000**	<0.2	<5	<10
		10/6/2014	<50	<1	**33**	**14**	<0.4	<0.5	**26,000**	<1	**7.2**	<5	**14,000**	<1	**4,000**	**1,600**	<0.1	<5	**2,300**	<5	<0.5	**17,000**	<0.2	<5	<10
		10/19/2015	<50	<1	**37**	**15**	<0.4	<0.5	**24,000**	<1	**9.3**	<5	**16,000**	<1	**4,400**	**2,000**	<0.1	<5	**2,400**	<5	<0.5	**16,000**	<0.2	<5	<10
		10/26/2016	**60**	<1	**47**	**19**	<0.4	<0.5	**23,000**	<1	**10**	<5	**18,000**	<1	**4,500**	**2,400**	<0.1	<5	**2,800**	<5	<0.5	**25,000**	**0.24**	<5	<10
		10/9/2017	<50	<1	**41**	**21**	<0.4	**0.6**	**19,000**	<1	**10**	<5	**15,000**	<1	**3,900**	**2,100**	<0.1	<5	**2,700**	<5	<0.5	**34,000**	**0.27**	<5	<10
OW-12	Pre-Cap Construction	4/22/2009	**110**	<50	**8**	**14**	<5	<4	**29,000**	<10	<20	<10	**1,200**	<10	**300**	**166**	<0.2	<25	**13,000**	<10	<7	**36,000**	<20	<10	<50
		7/28/2009	**150**	<2	**7**	**16**	<4	<4	**32,000**	<10	<20	<10	**420**	<10	**180**	**111**	<0.2	<25	**16,000**	<10	<7	**41,000**	<2	<10	<50
		10/28/2009	**270**	<50	**12**	**15**	<5	<4	**28,000**	<10	<20	<10	**1,200**	<10	**440**	**158**	<0.2	<25	**12,000**	<10	<7	**43,000**	<20	<10	<50
		1/20/2010	**120**	<2	**10**	**14**	<4	<4	**28,000**	<10	<20	<10	**700**	<10	**440**	**130**	<0.2	<25	**12,000**	<10	<7	**35,000**	<2	<10	<50
	Post-Cap Construction	5/2/2012	**89**	<1	**9**	**18**	<0.4	<0.5	**63,000**	<1	<1	<5	**810**	<1	**2,300**	**130**	<0.1	<5	**16,000**	<5	<0.5	**58,000**	<0.2	<5	<10
		10/2/2012	**280**	<1	**12**	**16**	<0.4	**2.2**	**40,000**	<1	<1	<5	**1,800**	<1	**1,500**	**240**	<0.1	<5	**11,000**	<5	<0.5	**41,000**	<0.2	<5	<10
		4/30/2013	**180**	<1	**10 JK**	**15**	<0.4	<0.5	**43,000**	<1	<1	<5	**430**	<1	**1,800**	**110**	<0.1 UJL	<5	**12,000**	<5	<0.5	**49,000**	<0.2	<5 UJL	<10
		10/7/2013	**380**	<1	**8.5**	**15**	<0.4	<0.5	**44,000**	<1	<1	<5	**1,200**	<1	**1,600**	**160**	<0.1	<5	**13,000**	<5	<0.5	**50,000**	<0.2	<5	<10
		4/21/2014	**260**	<1	**10**	**16**	<0.4	<0.5	**58,000**	<1	<1	<5	**390**	<1	**2,500**	**100**	<0.1	<5	**12,000**	<5	<0.5	**37,000**	<0.2	<5	<10
		10/6/2014	**230**	<1	**9.8**	**15**	<0.4	<0.5	**41,000**	<1	<1	<5	**3,100**	<1	**1,700**	**280**	<0.1	<5	**10,000**	<5	<0.5	**41,000**	<0.2	<5	<10
		10/19/2015	**260**	<1	**8.1**	**21**	<0.4	<0.5	**51,000**	<1	<1	<5	**1,800**	<1	**2,000**	**260**	<0.1	<5	**12,000**	<5	<0.5	**46,000**	<0.2	<5	<10
		10/26/2016	**460**	<1	**8.5**	**26**	<0.4	<0.5	**53,000**	<1	<1	<5	**4,500**	<1	**2,000**	**390**	<0.1	<5	**13,000**	<5	<0.5	**45,000**	<0.2	<5	<10
		10/9/2017	**600**	<1	**10**	**29**	<0.4	<0.5	**64,000**	<1	<1	<5	**2,100**	<1	**2,400**	**240**	<0.1	<5	**16,000**	<5	<0.5	**44,000**	<0.2	<5	<10

Table 4-4
Metals Analytical Data Summary
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
		PAL	200	6	10	2,000	4	5	5,000	100	50	1,300	300	15	5,000	840	2	100	35,000	50	100	5,000	2	30	500
		MDL	26	0.16	0.34	0.36	0.03	0.026	88	0.38	0.053	0.16	26	0.12	37	0.3	0.04	0.12	460	2.5	0.16	1,900	0.15	3.1	5.1
		QL	50	1	0.4	10	0.4	0.5	150	1	1	5	50	1	150	1	0.1	5	2,000	5	0.5	2,000	0.2	5	10
OW-21	Pre-Cap Construction	4/20/2009	**150**	<50	<5	**37**	<5	<4	**3,200**	<10	<20	<10	**1,200**	<10	**430**	**1,610**	<0.2	<25	<2500	<10	<7	<2000	<20	<10	**298**
		7/28/2009	<100	<2	<5	**44**	<4	<4	**6,800**	<10	<20	<10	**4,000**	<10	**750**	**1,770**	<0.2	<25	<2500	<10	<7	**2,300**	<2	<10	**137**
		10/29/2009	<100	<50	**7**	**54**	<5	<4	**7,000**	<10	<20	<10	**6,400**	<10	**800**	**1,410**	<0.2	<25	<2500	<10	<7	**7,600**	<20	<10	**126**
		1/21/2010	**150**	<2	<5	**36**	<4	<4	**4,500**	<10	<20	<10	**4,300**	<10	**520**	**1,450**	<0.2	<25	<2500	<10	<7	**2,400**	<2	<10	**134**
	Post-Cap Construction	5/3/2012	**110**	<1	**0.41**	**68**	<0.4	<0.5	**15,000**	<1	**3.3**	<5	**97**	<1	**1,700**	**310**	<0.1	**6.1**	**3,700**	<5	<0.5	**3,700**	<0.2	<5	**110**
		10/2/2012	<50	<1	**4.5**	**56**	<0.4	<0.5	**9,100**	<1	**3.3**	<5	**1,800**	<1	**1,300**	**740**	<0.1	<5	**3,300**	<5	<0.5	**10,000**	<0.2	<5	**43**
		5/1/2013	**130**	<1	**0.77 JK**	**64**	<0.4	<0.5	**5,800**	<1	**3**	<5	**160**	<1	**1,000**	**71**	<0.1 UJL	**10**	**4,200**	<5	<0.5	<2000	<0.2	<5 UJL	**120**
		10/8/2013	**85**	<1	**0.67**	**66**	<0.4	<0.5	**7,000**	<1	**4.3**	<5	**110**	<1	**1,100**	**310**	<0.1	**5.1**	**4,800**	<5	<0.5	**5,400**	<0.2	<5	**44**
		4/22/2014	**150**	<1	**1**	**23**	<0.4	**1.3**	**7,100**	<1	**1.5**	<5	**310**	<1	**980**	**81**	<0.1	<5	**2,900**	<5	<0.5	**2,400**	<0.2	<5	**46**
		10/7/2014	**99**	<1	**3**	**40**	<0.4	<0.5	**12,000**	<1	**4.5**	<5	**380**	<1	**1,400**	**540**	<0.1	<5	**3,700**	<5	<0.5	**8,700**	<0.2	<5	**28**
		10/19/2015	**690**	<1	**15**	**52**	<0.4	<0.5	**15,000**	<1	**6.7**	<5	**2,300**	**3.6**	**1,400**	**1,300**	<0.1	<5	**3,800**	<5	<0.5	**10,000**	<0.2	<5	**21**
		10/27/2016	**140**	<1	**7.9**	**41**	<0.4	<0.5	**19,000**	<1	**3.2**	<5	**1,100**	<1	**1,600**	**1,800**	<0.1	<5	**4,200**	<5	<0.5	**9,000**	<0.2	<5	**25**
		10/10/2017	**93**	<1	**8.8**	**44**	<2	<0.5	**18,000**	<1	**7**	<5	**1,800**	<1	**1,500**	**2,500**	<0.1	<5	**3,300**	<5	<0.5	**10,000**	<0.2	<5	**14**
MW-208S	Pre-Cap Construction	4/23/2009	<100	<50	**42**	**18**	<5	<4	**7,200**	<10	<20	<10	**14,000**	<10	**1,500**	**724**	<0.2	<25	<2500	<10	<7	**6,800**	<20	<10	<50
		7/27/2009	<100	<2	**43**	**23**	<4	<4	**8,200**	<10	<20	<10	**16,000**	<10	**1,700**	**749**	<0.2	<25	<2500	<10	<7	**7,900**	<2	<10	<50
		10/29/2009	<100	<50	**49**	**25**	<5	<4	**8,400**	<10	<20	<10	**16,000**	<10	**1,800**	**785**	<0.2	<25	<2500	<10	<7	**7,700**	<20	<10	<50
		1/22/2010	<100	<2	**48**	**26**	<4	<4	**9,000**	<10	<20	<10	**16,000**	<10	**2,000**	**814**	<0.2	<25	<2500	<10	<7	**8,200**	<2	<10	<50
	Post-Cap Construction	5/2/2012	<50	<1	**48**	**39**	<0.4	<0.5	**14,000**	<1	**3.3**	<5	**23,000**	<1	**35,000**	**1,200**	<0.1	<5	**3,000**	<5	<0.5	**13,000**	<0.2	<5	<10
		10/3/2012	<50	<1	**51**	**36**	<0.4	<0.5	**14,000**	<1	**3.1**	<5	**18,000**	<1	**2,800**	**1,200**	<0.1	<5	**2,500**	<5	<0.5	**14,000**	<0.2	<5	<10
		5/2/2013	<50	<1	**47 JK**	**64**	<0.4	<0.5	**19,000**	<1	**6.1**	<5	**29,000**	<1	**3,900**	**2,000**	<0.1	<5	**3,300**	<5	<0.5	**23,000**	<0.2	<5	<10
		10/8/2013	**62**	<1	**45**	**46**	<0.4	<0.5	**15,000**	<1	**3**	<5	**19,000**	<1	**2,600**	**1,200**	<0.1	<5	**3,300**	<5	<0.5	**23,000**	<0.2	<5	<10
		4/23/2014	<50	<1	**56**	**33**	<0.4	<0.5	**11,000**	<1	**2.6**	<5	**16,000**	<1	**2,100**	**1,100**	<0.1	<5	**2,500**	<5	<0.5 UJ	**19,000**	<0.2	<5	<10
		10/7/2014	<50	<1	**45**	**38**	<0.4	<0.5	**17,000**	<1	**3.3**	<5	**18,000**	<1	**3,200**	**1,200**	<0.1	<5	**3,700**	<5	<0.5	**30,000**	<0.2	<5	<10
		10/19/2015	<50	<1	**67**	**49**	<0.4	<0.5	**14,000**	<1	**3.5**	<5	**21,000**	<1	**2,600**	**1,400**	<0.1	<5	**4,100**	<5	<0.5	**35,000**	<0.2	<5	<10
		10/27/2016	**53**	<1	**58**	**37**	<0.4	<0.5	**8,500**	<1	**2.5**	<5	**14,000**	<1	**1,600**	**870**	<0.1	<5	**2,900**	<5	<0.5	**37,000**	<0.2	<5	<10
		10/9/2017	<50	<1	**51**	**49**	<0.4	<0.5	**10,000**	**1.2**	**3.1**	<5	**17,000**	<1	**2,100**	**1,000**	<0.1	<5	**3,100**	<5	<0.5	**34,000**	<0.2	<5	<10
P-5	Pre-Cap Construction	4/20/2009	<100	<50	**5**	**20**	<5	<4	**4,000**	<10	**37**	<10	**7,200**	<10	**1,100**	**8,140**	<0.2	<25	<2500	<10	<7	**3,000**	<20	<10	<50
		7/28/2009	**720**	<2	**7**	**23**	<4	<4	**4,800**	<10	**32**	<10	**7,100**	<10	**1,000**	**6,360**	<0.2	<25	<2500	<10	<7	**3,900**	<2	<10	<50
		10/29/2009	<100	<50	**7**	**20**	<5	<4	**4,700**	<10	**35**	<10	**7,200**	<10	**970**	**6,200**	<0.2	<25	<2500	<10	<7	**3,600**	<20	<10	<50
		1/21/2010	**130**	<2	**8**	**21**	<4	<4	**5,700**	<10	**37**	<10	**8,500**	<10	**1,300**	**6,820**	<0.2	<25	<2500	<10	<7	**4,200**	<2	<10	<50
	Post-Cap Construction	5/2/2012	**530**	<1	**5.5**	**22**	<0.4	<0.5	**6,400**	<1	**22**	<5	**7,300**	<1	**1,000**	**3,500**	<0.1	**10**	**2,100**	<5	<0.5	**6,500**	<0.2	<5	<10
		10/2/2012	**710**	<1	**7.9**	**34**	<0.4	<0.5	**9,800**	<1	**6**	<5	**13,000**	<1	**1,500**	**3,400**	<0.1	<5	**2,400**	<5	<0.5	**15,000**	<0.2	<5	<10
		5/1/2013	**710**	<1	**7.6 JK**	**28**	<0.4	<0.5	**6,600**	<1	**17**	<5	**10,000**	<1	**1,100**	**3,300**	<0.1 UJL	**6.8**	**2,500**	<5	<0.5	**12,000**	<0.2	<5 UJL	<10
		10/8/2013	**150**	<1	**8.8**	**38**	<0.4	<0.5	**8,400**	<1	**25**	<5	**16,000**	<1	**1,300**	**4,200**	<0.1	**9.9**	**3,000**	<5	<0.5	**13,000**	<0.2	<5	<10
		4/22/2014	<50	<1	**6**	**26**	<0.4	<0.5	**8,000**	<1	**16**	<5	**11,000**	<1	**1,200**	**3,200**	<0.1	**5.8**	**2,200**	<5	<0.5	**10,000**	<0.2	<5	<10
		10/7/2014	**2,800**	<1	**8.7**	**38**	<0.4	<0.5	**11,000**	**2.2**	**14**	**8.2**	**16,000**	**3**	**1,900**	**3,800**	<0.1	**8**	**2,400**	<5	<0.5	**17,000**	<0.2	<5	**30**
		10/19/2015	**170**	<1	**9.1**	**38**	<0.4	<0.5	**9,300**	<1	**16**	<5	**16,000**	<1	**1,400**	**5,700**	<0.1	**5.8**	**2,500**	<5	<0.5	**20,000**	<0.2	<5	<10
		10/27/2016	**600**	<1	**8.7**	**35**	<0.4	<0.5	**10,000**	<1	**11**	<5	**14,000**	<1	**1,900**	**5,900**	<0.1	<5	**2,200**	<5	<0.5	**18,000**	<0.2	<5	<10
		10/10/2017	**550**	<1	**11**	**32**	<2	<0.5	**10,000**	<1	**5.2**	<5	**16,000**	<1	**1,600**	**4,900**	<0.1	<5	**2,400**	<5	<0.5	**16,000**	<0.2	<5	<10
PZ-107	Pre-Cap Construction	4/23/2009	<100	<50	<5	**24**	<5	<4	**86,000**	<10	<20	<10	**2,700**	<10	**4,400**	**714**	<0.2	<25	**7,300**	<10	<7	**13,000**	<20	<10	<50
		7/28/2009	<100	<2	**10**	**31**	<4	<4	**99,000**	<10	<20	<10	**2,400**	<10	**4,800**	**616**	<0.2	<25	**9,800**	<10	<7	**11,000**	<2	<10	<50
		10/29/2009	<100	<50	**10**	**33**	<5	<4	**120,000**	<10	<20	<10	**1,900**	<10	**5,000**	**611**	<0.2	<25	**10,000**	<10	<7	**14,000**	<20	<10	<50
		1/21/2010	<100	<2	**7**	**23**	<4	<4	**91,000**	<10	<20	<10	**1,700**	<10	**5,100**	**629**	<0.2	<25	**6,900**	<10	<7	**10,000**	<2	<10	<50
	Post-Cap Construction	5/3/2012	<50	<1	**3**	**38**	<0.4	<0.5	**140,000**	<1	<1	<5	**2,000**	<1	**6,000**	**770**	<0.1	<5	**11,000**	<5	<0.5	**18,000**	<0.2	<5	<10
		10/3/2012	<50	<1	**4.5**	**35**	<0.4	<0.5	**120,000**	<1	<1	<5	**1,500**	<1	**4,500**	**660**	<0.1	<5	**10,000**	<5	<0.5	**12,000**	<0.2	<5	<10
		5/1/2013	<50	<1	**2.8 JK**	**28**	<0.4	<0.5	**110,000**	<1	<1	<5	**1,400**	<1	**5,100**	**620**	<0.1 UJL	<5	**7,500**	<5	<0.5	**8,800**	<0.2	<5 UJL	<10
		10/7/2013	**130**	<1	**4.1**	**29**	<0.4	<0.5	**100,000**	<1	<1	<5	**1,300**	<1	**4,100**	**540**	<0.1	<5	**9,000**	<5	<0.5	**9,200**	<0.2	<5	<10
		4/22/2014	<50	<1	**2.6**	**22**	<0.4	<0.5	**110,000**	<1	<1	<5	**1,900**	<1	**5,100**	**570**	<0.1	<5	**7,300**	<5	<0.5	**8,200**	<0.2	<5	<10
		10/6/2014	<50	<1	**3.4**	**31**	<0.4	<0.5	**110,000**	<1	<1	<5	**1,200**	<1	**4,300**	**500**	<0.1	<5	**9,700**	<5	<0.5	**8,600**	<0.2	<5	<10
		10/19/2015	**59**	<1	**3.8**	**32**	<0.4	<0.5	**100,000**	<1	<1	<5	**1,400**	<1	**3,700**	**540**	<0.1	<5	**11,000**	<5	<0.5	**11,000**	<0.2	<5	<10
		10/26/2016	**59**	<1	**3.8**	**27**	<0.4	<0.5	**110,000**	<1	<1	<5	**1,400**	<1	**3,700**	**450**	<0.1	<5	**9,700**	<5	<0.5	**12,000**	<0.2	<5	<10
		10/10/2017	<50	<1	**1.7**	**31**	<2	<0.5	**110,000**	<1	<1	<5	**1,000**	<1	**3,900**	**590**	<0.1	<5	**8,600**	<5	<0.5	**9,600**	<0.2	<5	<10

Table 4-4
Metals Analytical Data Summary
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
		PAL	200	6	10	2,000	4	5	5,000	100	50	1,300	300	15	5,000	840	2	100	35,000	50	100	5,000	2	30	500
		MDL	26	0.16	0.34	0.36	0.03	0.026	88	0.38	0.053	0.16	26	0.12	37	0.3	0.04	0.12	460	2.5	0.16	1,900	0.15	3.1	5.1
		QL	50	1	0.4	10	0.4	0.5	150	1	1	5	50	1	150	1	0.1	5	2,000	5	0.5	2,000	0.2	5	10
PZ-108	Pre-Cap Construction	4/23/2009	<100	<50	**6**	**35**	<5	<4	**120,000**	<10	<20	<10	**2,200**	<10	**8,700**	**901**	<0.2	<25	**7,800**	<10	<7	**7,600**	<20	<10	<50
		7/28/2009	**160**	<2	**15**	**42**	<4	<4	**120,000**	<10	<20	<10	**2,300**	<10	**9,000**	**804**	<0.2	<25	**8,300**	<10	<7	**6,400**	<2	<10	<50
		10/30/2009	<100	<50	**10**	**38**	<5	<4	**120,000**	<10	<20	<10	**1,700**	<10	**7,800**	**723**	<0.2	<25	**9,300**	<10	<7	**8,600**	<20	<10	<50
		1/22/2010	<100	<2	**11**	**30**	<4	<4	**110,000**	<10	<20	<10	**2,100**	<10	**8,000**	**904**	<0.2	<25	**6,700**	<10	<7	**6,700**	<2	<10	<50
	Post-Cap Construction	5/2/2012	<50	<1	**8.3**	**25**	<0.4	<0.5	**74,000**	<1	<1	<5	**1,000**	<1	**4,300**	**590**	<0.1	<5	**7,900**	<5	<0.5	**37,000**	<0.2	<5	<10
		10/2/2012	<50	<1	**4.7**	**44**	<0.4	<0.5	**120,000**	<1	<1	<5	**950**	<1	**6,400**	**590**	<0.1	**5**	**11,000**	<5	<0.5	**45,000**	<0.2	<5	<10
		5/1/2013	**58**	<1	**6.9 JK**	**47**	<0.4	<0.5	**130,000**	<1	<1	<5	**1,700**	<1	**12,000**	**990**	<0.1 UJL	**6.8**	**9,600**	<5	<0.5	**56,000**	<0.2	<5 UJL	<10
		10/7/2013	**83**	<1	**3**	**18**	<0.4	<0.5	**64,000**	<1	<1	<5	**640**	<1	**3,100**	**260**	<0.1	<5	**7,100**	<5	<0.5	**12,000**	<0.2	<5	<10
		4/22/2014	<50	<1	**4.7**	**18**	<0.4	<0.5	**71,000**	<1	<1	<5	**1,200**	<1	**3,700**	**440**	<0.1	<5	**5,200**	<5	<0.5	**14,000**	<0.2	<5	<10
		10/6/2014	<50	<1	**2.5**	**24**	<0.4	<0.5	**78,000**	<1	<1	<5	**720**	<1	**3,800**	**340**	<0.1	<5	**7,800**	<5	<0.5	**10,000**	<0.2	<5	<10
		10/19/2015	**69**	<1	**2.8**	**25**	<0.4	<0.5	**75,000**	<1	<1	<5	**810**	<1	**3,800**	**400**	<0.1	<5	**9,300**	<5	<0.5	**17,000**	<0.2	<5	<10
		10/26/2016	**79**	<1	**2.4**	**21**	<0.4	<0.5	**72,000**	<1	<1	<5	**940**	<1	**3,900**	**380**	<0.1	<5	**7,800**	<5	<0.5	**13,000**	<0.2	<5	<10
		10/10/2017	<50	<1	**1.6**	**22**	<2	<0.5	**66,000**	<1	<1	<5	**1,100**	<1	**4,000**	**430**	<0.1	<5	**7,100**	<5	<0.5	**11,000**	<0.2	<5	<10
PZ-109	Pre-Cap Construction	4/22/2009	<100	<50	**7**	**35**	<5	<4	**140,000**	<10	<20	<10	**8,300**	<10	**3,800**	**882**	<0.2	<25	**6,500**	<10	<7	**48,000**	<20	<10	<50
		7/28/2009	<100	<2	**7**	**28**	<4	<4	**110,000**	<10	<20	<10	**6,600**	<10	**3,200**	**725**	<0.2	<25	**5,900**	<10	<7	**31,000**	<2	<10	<50
		10/29/2009	<100	<50	**30**	**22**	<5	<4	**120,000**	<10	<20	<10	**3,600**	<10	**3,400**	**420**	<0.2	<25	**6,400**	<10	<7	**6,200**	<20	<10	<50
		1/21/2010	<100	<2	**14**	**19**	<4	<4	**100,000**	<10	<20	<10	**5,500**	<10	**3,100**	**646**	<0.2	<25	**4,800**	<10	<7	**8,900**	<2	<10	<50
	Post-Cap Construction	5/2/2012	<50	<1	**23**	**44**	<0.4	<0.5	**170,000**	<1	<1	<5	**6,200**	<1	**4,100**	**820**	<0.1	**8.1**	**6,300**	<5	<0.5	**77,000**	<0.2	<5	<10
		10/2/2012	<50	<1	**58**	**18**	<0.4	<0.5	**78,000**	<1	<1	<5	**1,700**	<1	**2,400**	**140**	<0.1	<5	**5,800**	<5	<0.5	**26,000**	<0.2	<5	<10
		5/1/2013	**72**	<1	**20 JK**	**35**	<0.4	<0.5	**140,000**	<1	<1	<5	**5,200**	<1	**3,500**	**660**	<0.1 UJL	**6**	**5,100**	<5	<0.5	**49,000**	<0.2	<5 UJL	<10
		10/9/2013	**120**	<1	**43**	**15**	<0.4	<0.5	**73,000**	<1	<1	<5	**2,500**	<1	**4,100**	**160**	<0.1	<5	**3,900**	<5	<0.5	**21,000**	<0.2	<5	<10
		4/22/2014	<50	<1	**15**	**30**	<0.4	<0.5	**150,000**	<1	<1	<5	**4,600**	<1	**4,100**	**610**	<0.1	<5	**4,500**	<5	<0.5	**35,000**	<0.2	<5	<10
		10/7/2014	<50	<1	**48**	**13**	<0.4	<0.5	**80,000**	<1	<1	<5	**2,600**	<1	**4,500**	**140**	<0.1	<5	**4,300**	<5	<0.5	**14,000**	<0.2	<5	<10
		10/19/2015	**55**	<1	**52**	**25**	<0.4	<0.5	**120,000**	**1**	<1	<5	**3,300**	<1	**5,100**	**260**	<0.1	<5	**7,000**	<5	<0.5	**18,000**	<0.2	<5	<10
		10/27/2016	**89**	<1	**32**	**25**	<0.4	<0.5	**120,000**	<1	<1	<5	**4,800**	<1	**5,300**	**480**	<0.1	<5	**7,700**	<5	<0.5	**16,000**	<0.2	<5	<10
		10/10/2017	<50	<1	**59**	**24**	<2	<0.5	**110,000**	<1	<1	<5	**3,400**	<1	**5,100**	**210**	<0.1	<5	**9,000**	<5	<0.5	**10,000**	<0.2	<5	<10

Notes:
1. PAL = Project Action Limit
2. MDL = Method Detection Limit
3. QL = Quantitation Limit
4. PAL
5. All results are presented in units of micrograms per liter (ug/L)
6. JH
7. UJL
8. Values in **bold** indicate a detection above the laboratory Quantitation Limit
9. Yellow highlighted cells indicate an exceedance of the Project Action Limit

Table 4-5
General Chemistry Analytical Data Summary
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			Alkalinity	Chemical Oxygen Demand	Chloride	Cyanide	Nitrite	Nitrate	Total Dissolved Solids	Sulfate
		PAL				0.2				
		MDL	0.78	7.8	0.68	0.009	0.0084	0.036	7.7	1.4
		QL	1	15	1	0.01	0.02	0.05	10	2
BEDROCK WELLS										
OW-9	Pre-Cap Construction	4/23/2009	**14**	NT	**1,600**	0.008	NT	<0.1	**3,400**	**74**
		7/27/2009	**12**	NT	**1,800**	<0.005	NT	<0.5	**3,400**	**78**
		10/28/2009	**11**	NT	**1,800**	**0.153**	NT	<0.1	**3,400**	**84**
		1/20/2010	**11**	NT	**2,000**	0.006	NT	<0.1	**3,400 J**	**72**
	Post-Cap Construction	5/1/2012	**5.2**	**93**	**2,600**	**0.056**	NT	<0.05	**4,500**	**71**
		10/1/2012	**3.8 J**	**110**	**2,500**	<0.01	NT	<0.05	**3,000 J**	**78**
		4/30/2013	**7**	**110 JK**	**2,400**	<0.01	<0.01	<0.05	**3,900 JK**	**62**
		10/7/2013	**7.5 J**	**300 J**	**2,700 J+**	<0.01	<0.01	<0.05 UJ	**4,800**	**70**
		4/21/2014	**5 J+**	**260 J**	**2,900**	<0.01	<0.01	<0.05 UJ	**4,000**	**52**
		10/6/2014	**5.7 J+**	**350**	**1,200 J+**	<0.01	<0.01	<0.05 UJ	**4,100**	**73 J**
		10/19/2015	**5.5**	**490J**	**3,400J**	<0.01	<0.01	<0.05	**4,800**	**40 J-**
		10/26/2016	**8 J+**	**470**	**2,800**	<0.01	<0.01	<0.05	**4,300**	**80**
		10/9/2017	**9 J**	**160**	**3,000**	<0.01	<0.01	<0.05	**3,800**	**79**
MW-208B	Pre-Cap Construction	4/23/2009	**49**	NT	**70**	<0.005	NT	**0.13**	**230**	**23**
		7/27/2009	**55**	NT	**68**	<0.005	NT	<0.5	**270**	**23**
		10/29/2009	**53**	NT	**66**	<0.005	NT	<0.1	**220**	**24**
		1/22/2010	**55**	NT	**73**	<0.005	NT	<0.1	**230**	**22**
	Post-Cap Construction	5/2/2012	**55**	<15	**75**	<0.01	NT	<0.05	**200**	**9.3**
		10/3/2012	**55 J**	<15	**76**	<0.01	NT	<0.05	**260 J**	**20**
		5/2/2013	**54**	<15 UJK	**76**	<0.01	<0.01	<0.05	**210 JK**	**18**
		10/7/2013	**56 J**	**18**	**77 J+**	<0.01	<0.01	**0.09**	**250**	**20**
		4/23/2014	**53**	<15	**89 J+**	<0.01	<0.01	<0.05	**200 J+**	**19**
		10/7/2014	**45**	<15	**78**	**0.048**	<0.01	<0.05	**260 J**	**26**
		10/19/2015	**55**	<15	**90J+**	**0.016**	<0.01	<0.05	**290**	**22**
		10/27/2016	**30**	<15	**83**	<0.01	<0.01	<0.05	**270 J**	**19**
		10/10/2017	**52**	<15	**79**	<0.01	<0.01	<0.05	**130 J+**	**18**
MW-209B	Pre-Cap Construction	4/20/2009	**54**	NT	**130**	<0.005	NT	<0.1	**460**	**84**
		7/28/2009	**46**	NT	**130**	<0.005	NT	<0.5	**430**	**86**
		10/29/2009	**40**	NT	**110**	<0.005	NT	<0.1	**370**	**100**
		1/21/2010	**45**	NT	**130**	<0.005	NT	<0.1	**420**	**91**
	Post-Cap Construction	5/3/2012	**34**	<15	**140**	<0.01	NT	<0.05	**370**	**57**
		10/2/2012	**32 J**	**19**	**170**	<0.01	NT	<0.05	**260 J**	**89 J**
		5/1/2013	**35**	<15 UJK	**130**	<0.01	<0.01	<0.05	**320 JK**	**67**
		10/8/2013	**30**	**24**	**150 J+**	<0.01	<0.01 UJ	<0.05	**420**	**77**
		4/22/2014	**34**	**22**	**170 J+**	<0.01	<0.01	<0.05	**380 J**	**68**
		10/7/2014	**27**	<15	**210 J+**	<0.01	<0.01	**0.053**	**440 J**	**54**
		10/19/2015	**28**	**17**	**200**	<0.01	<0.01	<0.05	**390**	**75 J-**
		10/27/2016	**54**	**<15**	**190 J+**	<0.01	<0.01	<0.05	**490 J**	**47**
		10/10/2017	**30**	19	**180**	<0.01	<0.01	<0.05	**320 J+**	**61**

Table 4-5
General Chemistry Analytical Data Summary
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			Alkalinity	Chemical Oxygen Demand	Chloride	Cyanide	Nitrite	Nitrate	Total Dissolved Solids	Sulfate
		PAL				0.2				
		MDL	0.78	7.8	0.68	0.009	0.0084	0.036	7.7	1.4
		QL	1	15	1	0.01	0.02	0.05	10	2
DEEP OVERBURDEN WELLS										
OW-10	Pre-Cap Construction	4/22/2009	**16**	NT	**150**	<0.005	NT	<0.1	**360**	**31**
		7/27/2009	**16**	NT	**160**	<0.005	NT	<0.1	**420**	**33**
		10/28/2009	**17**	NT	**170**	<0.005	NT	<0.1	**410**	**36**
		1/20/2010	**16**	NT	**100**	<0.005	NT	<0.1	**240 J**	**28**
	Post-Cap Construction	5/1/2012	**13**	<15	**180**	**0.051**	NT	<0.05	**340**	**21**
		10/1/2012	**13 J**	**19**	**340**	<0.01	NT	<0.05	**390 J**	**26**
		4/30/2013	**14**	<15 UJK	**170**	<0.01	<0.01	<0.05	**340 JK**	**19**
		10/7/2013	**26 J**	**21**	**58 J+**	<0.01	<0.01	**5.7**	**160**	**14**
		4/21/2014	**12**	**38**	**200**	<0.01	<0.01	**0.078 J**	**310 J+**	**20**
		10/6/2014	**25**	**48**	**68 J+**	<0.01	<0.01	<0.05	**160**	**5.7**
		10/19/2015	**12**	**23**	**2100**	<0.01	<0.01	<0.05	**560**	**18 J-**
		10/26/2016	**12**	**32**	**290**	<0.01	<0.01	<0.05	**480**	**22**
		10/9/2017	**8 J**	**32**	**360**	0.014	<0.01	<0.05	**560**	**23**
OW-20	Pre-Cap Construction	4/20/2009	**66**	NT	**140**	<0.005	NT	<0.5	**360**	**20**
		7/28/2009	**62**	NT	**120**	<0.005	NT	<2	**320**	**20**
		10/29/2009	**71**	NT	**93**	<0.005	NT	<0.1	**270**	**21**
		1/21/2010	**70**	NT	**100**	<0.005	NT	<0.1	**300**	**20**
	Post-Cap Construction	5/3/2012	**49**	**23**	**150**	<0.01	NT	<0.05	**340**	**11**
		10/3/2012	**53 J**	<15	**140**	<0.01	NT	**0.08**	**310 J**	**17**
		5/1/2013	**52**	<15 UJK	**68**	<0.01	<0.01	**0.058**	**270 JK**	**18**
		10/9/2013	**61**	**24**	**95 J+**	<0.01	<0.01	**0.089**	**250**	**21**
		4/22/2014	**60**	**28**	**110 J+**	<0.01	<0.01	<0.05	**210 J+**	**21**
		10/7/2014	**55**	<15	**150 J+**	<0.01	<0.01	<0.05	**210 J**	**17**
		10/19/2015	**46**	**23**	**140**	<0.01	<0.01	<0.05	**350**	**15J-**
		10/27/2016	**42**	**22**	**310**	<0.01	<0.01	<0.05	**520 J**	**23**
		10/10/2017	**43**	**22**	**170**	0.014	<0.01	<0.05	**320 J+**	**26**
MW-208D	Pre-Cap Construction	4/23/2009	**58**	NT	**18**	<0.005	NT	<0.1	**120**	<10
		7/27/2009	**59**	NT	**21**	<0.005	NT	<0.5	**120**	<10
		10/28/2009	**58**	NT	**22**	<0.005	NT	<0.1	**140**	<10
		1/22/2010	**56**	NT	**30**	<0.005	NT	<0.1	**130**	<10
	Post-Cap Construction	5/2/2012	**59**	<15	**61**	<0.01	NT	<0.05	**180**	**9.3**
		10/3/2012	**59 J**	<15	**75**	<0.01	NT	<0.05	**1000 J**	**8.2 J**
		5/2/2013	**58**	<15 UJK	**67**	<0.01	<0.01	<0.05	**150 JK**	**8.4**
		10/8/2013	**55**	**27**	**140 J+**	<0.01	<0.01 UJ	**4.6**	**190**	**9**
		4/23/2014	**54**	**20**	**93 J+**	<0.01	<0.01	**0.16**	**210 J+**	**9.5**
		10/7/2014	**52**	<15	**70**	<0.01	<0.01	<0.05	**200 J**	**13**
		10/19/2015	**46**	**18**	**130**	**0.011**	<0.01	<0.05	**330**	**14**
		10/27/2016	**20**	**28**	**230 J+**	<0.01	<0.01	<0.05	**480 J**	**23**
		10/9/2017	**46 J-**	**29**	**190**	0.015	<0.01	<0.05	**320 J+**	**21**
SHALLOW OVERBURDEN WELLS										
OW-11	Pre-Cap Construction	4/22/2009	**59**	NT	**33**	<0.005	NT	<0.5	**150**	**14**
		7/27/2009	**61**	NT	**47**	<0.005	NT	<1	**170**	**22**
		10/28/2009	**64**	NT	**34**	<0.005	NT	<0.1	**170**	**21**
		1/20/2010	**66**	NT	**22**	<0.05	NT	<0.1	**130 J**	**14**
	Post-Cap Construction	5/1/2012	**57**	<15	**18**	<0.01	NT	<0.05	**78**	**4.4**
		10/1/2012	**68 J**	<15	**20**	<0.01	NT	**0.051**	**78 UJ**	<2
		4/30/2013	**65**	<15 UJK	**33**	<0.01	<0.01	<0.05	**140 JK**	**4.9**
		10/8/2013	**61**	**18**	**44 J+**	<0.01	<0.01 R	**0.19 J**	**110**	**5**
		4/21/2014	**56**	**24**	**90**	<0.01	<0.01	<0.05 UJ	**42 J+**	<2
		10/6/2014	**68**	<15	**60 J+**	<0.01	<0.01	<0.05	**170**	<2
		10/19/2015	**53**	<15	**58**	<0.01	<0.01	<0.05	**220**	<2
		10/26/2016	**68**	19	**85**	<0.01	<0.01	0.15	**96**	<2
		10/9/2017	**65 J-**	**29**	**75**	<0.01	<0.01	**0.15**	**86 J+**	8.5

Table 4-5
General Chemistry Analytical Data Summary
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			Alkalinity	Chemical Oxygen Demand	Chloride	Cyanide	Nitrite	Nitrate	Total Dissolved Solids	Sulfate
		PAL				0.2				
		MDL	0.78	7.8	0.68	0.009	0.0084	0.036	7.7	1.4
		QL	1	15	1	0.01	0.02	0.05	10	2
OW-12	Pre-Cap Construction	4/22/2009	**160**	NT	**9.5**	<0.005	NT	<0.1	**220**	<10
		7/28/2009	**180**	NT	**8.5**	<0.005	NT	<0.1	**220**	<10
		10/28/2009	**160**	NT	**19**	<0.005	NT	<0.1	**240**	<10
		1/20/2010	**160**	NT	**15**	<0.005	NT	<0.1	**210 J**	<10
	Post-Cap Construction	5/2/2012	**200**	**60**	**57**	<0.01	NT	<0.05	**350**	**13**
		10/2/2012	**180 J**	**61**	**50**	<0.01	NT	<0.05	**200 J**	<2 UJ
		4/30/2013	**200**	**59 JK**	**40**	**0.011**	<0.01	<0.05	**270 JK**	**6**
		10/7/2013	**260 J**	**67**	**36 J+**	<0.01	<0.01	**0.2**	**310**	**6.1**
		4/21/2014	**220**	**47**	**26**	<0.01	<0.01	**0.12 J**	**230 J+**	**14**
		10/6/2014	**190**	**77**	**24 J+**	<0.01	<0.01	**0.23**	**230**	<2
		10/19/2015	**240**	**57**	**27**	<0.01	<0.01	<0.05	**310**	<2
		10/26/2016	**250**	**53**	**33**	<0.01	<0.01	<0.05	**300**	<2
		10/9/2017	**280 J-**	**55**	**27**	<0.01	<0.01	0.14	**250 J+**	<2
OW-21	Pre-Cap Construction	4/20/2009	**8.6 U**	NT	**1.9**	<0.005	NT	<0.1	**78 J**	<10
		7/28/2009	**18**	NT	**5.2**	<0.005	NT	<0.5	**46**	**12**
		10/29/2009	**13**	NT	**7.9**	<0.005	NT	<0.1	**82**	**26**
		1/21/2010	**12**	NT	**3**	<0.005	NT	<0.1	**46**	**17**
	Post-Cap Construction	5/3/2012	**27**	<15	**4.3 U**	<0.01	NT	**2.1**	**78**	**6.1 J**
		10/2/2012	**20 J**	<15	**14**	<0.01	NT	**0.089**	**22 J**	**14 J**
		5/1/2013	**4.5**	<15 UJK	**5.3**	<0.01	<0.01	**2.8**	**62 JK**	**11**
		10/8/2013	**11**	<15	**9.7 J+**	<0.01	<0.01 UJ	**0.47**	**44**	**17**
		4/22/2014	**7.5 J+**	**20**	**27**	<0.01	<0.01	**0.24**	**28 J+**	**15**
		10/7/2014	**25**	<15	**10 J+**	<0.01	<0.01	<0.05	**64 J**	**13**
		10/19/2015	**38**	<15	**8.3J+**	<0.01	<0.01	<0.05	**88**	**16J-**
		10/27/2016	**57**	<15	**5 J+**	<0.01	<0.01	<0.05	**98 J**	**21**
		10/10/2017	**58**	19	**6 J+**	0.013	<0.01	<0.05	**76 J+**	**17**
MW-208S	Pre-Cap Construction	4/23/2009	**54**	NT	**10**	<0.005	NT	<0.5	**85**	<10
		7/27/2009	**66**	NT	**10**	<0.005	NT	<1	**88**	<10
		10/29/2009	**57**	NT	**13**	<0.005	NT	**0.12**	**110**	<10
		1/22/2010	**57**	NT	**17**	<0.005	NT	<0.1	**100**	<10
	Post-Cap Construction	5/2/2012	**61**	**29**	**40**	<0.01	NT	**0.055**	**140**	<2
		10/3/2012	**88 J**	<15	**27**	<0.01	NT	**0.091**	**150 J**	<2
		5/2/2013	**67**	**19 JK**	**96**	<0.01	<0.01	<0.05	**110 JK**	<2
		10/8/2013	**69**	**30**	**49 J+**	<0.01	<0.01 UJ	**0.072**	**130**	<2
		4/23/2014	**50**	**25**	**52**	<0.01	<0.01	<0.05	**120 J+**	<2
		10/7/2014	**73**	15	**57**	<0.01	<0.01	**0.23**	**190 J**	<2
		10/19/2015	**65**	**24**	**73J+**	<0.01	<0.01	<0.05	**230**	**4.2**
		10/27/2016	**75**	**25**	**56**	<0.01	<0.01	0.074	**190 J**	**4.2**
		10/9/2017	**54 J-**	**32**	**74**	<0.01	<0.01	**0.14**	**160 J+**	**5.4**
P-5	Pre-Cap Construction	4/20/2009	**31**	NT	**4.4**	0.01	NT	<0.5	**56**	**15**
		7/28/2009	**32**	NT	**3.4 U**	<0.005	NT	<1	**57**	**14**
		10/29/2009	**32**	NT	**2.8**	<0.005	NT	<0.1	**52 U**	**14**
		1/21/2010	**39**	NT	**5.9**	<0.005	NT	<0.1	**59**	<10
	Post-Cap Construction	5/2/2012	**34**	<15	**7.7**	<0.01	NT	<0.05	**82**	**5.1**
		10/2/2012	**54 J**	**28**	**34**	<0.01	NT	**0.081**	**18 J**	<2 UJ
		5/1/2013	**46**	<15 UJK	**12**	<0.01	<0.01	<0.05	**62 JK**	**8.7**
		10/8/2013	**47**	**24**	**22 J+**	<0.01	<0.01 UJ	<0.05	**110**	**6.8**
		4/22/2014	**50**	**36**	**34**	<0.01	<0.01	<0.05	**82 J+**	**9**
		10/7/2014	**53**	**21**	**23 J+**	<0.01	<0.01	<0.05	**96 J**	<2
		10/19/2015	**76**	**26**	**17J+**	**0.013**	<0.01	<0.05	**120**	**3J-**
		10/27/2016	**84**	**34**	**12 J+**	<0.01	<0.01	<0.05	**120 J**	**5.2**
		10/10/2017	**80**	**31**	**10 J+**	<0.01	<0.01	<0.05	**24 J+**	**<2**

Table 4-5
General Chemistry Analytical Data Summary
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			Alkalinity	Chemical Oxygen Demand	Chloride	Cyanide	Nitrite	Nitrate	Total Dissolved Solids	Sulfate
		PAL				0.2				
		MDL	0.78	7.8	0.68	0.009	0.0084	0.036	7.7	1.4
		QL	1	15	1	0.01	0.02	0.05	10	2
PZ-107	Pre-Cap Construction	4/23/2009	**280**	NT	**3.9**	<0.005	NT	**0.1**	**330**	<10
		7/28/2009	**300**	NT	**4 U**	<0.005	NT	<0.1	**380**	<10
		10/29/2009	**340**	NT	**4.6**	<0.005	NT	<0.1	**400**	<10
		1/21/2010	**280**	NT	**3.7**	<0.005	NT	<0.1	**340**	<10
	Post-Cap Construction	5/3/2012	**380**	**55**	**27**	<0.01	NT	<0.05	**470**	**13**
		10/3/2012	**360 J**	**33**	**11**	<0.01	NT	<0.05	**390 J**	<2
		5/1/2013	**320**	**19 JK**	**8.2**	<0.01	<0.01	<0.05	**340 JK**	**5.4**
		10/7/2013	**300 J**	**27**	**9.7 J+**	<0.01	<0.01	**0.11**	**320**	**6.5**
		4/22/2014	**290**	**24**	**29**	<0.01	<0.01	<0.05	**240 J+**	<2
		10/6/2014	**290**	<15	**6.3 J+**	<0.01	<0.01	<0.05	**300**	<2
		10/19/2015	**310**	**17**	**7.8J+**	<0.01	<0.01	<0.05	**330J**	<2
		10/26/2016	**290**	**<15**	**20 J+**	<0.01	<0.01	<0.05	**250**	<2
		10/10/2017	**300**	25	**8.5 J+**	<0.01	<0.01	<0.05	**270 J+**	12
PZ-108	Pre-Cap Construction	4/23/2009	**360**	NT	**2.7**	<0.005	NT	<0.1	**430**	**21**
		7/28/2009	**370**	NT	**2.8 U**	<0.005	NT	<0.1	**450**	**21**
		10/30/2009	**340**	NT	**2**	<0.005	NT	<0.1	**400**	<10
		1/22/2010	**320**	NT	**4**	<0.005	NT	<0.1	**390**	**15**
	Post-Cap Construction	5/2/2012	**220**	**29**	**24**	<0.01	NT	<0.05	**330**	**29**
		10/2/2012	**350 J**	**52**	**56**	<0.01	NT	<0.05	**390 J**	**14 J**
		5/1/2013	**340**	**36 JK**	**30**	<0.01	<0.01	<0.05	**550 JK**	**170**
		10/7/2013	**200 J**	**31**	**6.3 J+**	<0.01	<0.01	<0.05	**240**	**8.8**
		4/22/2014	**140**	**28**	**34**	<0.01	<0.01	<0.05	**200 J+**	**45**
		10/6/2014	**230**	15	**9.2 J+**	<0.01	<0.01	<0.05	**220**	<2
		10/19/2015	**220**	**20**	**9.7J+**	<0.01	<0.01	<0.05	**230**	**7 J-**
		10/26/2016	**200**	**<15**	**8.6 J+**	<0.01	<0.01	0.13	**170**	**21**
		10/10/2017	**200**	25	**5 J+**	<0.01	<0.01	**0.36**	**160 J+**	**2.2**
PZ-109	Pre-Cap Construction	4/22/2009	**330**	NT	**100**	<0.005	NT	**0.14**	**590**	<10
		7/28/2009	**340**	NT	**30**	<0.005	NT	<0.5	**430**	<10
		10/29/2009	**330**	NT	**2.9**	<0.005	NT	<0.1	**420**	<10
		1/21/2010	**300**	NT	**11**	<0.005	NT	<0.1	**370**	**12**
	Post-Cap Construction	5/2/2012	**420**	**63**	**130**	<0.01	NT	<0.05	**640**	**64**
		10/2/2012	**190 J**	**91**	**32**	<0.01	NT	<0.05	**280 J**	**39 J**
		5/1/2013	**400**	**77 JK**	**49**	<0.01	<0.01	**0.08**	**510 JK**	**23**
		10/9/2013	**190**	**82**	**13 J+**	<0.01	<0.01	<0.05	**310**	**55**
		4/22/2014	**370**	**47**	**62**	<0.01	<0.01	<0.05	**430 J**	**30**
		10/7/2014	**160**	**56**	**13 J+**	**0.013**	<0.01	**0.079**	**220 J**	**41**
		10/19/2015	**320**	**68**	**17 J+**	<0.01	<0.01	<0.05	**420**	**32 J-**
		10/27/2016	**310**	**64**	**19 J+**	0.01	<0.01	<0.05	**380 J**	**32**
		10/10/2017	**300**	**55**	**9 J+**	<0.01	<0.01	<0.05	**320 J+**	**26**

Notes:
1. PAL = Project Action Limit
2. MDL = Method Detection Limit
3. QL = Quantitation Limit
4. PAL, MDL, and QL values are from Quality Assurance Project Plan (QAPP) Table 6-4, as revised on 4/12/12
5. All results are presented in units of micrograms per liter (mg/L)
6. JH, J+, JK, or J = Result is qualified as estimated; biased high (JH or J+), biased low (JL or J-), or bias unknown (JK or J).
7. UJK or UJ = Result is qualified as not detected based on data validation; bias unknown.
8. Values in **bold** indicate a detection above the laboratory Quantitation Limit

Table 3-1
Passive Gas Vent Monitoring Data
Iron Horse Park Superfund Site AOC 7, OU3, Billerica, Massachusetts

Well ID	Date	Time	Monitoring Parameter				
			VOC (ppmv)	CH_4 (%)	O_2 (%)	CO_2 (%)	H_2S (ppm)
GV-101	07/27/11	10:01	0.0	0.0	20.9	0.0	0
	10/27/11	12:05	0.0	0.1	11.0	4.9	0
	10/28/11	16:52	0.0	0.0	20.9	0.0	0
	01/24/12	12:36	0.0	0.0	20.6	0.0	0
	04/18/12	8:01	0.0	0.2	20.6	0.3	1
	07/24/12	9:21	0.0	0.0	15.5	3.1	0
	11/01/12	10:26	0.0	0.0	14.9	2.4	0
	01/31/13	10:15	0.0	0.0	20.7	0.0	0
	04/30/13	9:31	0.0	0.0	19.8	0.0	0
	07/15/13	8:51	0.0	0.2	20.3	0.0	2
	10/08/13	14:32	0.0	0.0	17.5	2.3	0
	01/15/14	12:13	0.0	0.0	20.8	0.0	0
	04/21/14	15:52	0.0	0.1	17.9	0.8	0
	07/14/14	12:05	0.0	0.0	19.8	0.0	0
	10/07/14	16:29	0.0	0.0	19.7	0.0	0
	01/14/15	10:48	0.0	0.0	18.1	1.0	0
	07/09/15	13:52	0.0	0.1	20.1	0.0	0
	07/27/16	16:23	0.0	0.0	20.0	0.0	0
	07/28/17	13:05	0.1	0.0	20.7	0.0	0
GV-102	07/27/11	10:04	0.0	0.0	17.9	0.0 / 2.9	0
	10/27/11	12:08	0.0	0.0	19.7	2.0	0
	10/28/11	16:40	0.0	0.0	20.7	0.4	0
	01/24/12	12:30	0.0	0.0	18.0	1.2	0
	04/18/12	7:57	0.0	0.0	20.7	0.3	0
	07/24/12	9:13	0.0	0.0	18.3	1.6	0
	11/01/12	10:20	0.0	0.0	18.6	1.5	0
	01/31/13	10:05	0.0	0.0	20.5	0.0	0
	04/30/13	9:39	0.0	0.0	19.1	0.6	0
	07/15/13	8:45	0.0	0.1	20.5	0.0	1
	10/08/13	14:26	0.0	0.0	19.5	0.9	0
	01/15/14	12:09	0.0	0.0	18.5	1.1	0
	04/21/14	15:28	0.0	0.0	18.3	1.1	0
	07/14/14	12:09	0.0	0.0	19.7	0.0	0
	10/07/14	16:20	0.0	0.0	19.0	0.5	0
	01/14/15	10:54	0.0	0.0	19.1	0.7	0
	07/09/15	13:46	0.0	0.1	18.0	1.6	0
	07/27/16	16:17	0.0	0.0	18.6	0.5	0
	07/28/17	13:05	0.0	0.0	20.6	0.0	0
GV-103	07/27/11	10:07	0.0	0.0	21.0	0.0	0
	10/27/11	12:11	0.0	0.0	20.0	0.1	0
	10/28/11	16:43	0.0	0.0	20.9	0.0	0
	01/24/12	12:33	0.0	0.0	11.7	0.1	0
	04/18/12	7:59	0.0	0.0	20.6	0.3	0
	07/24/12	9:17	0.0	0.0	20.2	0.0	0
	11/01/12	10:23	0.0	0.0	16.1	2.2	0
	01/31/13	10:10	0.0	0.0	20.6	0.0	0
	04/30/13	9:35	0.0	0.0	18.6	1.4	0
	07/15/13	8:49	0.0	0.2	20.3	0.0	2
	10/08/13	14:30	0.0	0.0	20.4	0.0	0
	01/15/14	12:13	0.0	0.0	17.4	1.6	0
	04/21/14	15:31	0.0	0.0	20.5	0.0	0
	07/14/14	12:15	0.0	0.0	19.7	0.0	0
	10/07/14	16:23	0.0	0.0	18.4	1.1	0
	01/14/15	10:59	0.1	0.0	15.2	4.0	0
	07/09/15	13:49	0.0	0.1	20.2	0.0	0
	07/27/16	16:20	0.0	0.0	20.1	0.0	0
	07/28/17	13:08	0.0	0.0	20.6	0.0	0

Table 3-1
Passive Gas Vent Monitoring Data
Iron Horse Park Superfund Site AOC 7, OU3, Billerica, Massachusetts

Well ID	Date	Time	Monitoring Parameter				
			VOC (ppmv)	CH_4 (%)	O_2 (%)	CO_2 (%)	H_2S (ppm)
GV-104	07/27/11	10:09	0.0	0.0	20.9	0.0	0
	10/27/11	12:14	0.0	6.4	4.6	9.7	0
	10/28/11	16:46	0.0	5.6	3.8 / 19.3	8.5	95
	01/24/12	12:41	0.0	0.0	20.3	0.2	0
	04/18/12	8:03	0.0	0.6	10.5	6.7	0
	07/24/12	9:26	0.0	5.5	4.4	8.0	0
	11/01/12	10:28	0.3	1.6	6.7	5.9	0
	01/31/13	10:20	0.0	4.6	12.8	3.2	0
	04/30/13	9:27	0.0	0.0	17.9	1.8	0
	07/15/13	8:55	0.0	0.2	20.2	0.0	1
	10/08/13	14:34	0.0	0.0	20.2	0.2	0
	01/15/14	12:15	0.0	2.5	11.7	3.5	0
	04/21/14	15:37	0.0	1.9	15.5	2.4	0
	07/14/14	12:18	0.0	0.0	19.8	0.0	0
	10/07/14	16:35	0.0	0.0	19.5	0.2	0
	01/14/15	11:03	0.0	0.1	18.2	1.1	0
	07/09/15	13:56	0.0	0.1	20.2	0.0	0
	07/27/16	16:26	0.0	0.0	19.7	0.0	0
	07/28/17	13:00	0.0	0.0	20.8	0.0	0
GV-105	07/27/11	10:11	0.0	0.0	21.2	0.0	0
	10/27/11	12:17	0.0	0.1	16.7	2.5	0
	10/28/11	16:49	0.0	0.0	16.2	2.8	0
	01/24/12	12:45	0.0	0.0	20.6	0.1	0
	04/18/12	8:05	0.0	0.5	17.6	2.0	0
	07/24/12	9:30	0.0	0.0	18.8	1.3	0
	11/01/12	10:30	0.0	0.2	17.0	2.9	0
	01/31/13	10:25	0.0	0.1	19.9	0.5	0
	04/30/13	9:24	0.0	0.0	18.5	1.2	0
	07/15/13	8:57	0.0	0.2	20.1	0.0	1
	10/08/13	14:38	0.0	0.0	20.5	0.6	0
	01/15/14	12:17	0.0	0.0	19.5	0.9	0
	04/21/14	15:41	0.0	0.1	17.9	0.8	0
	07/14/14	12:23	0.0	0.0	19.7	0.0	0
	10/07/14	16:43	0.0	0.0	17.1	2.1	0
	01/14/15	11:08	0.0	0.2	18.3	0.9	0
	07/09/15	13:59	0.0	0.1	20.1	0.0	0
	07/27/16	16:29	0.0	0.0	19.6	0.0	0
	07/28/17	13:12	0.0	0.0	20.8	0.0	0
Back-ground	07/09/15	13:42	0.0	0.1	20.3	0.0	0.0
	07/27/16	16:08	0.0	0.0	20.4	0.0	0.0
	07/28/17	12:55	0.0	0.0	20.6	0.0	0.0

Notes:

1. Volatile Organic Compounds (VOCs) were measured with a 10.6-eV MiniRAE 2000 photoionization detector (PID). The range of the MiniRAE 3000 is 0-999.9 ppmv.
2. Methane (CH_4), Oxygen (O_2), Carbon Dioxide (CO_2), and Hydrogen Sulfide (H_2S) were measured with a CES-Landtec GEM 2000+ meter. Meter ranges are: H_2S (0-50 ppm); CH_4 (0-100%); O_2 (0-25%); CO_2 (0-100%).
3. Monitoring was performed on two occasions in October 2011 for quality control purposes.
4. Cells listed with two values (e.g., "3.8 / 19.3") indicate the range reported by the meter.
5. Ambient PID reading on 1/24/12 was 0.4 ppmv.

D.4 – Site Inspection Checklists

- AOC7
- AOC2
- AOC6
- AOC5
- AOC4

Five-Year Review Site Inspection Checklist

("N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: Iron Horse Park OU-3; AOC7	**Date of inspection:** May 30, 2018
Location and Region: N. Billerica, MA; Region I	**EPA ID:** MAD051787323
Agency, office, or company leading the five-year review: USEPA/AECOM	**Weather/temperature:** Clear/75°F
Remedy Includes: (Check all that apply) X Landfill cover/containment X Access controls □ Institutional controls □ Groundwater pump and treatment □ Surface water collection and treatment □ Other_____ _____ □ Monitored natural attenuation □ Groundwater containment □ Vertical barrier walls	
Attachments: □ Inspection team roster attached □ Site map attached	
II. INTERVIEWS	
Interviews were performed by USEPA and are included separately.	

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	☐ Up to date	☐ N/A
	☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A
	Remarks:			
2.	**Site-Specific Health and Safety Plan**	X Readily available	☐ Up to date	☐ N/A
	☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☐ N/A
	Remarks:			
3.	**O&M and OSHA Training Records**	☐ Readily available	☐ 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
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	X 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: Reviewed records prior to site visit			
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
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
☐ PRP in-house X Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____
_____

2. **O&M Cost Records**

Not Reviewed

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

Describe costs and reasons: None noted during review of monthly reports and during_____
_____discussion with EPA Remedial Project Manager_____
_____
_____
_____
_____

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

A. Fencing

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

Remarks: Fence was in good shape.

B. Other Access Restrictions

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

Remarks: Signs are in good shape.

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) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
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
_____
_____
_____
_____

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

D. General

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

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** ☐ Location shown on site map X Roads adequate ☐ N/A
Remarks_____
_____

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS X Applicable ☐ N/A

A. Landfill Surface

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

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 ☐ Holes not evident
   Areal extent_____ Depth_____

   Remarks: Multiple groundhog burrows were observed near the base of the landfill.

5. **Vegetative Cover** X Grass X 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.)** ☐ N/A

   Remarks: Asphalt cover looked good.
   _____

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_____
_____

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

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

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

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

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

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

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

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

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

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

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

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

Remarks:

D. Cover Penetrations X Applicable ☐ N/A

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

Remarks:

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

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

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ 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** ☐ Functioning X N/A

   Remarks:

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

   Remarks: No issues observed

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** □ Location shown on site map X Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Vegetative Growth** □ Location shown on site map X N/A
   □ 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 ☐ Applicable X 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 ☐ 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 ☐ Requires upgrade ☐ Needs to be provided
   Remarks_____
   _____

C. Treatment System ☐ Applicable X 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_____
   _____

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

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

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

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

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

D. Monitoring Data

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

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

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

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.).

This source control remedy appears to be operating as designed.

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.

The landfill cover and gas venting systems are well-maintained.
Monitoring continues to be performed and submitted in a timely fashion.

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.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

With some groundwater contaminant concentrations observed to be low, it may be possible to reduce the list of analytes in the future.

Five-Year Review Site Inspection Checklist

("N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: Iron Horse Park OU-3; AOC2	**Date of inspection:** May 30, 2018
Location and Region: N. Billerica, MA; Region I	**EPA ID:** MAD051787323
Agency, office, or company leading the five-year review: USEPA/AECOM	**Weather/temperature:** Clear/70°F
Remedy Includes: (Check all that apply) X Landfill cover/containment X Access controls □ Institutional controls □ Groundwater pump and treatment □ Surface water collection and treatment □ Other_____ _____ □ Monitored natural attenuation □ Groundwater containment □ Vertical barrier walls	
Attachments: □ Inspection team roster attached □ Site map attached	
II. INTERVIEWS	
Interviews were performed by USEPA and are included separately.	

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	☐ Up to date	☐ N/A
	☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A
	Remarks:			
2.	**Site-Specific Health and Safety Plan**	X Readily available	☐ Up to date	☐ N/A
	☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☐ N/A
	Remarks:			
3.	**O&M and OSHA Training Records**	☐ Readily available	☐ 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
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	X N/A
	Remarks:			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	X N/A
	Remarks:			
7.	**Groundwater Monitoring Records**	☐ Readily available	☐ Up to date	X N/A
	Remarks: Reviewed records prior to site visit			
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
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
☐ PRP in-house X Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____
_____

2. **O&M Cost Records**

Not Reviewed

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

Describe costs and reasons: None noted during review of monthly reports and during_____
_____discussion with EPA Remedial Project Manager_____
_____
_____
_____
_____

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

A. Fencing

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

Remarks: Fence was in good shape.

B. Other Access Restrictions

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

Remarks:

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) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
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
_____
_____
_____
_____

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

D. General

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

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** ☐ Location shown on site map X Roads adequate ☐ N/A
Remarks_____
_____

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS X Applicable ☐ N/A

A. Landfill Surface

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

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** X Grass X 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_____
_____

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 X N/A or okay
Remarks_____
_____

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

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

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

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

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

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

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

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

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

Remarks:

D. Cover Penetrations X Applicable ☐ N/A

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

Remarks:

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

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

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ 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** ☐ Functioning X N/A

   Remarks:

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

   Remarks: No issues observed

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

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

   Remarks:

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

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

4. **Dam** ☐ Functioning 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** □ Location shown on site map X Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Vegetative Growth** □ Location shown on site map X N/A
   □ 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 ☐ Applicable X 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 ☐ 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 ☐ Requires upgrade ☐ Needs to be provided
   Remarks_____
   _____

C. Treatment System ☐ Applicable X 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_____
   _____

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

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

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

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

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

D. Monitoring Data

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

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

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

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.).

This source control remedy appears to be operating as designed.

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.

The landfill cover system is well-maintained.

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.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None at this time (too soon).

Five-Year Review Site Inspection Checklist

("N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: Iron Horse Park OU-3; AOC6	**Date of inspection:** May 30, 2018
Location and Region: N. Billerica, MA; Region I	**EPA ID:** MAD051787323
Agency, office, or company leading the five-year review: USEPA/AECOM	**Weather/temperature:** Clear/70°F
Remedy Includes: (Check all that apply) X Landfill cover/containment X Access controls □ Institutional controls □ Groundwater pump and treatment □ Surface water collection and treatment □ Other_____ _____ □ Monitored natural attenuation □ Groundwater containment □ Vertical barrier walls	
Attachments: □ Inspection team roster attached □ Site map attached	
II. INTERVIEWS	
Interviews were performed by USEPA and are included separately.	

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	☐ Up to date	☐ N/A
	☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A
	Remarks:			
2.	**Site-Specific Health and Safety Plan**	X Readily available	☐ Up to date	☐ N/A
	☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☐ N/A
	Remarks:			
3.	**O&M and OSHA Training Records**	☐ Readily available	☐ 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
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	X N/A
	Remarks:			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	X N/A
	Remarks:			
7.	**Groundwater Monitoring Records**	☐ Readily available	☐ Up to date	X N/A
	Remarks: Reviewed records prior to site visit			
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
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
☐ PRP in-house X Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____
_____

2. **O&M Cost Records**

Not Reviewed

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

Describe costs and reasons: None noted during review of monthly reports and during_____
_____discussion with EPA Remedial Project Manager_____
_____
_____
_____
_____

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

A. Fencing

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

Remarks: Fence was in good shape.

B. Other Access Restrictions

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

Remarks:

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) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
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

_____
_____
_____
_____

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

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map X No vandalism evident
Remarks__No visual ATV tracks_____
_____

2. **Land use changes on site** ☐ N/A
Remarks___The new solar facility impacts ATV use in a positive way._____
_____

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

VI. GENERAL SITE CONDITIONS

A. Roads X Applicable ☐ N/A

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

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS X Applicable ☐ N/A

A. Landfill Surface

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

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** X Grass X Cover properly established X No signs of stress
   X Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____Some trees getting a bit large. The most recent covered areas (on edge of landfill) could use more vegetation, but erosion is not evident._____

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_____
_____

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 X N/A or okay
Remarks_____
_____

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

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

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

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

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

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

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

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

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

Remarks:

D. Cover Penetrations ☐ Applicable X N/A

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

Remarks:

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

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

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

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

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

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

   Remarks:

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

   Remarks:

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

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

   Remarks:

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

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

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

H. Retaining Walls ☐ Applicable 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 ☐ Applicable X N/A

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

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

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

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

VIII. VERTICAL BARRIER WALLS ☐ Applicable 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 ☐ Applicable X 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 ☐ 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 ☐ Requires upgrade ☐ Needs to be provided
   Remarks_____
   _____

C. Treatment System ☐ Applicable X 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_____
   _____

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

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

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

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

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

D. Monitoring Data

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

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

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

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.).

This source control remedy appears to be operating as designed.

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.

The landfill cover system is low maintenance, but may need some tree trimming in the near future.

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.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None at this time.

Five-Year Review Site Inspection Checklist

("N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: Iron Horse Park OU-3; AOC5	**Date of inspection:** May 30, 2018
Location and Region: N. Billerica, MA; Region I	**EPA ID:** MAD051787323
Agency, office, or company leading the five-year review: USEPA/AECOM	**Weather/temperature:** Clear/75^{o}F
Remedy Includes: (Check all that apply) X Landfill cover/containment X Access controls □ Institutional controls □ Groundwater pump and treatment □ Surface water collection and treatment □ Other_____ _____ □ Monitored natural attenuation □ Groundwater containment □ Vertical barrier walls	
Attachments: □ Inspection team roster attached □ Site map attached	
II. INTERVIEWS	
Interviews were performed by USEPA and are included separately.	

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	☐ Up to date	☐ N/A
	☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A
	Remarks:			
2.	**Site-Specific Health and Safety Plan**	X Readily available	☐ Up to date	☐ N/A
	☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☐ N/A
	Remarks:			
3.	**O&M and OSHA Training Records**	☐ Readily available	☐ 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
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	X N/A
	Remarks:			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	X N/A
	Remarks:			
7.	**Groundwater Monitoring Records**	☐ Readily available	☐ Up to date	X N/A
	Remarks: Reviewed records prior to site visit			
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
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
☐ PRP in-house X Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____

2. **O&M Cost Records**

Not Reviewed

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

Describe costs and reasons: None noted during review of monthly reports and during_____ _____discussion with EPA Remedial Project Manager_____

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

A. Fencing

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

Remarks: Fence was in pretty good shape. Note that the area is not 100% fenced and some trespasser access has been noted (discussion with worker at the site).

B. Other Access Restrictions

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

Remarks:

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) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
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

_____
_____
_____
_____

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

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map X No vandalism evident
Remarks__Onsite worker noted that trespassers have disturbed wood stored on site._____
_____

2. **Land use changes on site** ☐ N/A
Remarks___Lumber storage on the asphalt._____
_____

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

VI. GENERAL SITE CONDITIONS

A. Roads X Applicable ☐ N/A

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

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS X Applicable ☐ N/A

A. Landfill Surface

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

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 ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____

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

   Remarks: Asphalt in decent shape with some minor damage (surface scrapes) in a couple of areas.
   _____

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_____
_____

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 X N/A or okay
Remarks_____
_____

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

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

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

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

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

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

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

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

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

Remarks:

D. Cover Penetrations ☐ Applicable X N/A

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

Remarks:

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

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

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

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

E. Gas Collection and Treatment ☐ Applicable 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: Multiple drain covers missing or damaged.

2. **Outlet Rock Inspected** ☐ 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 ☐ Applicable X N/A

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

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

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

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

VIII. VERTICAL BARRIER WALLS ☐ Applicable 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 ☐ Applicable X 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 ☐ 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 ☐ Requires upgrade ☐ Needs to be provided
   Remarks_____
   _____

C. Treatment System ☐ Applicable X 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_____
   _____

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

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

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

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

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

D. Monitoring Data

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

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

D. Monitored Natural Attenuation

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

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

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.).

This source control remedy appears to be operating as designed.

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.

The asphalt cover appears to be in decent shape. However, the gravel portion of the cover is no longer in place and should be replaced. Drain grates also need to be replaced.

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.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None at this time.

Five-Year Review Site Inspection Checklist

("N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: Iron Horse Park OU-3; AOC4	**Date of inspection:** May 30, 2018
Location and Region: N. Billerica, MA; Region I	**EPA ID:** MAD051787323
Agency, office, or company leading the five-year review: USEPA/AECOM	**Weather/temperature:** Clear/75°F
Remedy Includes: (Check all that apply) X Landfill cover/containment X Access controls □ Institutional controls □ Groundwater pump and treatment □ Surface water collection and treatment □ Other_____ _____ □ Monitored natural attenuation □ Groundwater containment □ Vertical barrier walls	
Attachments: □ Inspection team roster attached □ Site map attached	
II. INTERVIEWS	
Interviews were performed by USEPA and are included separately.	

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	☐ Up to date	☐ N/A
	☐ Maintenance logs	☐ Readily available	☐ Up to date	☐ N/A
	Remarks:			
2.	**Site-Specific Health and Safety Plan**	X Readily available	☐ Up to date	☐ N/A
	☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☐ N/A
	Remarks:			
3.	**O&M and OSHA Training Records**	☐ Readily available	☐ 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
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	X N/A
	Remarks:			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	X N/A
	Remarks:			
7.	**Groundwater Monitoring Records**	☐ Readily available	☐ Up to date	X N/A
	Remarks: Reviewed records prior to site visit			
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
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
☐ PRP in-house X Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____
_____

2. **O&M Cost Records**

Not Reviewed

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

Describe costs and reasons: None noted during review of monthly reports and during_____
_____discussion with EPA Remedial Project Manager_____
_____
_____
_____
_____

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

A. Fencing

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

Remarks: Fence only around Cooperative Reserve property.

B. Other Access Restrictions

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

Remarks:

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) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
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

_____
_____
_____
_____

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

D. General

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

2. **Land use changes on site** ☐ N/A
Remarks___Lumber storage on the asphalt both inside Cooperative Reserve and outside._____
_____

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

VI. GENERAL SITE CONDITIONS

A. Roads X Applicable ☐ N/A

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

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS X Applicable ☐ N/A

A. Landfill Surface

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

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_Multiple cracks inside the Cooperative Reserve property. Repair needed in the near future._____

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 ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____

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

   Remarks: Asphalt in overall decent shape. Edge outside of Cooperative Reserve broken back about a foot. Needs to be watched for future degradation._____

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_____
_____

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 X N/A or okay
Remarks_____
_____

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

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

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

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

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

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

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

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

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

Remarks:

D. Cover Penetrations ☐ Applicable X N/A

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

Remarks:

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

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

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

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

E. Gas Collection and Treatment ☐ Applicable 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: Multiple drain covers missing or damaged.

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

   Remarks:

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

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

   Remarks:

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

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

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

H. Retaining Walls ☐ Applicable 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 ☐ Applicable X N/A

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

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

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

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

VIII. VERTICAL BARRIER WALLS ☐ Applicable 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 ☐ Applicable X 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 ☐ 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 ☐ Requires upgrade ☐ Needs to be provided
   Remarks_____
   _____

C. Treatment System ☐ Applicable X 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_____
   _____

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

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

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

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

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

D. Monitoring Data

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

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

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

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.).

This source control remedy appears to be operating as designed.

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.

The asphalt cover appears to be in decent shape. However, there are some cracks that should be repaired in the near future.

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.

None

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None at this time.

D.5 – Pre-Design Lead Results for AOC5

Potential lead impact under pavement

Final extent to be determined by XRF Field Screening Program

Legend

- Iron Horse Park Site Boundary
- AOC 5 Boundary (RD/RA, 2012)
- Approximate Fence Line
- Estimated Limit of Lead Contamination
- Railroad
- Abandoned Railroad
- Platform Area (ground elevation approximately 3 feet higher than surrounding AOC)

Soil Sampling Results

2012 Lead Concentrations (ERM)
(Field/Laboratory Data Maximum Value)[2]
- < Cleanup Level[1]
- > Cleanup Level[1]

2010 Lead Concentrations (ERM)
(Field/Lab Data Maximum Value)[2]
- < Cleanup Level[1]
- > Cleanup Level[1]

2009 Lead Concentrations (GZA)[3]
(Laboratory Analytical Data)
- < Cleanup Level[1]
- > Cleanup Level[1]

2009 Lead Concentrations (ERM)
(Field/Laboratory Data Maximum Value)[2]
- < Cleanup Level[1]
- > Cleanup Level[1]

1993 Lead Concentrations (M&E)[4]
(Laboratory Analytical Data)
- < Cleanup Level[1]
- > Cleanup Level[1]

52 Lead Concentration (mg/kg)

SOURCES:
Color Ortho Imagery of site (2009) provided by WSP-Sells. Regional Color Ortho Imagery (April 2008) provided by The Office of Geographic and Environmental Informtion (MassGIS), Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs.

NOTES:
1 USEPA cleanup level (2009 revision) = 1,107 mg/kg. (Potential risk to human health)
Initial USEPA cleanup level = 1,736 mg/kg.
2 Analytical data shows the maximum value obtained at each location from either laboratory or field analysis (Niton XLt 600 Analyzer).
3 Soil Sampling Program letter to McFarland Cascade Pole & Lumber Company, dated 24 July 2009 summarizing sampling results conducted by GZA Environmental on 8 July 2009.
4 Remedial Investigation Final Report. Iron Horse Park Superfund Site, 3rd Operable Unit, North Billerica, Massachusetts, dated September 1997.

0 25 50 100 150 200 250 Feet

1:1,400

Figure 9 - AOC 5 Pre-Design Investigation Results
Iron Horse Park Superfund Site
Operable Unit 3
Billerica, Massachusetts

ERM

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