Fourth Five-Year Review Report

for

Iron Horse Park Superfund Site

Operable Units 1, 2, 3, and 4

North Billerica, Massachusetts

September 2013

PREPARED BY:

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Region I
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Executive Summary

The Iron Horse Park Superfund Site has been divided into four operable units (OUs). The remedy for OU-1, the B&M Wastewater Lagoons, included removal and off-site asphalt batching of contaminated soils. Construction of 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, soil (in areas not addressed in OUs 1 through 3), and groundwater. This is the fourth five-year review for the Iron Horse Park site. The triggering action for this review is the third five-year review which was signed on September 26, 2008.

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 Record of Decision (ROD) and as modified by the Explanation of Significant Differences (ESD). The assumptions used at the time of remedy selection are valid and no changes to cleanup levels are warranted.

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. Although the ROD did not anticipate any reuse of the Site, State regulatory approval has been given to develop solar panels on the landfill cover in a manner that will maintain the protectiveness of the remedy. 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 compliance boundary for the landfill. There is no current use of groundwater in areas where groundwater cleanup standards still need to be attained. The State Groundwater Quality Standards cited in the OU2 ROD at 314 CMR 6.00 have been repromulgated within 314 CMR 5.11. The change will need to be incorporated into a future CERCLA decision document.

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 and 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.

The OU-4 remedy construction has not yet been implemented. In the interim, the groundwater exposure pathway is not complete, as groundwater is not being extracted from beneath the site. The RAOs, ARARs for the remedy established in the ROD, and established cleanup levels remain valid and protective.

A sitewide asbestos evaluation was performed since the previous five-year review and included surface soil and activity-based sampling. Results of the evaluation showed that calculated risk levels for the exposure scenarios evaluated were within or below the EPA acceptable risk range. Therefore, no further remedial measures are required for asbestos in the areas investigated as part of the sitewide evaluation.

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" was selected above, enter Agency name:**
Author name (Federal or State Project Manager): Don McElroy
Author affiliation: EPA Region I
Review period: 12/06/12 – 09/26/13
Date of site inspection: 07/16/13
Type of review: Statutory
Review number: 4
Triggering action date: September 26, 2008
Due date *(five years after triggering action date)*: September 26, 2013

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU-1, OU-4

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 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.			
	Recommendation: 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.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	Dec 2015

OU(s): OU-2	Issue Category: Monitoring			
	Issue: 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.			
	Recommendation: 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.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	EPA		2017

OU(s): OU-2	Issue Category: Remedy Performance			
	Issue: The reduction in groundwater concentrations outside of the existing compliance boundary (edge of landfill) is progressing slowly.			
	Recommendation: 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.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State		2017

OU(s): OU-3	Issue Category: Remedy Performance			
	Issue: 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.			
	Recommendation: 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.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	EPA		2017

Protectiveness Statement(s)

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
OU-1	Protective	

Protectiveness Statement:
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.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
OU-2	Short-term Protective	

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. 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.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
OU-3	Will be Protective	

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. 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.

1.0 Introduction

EPA New England Region has conducted a fourth five-year review of the remedial actions implemented at the Iron Horse Park Superfund Site in Billerica, Massachusetts. This review was conducted from December 2012 through August 2013. This report documents the results of the review. The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify deficiencies found during the review, if any, and identify recommendations to address them.

This review is required by statute. EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 42 U.S.C. §§ 9601 *et seq*., and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 C.F.R. Part 300. Section 121(c) of CERCLA 42 U.S.C. 9622(c), states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The NCP, at 40 C.F.R. §300.430(f)(4)(ii), states:

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

This is the fourth five-year review for the Iron Horse Park site. The triggering action for this review is the third five-year review which was signed on September 26, 2008. Due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unrestricted use and unlimited exposure, a five-year review is required.

2.0 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.

The Iron Horse Park Superfund Site was historically surrounded by residential properties and wetlands. This situation 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 NPL in 1984. In 1984, prior to final placement on the NPL, EPA conducted a removal effort, capping a 13.3-acre asbestos landfill. 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 operable units (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 Explanation of Significant Differences (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. 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 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 PRPs 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, soil (in areas not addressed in OUs 1 through 3), 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, and long-term monitoring of groundwater. Although some information regarding OU-4 will be presented in this review, this operable unit will not be the subject of a protectiveness finding.

3.0 Five-Year Review of the B&M Wastewater Lagoons (OU-1)

3.1 Background — OU-1

OU-1 - the B & M Wastewater Lagoons is an approximately 15-acre area which consisted of 5 unlined lagoons (see figure in Appendix B.2). 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

3.2 Chronology — OU-1

DATE	EVENT
1915 (approx)	Lagoons begin operation
1915-1992	Lagoons receive wastewater. Periodically, material is dredged and placed in piles adjacent to lagoons
1984	Site listed on the National Priorities List
1988	EPA completes Remedial Investigation/Feasibility Study
1988	EPA signs Record of Decision choosing bio-remediation of soil/sludge as the remedy.
1990	Settlement reached via Consent Decree with Boston & Maine Corporation agreeing to perform cleanup.
1991	Remedial Design approved
1991(November)	Remedial Action initiated
1992	Discharges to the Lagoons cease
1991-1996	Bio-remediation remedy conducted. Progress slower than anticipated.
1997	EPA issues Explanation of Significant Differences (ESD) - revising remedy to Asphalt Batching

DATE	EVENT
2002	Removal of final load of contaminated material
2003	Final round of confirmatory sampling to demonstrate completion of cleanup work
2003	Site Summary Report submitted in September 2003 to document completion of the Remedial Action

3.3 Remedial Actions — OU-1

3.3.1 Remedy Selection — OU-1

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

1. Excavating lagoon sediments and contaminated soil piles to a constructed treatment cell;

2. Treating the contaminated material from the lagoons by bioremediation;

3. Returning the treated material to the lagoon area, covering it with clean soil, and establishing a vegetative cover;

4. Establish land use restrictions limiting disturbance of the treated material and cover soil without prior review by state and federal authorities; and,

5. Decontaminating the lagoon system's piping and pumps.

3.3.2 Remedy Implementation — OU-1

In a Consent Decree (CD) which was entered on September 13, 1990, Boston and Maine 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 ≤ 1 ppm) of total PAHs; and

- 50-60% removal of total petroleum hydrocarbons (TPH).

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). Because no contamination remains in place, this operable unit does not trigger Five-Year Review requirements, although Site-wide Review-Year Reviews still need 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.

3.3.3 Operation and Maintenance — 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.

3.4 Progress Since Last Five-Year Review — OU-1

The previous five-year review for Iron Horse Park was completed in 2008. No further site activities have occurred at OU-1.

No recommendations or follow-up actions were identified at OU-1 in the previous five-year review other than evaluating and addressing the asbestos deposits in the areas previously visually observed to contain asbestos materials. The exposed asbestos materials observed during the OU-1 remedial action are considered to be part of, and will be addressed along with, AOC6 in OU-3. Previous five-year reviews included establishment of land use restrictions as a follow-up action. However, given that the revised remedy under the 1997 ESD removed all contamination to achieve unrestricted risk levels, no institutional controls are required related to OU-1 soils.

The OU-1 protectiveness statement from the previous five-year review noted that review and approval of the 2003 Site Summary Report confirms that the remedy for OU-1 was implemented as required in the ROD and as modified by the 1997 ESD. The assumptions used at the time of remedy selection were noted to be valid and no changes to cleanup levels were warranted. All contamination exceeding cleanup levels in the ROD and 1997 ESD have been removed from the Site and, therefore, the land remediated under OU-1 no longer contains contamination that poses an unacceptable risk to human health or the environment.

3.5 Five-Year Review Process — OU-1

The Iron Horse Park 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. This five-year review consisted of a site walkover, a review of relevant OU-1 documents (see Appendix B.1), a review of cleanup standards, and consultation with risk assessment personnel.

Site Walkover

Remedial activities (summarized above in the Remedy Implementation section) were completed in 2003. A brief site walkover was conducted by AECOM and EPA on July 16, 2013 to support the evaluation of the remedy for the five-year review. Photos of the OU-1 area are included in Appendix A.1 and show that there is evidence of all-terrain vehicle (ATV) use. A Site Inspection Checklist was not completed for OU-1, as the PAH-contaminated soils were removed and there is no ongoing post-construction O&M.

Interviews

Interviews regarding the entire Iron Horse Park site were performed on July 31 and August 1, 2013 with officials from Billerica, Massachusetts and MassDEP. Results of these interviews are summarized in Appendix A.2.

3.6 Technical Assessment — OU-1

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

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.

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?

Yes. The exposure assumptions 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 indicate maximum exposure point concentrations for contaminants of concern as follows:

- Total PAHs - 0.91 mg/kg;
- Lead - 320 mg/kg
- Antimony - 2.2 mg/kg
- Arsenic - 5.3 mg/kg
- Cadmium - 0.37 mg/kg; and
- Chromium - 27 mg/kg.

For compounds 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 (2013). 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 (2013). Elevated levels of TPH which were present within the OU, regulated under State authority, were removed concurrently with the CERCLA cleanup.

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 (see Section 6.0).

The 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 applicable or relevant and appropriate environmental requirements (ARARs).

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

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.

Technical Assessment Summary

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 (see next paragraph) from the site 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, 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.

3.7 Issues — OU-1

There are no current issues which would prevent unrestricted use of the site based on CERCLA risks from the CERCLA contaminants addressed under the OU-1 ROD and 1997 ESD.

3.8 Recommendations and Follow-up Actions — OU-1

There are no recommendations or follow-up actions specific to OU-1.

4.0 Five-Year Review of Shaffer Landfill (OU-2)

4.1 Background — 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
Toluene		
1,1,2-Trichloroethane		
Trichloroethene		
Vinyl Chloride		
Xylene		

4.2 Chronology — OU-2

DATE	EVENT
From about 1946	Open burning dump
1966	Property purchased by Shaffer Realty Corporation
1966 – 1984	Waste disposal operations at a significant level
1983	Court-ordered closure of the landfill
1984	Site listed on the National Priorities List
1986	Waste disposal operations cease
1986 – 1988	Most of landfill covered with clay cap
1989	EPA completes Remedial Investigation
1991	EPA completes Feasibility Study
1991	EPA signs Record of Decision choosing remedy for Shaffer Landfill
1994	EPA reaches settlement (AOC) with PRP group to conduct Remedial Design
2000	Remedial Design Completed

DATE	EVENT
2000	Settlement via Consent Decree. PRP group agrees to perform Remedial Action
2000	EPA issues ESD - revising leachate collection method
2001	Remedial Action Started
2003	Construction Activities Complete
2003	O&M Initiated

4.3 Remedial Actions — OU-2

4.3.1 Remedy Selection — OU-2

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:

1. Removing the existing topsoil layer exposing the existing in-place low-permeability soil;

2. Raising existing gas collection well heads as necessary up to reconstructed cap surface level and adding additional gas extraction wells;

3. Adding additional low-permeability soil;

4. Grading of low-permeability soil to:

   a) Provide a 5% grade on the top of the landfill lobes, and

   b) Provide a consistent smooth sub-grade on the landfill side slopes;

5. Installing an impermeable textured membrane liner over the entire landfill area;

6. Installing a 6-inch drainage layer on top of the textured membrane liner over the entire landfill area;

7. Installing a non-woven filter fabric between the drainage and topsoil layers;

8. Reinstalling the topsoil layer and adding additional topsoil to achieve a topsoil depth of 12 inches;

9. Reinstalling an upgraded surface drainage system; and

10. 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 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

4.3.2 Explanation of Significant Differences (2000 ESD) — OU-2

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.

4.3.3 Remedy Implementation — OU-2

The Remedial Design was approved by EPA in the fall of 2000. Also in the fall of 2000, a settlement, via a Consent Decree (CD), was reached with a group of Settling Defendants. Under the terms of the CD, the 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 Settling Defendant group, 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 still have not been established for the landfill, although access is restricted by the Settling Defendants and O&M activities do also note whether trespassing or other disturbance of the remedy has occurred.

4.3.4 Operation and Maintenance — OU-2

The Operation and Maintenance phase of the project began in the fall of 2003. This phase entails 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. In addition, wetlands inspections and maintenance, and periodic monitoring of groundwater and surface water are also conducted. Under the terms of the CD, the 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 are currently being conducted by the Commonwealth. In addition, depending on how quickly groundwater quality improves outside of the compliance boundary (edge of landfill), in accordance with the CD, the Commonwealth will take over responsibility for groundwater monitoring activities between 8 and 15 years after the remedy is determined to be “working properly and as designed.”

4.4 Progress Since Last Five-Year Review — OU-2

No recommendations or follow-up actions were identified at OU-2 in the previous five-year review other than establishment of land use restrictions. These land use restrictions have not been established to date. Discussion of the establishment of land use restrictions is presented in Section 4.6 through 4.8 of this report.

Since the previous five-year review, regular O&M and monitoring activities have occurred at the site. Based on the reduction in landfill gas production causing intermittent operation of the enclosed flare, discussions have occurred related to installation of candlestick flares at various locations on the landfill. These discussions are ongoing. Similarly, the design for installation of solar panels on the landfill surface was evaluated and approved, and may be implemented within the next year. This may lead to modifications of the cap or other surface remedial infrastructure, changes to O&M requirements, and additional institutional control needs. The determination of the need for an ESD based on any changes will be performed in the future.

Continued monitoring shows progress towards attainment of groundwater cleanup levels. Although institutional controls are not in place, there is no current use of groundwater in areas where groundwater cleanup standards still need to be attained.

The State Groundwater Quality Standards cited in the OU2 ROD at 314 CMR 6.00 have been repromulgated within 314 CMR 5.11. The change will need to be incorporated into a future CERCLA decision document, as will a change to the arsenic MCL.

4.5 Five-Year Review Process — OU-2

The Iron Horse Park 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. This five-year review consisted of a site walkover, a review of relevant OU-2 documents (see Appendix C.1), a review of cleanup standards, and consultation with risk assessment personnel.

Site Walkover

Remedial activities (summarized above in the Remedy Implementation section) were completed in 2003. A brief site walkover was conducted by AECOM and EPA on July 16, 2013 to support the evaluation of the remedy for the five-year review. Photos of the OU-2 area are included in Appendix A.1 and show that the landfill cover, security fence, and operational systems appear 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. One section of fence had recently been damaged due to a fallen tree. This fence section was observed to have already been temporarily repaired. The Site Inspection Checklist associated with OU-2 is included in Appendix C.4

Interviews

Interviews regarding the entire Iron Horse Park site were performed on July 31 and August 1, 2013 with officials from Billerica, Massachusetts and MassDEP. Results of these interviews are summarized in Appendix A.2.

4.6 Technical Assessment — OU-2

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

Yes. The review of documents, ARARs, risk assumptions, and the results of site inspections indicate that the OU-2 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.

Appendices C.2 and C.3 contain groundwater and surface water post-construction sampling results. The previous 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 since the previous five-year review confirms this observation. TCE and VC showed no detections above interim cleanup levels (ICLs). Benzene concentrations in ENSR-11B have been decreasing slightly, while detections in GZA-6A and GZA-3B have been fairly stable over the last five years, slightly above the ICL of 5 ug/L. Arsenic concentrations have remained consistent, with exceedances of the ICL at multiple wells. 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 OU2 ROD, the arsenic MCL has changed from 50 ppb to 10 ppb. The revised arsenic MCL will need to be incorporated into the OU2 remedy through a future CERCLA decision document.

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.

VOCs, though sporadically detected in surface water, are present at low concentrations that do not exceed National Recommended Water Quality Criteria (NRWQC; formerly designated as Ambient Water Quality Criteria, or AWQC), and would not pose a risk or hazard to human health. It should be noted that 1,4-dioxane analysis was performed during multiple sampling rounds since the last five-year review. Concentrations at three locations (SW-G, SW-H, and SW-I) were consistently above 100 ug/L. For comparison, this concentration is well below the Massachusetts GW-3 groundwater concentration of 50,000 ug/L (GW-3 standards are used by

the State to evaluate groundwater-to-surface water impacts). However, concentrations of 1,4-dioxane above 100 ug/L in surface water are notable and it may be appropriate to investigate this analyte further in groundwater.

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. While all systems appear to be operating and maintained as designed, there is typically at least one system shutdown due to low methane. As noted above, based on the reduction in landfill gas production causing intermittent operation of the enclosed flare, discussions have occurred related to installation of candlestick flares at various locations on the landfill. These discussions are ongoing.

Wetlands mitigation appears to have been successful.

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?

Yes. 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 and leachate collection systems 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). At the MCL of 10 ppb arsenic, the chosen remedy would not be different. When the ROD-established interim cleanup levels for groundwater are achieved outside the compliance boundary for the landfill, the risk associated with residual site-related groundwater contamination will be evaluated to ensure that the remedy is protective. 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 OU2 remedy, the revised regulations will need to be incorporated in to the remedy with a future CERCLA decision document.

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 MCLs, non-zero MCLGs, proposed MCLs and MCLGs, and Massachusetts Groundwater Quality Standards;
- Prevent migration of contamination via leachate to surface waters and sediments to ensure that 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.

These 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 OU2 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). The changes noted do not impact the protectiveness of the remedy. However, a future ESD would be required to incorporate the change to the arsenic MCL into the OU-2 remedy.

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.

Technical Assessment Summary

As indicated above, the Final Remedial Construction Report (GeoSyntec, 2003) has been reviewed and approved. The remedy was determined to have been designed and constructed as intended in the ROD, as modified by the ESD. However, as noted above, the reduction in groundwater concentrations outside of the existing compliance boundary (edge of landfill) is progressing slowly.

The RAOs remain valid. With the exception of the groundwater cleanup level for arsenic (discussed above), the established cleanup levels remain valid.

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 remedy. The closure/post-closure requirement for the landfill and the groundwater requirements to establish institutional controls still have not been met.

4.7 Issues — OU-2

There are no current issues which would prevent the remedy at OU-2 from being considered protective, except for the absence of institutional controls. 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.

As described above, a future ESD would be required to incorporate the change to the arsenic MCL and to incorporate the repromulgated State Groundwater standards at 314 CMR 5.11 into the OU-2 remedy.

The reduction in groundwater concentrations outside of the existing compliance boundary (edge of landfill) is progressing slowly and will be reassessed before or during the next Five-Year Review.

4.8 Recommendations and Follow-up Actions — OU-2

Recommendations or follow-up actions with regard to protectiveness at OU-2 include the implementation of institutional controls and an ESD to incorporate the change to the arsenic MCL and repromulgation of the State groundwater standards. 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. The ESD to incorporate the change to the arsenic MCL and repromulgated State groundwater standards into the OU-2 remedy should be completed before the next five-year review.

To address the groundwater concentrations outside of the existing compliance boundary, it is recommended to either evaluate refinement of the compliance boundary, including consideration of an exclusion area for offsite groundwater extraction, or to potentially consider groundwater reclassification in the area.

5.0 Five-Year Review of Site Wide Source Areas (OU-3)

5.1 Background — 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.

Areas of concern (AOCs) in OU-3 consist of the B&M Railroad Landfill, the B&M Locomotive Shop Disposal Areas (A and B), the RSI Landfill, the Old B&M Oil/Sludge Recycling Area, the Contaminated Soils Area, and the asbestos contamination areas (including the Asbestos Landfill and the Asbestos Lagoons). 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 these 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 Record of Decision (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 responsible parties (PRPs), which requires the PRPs 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 one AOC and ongoing for others.

5.2 Chronology — OU-3

DATE	EVENT
1911	553 acres of land purchased by B&M Railroad.
1911 – mid-1970s	Area used for disposal of industrial wastes and oil and sludge recycling
1944	70 acres bought by Johns-Manville, which built three unlined lagoons for disposal of asbestos wastes
1984	EPA capped asbestos sludge landfill as part of “Immediate Removal Action”
1984	Site listed on the National Priorities List
1993	Extensive sampling program conducted.
1997	EPA completes the Remedial Investigation
2004	EPA completes the Feasibility Study

DATE	EVENT
2004	EPA signs the Record of Decision
2007	EPA reaches an agreement with the PRPs
2008	PRPs initiate the Remedial Design
2009	EPA issues ESD - modifying remedy to eliminate an ARAR
2010	AOC7 (Asbestos Lagoons) Remedy Construction
2012	Remedial Design Completion of the remaining AOCs
2012	AOCs 4 (Old B&M Oil/Sludge Recycling Area) and 5 (Contaminated Soils Area) Remedial Action implementation

5.3 Remedial Actions — OU-3

5.3.1 Remedy Selection — OU-3

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 areas of concern (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	1736 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

5.3.2 Remedy Implementation — OU-3

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

The previous five-year review 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 performed in 2009. A revised lead soil cleanup level of 1,107 mg/kg was calculated to replace the 1,736 mg/kg cleanup level noted above.

The cleanup level defined initially was calculated based on USEPA's Adult Lead Methodology, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposure to Lead in Soil, 1996. In 2009, the USEPA updated the risk calculation taking into account a change in two parameters, which resulted in a lower (more conservative) value of 1,107 mg/kg for the cleanup level. The two parameters, which were updated based on the National Health and Nutrition Evaluation Survey (NHANES III) conducted by the Centers for Disease Control and Prevention are: 1) the estimated geometric mean (GM) background blood lead levels; and 2) the estimated value of the individual geometric standard deviation blood lead concentrations. This revision was summarized in an internal USEPA memorandum, dated 11 March 2009, between Mrs. Margaret McDonough, USEPA Human Health Risk Assessor, and Mr. Don McElroy (see Appendix D.2).

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 initiated. 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. A construction completion report has not been submitted yet.

Work on AOC6 (Asbestos Landfill; cover erosion repair) is planned for 2013, with work on AOCs 1 (B&M Railroad Landfill), 2 (RSI Landfill), and 3 (B&M Locomotive Shop Disposal Areas) to follow in subsequent years.

5.4 Progress Since Last Five-Year Review — OU-3

Since the five-year review conducted in 2008, design of the remedies for OU-3 was completed and construction of remedies was completed and/or initiated for multiple AOCs.

5.5 Five-Year Review Process — OU-3

The Iron Horse Park 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. This five-year review consisted of a site walkover, a review of relevant OU-3 documents (see Appendix D.1), a review of cleanup standards, and consultation with risk assessment personnel.

Site Walkover

A brief site walkover was conducted by AECOM and EPA on July 16, 2013 to evaluate current conditions of the site at the time of five-year review. 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 AOC7 has been completed, a Site Inspection Checklist was utilized and is included in Appendix D.4.

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

Construction at the Contaminated Soils Area (AOC5) is almost fully complete. Pavement was completed in the spring of 2013. There is minor erosion occurring behind an outfall headwall as it enters the detention basin. The area appears to be aesthetically pleasing compared to historical site visits. Lumber yard operations next to AOC5 have ceased and that area is now vacant.

A large pile of covered soil was observed northeast of the RSI Landfill (AOC2). The origin of the pile was unclear, but later confirmed to be clean soil from the construction of the AOC5 detention basin. This soil is likely to be used during cap construction at one of the other AOCs on site.

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. Some silt fence was observed to be in need of repair, as well as the plastic cover, some of which is actually collecting water.

The RSI Landfill (AOC2) and B&M Locomotive Shop Disposal Areas (AOC3) were well-vegetated, with no obvious changes since the 2008 site walkover.

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. 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. Similarly, vegetation has been encroaching on the edge of the cover and should be removed to assist in maintenance observations. Based on a review of historical documents, the cap inside the fence was not intended to have materials stored on its surface (GEC, 2007). 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.

As first discussed in Section 3.4, during the OU-1 remedial action excavation, asbestos-containing materials (ACM) were uncovered in two areas near the Asbestos Landfill (AOC6 of OU-3) and were subsequently covered with plastic sheeting and soil. During the 2008 site walkover, the plastic sheeting in these two areas was visible and not fully intact. At the time, exposed ACM were not visible. During the current site walkover, access to this area was limited by both anthropogenic barriers and vegetation. The previous walkover showed evidence of ATV activities near this area of exposed ACM. Based on the barriers and vegetation, it does not appear that ATV activities have been occurring in this area recently. Remedial actions associated with AOC6 of OU-3 are expected to address this area. Some soil has recently been placed in the depression next to OU-1/AOC6 of OU-3, near the asbestos material observed during the OU-1 remedial action. This soil does not yet cover the zone containing the asbestos material. The Settling Defendants indicated in follow-up discussions that these issues would be addressed in accordance with the AOC6 design.

Interviews

Interviews regarding the entire Iron Horse Park site were performed on July 31 and August 1, 2013 with officials from Billerica, Massachusetts and MassDEP. Results of these interviews are summarized in Appendix A.2.

5.6 Technical Assessment — OU-3

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

Yes. Upon construction completion at all AOCs, the remedy will be protective. As described above, construction is completed at AOC7 (functioning as intended) and substantially completed at AOCs 4 and 5. The construction of the AOC7 remedy has been formally completed, as defined by the review and approval of the Final Remedial Construction Report (W&C, 2010), which was submitted on behalf of the Settling Defendant. Construction of the remedy at the remaining AOCs (1, 2, 3, and 6) is anticipated to be complete by the next five-year review.

With respect to groundwater monitoring data at AOC7 (see Appendix D.3), the comparison of pre- and post-construction results shows that analyte concentrations have been generally stable or decreasing. Only tetrachloroethene (PCE) in OW-20 showed a noticeable increase in the most recent (October 2012) sampling event. However, this location is considered "side-gradient" to the AOC7 material. These groundwater results will be utilized during future evaluations of OU-4.

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

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?

Yes. 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 cleanup level based on the additional population statistics has been calculated and used during remedy design/implementation.

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 6.0).

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 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 described earlier, a revised lead cleanup level based on the additional population statistics has been calculated to be 1,107 mg/kg.

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. In the previous five-year review, there was discussion of residual asbestos detections in soil across the site. These residual detections were further investigated as part of a site-wide asbestos evaluation, as part of OU-4, to determine magnitude of risk (see Section 7.0). The evaluation determined that the residual detections did not result in an exceedance of USEPA risk criteria.

Technical Assessment Summary

At this time, remedy construction has not been completed at all AOCs. However, as indicated above, the Final Remedial Construction Report (W&C, 2010) for AOC7 has been reviewed and approved. The remedy was determined to have been designed and constructed as intended in the ROD. The design and construction work completed to date at other AOCs has also been as intended in the ROD.

The RAOs, ARARs, and established cleanup levels, except for lead (discussed above), remain valid.

5.7 Issues — OU-3

There are no current issues which would prevent the selected remedy at OU-3, once fully implemented, from being considered protective.

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. To be incorporated into the OU-3 remedy, this revision will require an ESD. It should be noted that the revised cleanup level has been informally applied during OU-3 remedy implementation.

Once construction of the remedy is completed at all of the AOCs, long-term institutional controls restricting inappropriate land uses and protecting the source area caps and other components of the remedy will need to be established.

5.8 Recommendations and Follow-up Actions — OU-3

The ESD to incorporate the change to the lead cleanup level for the remedy should be completed before the next five-year review.

6.0 Site-Wide Surface Water, Sediment, and Groundwater (OU-4)

6.1 Background — OU-4

OU-4 of Iron Horse Park includes site-wide surface water, sediment, and groundwater. 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. A settlement has not yet been reached with the PRPs to implement the remedies selected in the ROD.

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	

6.2 Chronology — OU-4

DATE	EVENT
1997	EPA completes the Remedial Investigation for OU-3, initially including surface water, sediment, and groundwater
2004	EPA completes the Feasibility Study for OU-3, initially including surface water, sediment, and groundwater

DATE	EVENT
2004	EPA signs the Record of Decision for OU-3, leaving surface water, sediment, and groundwater to be further evaluated as OU-4
2006	ERA/WRIA evaluating surface water and sediment completed
2006	Groundwater Data Evaluation report completed
2008	Supplemental Human Health Risk Assessment completed
2010	EPA completes the Feasibility Study for OU-4
2011	EPA signs the Record of Decision for OU-4

6.3 Remedial Actions — OU-4

6.3.1 Remedy Selection — OU-4

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

1. Excavation of about 7,400 cubic yards of B&M Pond contaminated sediment
2. Dewatering, transport and disposal of contaminated sediments (either on or off-site)
3. Treatment (if necessary) and discharge of sediment dewatering fluid and potential stabilization of sediment prior to disposal
4. Wetland mitigation as required
5. Monitored Natural Recovery (MNR) in Unnamed Brook and other unexcavated sediments that exceed sediment cleanup levels
6. Implementing stormwater runoff controls to prevent sediment recontamination
7. 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)
8. 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)
9. Institutional Controls to prevent use of groundwater on Site and to protect components of the remedy, including at least yearly compliance monitoring
10. Five-year reviews

Cleanup Levels/Performance Standards were established for both sediment and groundwater in the ROD for the contaminants listed in Section 6.1 above. The ROD tables showing those concentrations are presented in Appendix E.1.

6.3.2 Remedy Implementation — OU-4

As EPA has not yet reached a settlement with PRPs, the remedy has not yet been designed/implemented.

6.4 Progress Since Last Five-Year Review — OU-4

Since the five-year review conducted in 2008, a remedy has been selected for OU-4. However, since the remedy has not yet been implemented, the five-year review evaluations associated with the selected remedy will not be performed. To assist in estimating the extent/cost of sediment removal in B&M Pond, a sampling event was performed in September 2012 by the Settling Defendants. In addition, EPA performed a sediment sampling event in 2013 to evaluate toxicity across the pond. The results from these events are undergoing evaluation and will be incorporated into future site documents.

7.0 Site-Wide Asbestos

The site has historically been identified with asbestos contamination due to asbestos landfilling operations by Johns-Manville over a 32-year period. The Asbestos Landfill was the primary disposal area for asbestos-containing waste, however, three unlined lagoons received an asbestos slurry which was periodically dredged and disposed of in the landfill. The asbestos lagoons, one of which has been filled and covered, contain residual asbestos contamination. In addition, a deposit of asbestos was discovered during excavation of the B&M Wastewater Lagoons in 2003. The asbestos material was covered and left in place. Furthermore, historical information indicates that, between 1953 and 1964, the Zonolite Company leased a building on the B&M property for the manufacture of insulation, concrete, and fill material using asbestos-contaminated vermiculite.

To partially address the risk associated with asbestos-containing soils, EPA capped the Asbestos Landfill in 1984. However, random supplemental sampling in October/November 1985 and March 1986 (CDM, 1987) indicated the presence of asbestos in 28 of 40 surface soil samples (0-3 inches and 0-1 foot) collected across the site with six of the locations on the Johns-Manville (now BNZ Materials), Penn Culvert (now Cooperative Reserve Supply, Inc. [CRSI]), and B&M properties (see Figure 3) displaying asbestos at levels greater than one percent, the historical limit of detection for analytical methods available at the time. Surface soil sampling (0-3 inches) of 25 adjacent residential properties was conducted in December 1986 (see Figure 4), with asbestos only detected in a sample collected from a residence on High Street. In December 1986, focused sampling at the locations (see Figure 4) with asbestos levels greater than one percent confirmed the presence of asbestos at depths up to 24 inches below ground surface. Both chrysotile and amphibole asbestos fiber types have been detected in on-site soil samples. Only amphibole fibers were detected in the single residential soil sample with detectable asbestos, suggesting that this finding is not related to the site. In December 2000, EPA conducted surface soil sampling at the former Zonolite facility location (see Figure 5). Asbestos was detected in 8 of 12 surface soil samples collected. Asbestos content exceeded one percent in 2 of the 12 samples, with chrysotile and actinolite forms of asbestos identified in the other samples. These

findings suggested that residual asbestos contamination remains on the Johns-Manville, CRSI (currently paved), and B&M properties. It is possible that there may have been wind-blown dispersion and deposition of asbestos to portions of the site adjacent to and down-wind of suspected asbestos source areas.

In 2004, EPA issued OSWER Directive Memorandum 9345.4-05 entitled "Clarifying Cleanup Goals and Identification of New Assessment Tools for Evaluating Asbestos at Superfund Cleanups." This memorandum indicates that soils containing less than one percent asbestos may pose an unreasonable risk to human health, should the fibers become airborne and be inhaled by workers, trespassers, or neighboring residents. Therefore, in the previous five-year review, based on the sampling information available, it was thought to be possible that the residual asbestos posed a current or potential future human health risk, though it was not possible to quantify the risk at the time. It was noted that the limits of the OU-3 source control remedial actions do not include many of the locations where asbestos fibers have been detected in historic site-wide samples listed above.

A supplemental asbestos evaluation was performed where soil sampling using current analytical methods (e.g., Polarized Light Microscopy by method CARB 435) with detection limits of 0.25 percent or lower was used to provide a current and more accurate delineation of the extent of residual asbestos contamination. The sampling program (conducted in 2009) considered the possible wind-blown transport of exposed asbestos fibers to sensitive receptors such as residential yards. Activity-based sampling is currently the recommended approach to characterize the inhalation risks associated with soil asbestos contamination and was also conducted in 2009 to determine whether current site conditions are protective of human health, and to document whether additional remedial actions or site controls are indicated to maintain protectiveness in the future.

Details of the asbestos evaluation are provided in Appendix E.2. Results of the evaluation showed that calculated risk levels for the exposure scenarios evaluated were within or below the EPA acceptable risk range.

8.0 Issues

This section provides a summary of the issues identified during this five-year review. Recommendations and follow-up actions are presented in Section 9.0.

Issue	Affects Protectiveness? (Y/N)	
	Current	Future
OU-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.	N	Y

Issue	Affects Protectiveness? (Y/N)	
	Current	Future
OU-2: A future ESD would be required to incorporate the change to the arsenic MCL and repromulgated State groundwater standards into the OU-2 remedy.	N	Y
OU-2: The reduction in groundwater concentrations outside of the existing compliance boundary (edge of landfill) is progressing slowly.	N	Y
OU-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	N	N

9.0 Recommendations and Follow-Up Actions

The following is a summary of recommendations and follow-up actions that are proposed for the site.

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
OU-2: Institutional controls are not established	Re-start discussions and establish institutional controls	MassDEP	EPA	Dec. 2015	N	Y
OU-2: Arsenic MCL and repromulgated State groundwater standards change	Prepare ESD to incorporate change	EPA	None	2017	N	Y
OU-2: Lengthy groundwater cleanup timeframe	Evaluate compliance boundary refinement or groundwater reclassification	EPA/ MassDEP	None	2017	N	Y

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
OU-3: Lead cleanup level change	Prepare ESD to incorporate change	EPA	None	2017	N	N

10.0 Protectiveness Statement

As described above, OU-1 and OU-2 are both completed with respect to implementation of the remedy. Institutional Controls need to be established at OU-2, for the remedy to be protective in the long-term. Review and approval of the final summary documents *(Site Summary Report* for OU-1, and *Final Remedial Construction Report* for OU-2) was performed by EPA. While construction of the remedy at OU-2 is complete, interim groundwater cleanup levels have not yet been attained.

10.1 OU-1

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.

10.2 OU-2

The remedy at OU-2 currently protects human health and the environment, as exposure pathways that could result in unacceptable risks are being controlled. Review and approval of the Final Remedial Construction Report (GeoSyntec, 2003) was performed by EPA, confirming that the remedy for OU-2 was implemented as required in the ROD and as modified by the 2000 ESD. The assumptions used at the time of remedy selection are valid. The change of the MCL for arsenic and repromulgated State groundwater standards would not change the selected remedy, but may need to be incorporated into the OU-2 remedy through a CERCLA decision document. 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 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.

10.3 OU-3

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 AOC, initiated at two other AOCs, and not yet implemented at the four remaining AOCs. The RAOs, 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.

10.4 OU-4

The OU-4 remedy construction has not yet been implemented. In the interim, the groundwater exposure pathway is not complete, as groundwater is not being extracted from beneath the site. The RAOs, ARARs for the remedy established in the ROD, and established cleanup levels remain valid and protective.

11.0 Next Review

Five-year reviews are conducted every five years at sites where contaminant levels remain at concentrations that prevent unlimited, unrestricted use of the Site. The next five-year review for the Iron Horse Park Superfund Site should be conducted by September 2018.

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FIGURES

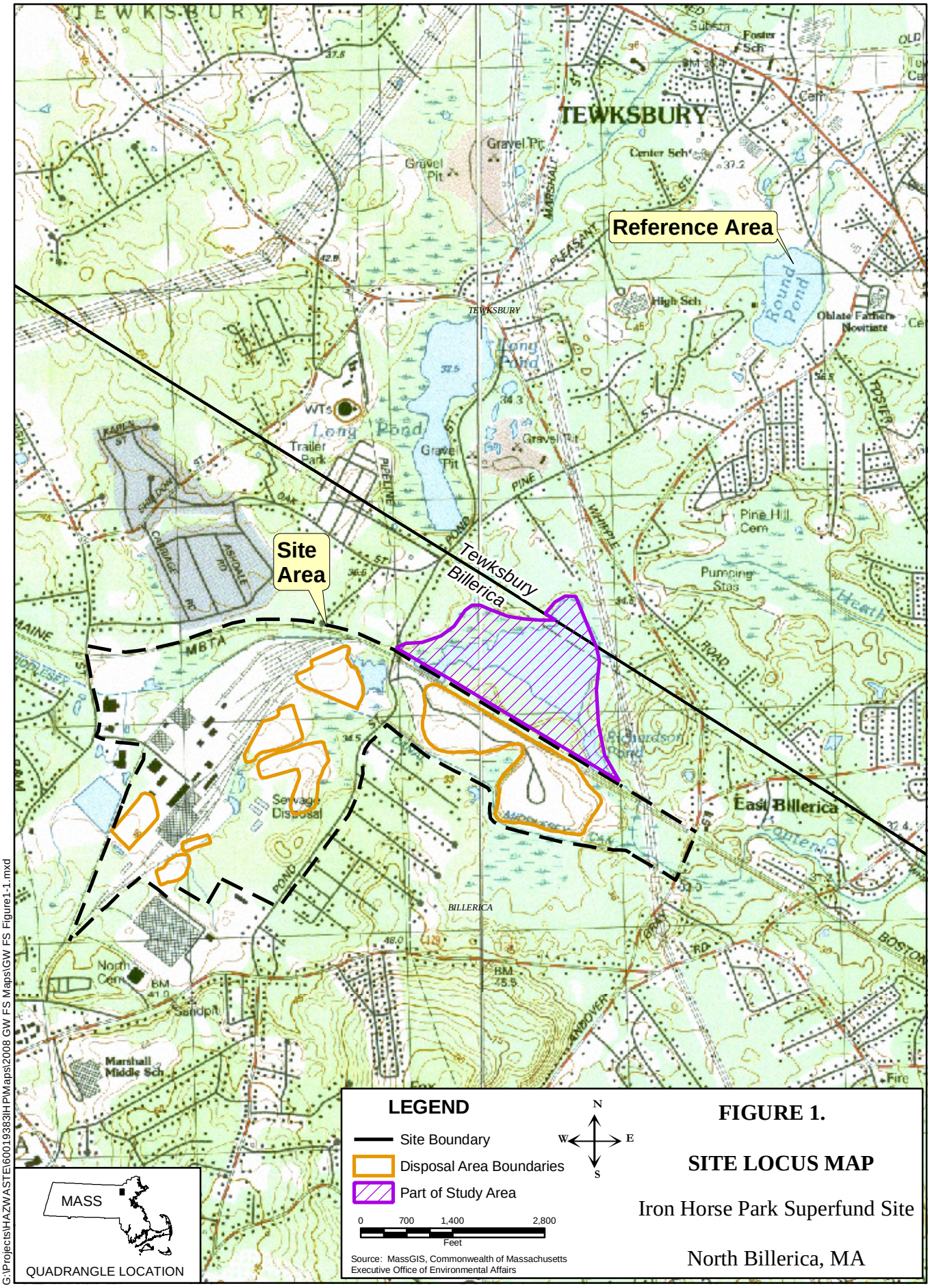

FIGURE 1.

SITE LOCUS MAP

Iron Horse Park Superfund Site

North Billerica, MA

Contaminated Soils Area
West Middlesex Canal Group (AOC #8a)
BOSTON AND MAINE
Middlesex Canal
Middlesex Canal
Barge Turnout
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
Asbestos Lagoons
Unnamed Brook
RSI Landfill
Asbestos Landfill
Middlesex Canal
Shaffer
Landfill
HIGH STREET
Old B&M Oil/Sludge Recycling Area
Extent of Railroad Not Shown
M.B.T.A
B&M Wastewater Lagoons
M.B.T.A
Wetland 2 Group (AOC #8b)
Content Brook Wetland Group (AOC #8e)
Content Brook
A
B
B&M Locomotive Shop Disposal Areas (A and B)
POND STREET
GRAY STREET
Man-made Canal
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

LOWELL
ANDOVER
CHELMSFORD
TEWKSBURY
BILLERICA
WILMINGTON
CARLISLE
BEDFORD
BURLINGTON
WOBURN

FIGURE 2

SITE MAP

Iron Horse Park Superfund Site
North Billerica, MA

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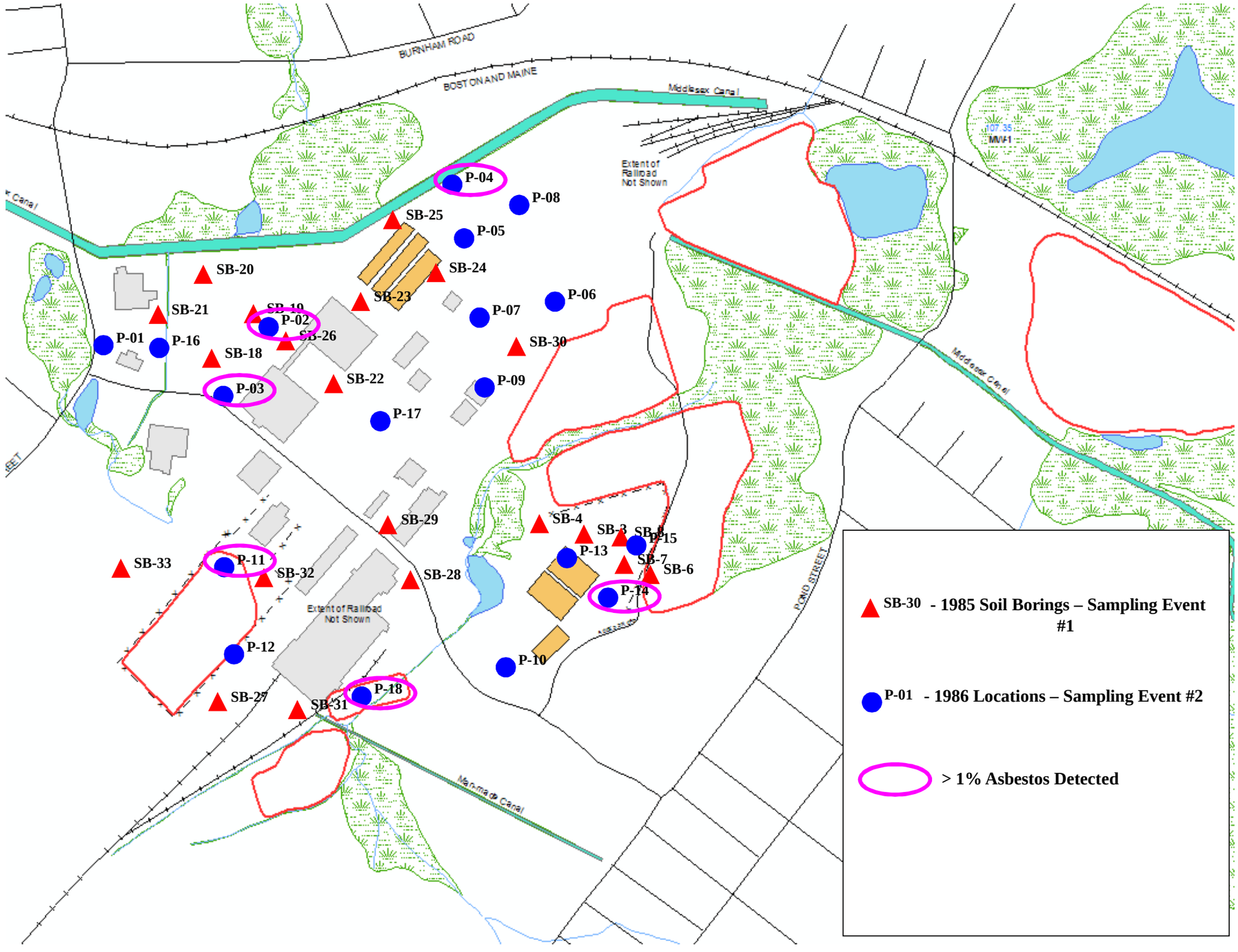

FIGURE 3. ASBESTOS SAMPLING DURING EVENTS #1 (1985) AND #2 (1986)

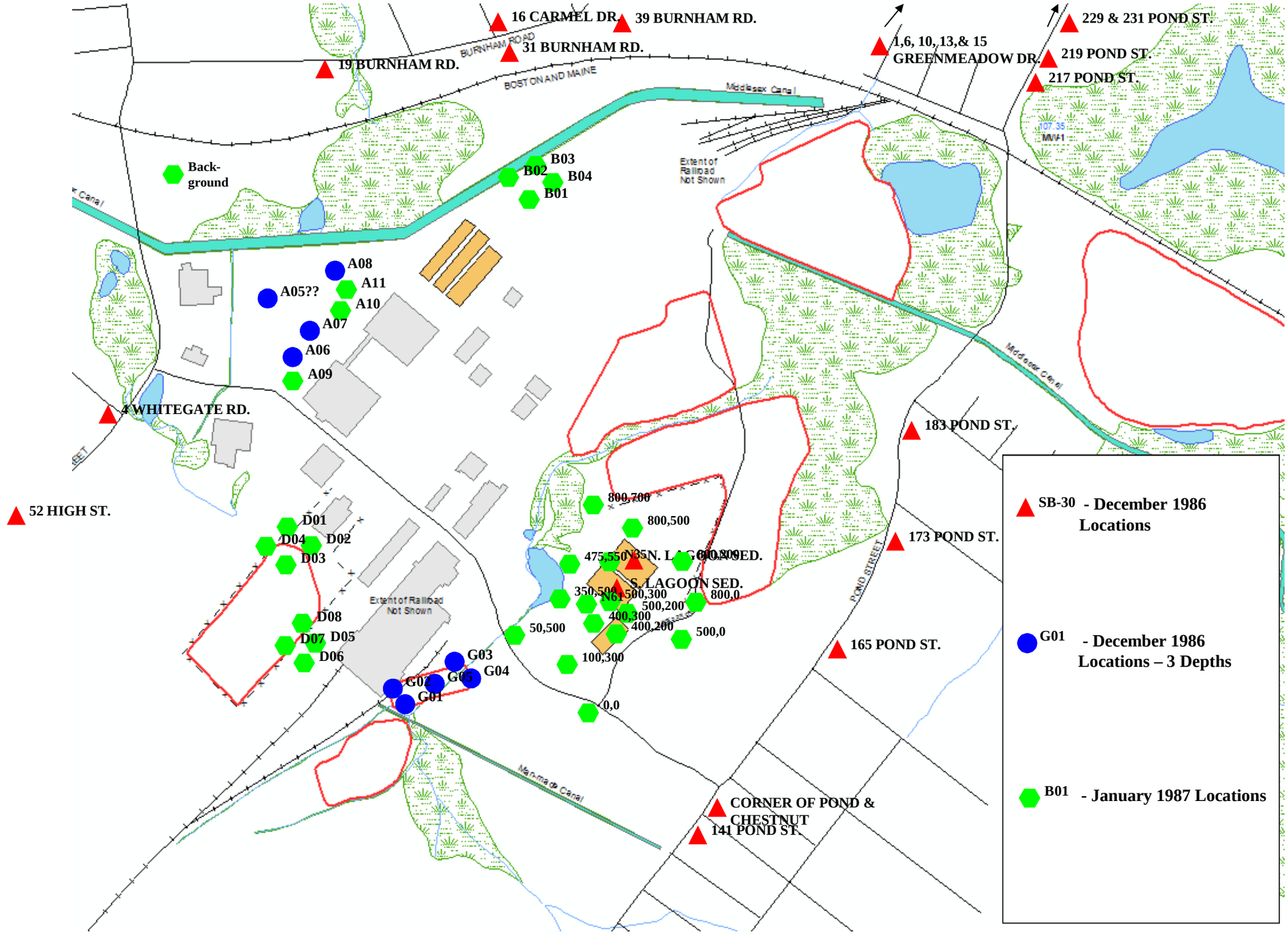

FIGURE 4. ASBESTOS SAMPLING DURING EVENT #5 (DEC. 1986 – JAN. 1987)

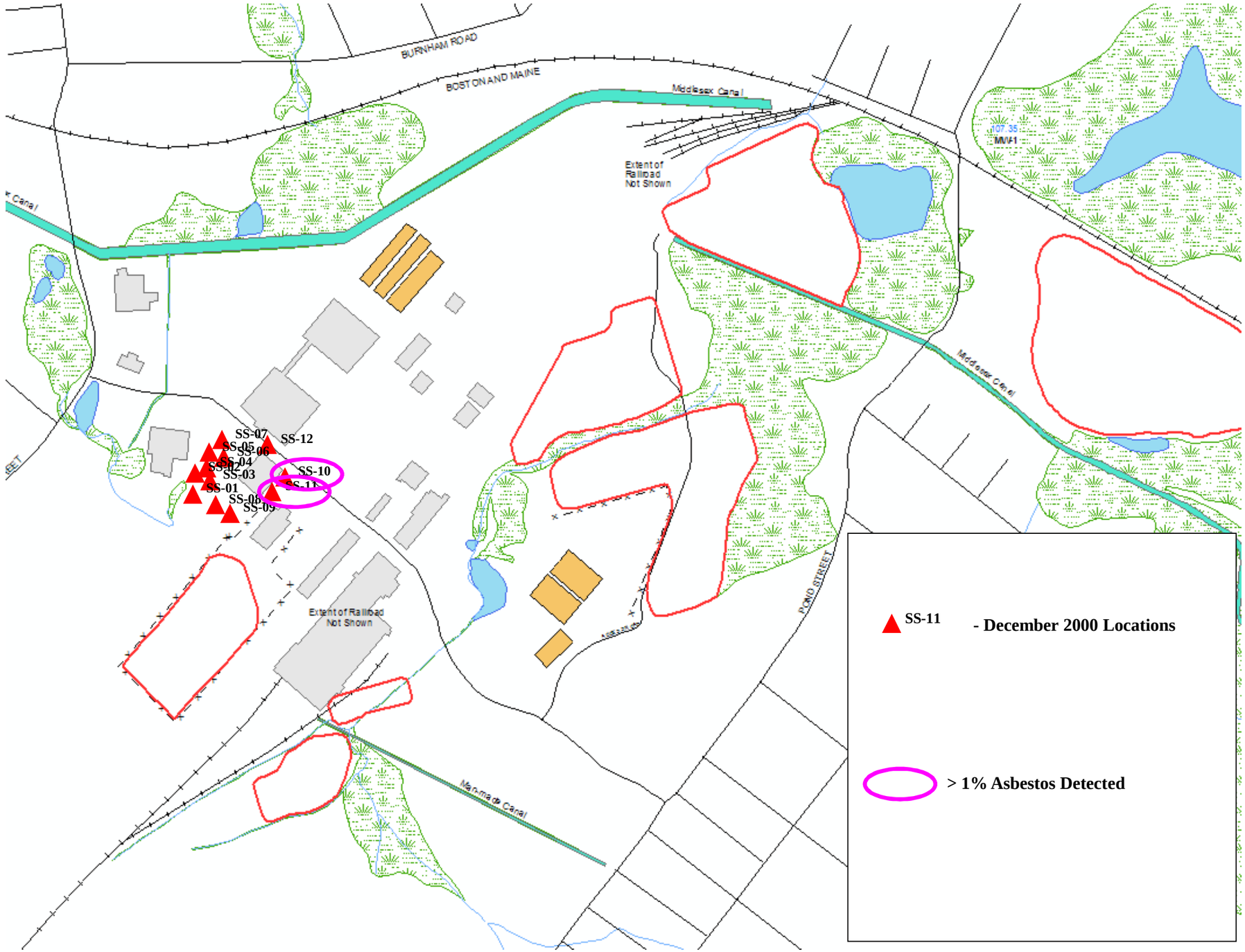

FIGURE 5. ASBESTOS SAMPLING AT ZONOLITE FACILITY (DEC. 2000)

APPENDICES

Appendix A
Interview Summary and Site Walkover Photos

A.1 – Site Walkover Photos

OU-2: Flare and detention basin outlet structure

OU-2: Fence damage due to fallen tree. Temporary repairs already implemented.

OU-2: Downchute with minimal vegetation

OU-2: View of wetland restoration area (east of eastern lobe) with ducks in the water

OU-2: Downchute with vegetation

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

OU-3: AOC5 finish pavement near tracks

OU-1: View of former lagoon area

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

OU-3: AOC5 – Contaminated Soils Area paved

OU-3: AOC1 – soil from AOC5 and pile of fencing

OU-3: AOC1 – soil from AOC5; water captured in plastic cover and silt fence collapsing

OU-3: AOC5 – pipe crossing under railroad tracks

OU-3: AOC7 – groundhog burrow

OU-3: AOC7 – view of landfill from beyond detention basin

OU-3: AOC7 – view of landfill from beyond detention basin

OU-3: AOC4 – cover inside Cooperative Reserve; lumber stored on top

OU-3: AOC4 – cover outside Cooperative Reserve; various views with lumber stored on new pavement

A.2 – Interview Summary

Iron Horse Park
2013 Five Year Review
Interview Summary

Interviewee: Andrew Deslaurier **Title:** Billerica Selectman
Type: Telephone **Date of Interview:** July 31, 2013

1. What is your overall impression of the project?

   Progress is being made.
   The area still has a "branding" issue or stigma from being a Superfund Site.
   Site updates get lost for people who are not regularly involved in the Site.

2. What effects have site operations had on the surrounding community?

   Very little, if any.

3. Are you aware of any community concerns at the site?

   Typically concerns are only voiced when something comes up that focuses attention on the site. (for example the fire that occurred at the site last month)

4. Are you aware of any events or incidents at the site?

   Aside from the fire, there are periodic trespass issues with ATVs.

5. Do you feel well informed about the site?

   Yes, but considering the issue regarding updates mentioned in question #1, a periodic presentation to the Board regarding site updates and information would be welcome and helpful.

6. Do you have any comments, suggestions, or recommendations regarding site management?

   To present site updates to the Board of Selectmen one or two times per year. The meetings are televised. The Board and town can get current site information and ask questions.

Iron Horse Park
2013 Five Year Review
Interview Summary

Interviewee: Janet Waldron **Title:** MassDEP Project Manager
Type: Telephone **Date of Interview:** August 1, 2013

1. What is your overall impression of the project?

   It is and has been a long process, but progress continues to be made.

2. Have there been routine communications or activities conducted by your office regarding the site?

   MassDEP is conducting monitoring (as a part of O&M) at OU2 – Shaffer Landfill. This involves monitoring of surface water and landfill gas.
   The office was heavily involved in review and permitting for the planned solar development project at the Shaffer Landfill.
   MassDEP has also responded to other non-Superfund issues at the site (odors and potential soil contamination from pressure-treated stored telephone poles, for example).

3. Have there been complaints, violations or incidents that required response by MassDEP?

   The issues with the stored telephone poles.

4. Do you feel well informed about the site?

   Overall, yes.

5. Do you have any comments, suggestions, or recommendations regarding site management?

   Not at this time.

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*.

B.2 – Confirmatory Soil Sample Results

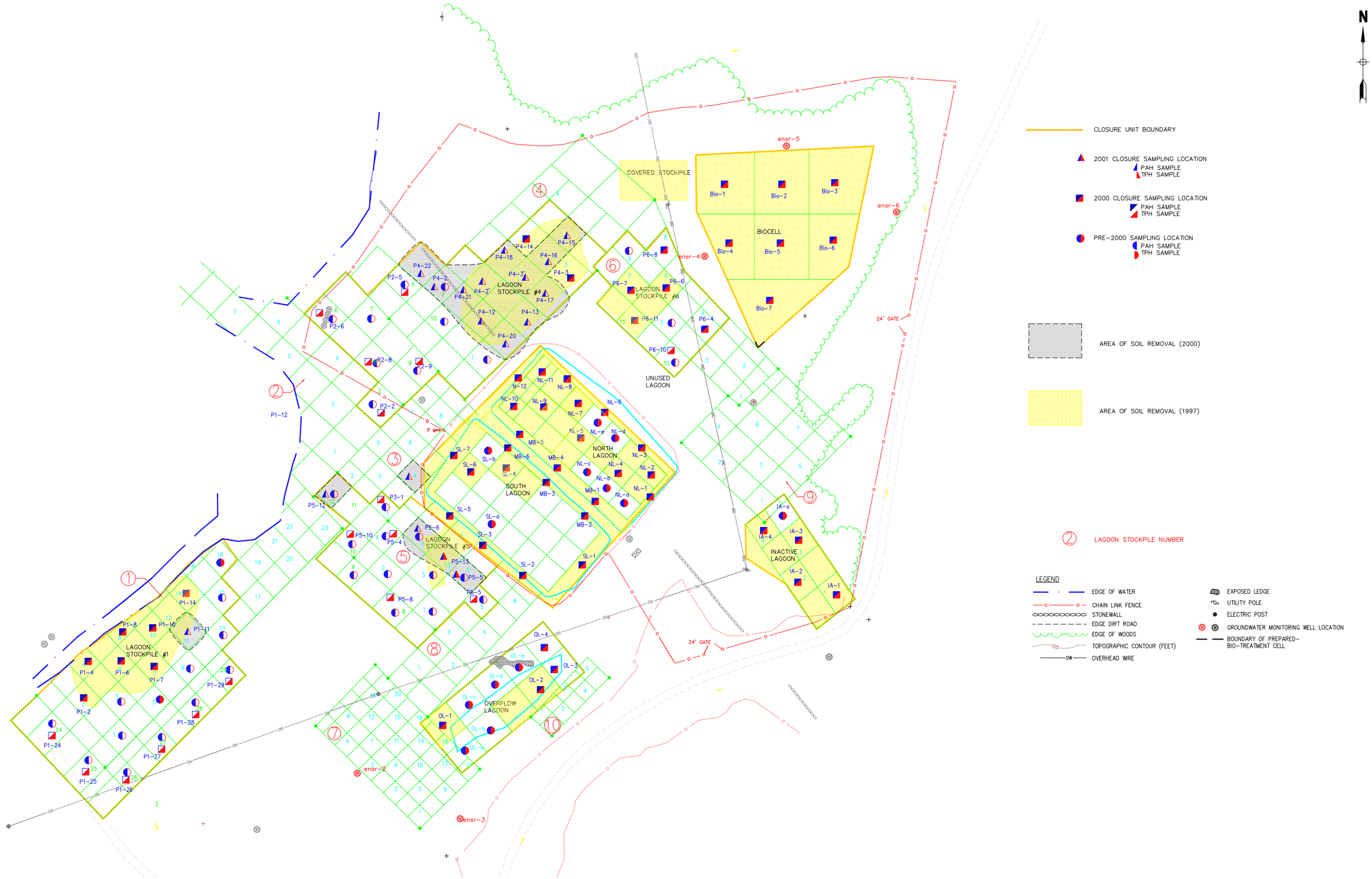

Figure 2 - TPH and PAH Sampling Locations
B&M, Billerca, MA

ERM

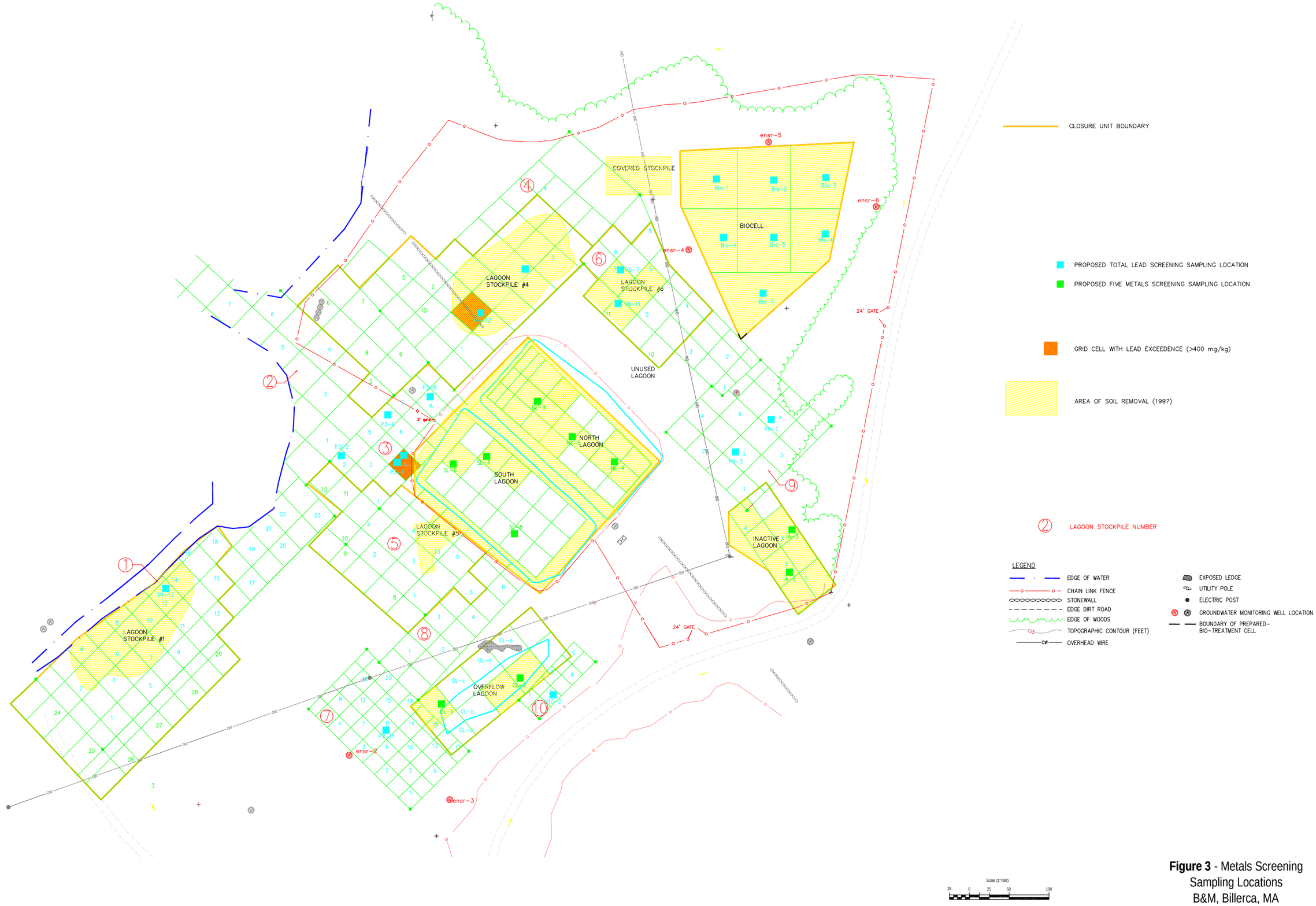

Figure 3 - Metals Screening Sampling Locations
B&M, Billerca, MA

ERM

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 was 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)	mg/kg		42	U	73		60		42	U			42	U
by Method 418.1														
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-parameter not detected at the specified 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)	mg/kg	172	223	119	62	85	530		650		250		1300		1200	
by Method 418.1																
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)	mg/kg	40	44		50		50		44	U	550	
by Method 418.1												
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)	mg/kg	96		79		230		570		130		160		180	
by Method 418.1															
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)	mg/kg	25	-	-	-	-	-	44	-	-	-		-		63	J	42	UJ	140	J	57	J
by Method 418.1																						
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)	mg/kg	42	U	46		43	U	43	U	77		48	J	56	J		
by Method 418.1																	
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)	mg / kg										890		3200	
by Method 418.1														
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)	mg/kg	140		2000		2400		81		1500		240		98	U
by Method 418.1															
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)	mg/kg												
by Method 418.1													
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 L0009077-01 on 10/6/2000									TPH data P5-12-1-1 L0009239-01 on 10/12/2000

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			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)	mg/kg	U	40	U	42	U	2300		3400		3300	
by Method 418.1												
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 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. 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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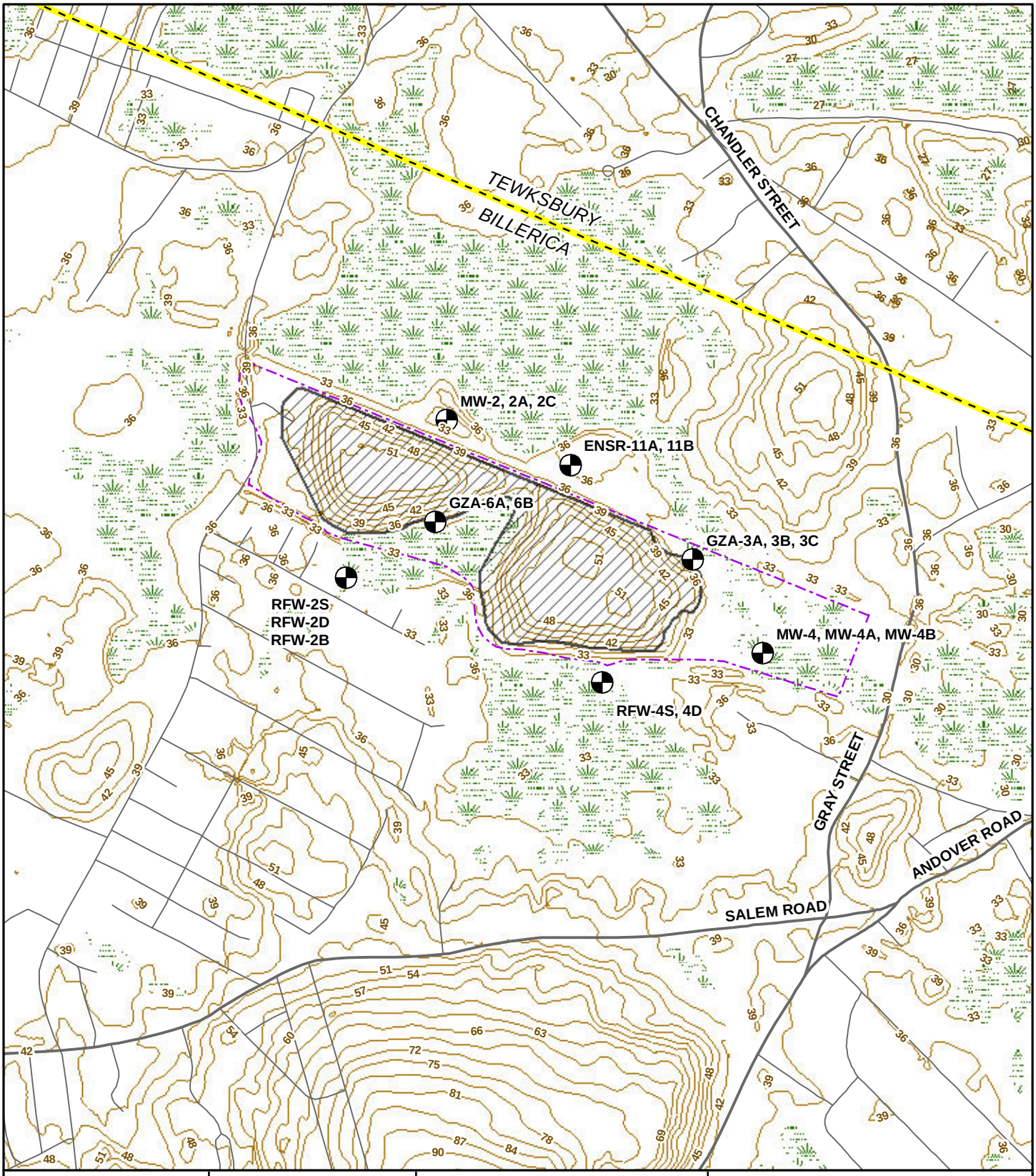
United States Environmental Protection Agency. 2001. *Shaffer Landfill RD/RA Consent Decree*.

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*.

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	ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A
Sample Date:	MCL/ICL	11/12/2008	5/5/2009	11/5/2009	6/15/2010	11/11/2010	4/15/2011	10/28/2011	5/7/2012 (a)	11/2/2012	5/2/2013
Inorganics-Metals (ug/l)											
Antimony	6	9.4 U	3.9 U	3.9 U	4 U	2.1 U	1.5 U	3.1 J	2.3 U	1.1 U	2 U
Arsenic	**10/50**	21.7	5.6	7.5	4.8	7.6	7.6	7.1	16.3	8.6	8.4
Barium	2000	729	61.6	37.9	35.2	31.1	27.8	28.8	431	38.3	41.3
Beryllium	4	0.215 B	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.077 U	0.394 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	5.8 B	2 B	1.8 J	2.3 U	2.2 J	2.3 J	1.9 J	3.5 J	1.2 J	0.944 J
Copper	1300	2.7 B	1.6 U	1.6 U	2 U	1.6 U	3.1 U	3.4 U	2.8 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.036 U	0.026 U	0.135 J	0.197 J	0.215 U	0.124 U	0.052 U	0.057 J	0.079 U	0.033 U
Lead, dissolved	NA	0.046 B	0.098 B	0.127 J	0.296 J	0.215 U	0.124 U	0.066 J	0.055 U	0.079 U	0.033 U
Magnesium	NA	51400	9400	8070	6900	6510	7270	5810	30200	9260	12000
Mercury	2	0.027 U	0.019 U	0.03 J	0.014 U	0.014 U	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	102	1.4 B	1.1 U	3.4 U	1.2 U	0.748 U	0.336 U	68.4	2.1 U	0.531 U
Selenium	50	32.1	0.34 B	0.064 J	0.123 U	0.183 U	1.2 J	0.163 U	16.1	0.68 J	0.124 U
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.913 J	1.4 J	0.54 U	0.378 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.014 U	0.039 U	0.015 U	0.064 U	0.026 U
Zinc	NA	6.8 U	2.6 U	3.1 J	4.2 J	2.2 J	5.5 J	2.8 U	3 J	3.6 J	2.1 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	4.6 J	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.061 U	0.061 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.4 J	5 U	5 U
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.74 J	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5.5	0.23 J	5 U
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.71 J	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	20 U	4 J	2.5 J	2.1 J	3.6 J	4.3 J	20 U	11	1.4 J	1.7 J
Benzene	**5/5**	5 U	1.3 J	5 U	0.63 J	5 U	0.96 J	5 U	6.8	0.61 J	5 U
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5 U	1.3 J	5 U	0.78 J	5 U	0.61 J	5 U	7.8	0.38 J	5 U
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.62 J	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.22 J	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.2 J	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A	ENSR-11A
Sample Date:		11/12/2008	5/5/2009	11/5/2009	6/15/2010	11/11/2010	4/15/2011	10/28/2011	5/7/2012 (a)	11/2/2012	5/2/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	0.61 J	5 U	0.37 J	5 U	0.34 J	5 U	17	0.29 J	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	12	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	0.6 J	5 U	2.3 J	0.94 J	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.92 J	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2.6 J	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.99 U	0.94 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.24 J	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.5	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B
Sample Date:	MCL/ICL	11/12/2008	5/5/2009	11/5/2009	6/15/2010	11/11/2010	4/15/2011	10/28/2011	5/7/2012 (a)	11/2/2012	5/2/2013
Inorganics-Metals (ug/l)											
Antimony	6	9.4 U	4 B	3.9 U	4 U	2.1 U	1.5 J	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	7.3	21	21.1	15	15.9	19	13.4	8.4	14.9	13.8
Barium	2000	52.1	653	606	488	506	475	458	32.4	400	373
Beryllium	4	0.143 U	0.216 B	0.184 J	0.238 U	0.121 J	0.101 U	0.168 U	0.077 U	0.453 J	0.211 J
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	2.6 B	4.9 B	4.7 J	4.1 J	3.8 J	3.7 J	4.1 J	1.7 J	2.5 J	3 J
Copper	1300	1.9 B	1.6 U	1.6 U	2 U	1.6 U	7.1 J	3.4 U	1 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.036 U	0.075 B	0.226 J	0.263 J	0.215 U	0.124 U	0.136 J	0.055 U	0.079 U	0.074 J
Lead, dissolved	NA	0.041 B	0.026 U	0.077 J	0.162 U	0.215 U	0.124 U	0.052 U	0.055 U	0.079 U	0.145 J
Magnesium	NA	7490	47500	43700	36000	36500	33000	32400	6740	26600	25800
Mercury	2	0.027 U	0.019 U	0.019 U	0.014 U	0.067 J	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	1.3 B	103	94.9	84.7	82.8	72.9	68.3	1.9 U	63.8	59.6
Selenium	50	0.551 B	27.5	28.8	19.2	16.8	30.1	15.4	0.424 J	16.3	12.7
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	1.1 J	1.2 U	0.646 J	0.795 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.039 U	0.015 U	0.064 U	0.026 U
Zinc	NA	6.8 U	2.6 U	5.8 J	3.9 J	1.6 U	2.8 U	2.8 U	2.4 J	5.5 J	1.7 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	7.9	8.6	7.5	5.6	5.8	5.9	5.1	5 U	5.2	4.4 J
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.061 U	0.061 U	0.059 U	0.06 U	0.06 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	1.3 J	2 J	1.8 J	1.6 J	1.6 J	1.5 J	1.4 J	5 U	1.5 J	1.2 J
1,2-Dichloroethane	**5/5**	0.53 J	5 U	5 U	5 U	5 U	0.46 J	0.41 J	5 U	0.37 J	0.39 J
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	1.4 J	1.4 J	1.4 J	0.91 J	1 J	0.88 J	0.77 J	5 U	0.79 J	0.68 J
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	7.7	7.9	7.2	6.9	6.9	6.2	6.3	5 U	6.1	4.8 J
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	1.1 J	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	0.38 J	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5.1	5 U	5 U	3 J	2.4 J	5 U	2.2 J	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	6.6 J	10 J	6.7 J	7.9 J	12 J	14 J	5.4 J	2.4 J	5.7 J	9.7 J
Benzene	**5/5**	11	11	11	8.9	9	8.1	7.4	5 U	6.6	5.7
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	7.4	8.7	8.5	8.3	9.2	8.4	8.7	5 U	7.9	6.9
Chloroethane	NA	0.84 J	0.52 J	5 U	0.48 J	0.61 J	0.64 J	0.67 J	5 U	0.55 J	0.51 J
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	0.26 J	0.26 J	5 U	0.24 J	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	23	20	17	7.4	7	4.2 J	2.9 J	5 U	1.5 J	0.9 J
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B	ENSR-11B
Sample Date:		11/12/2008	5/5/2009	11/5/2009	6/15/2010	11/11/2010	4/15/2011	10/28/2011	5/7/2012 (a)	11/2/2012	5/2/2013
	MCL/ICL										
Isopropylbenzene	NA	33	35	34	25	26	24	21	5 U	18	16
m,p-Xylenes	10000	30	29	25	18	18	15	14	5 U	13	11
Naphthalene	NA	5.6	3.9 J	3.3 J	2.2 J	2.5 J	2.4 J	2.6 J	5 U	2.7 J	2 J
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	1.2 J	1.4 J	1.4 J	0.95 J	1.2 J	1.1 J	1 J	5 U	0.9 J	0.82 J
o-Xylene	10000	4.4 J	4.9 J	4.1 J	3.2 J	3.1 J	3 J	2.7 J	5 U	2.7 J	2.3 J
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.94 U	0.94 U	0.47 U	0.5 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	0.22 J	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	2.7 J	3.8	2.9	2.3	2.5	2	1.8	1 U	1.4	1.2
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A
Sample Date:	MCL/ICL	11/12/2008	5/4/2009	11/4/2009	6/14/2010	11/9/2010	4/14/2011	10/24/2011	5/1/2012	10/31/2012	5/1/2013
Inorganics-Metals (ug/l)											
Antimony	6	9.4 U	3.9 U	3.9 U	4 U	2.1 U	2.5 J	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	3.5	3.1	3.9	3.1	2.7	2.4	2.7	2.6	3.7	2.5
Barium	2000	4150	3480	4010	3670	3590	2590	4010	3370	4370	2720
Beryllium	4	0.143 U	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.077 U	0.269 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	0.386 J	0.191 J	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.325 J	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	3.7 B	1.3 B	2.5 J	2.3 J	2.9 J	2.3 J	1.9 J	1.5 J	2 J	1.2 J
Copper	1300	1.5 B	1.6 U	1.6 U	2.7 J	3.8 J	3.4 J	3.4 U	1.4 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	199	178	248	179	270	180	251	146	255	126
Lead, dissolved	NA	36.2	45.7	70.7	8.50	5.1	4.7	13.1	6.8	51.8	9.4
Magnesium	NA	23200	22700	24500	20700	22200	11700	15600	17800	19600	19500
Mercury	2	0.027 U	0.019 U	0.019 U	0.014 U	0.06 J	0.014 U	0.014 U	0.026 U	0.032 J	0.032 U
Nickel	NA	7.7 B	5.1 B	5.3 J	5.7 J	4.7 J	1.6 J	2.8 J	2.7 J	8 J	1 J
Selenium	50	1.8 B	1.1 B	0.749 J	1.0 J	0.609 J	1.5 J	1.4 J	1.8 J	1.8 J	1.2 J
Silver	NA	1.4 U	1.5 B	0.829 U	2.3 U	1.4 U	0.922 J	1.7 J	1.2 J	1.7 J	0.622 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.039 U	0.015 U	0.064 U	0.026 U
Zinc	NA	8.2 B	5.6 B	12.6 J	11.9 J	16.1 J	6.5 J	6.5 J	9.4 J	10 J	3.2 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	0.7 J	5 U	0.56 J	0.64 J	5 U	0.61 J	1 J	25 U	0.7 J	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.061 U	0.061 U	0.06 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,2-Dichlorobenzene	600	0.35 J	5 U	5 U	5 U	0.4 J	5 U	25 U	25 U	0.35 J	0.28 J
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	0.25 J	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	1.6 J	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
1,4-Dichlorobenzene	75	1.4 J	1.8 J	1.5 J	1.9 J	2.1 J	1.9 J	25 U	1.6 J	1.9 J	1.5 J
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
2-Butanone (MEK)	NA	0.74 J	5 U	5 U	5 U	5 U	2.8 J	25 U	25 U	1.9 J	0.93 J
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	1.4 J	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Acetone	NA	3.5 J	6.7 J	3 J	4.7 J	3.8 J	3 J	8.7 J	14 J	2.9 J	4.1 J
Benzene	**5/5**	7.1	6.8	5.6	7.3	7	5.4	6 J	5.3 J	6	5.9
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	50 U	50 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Chlorobenzene	100	5.2	6	5.6	6	6.2	5.4	5.4 J	4.6 J	5.5	5.3
Chloroethane	NA	0.54 J	0.57 J	5 U	0.41 J	0.56 J	5 U	25 U	25 U	0.43 J	0.4 J
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Ethylbenzene	700	15	9.9	11	12	8.7	14	12 J	6.5 J	13	9.3
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	5 U	5 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A	GZA-6A
Sample Date:		11/12/2008	5/4/2009	11/4/2009	6/14/2010	11/9/2010	4/14/2011	10/24/2011	5/1/2012	10/31/2012	5/1/2013
	MCL/ICL										
Isopropylbenzene	NA	2.8 J	2.7 J	2.7 J	3.2 J	2.2 J	3.4 J	3 J	2.2 J	3 J	3 J
m,p-Xylenes	10000	4.3 J	3.4 J	3.6 J	4.5 J	3 J	4.6 J	4.7 J	2.3 J	5.2	3.9 J
Naphthalene	NA	5.1	0.91 J	1.2 J	1.2 J	0.73 J	2.2 J	2.2 J	1.4 J	1.6 J	0.68 J
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
N-Propylbenzene	NA	0.57 J	0.73 J	0.68 J	0.82 J	0.76 J	1.1 J	25 U	25 U	0.82 J	0.8 J
o-Xylene	10000	0.56 J	5 U	5 U	0.56 J	5 U	0.65 J	25 U	25 U	0.63 J	0.51 J
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.94 U	0.96 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Toluene	1000	0.43 J	1 U	1 U	0.48 J	0.38 J	0.46 J	5 U	5 U	0.51 J	0.44 J
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	25 U	25 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B
Sample Date:	MCL/ICL	11/12/2008	5/4/2009	11/4/2009	6/14/2010	11/9/2010	4/14/2011	10/24/2011	5/1/2012	10/31/2012	5/1/2013
Inorganics-Metals (ug/l)											
Antimony	6	9.4 U	3.9 U	3.9 U	4 U	2.1 U	1.5 U	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	3.7	1.2	7.7	0.875 J	3.1	1.3	1.2	2.2	1.6	1.2
Barium	2000	28.8	28.8	26.5	22.4	25.8	20.9	29.3	29.7	30.6	32.2
Beryllium	4	0.143 U	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.077 U	0.286 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	1.3 J	0.253 J	0.132 J	0.168 U	0.146 U	0.215 J	0.155 U
Cadmium, dissolved	NA	0.155 U	0.143 B	0.119 U	0.119 U	0.191 J	0.151 J	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	1.7 B	0.98 B	1.7 J	2.3 U	1.6 J	2.2 J	0.845 J	0.238 U	0.884 U	0.169 U
Copper	1300	1.8 B	1.6 U	1.7 J	2 U	1.6 U	3.1 U	3.4 U	2 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.036 U	0.044 B	0.596 J	0.162 U	0.215 U	0.124 U	0.092 J	0.066 J	0.079 U	0.07 J
Lead, dissolved	NA	0.111 B	0.033 B	0.041 J	0.162 U	0.594 J	0.124 U	0.052 U	0.055 U	0.148 J	0.035 J
Magnesium	NA	6960	7220	6070	5590	5630	5790	5600	6480	5890	7050
Mercury	2	0.027 U	0.019 U	0.021 J	0.014 U	0.018 J	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	6.4 B	6.4 B	6.1 J	7.1 J	7.3 J	6.6 J	7.2 J	6.1 J	8.3 J	6 J
Selenium	50	0.152 U	0.103 U	0.056 U	0.123 U	0.183 U	0.254 J	0.163 U	0.208 U	0.208 U	0.124 U
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.557 U	1.2 U	0.547 J	0.891 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.047 J	0.052 J	0.064 U	0.026 U
Zinc	NA	6.8 U	2.7 B	4 J	5.2 J	3.7 J	22.6	2.8 U	3.2 J	3.6 J	3.4 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.062 U	0.061 U	0.062 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	20 U	20 U	20 U	20 U	20 U	20 U	20 U	1.2 J	10 U	1.3 J
Benzene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B	GZA-6B
Sample Date:		11/12/2008	5/4/2009	11/4/2009	6/14/2010	11/9/2010	4/14/2011	10/24/2011	5/1/2012	10/31/2012	5/1/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.94 U	1 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2
Sample Date:		11/12/2008	5/5/2009	11/5/2009	6/15/2010	11/11/2010	4/15/2011	10/28/2011	5/7/2012	11/2/2012	5/2/2013
	MCL/ICL										
Inorganics-Metals (ug/l)											
Antimony	6	9.4 U	3.9 U	3.9 U	4 U	2.1 U	1.5 U	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	3.4	4.4	6.3	1.7	5.4	2.5	3.5	2.8	3.5	5.5
Barium	2000	9.8 B	10.5 B	11.3 J	8.1 J	12.1 J	2.3 J	12.4 J	12.2 J	14.5 J	14.1 J
Beryllium	4	0.143 U	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.077 U	0.375 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.171 J	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	1.5 B	0.712 B	1.1 J	2.3 U	1.5 J	1.3 J	1.2 J	1.4 J	0.884 U	0.669 J
Copper	1300	1.9 B	1.6 U	1.8 J	2 U	1.6 U	3.1 U	3.4 U	1.3 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.036 U	0.162 B	0.29 J	0.49 J	0.275 J	0.128 J	0.245 J	0.246 J	0.079 U	0.226 J
Lead, dissolved	NA	0.044 B	0.026 U	0.148 J	0.162 U	0.215 U	0.124 U	0.074 J	0.055 U	0.079 U	0.06 J
Magnesium	NA	9430	10700	11600	10600	11300	11600	11500	12300	12400	13900
Mercury	2	0.027 U	0.019 U	0.028 J	0.014 U	0.014 U	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	0.806 B	1.1 U	1.1 U	3.4 U	1.4 J	0.748 U	1.1 J	1.9 U	2.1 U	0.531 U
Selenium	50	0.152 U	0.319 B	0.151 J	0.123 U	0.183 U	1.4 J	0.691 J	0.651 J	0.764 J	0.368 J
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.557 U	1.2 U	0.593 J	0.581 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.039 U	0.015 U	0.064 U	0.026 U
Zinc	NA	6.8 U	17.8 B	3.5 J	6.9 J	3.2 J	12.4 J	2.8 U	2.5 J	2.5 J	3.6 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	1.6 J	1.7 J	1.5 J	1.5 J	1.6 J	1.8 J	1.5 J	1.6 J	1.6 J	1.3 J
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.061 U	0.061 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	1.5 J	20 U	20 U	20 U	20 U	20 U	20 U	10 U	10 U	10 U
Benzene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5 U	5 U	5 U	5 U	0.27 J	5 U	0.27 J	0.28 J	0.32 J	0.34 J
Chloroethane	NA	5 U	5 U	5 U	5 U	0.26 J	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	0.32 J	0.35 J	0.39 J	0.32 J	0.34 J	0.36 J	0.34 J
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2
Sample Date:		11/12/2008	5/5/2009	11/5/2009	6/15/2010	11/11/2010	4/15/2011	10/28/2011	5/7/2012	11/2/2012	5/2/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	1 U	0.94 U	0.47 U	0.49 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Notes

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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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A
Sample Date:	MCL/ICL	11/12/2008	5/5/2009	11/5/2009	6/15/2010	11/11/2010	4/15/2011	10/28/2011	5/7/2012	11/2/2012	5/2/2013
Inorganics-Metals (ug/l)											
Antimony	6	9.4 U	3.9 U	3.9 U	4 U	2.1 U	1.5 U	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	175	184	184	147	160	167	185	149	136	133
Barium	2000	261	232	218	184	198	197	200	167	182	160
Beryllium	4	0.143 U	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.077 U	0.341 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.453 J	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	1.5 B	0.475 U	0.745 J	2.3 U	0.54 U	0.488 J	2.2 J	0.583 J	0.884 U	0.169 U
Copper	1300	1.8 B	1.6 U	1.6 U	4.2 J	1.6 U	3.1 U	3.4 U	1.1 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.036 U	0.026 U	0.093 J	0.162 U	0.215 U	0.354 J	0.227 J	0.055 U	0.079 U	0.068 J
Lead, dissolved	NA	0.041 B	0.026 U	0.082 J	0.509 J	0.215 U	0.124 U	0.062 J	0.055 U	0.202 J	0.033 U
Magnesium	NA	14500	14100	13300	11800	12400	12600	12600	11200	11800	11500
Mercury	2	0.027 U	0.019 U	0.027 J	0.014 U	0.014 U	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	5.7 B	4.7 B	4.5 J	4 J	4 J	2.3 J	3.4 J	2.7 J	3.1 J	1.5 J
Selenium	50	0.8 B	0.242 B	0.131 J	0.123 U	0.183 U	1.5 J	0.163 U	0.37 J	0.406 J	0.124 U
Silver	NA	1.4 U	1 B	0.829 U	2.3 U	1.4 U	0.902 U	0.792 J	1.2 U	0.895 J	0.438 J
Thallium	2	0.075 U	0.103 B	0.102 U	0.204 U	0.2 U	0.041 U	0.039 U	0.015 U	0.064 U	0.026 U
Zinc	NA	6.8 U	5.5 B	2.6 U	4.7 J	1.6 U	2.8 U	2.8 U	1.4 U	1.9 J	2 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	0.35 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.061 U	0.062 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	1 J	1 J	0.74 J	0.68 J	0.65 J	5 U	0.48 J	0.43 J	0.41 J	0.3 J
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	3.2 J	3.3 J	20 U	20 U	4.4 J	20 U	1.7 J	3.1 J	10 U	3 J
Benzene	**5/5**	0.62 J	0.51 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	4.8 J	4.2 J	2.9 J	2.3 J	2.1 J	1.9 J	1.6 J	1.5 J	1.2 J	0.97 J
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	0.68 J	0.7 J	0.48 J	0.43 J	0.37 J	0.35 J	0.35 J	0.26 J	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A
Sample Date:		11/12/2008	5/5/2009	11/5/2009	6/15/2010	11/11/2010	4/15/2011	10/28/2011	5/7/2012	11/2/2012	5/2/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.95 U	1 U	0.94 U	0.47 U	0.5 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	0.31 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-2C	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C
Sample Date:	MCL/ICL	11/12/2008	5/5/2009	11/5/2009	6/15/2010	11/11/2010	4/15/2011	10/28/2011	5/7/2012	11/2/2012	5/2/2013
Inorganics-Metals (ug/l)											
Antimony	6	9.4 U	3.9 U	3.9 U	4 U	2.1 U	1.5 U	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	168	179	183	147	168	141	163	163	143	145
Barium	2000	144	139	146	104	122	88.9	102	108	112	79.2
Beryllium	4	0.143 U	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.077 U	0.38 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	1.5 B	0.621 B	0.952 J	2.3 U	0.741 J	0.665 J	0.792 J	6 J	0.884 U	0.169 U
Copper	1300	4.1 B	1.6 U	1.6 U	2 U	10.2 J	3.1 U	3.4 U	1.7 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.036 U	0.209 B	0.255 J	0.162 U	0.331 J	0.153 J	0.058 J	0.109 J	0.079 U	0.041 J
Lead, dissolved	NA	0.056 B	0.081 B	0.097 J	0.162 U	0.243 J	0.124 U	0.086 J	0.055 U	0.079 U	0.036 J
Magnesium	NA	11700	10800	11800	8280	7950	6200	7260	10100	9060	8170
Mercury	2	0.027 U	0.019 U	0.019 U	0.014 U	0.014 U	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	3.7 B	3 B	3.5 J	3.4 U	4.6 J	1.6 J	2.7 J	4.9 J	2.2 J	0.531 U
Selenium	50	0.5 B	0.235 B	0.325 J	0.123 U	0.183 U	1.1 J	0.27 J	0.588 J	0.587 J	0.124 U
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.756 J	1.2 U	0.547 J	0.458 J
Thallium	2	0.098 B	0.143 B	0.102 U	0.204 U	0.2 U	0.047 J	0.09 J	0.118 J	0.096 J	0.03 J
Zinc	NA	6.8 U	2.8 B	4.8 J	2.5 J	4.6 J	6 J	2.8 U	2.1 J	2.8 J	1.5 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.062 U	0.062 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	0.37 J	0.4 J	5 U	5 U	5 U	5 U	0.23 J	5 U	0.25 J	5 U
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	1.1 J	0.99 J	0.92 J	0.63 J	0.83 J	0.68 J	0.62 J	0.6 J	0.58 J	0.21 J
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	3.8 J	2.9 J	1.7 J	4.7 J	4.8 J	20 U	1.3 J	3.2 J	10 U	10 U
Benzene	**5/5**	1 J	0.83 J	0.89 J	0.56 J	0.59 J	0.58 J	0.57 J	0.65 J	0.46 J	1.7 J
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	3.9 J	2.9 J	2.9 J	1.8 J	2.4 J	5 U	1.7 J	1.5 J	1.4 J	0.44 J
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-2C	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C	MW-2C
Sample Date:		11/12/2008	5/5/2009	11/5/2009	6/15/2010	11/11/2010	4/15/2011	10/28/2011	5/7/2012	11/2/2012	5/2/2013
	MCL/ICL										
Isopropylbenzene	NA	0.3 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	0.56 J	5 U	5 U	0.33 J	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	1 U	0.94 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	0.26 J	0.26 J	0.27 J	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	0.32 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B
Sample Date:		11/13/2008	5/6/2009	11/4/2009	6/15/2010	11/10/2010	4/14/2011	10/25/2011	5/3/2012	11/1/2012	4/30/2013
	MCL/ICL										
Inorganics-Metals (ug/l)											
Antimony	6	0.131 B	3.9 U	3.9 U	4 U	2.1 U	1.5 U	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	3	2.8	3	2	3.2	3.1	3.5	2.9	3	3.1
Barium	2000	43.8	42	43.4	42.8	45.1	43.4	51.1	51.1	52.1	54.7
Beryllium	4	0.143 U	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.077 U	0.482 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	1.0 B	0.475 U	0.491 J	2.3 U	0.54 U	0.56 J	0.677 J	0.238 U	0.884 U	0.169 U
Copper	1300	2.1 B	1.6 U	1.6 U	2 U	1.6 U	3.1 U	3.4 U	0.992 U	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.165 B	1.4	0.253 J	0.681 J	0.215 U	0.157 J	0.08 J	0.116 J	0.079 U	0.088 J
Lead, dissolved	NA	0.036 U	0.026 U	0.052 J	0.323 J	0.215 U	0.124 U	0.087 J	0.094 J	0.079 U	0.033 U
Magnesium	NA	7600	7770	7660	8180	7920	8900	8550	9050	8700	9620
Mercury	2	0.027 U	0.019 U	0.023 J	0.014 U	0.014 U	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	0.172 U	1.1 U	1.1 U	3.4 U	1.2 U	0.748 U	0.336 U	1.9 U	2.1 U	0.531 U
Selenium	50	0.2 U	0.103 U	0.056 U	0.123 U	0.183 U	0.108 J	0.163 U	0.208 U	0.208 U	0.124 U
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.89 J	1.2 U	0.54 U	0.354 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.039 U	0.015 U	0.064 U	0.026 U
Zinc	NA	6.8 U	7.4 B	2.6 U	4.3 J	2.8 J	2.8 U	2.8 U	1.9 J	2.6 J	2.9 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.062 U	0.061 U	0.061 U	0.06 U	0.062 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	20 U	20 U	20 U	20 U	20 U	20 U	20 U	10 U	10 U	10 U
Benzene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B	RFW-2B
Sample Date:		11/13/2008	5/6/2009	11/4/2009	6/15/2010	11/10/2010	4/14/2011	10/25/2011	5/3/2012	11/1/2012	4/30/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.94 U	0.94 U	0.49 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D
Sample Date:		11/13/2008	5/6/2009	11/4/2009	6/15/2010	11/10/2010	4/14/2011	10/25/2011	5/3/2012	11/1/2012	4/30/2013
	MCL/ICL										
Inorganics-Metals (ug/l)											
Antimony	6	0.084 U	3.9 U	3.9 U	4 U	2.1 U	1.5 U	1.8 J	2.3 U	1.1 U	2 U
Arsenic	**10/50**	0.311 U	0.178 U	0.25 U	0.236 U	0.423 U	0.1 U	0.369 U	0.394 U	0.324 U	0.11 U
Barium	2000	61.5	63.1	60.2	59.8	53.8	61.8	65.6	71.4	77.5	83.7
Beryllium	4	0.143 U	0.119 U	0.119 U	0.238 U	0.14 J	0.101 U	0.168 U	0.077 U	0.419 J	0.197 J
Cadmium	5	0.2 B	0.119 U	0.122 J	0.283 U	0.229 J	0.214 J	0.168 U	0.146 U	0.286 J	0.155 U
Cadmium, dissolved	NA	0.238 B	0.147 B	0.119 U	0.283 U	0.153 U	0.235 J	0.214 J	0.146 U	0.168 U	0.155 U
Chromium	100	1.3 B	0.904 B	0.626 J	2.3 U	0.54 U	0.488 J	0.474 J	0.238 U	0.884 U	0.452 J
Copper	1300	2.3 B	1.6 U	1.6 U	2 U	1.6 U	3.1 U	3.4 U	1.5 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.116 B	0.026 U	0.069 J	0.175 J	0.215 U	0.124 U	0.099 J	0.055 U	0.079 U	0.072 J
Lead, dissolved	NA	0.079 B	0.041 B	0.308 J	0.26 J	0.215 U	0.124 U	0.052 U	0.055 U	0.079 U	0.039 J
Magnesium	NA	6550	6940	6630	6890	5890	7000	6900	7450	7040	7650
Mercury	2	0.027 U	0.019 U	0.019 U	0.228	0.014 U	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	2.9 B	2.5 B	2.5 J	3.4 U	2.5 J	1.7 J	2.6 J	1.9 U	3.3 J	2.4 J
Selenium	50	0.2 U	0.103 U	0.056 U	0.123 U	0.183 U	0.253 J	0.163 U	0.208 U	0.208 U	0.124 U
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.557 U	1.2 U	0.54 U	0.78 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.039 U	0.019 J	0.064 U	0.029 J
Zinc	NA	6.8 U	8.1 B	2.6 J	2.4 J	3.3 J	2.8 U	2.8 U	1.4 U	1.4 U	2.1 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.061 U	0.061 U	0.06 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	20 U	20 U	20 U	20 U	20 U	20 U	20 U	10 U	10 U	10 U
Benzene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	0.32 J	5 U	0.27 J	0.24 J	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D	RFW-2D
Sample Date:		11/13/2008	5/6/2009	11/4/2009	6/15/2010	11/10/2010	4/14/2011	10/25/2011	5/3/2012	11/1/2012	4/30/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	1 U	0.94 U	0.94 U	0.94 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S
Sample Date:	MCL/ICL	11/13/2008	5/6/2009	11/4/2009	6/15/2010	11/10/2010	4/14/2011	10/25/2011	5/3/2012	11/1/2012	4/30/2013
Inorganics-Metals (ug/l)											
Antimony	6	0.084 U	3.9 U	3.9 U	4 U	2.1 U	1.7 J	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	0.311 U	0.178 U	0.25 U	0.236 U	0.423 U	0.1 U	0.369 U	0.394 U	0.324 U	0.11 U
Barium	2000	51.6	54.3	74.6	54.3	77.2	51.1	65	74.4	83.3	57.4
Beryllium	4	0.143 U	0.152 B	0.119 U	0.238 U	0.152 J	0.101 U	0.168 U	0.098 J	0.504 J	0.233 J
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.225 J	0.119 U	0.168 U	0.146 U	0.177 J	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.214 J	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	1.3 B	0.874 B	0.618 J	2.3 U	0.617 J	0.845 J	0.822 J	0.238 U	0.884 U	0.169 U
Copper	1300	2.4 B	1.6 U	1.6 U	2 U	1.6 U	3.1 U	3.4 U	1.6 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.1 B	0.057 B	0.052 J	0.282 J	0.215 U	0.175 J	0.092 J	0.055 U	0.079 U	0.069 J
Lead, dissolved	NA	0.064 B	0.044 B	0.193 J	0.236 J	0.215 U	0.266 J	0.52 U	0.074 J	0.079 U	0.056 J
Magnesium	NA	2680	2800	3580	2500	2880	2250	2760	5000	3320	2970
Mercury	2	0.027 U	0.019 U	0.028 J	0.028 J	0.014 U	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	2.3 B	2.2 B	2.8 J	3.4 U	2.6 J	2.7 J	2.3 J	2.2 J	3.2 J	0.994 J
Selenium	50	0.152 B	0.17 B	0.106 J	0.123 U	0.183 U	0.133 J	0.163 U	0.208 U	0.338 J	0.127 J
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.557 U	1.2 U	0.595 J	0.445 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.064 J	0.047 J	0.067 J	0.064 U	0.026 U
Zinc	NA	6.8 U	3.4 B	2.7 J	5.1 J	3.5 J	2.8 U	2.8 U	2.4 J	1.7 J	2.9 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.060 U	0.06 U	0.060 U	0.06 U	0.06 U	0.061 U	0.061 U	0.061 U	0.061 U	0.062 U
1,2-Dibromoethane (EDB)	0.05	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	**5/5**	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2-Dichloropropane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	20 U	20 U	20 U	20 U	20 U	20 U	20 U	10 U	10 U	10 U
Benzene	**5/5**	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromobenzene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10.0 U	10 U	10.0 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S	RFW-2S
Sample Date:		11/13/2008	5/6/2009	11/4/2009	6/15/2010	11/10/2010	4/14/2011	10/25/2011	5/3/2012	11/1/2012	4/30/2013
	MCL/ICL										
Isopropylbenzene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.96 U	0.99 U	0.94 U	0.94 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A
Sample Date:	MCL/ICL	11/13/2008	5/4/2009	11/3/2009	6/16/2010	11/9/2010	4/18/2011	10/25/2011	5/1/2012	10/31/2012	5/1/2013
Inorganics-Metals (ug/l)											
Antimony	6	0.211 B	3.9 U	3.9 U	4 U	2.1 U	1.5 U	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	47.9	9.7	41.8	28	16.4	2.9	20.4	9.5	29.1	5
Barium	2000	80.9	58.1	95.2	85.6	66.3	42.1	77.6	90.5	90.4	42.9
Beryllium	4	0.143 U	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.077 U	0.394 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.156 J	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	1.4 B	0.475 U	1.6 J	2.3 U	0.696 J	0.382 U	0.762 J	0.238 U	0.884 U	0.169 U
Copper	1300	4.5 B	1.6 U	2.6 J	2 U	2 J	3.1 U	3.4 U	5.2 J	2.6 J	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.151 B	0.038 B	0.081 J	0.21 J	0.36 J	0.124 U	0.052 U	0.203 J	0.079 U	0.088 J
Lead, dissolved	NA	0.036 U	0.026 U	0.065 J	0.162 U	0.215 U	0.124 U	0.052 U	0.069 J	0.079 U	0.043 J
Magnesium	NA	10100	8520	12200	10700	6550	4480	7510	8360	7800	6370
Mercury	2	0.027 U	0.019 U	0.019 U	0.014 U	0.014 U	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	1.4 B	5.5 B	1.9 J	3.4 U	2.6 J	1.6 J	2.7 J	1.9 U	6.6 J	0.728 J
Selenium	50	0.242 B	0.146 B	0.177 J	0.123 U	0.183 U	0.227 J	0.163 U	0.225 J	0.685 J	0.158 J
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.557 U	1.2 U	0.54 U	0.88 J
Thallium	2	0.1 B	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.071 J	0.102 J	0.064 U	0.068 J
Zinc	NA	6.8 U	2.6 U	2.6 U	4.5 J	2.5 J	2.8 U	2.8 U	1.9 J	2.8 J	2 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.062 U	0.061 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	0.73 J	5 U	0.47 J	5 U	5 U	0.63 J	0.52 J	5 U
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	0.35 J	5 U	5 U	1.2 J	1.1 J	5 U	5 U	1.7 J	1.4 J	0.26 J
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	1.9 J	1.3 J	2.5 J	2 J	20 U	1.8 J	1.5 J	1.6 J	10 U	1.6 J
Benzene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.34 J	5 U
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	0.27 JB	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	0.35 J	5 U	0.48 J	0.69 J	5 U	5 U	5 U	1.4 J	1.1 J	5 U
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A	GZA-3A
Sample Date:		11/13/2008	5/4/2009	11/3/2009	6/16/2010	11/9/2010	4/18/2011	10/25/2011	5/1/2012	10/31/2012	5/1/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.94 U	1 U	0.48 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B
Sample Date:	MCL/ICL	11/13/2008	5/4/2009	11/3/2009	6/16/2010	11/9/2010	4/18/2011	10/25/2011	5/1/2012	10/31/2012	5/1/2013
Inorganics-Metals (ug/l)											
Antimony	6	0.125 B	3.9 U	3.9 U	4 U	2.1 U	1.5 U	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	743	715	863	746	831	649	809	960	709	907
Barium	2000	148	145	232	199	261	196	207	265	391	274
Beryllium	4	0.143 U	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.077 U	0.301 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	1.9 B	1.3 B	1.8 J	2.3 U	2.2 J	1.8 J	1.6 J	1.3 J	1.4 J	0.919 J
Copper	1300	3 B	1.6 U	1.6 U	2 U	1.6 U	3.1 U	3.4 U	1.9 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.098 B	0.026 U	0.112 J	0.162 U	0.247 J	0.124 U	0.052 U	0.055 U	0.079 U	0.033 J
Lead, dissolved	NA	0.069 B	0.038 B	0.026 U	0.162 U	0.215 U	0.124 U	0.052 U	0.074 J	0.079 U	0.106 J
Magnesium	NA	16400	17300	22200	21600	23400	21700	22900	24500	24000	25200
Mercury	2	0.027 U	0.019 U	0.019 U	0.014 U	0.043 J	0.014 U	0.014 U	0.026 U	0.029 J	0.032 U
Nickel	NA	8.2 B	7.7 B	12.1 J	11.7 J	13.1 J	8 J	10.7 J	13.4 J	22.2 J	13.6 J
Selenium	50	0.944 B	0.877 B	2.1	3.7	2.5	6.8	4.2	6.1	6.8	5.2
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	1.4 J	1.2 U	0.758 J	0.658 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.039 U	0.015 U	0.064 U	0.026 U
Zinc	NA	6.8 U	2.6 U	2.6 U	3.4 J	2.1 J	2.8 U	2.8 U	2.4 J	3.8 J	0.486 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	0.23 J	0.27 J	5 U	0.22 J	0.2 J	0.25 J	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.061 U	0.062 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	1.3 J	1.6 J	1.9 J	2.1 J	2.1 J	1.9 J	2 J	2.3 J	2.3 J	1.9 J
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	0.23 J	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	7.1	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	4.7 J	5.9	7	8.2	9	6.6	7.2	9.3	10	8.2
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	2.8 J	6.2 J	20 U	7.4 J	5.1 J	3.2 J	2.7 J	6 J	3.8 J	5 J
Benzene	**5/5**	6.2	7.1	7.2	8.5	8.3	5.6	5.8	7.8	6.2	6.1
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5.6	7.3	9.7	11	13	9.4	10	15	16	15
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	0.21 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B	GZA-3B
Sample Date:		11/13/2008	5/4/2009	11/3/2009	6/16/2010	11/9/2010	4/18/2011	10/25/2011	5/1/2012	10/31/2012	5/1/2013
	MCL/ICL										
Isopropylbenzene	NA	0.5 J	0.57 J	1.2 J	0.74 J	0.72 J	0.65 J	0.41 J	0.78 J	0.68 J	0.4 J
m,p-Xylenes	10000	0.34 J	5 U	5 U	5 U	5 U	5 U	0.6 J	0.89 J	0.58 J	0.92 J
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	0.25 J	0.36 J	0.27 J	0.32 J
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.7 J	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.94 U	0.94 U	0.49 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.27 J	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.21 J	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	0.34 J	0.36 J	1 U	0.27 J	0.35 J	0.32 J	0.33 J
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C
Sample Date:	MCL/ICL	11/13/2008	5/4/2009	11/3/2009	6/16/2010	11/9/2010	4/18/2011	10/25/2011	5/1/2012	10/31/2012	5/1/2013
Inorganics-Metals (ug/l)											
Antimony	6	0.084 U	3.9 U	3.9 U	4 U	2.1 U	1.5 U	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	221	258	216	168	250	246	254	246	241	224
Barium	2000	24.2	17.1 B	26.6	23.1	14.2 J	5.3 J	11.1 J	7.2 J	9.3 J	7.7 J
Beryllium	4	0.143 U	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.077 U	0.354 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	2.3 B	0.656 B	1.9 J	2.7 J	0.989 J	0.471 J	0.937 J	0.494 J	0.884 U	0.372 J
Copper	1300	3.8 B	1.6 U	3.3 J	2.3 J	1.6 U	3.1 U	3.4 U	1.4 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.062 B	0.026 U	0.104 J	0.162 U	0.215 U	0.124 U	0.052 U	0.055 U	0.079 U	0.035 J
Lead, dissolved	NA	0.061 B	0.026 U	0.034 J	0.162 U	0.215 U	0.124 U	0.064 J	0.055 U	0.079 U	0.058 J
Magnesium	NA	2160	2660	2040	1590	2560	2730	2800	3040	3060	2620
Mercury	2	0.027 U	0.019 U	0.019 U	0.014 U	0.014 U	0.014 U	0.014 U	0.026 U	0.046 J	0.032 U
Nickel	NA	0.172 U	1.1 U	1.1 U	3.4 U	1.2 U	0.748 U	0.336 U	1.9 U	3 J	0.531 U
Selenium	50	0.152 U	0.103 U	0.073 J	0.123 U	0.183 U	0.074 J	0.163 U	0.208 U	0.208 U	0.126 J
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.557 U	1.2 U	0.54 U	0.841 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.41 U	0.039 U	0.015 U	0.064 U	0.026 U
Zinc	NA	6.8 U	2.6 U	2.9 J	2.6 J	3.3 J	7 J	2.8 U	1.4 U	21.8	1.2 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.061 U	0.061 U	0.061 U	0.062 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	20 U	20 U	20 U	2.1 J	20 U	20 U	20 U	10 U	10 U	10 U
Benzene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C	GZA-3C
Sample Date:		11/13/2008	5/4/2009	11/3/2009	6/16/2010	11/9/2010	4/18/2011	10/25/2011	5/1/2012	10/31/2012	5/1/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.94 U	0.94 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	0.25 J	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4
Sample Date:		11/11/2008	5/6/2009	11/4/2009	6/16/2010	11/10/2010	4/18/2011	10/25/2011	5/3/2012	11/1/2012	4/30/2013
	MCL/ICL										
Inorganics-Metals (ug/l)											
Antimony	6	9.4 U	3.9 U	3.9 U	4 U	2.1 U	1.7 J	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	132	130	142	10.8	120	106	80.6	23.5	97.7	124
Barium	2000	17.1 B	30	25.5	34.9	45.6	41	57.3	75.8	52.3	74.4
Beryllium	4	0.143 U	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.302 J	0.398 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	1.9 B	1.1 B	3.1 J	3.4 J	0.999 J	4.5 J	1.6 J	19.7	1.7 J	34.9
Copper	1300	2.8 B	1.6 U	2.3 J	2 U	1.6 U	3.1 U	3.4 U	10.8 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.326 B	0.049 B	3.4	0.728 J	0.372 J	0.543 J	0.454 J	22.7	0.583 J	2.8
Lead, dissolved	NA	0.036 U	0.037 B	0.279 J	0.293 J	0.215 U	0.124 U	0.3 J	0.078 J	0.218 J	1.1
Magnesium	NA	2400	8000	3690	3300	4740	6710	3490	3810	5530	11100
Mercury	2	0.027	0.019 U	0.033 J	0.014 U	0.014 U	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	2.8 B	1.8 B	2.7 J	3.4 U	1.5 J	0.748 U	2.4 J	6.1 J	2.7 J	7.6 J
Selenium	50	0.152 U	0.123 B	0.056 U	0.123 U	0.183 U	0.731 J	0.163 U	0.208 U	0.65 J	0.952 J
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.557 U	1.2 U	1.2 J	0.349 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.039 U	0.073 J	0.064 U	0.026 U
Zinc	NA	6.8 U	2.6 U	8.1 J	8.7 J	4.1 J	11.3 J	2.8 U	26.9	3.5 J	4.9 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.061 U	0.061 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.44 J
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	5 U	0.51 J	5 U	5 U	0.35 J	0.41 J	5 U	5 U	0.57 J	1.4 J
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	1 J	6.8 J	20 U	20 U	1.8 J	20 U	20 U	1 J	10 U	1.9 J
Benzene	**5/5**	5 U	5 U	5 U	5 U	0.34 J	0.35 J	5 U	5 U	0.32 J	1.1 J
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5 U	0.46 J	5 U	5 U	0.67 J	0.45 J	5 U	5 U	0.9 J	2.6 J
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4
Sample Date:		11/11/2008	5/6/2009	11/4/2009	6/16/2010	11/10/2010	4/18/2011	10/25/2011	5/3/2012	11/1/2012	4/30/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.94 U	0.95 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A
Sample Date:	MCL/ICL	11/11/2008	5/6/2009	11/4/2009	6/16/2010	11/10/2010	4/18/2011	10/25/2011	5/3/2012	11/1/2012	4/30/2013
Inorganics-Metals (ug/l)											
Antimony	6	9.4 U	3.9 U	3.9 U	4 U	2.1 J	1.5 U	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	58.8	75.6	71.4	60.1	62.6	70	64.1	76.1	80.7	66.8
Barium	2000	59.3	48.4	45.7	37.9	95.2	42.9	56.1	61.5	170	75.2
Beryllium	4	0.512 B	0.333 B	0.328 J	0.286 J	0.301 J	0.101 U	0.554 J	0.524 J	0.509 J	0.325 J
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	11.4	4.7 B	8.3 J	3.3 J	5.7 J	5.8 J	7.3 J	7.5 J	4.3 J	3.3 J
Copper	1300	8.2 B	1.6 U	4.4 J	2 U	3.8 J	3.1 U	5.3 J	5.7 J	2.8 J	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	1.8	1.2	1.8	0.699 J	1.4	1	1.7	1.8	0.806 J	1
Lead, dissolved	NA	0.036 U	8.3	0.087 J	0.24 J	0.298 J	0.124 U	0.084 J	0.055 U	0.079 U	0.223 J
Magnesium	NA	4130	3690	3700	3350	8180	4140	5000	4750	13300	6870
Mercury	2	0.027 U	0.019 U	0.026 J	0.014 U	0.014 U	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	10.5 B	5 B	6.9 J	3.4 U	8.2 J	4.1 J	7.8 J	6.3 J	12.8 J	5.1 J
Selenium	50	0.152 U	0.103 U	0.056 U	0.123 U	0.183 U	0.258 J	0.163 U	0.208 U	2.4	0.247 J
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.557 U	1.2 U	0.716 J	0.24 U
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.04 J	0.049 J	0.064 U	0.026 U
Zinc	NA	15.7 B	8.6 B	13.6 J	8 J	9.6 J	8.8 J	12.7 J	14.2 J	8.2 J	6.9 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.061 U	0.061 U	0.061 U	0.062 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.54 J	0.24 J
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	5 U	5 U	5 U	5 U	0.89 J	5 U	0.28 J	5 U	1.8 J	0.6 J
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	20 U	4.4 J	20 U	20 U	3.3 J	20 U	20 U	1.3 J	2.7 J	10 U
Benzene	**5/5**	5 U	5 U	5 U	5 U	0.64 J	5 U	5 U	5 U	0.8 J	5 U
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5 U	5 U	5 U	5 U	1.3 J	5 U	0.3 J	5 U	2.8 J	0.95 J
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A
Sample Date:		11/11/2008	5/6/2009	11/4/2009	6/16/2010	11/10/2010	4/18/2011	10/25/2011	5/3/2012	11/1/2012	4/30/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.27 J	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.94 U	1 U	0.47 U	0.5 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B
Sample Date:		11/11/2008	5/6/2009	11/4/2009	6/16/2010	11/10/2010	4/18/2011	10/25/2011	5/3/2012	11/1/2012	4/30/2013
	MCL/ICL										
Inorganics-Metals (ug/l)											
Antimony	6	9.4 U	3.9 U	3.9 U	4 U	2.5 J	1.5 U	1.8 J	2.3 U	1.1 U	2 U
Arsenic	**10/50**	0.568 B	0.496 B	0.386 J	0.236 U	0.423 U	0.292 J	0.409 J	0.394 U	0.509 J	0.11 U
Barium	2000	21	19.3 B	18 J	19.3 J	20.7	13.1 J	23.7	21.3	26	20.9
Beryllium	4	0.1473 U	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.077 U	0.512 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	1.1 B	0.59 B	0.631 J	2.3 U	0.54 U	0.382 U	0.68 J	0.238 U	0.884 U	0.169 U
Copper	1300	3.2 B	1.6 U	2.4 J	2 U	1.7 J	3.1 U	3.4 U	2.6 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.053 B	0.22 B	0.225 J	0.162 U	0.26 J	0.153 J	0.138 J	0.246 J	0.079 U	0.118 J
Lead, dissolved	NA	0.036 U	0.055 B	0.067 J	0.364 J	0.215 U	0.124 U	0.067 J	0.055 U	0.398 J	0.089 J
Magnesium	NA	712 B	624 B	877 J	1320	1070	1150	1300	1170	1460	1370
Mercury	2	0.027 U	0.019 U	0.019 U	0.014 U	0.014 U	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	0.435 B	1.1 U	1.1 U	3.4 U	1.2 U	0.748 U	0.406 J	1.9 U	2.3 J	0.531 U
Selenium	50	0.152 U	0.103 U	0.056 U	0.123 U	0.183 U	0.062 U	0.163 U	0.208 U	0.208 U	0.124 U
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.557 U	1.2 U	0.54 U	0.354 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.039 U	0.015 U	0.064 U	0.026 U
Zinc	NA	6.8 U	3.3 B	2.6 U	2.8 J	2.7 J	2.8 U	2.8 U	1.8 J	1.4 U	2 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.061 U	0.061 U	0.061 U	0.061 U	0.062 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	20 U	5.7 J	2.6 J	1.7 J	20 U	20 U	20 U	10 U	10 U	1.3 J
Benzene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B
Sample Date:		11/11/2008	5/6/2009	11/4/2009	6/16/2010	11/10/2010	4/18/2011	10/25/2011	5/3/2012	11/1/2012	4/30/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.94 U	1 U	0.47 U	0.5 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D
Sample Date:	MCL/ICL	11/11/2008	5/4/2009	11/3/2009	6/14/2010	11/9/2010	4/14/2011	10/24/2011	5/2/2012	10/31/2012	5/1/2013
Inorganics-Metals (ug/l)											
Antimony	6	9.4 U	3.9 U	3.9 U	4 U	2.1 U	1.5 U	1.7 U	2.3 U	1.1 U	2 U
Arsenic	**10/50**	12.6	16.1	11.6	17.1	10.4	19.9	8.3	20.3	11.6	31.2
Barium	2000	26.6	32.2	31.4	28.2	25.4	28.7	30.8	32.8	31.8	33.8
Beryllium	4	0.143 U	0.119 U	0.119 U	0.236 J	0.17 J	0.101 U	0.168 U	0.092 J	0.455 J	0.401 J
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	1.3 B	0.475 U	0.709 J	2.3 U	0.546 J	0.733 J	0.729 J	0.238 U	0.884 U	0.169 U
Copper	1300	4 B	1.7 B	1.6 U	2 U	1.6 U	3.1 U	3.4 U	1 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.036 U	0.138 B	0.068 J	0.162 U	0.317 J	0.19 J	0.066 J	0.104 J	0.1 J	0.109 J
Lead, dissolved	NA	0.036 U	0.026 U	0.055 J	0.162 U	0.255 J	0.124 U	0.052 U	0.095 J	0.079 U	0.077 J
Magnesium	NA	5800	6460	6920	6590	5920	6770	6540	6590	6990	6560
Mercury	2	0.027 U	0.019 U	0.019 J	0.014 U	0.014 U	0.014 U	0.014 U	0.026 U	0.026 U	0.032 U
Nickel	NA	0.172 U	1.1 U	1.1 U	3.4 U	1.2 U	0.748 U	0.336 U	1.9 U	2.1 U	0.531 U
Selenium	50	0.152 U	0.103 U	0.056 U	0.123 U	0.183 U	0.062 U	0.163 U	0.208 U	0.208 U	0.124 U
Silver	NA	1.4 U	0.829 U	0.829 U	2.3 U	1.4 U	0.902 U	0.663 J	1.2 U	0.609 J	0.839 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.039 U	0.015 U	0.064 U	0.026 U
Zinc	NA	6.8 U	2.6 U	10.7 J	4.3 J	3.8 J	2.8 U	2.8 U	1.5 J	3.5 J	0.89 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.062 U	0.061 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	20 U	20 U	20 U	20 U	20 U	20 U	20 U	10 U	10 U	10 U
Benzene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D	RFW-4D
Sample Date:		11/11/2008	5/4/2009	11/3/2009	6/14/2010	11/9/2010	4/14/2011	10/24/2011	5/2/2012	10/31/2012	5/1/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.94 U	0.94 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 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

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S
Sample Date:	MCL/ICL	11/11/2008	5/4/2009	11/3/2009	6/14/2010	11/9/2010	4/14/2011	10/24/2011	5/2/2012	10/31/2012	5/1/2013
Inorganics-Metals (ug/l)											
Antimony	6	9.4 U	3.9 U	3.9 U	4 U	2.1 U	1.5 U	4.4 J	2.3 U	1.1 U	2 U
Arsenic	**10/50**	19	193	18.8	41.2	8.4	132	12.8	129	7.9	49.5
Barium	2000	19.4	19.5 B	20.9	14.7 J	43.7	30.4	40.2	34.5	52.9	18.4 J
Beryllium	4	0.143 U	0.119 U	0.119 U	0.238 U	0.119 U	0.101 U	0.168 U	0.077 U	0.317 J	0.169 U
Cadmium	5	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.137 J	0.168 U	0.146 U	0.168 U	0.155 U
Cadmium, dissolved	NA	0.155 U	0.119 U	0.119 U	0.283 U	0.153 U	0.119 U	0.168 U	0.146 U	0.168 U	0.155 U
Chromium	100	1.5 B	1.4 B	0.787 B	2.3 U	0.861 J	1.7 J	0.834 J	1.7 J	0.884 U	0.238 J
Copper	1300	2.5 B	1.6 U	1.6 U	2 U	2 J	3.1 U	3.4 U	1.8 J	1.5 U	0.993 U
Cyanide (mg/l)	200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Lead	15	0.036 U	0.696 B	0.108 J	0.162 U	0.217 J	0.563 J	0.092 J	0.621 J	0.079 U	0.193 J
Lead, dissolved	NA	0.036 U	0.026 U	0.087 J	0.162 U	0.215 U	0.124 U	0.052 U	0.075 J	0.079 U	0.074 J
Magnesium	NA	6360	6500	7580	8240	10800	6600	6840	7420	11900	7420
Mercury	2	0.027 U	0.019 U	0.025 J	0.014 U	0.014 U	0.014 U	0.014 U	0.026 U	0.043 J	0.032 U
Nickel	NA	0.237 B	1.1 U	1.1 U	3.4 U	1.3 J	0.748 U	2.1 J	1.9 U	3 J	0.531 U
Selenium	50	0.152 U	0.16 B	0.056 U	0.123 U	0.183 U	0.401 J	0.163 U	0.276 J	0.254 J	0.124 U
Silver	NA	1.4 U	0.87 B	0.829 U	2.3 U	1.4 U	0.902 U	0.557 U	1.2 U	0.713 J	0.691 J
Thallium	2	0.075 U	0.094 U	0.102 U	0.204 U	0.2 U	0.041 U	0.039 U	0.015 U	0.064 U	0.026 U
Zinc	NA	6.8 U	2.6 U	2.6 J	4.2 J	3 J	4.2 J	4.2 J	5.3 J	2.4 J	2.2 J
Organics (ug/l)											
1,1,1,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane (TCA)	200	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	**5/3**	3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,3-Trichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dibromo-3-chloropropane	NA	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.062 U	0.061 U	0.061 U	0.061 U	0.061 U
1,2-Dibromoethane (EDB)	0.05	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	600	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3,5-Trimethylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2-Dichloropropane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone (MEK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorotoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Ispropyltoluene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone (MIBK)	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NA	20 U	3 J	20 U	20 U	20 U	2.2 J	20 U	1.6 J	1.9 J	10 U
Benzene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromobenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromochloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon tetrachloride	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-11	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CFC-12	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorodibromomethane	NA	5 U	5 U	0 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromomethane	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dichloromethane	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloro-1,3-butadiene	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Iron Horse Park OU-2 - Historical Groundwater Results

Well:		RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S	RFW-4S
Sample Date:		11/11/2008	5/4/2009	11/3/2009	6/14/2010	11/9/2010	4/14/2011	10/24/2011	5/2/2012	10/31/2012	5/1/2013
	MCL/ICL										
Isopropylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylenes	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Propylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
o-Xylene	10000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	**1/1**	0.94 U	0.94 U	0.94 U	0.94 U	0.49 U	0.56 U	0.47 U	0.47 U	0.47 U	0.47 U
Sec-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
tert-Butylbenzene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene (PCE)	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	**5/5**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	**2/2**	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Notes

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

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

U = Undetected

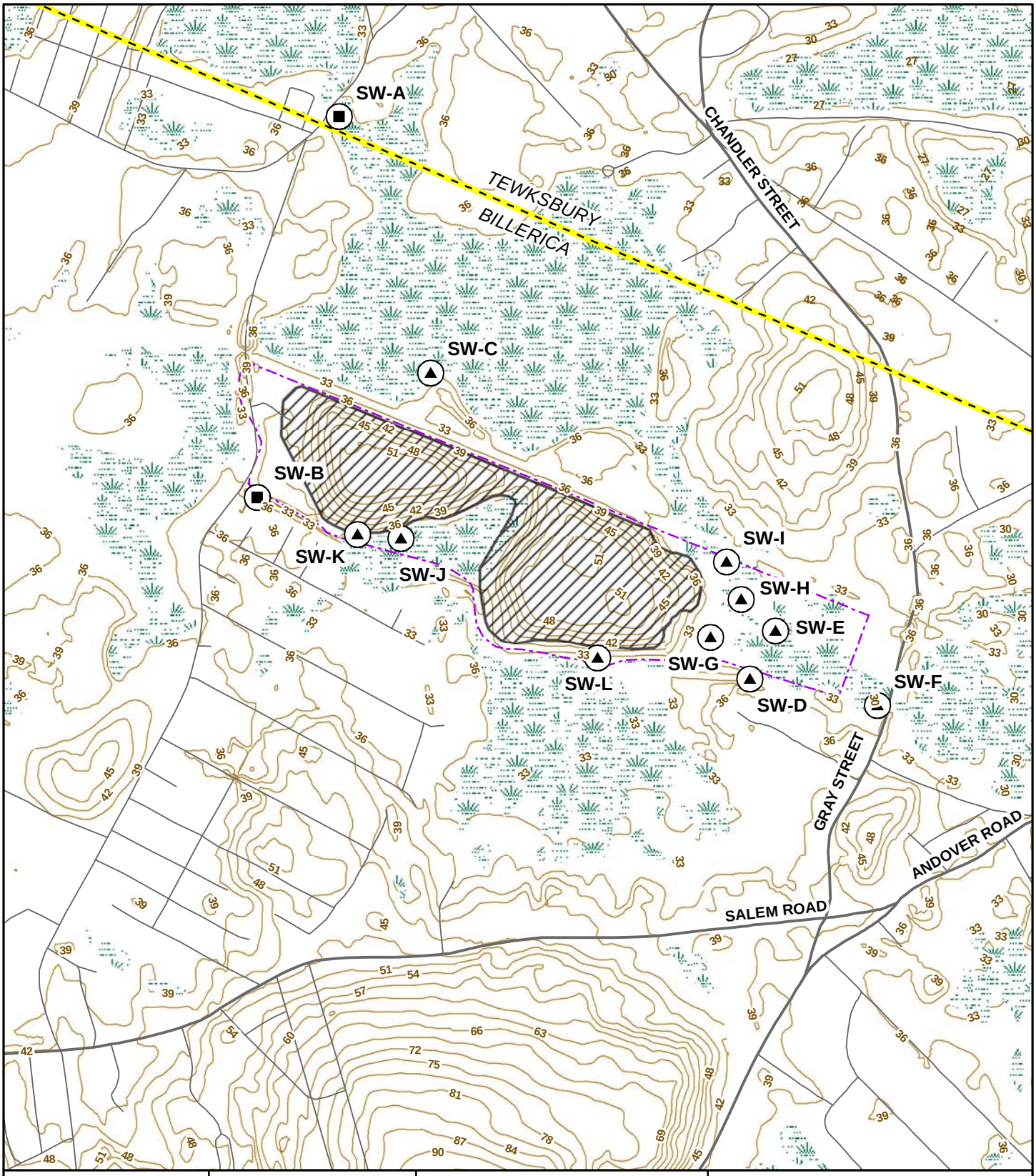
J = Estimated value

N = Spiked sample recovery not within control limits

NA - Not Analyzed or Not Available

(a) Based on a comparison of historical data, it appears that ENSR-11A and ENSR-11B results have been switched.

C.3 – Surface Water Monitoring Results



AECOM

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

Map Location

Legend

- Downgradient/Wetland Water Monitoring
- Upgradient Surface Water Monitoring
- Town Boundary
- SiteBoundary
- Landfill
- Contour (Meters)

0 500 1,000 Feet

N

FIGURE 5:
SURFACE WATER MONITORING LOCATIONS

SHAFFER LANDFILL
BILLERICA, MASSACHUSETTS

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

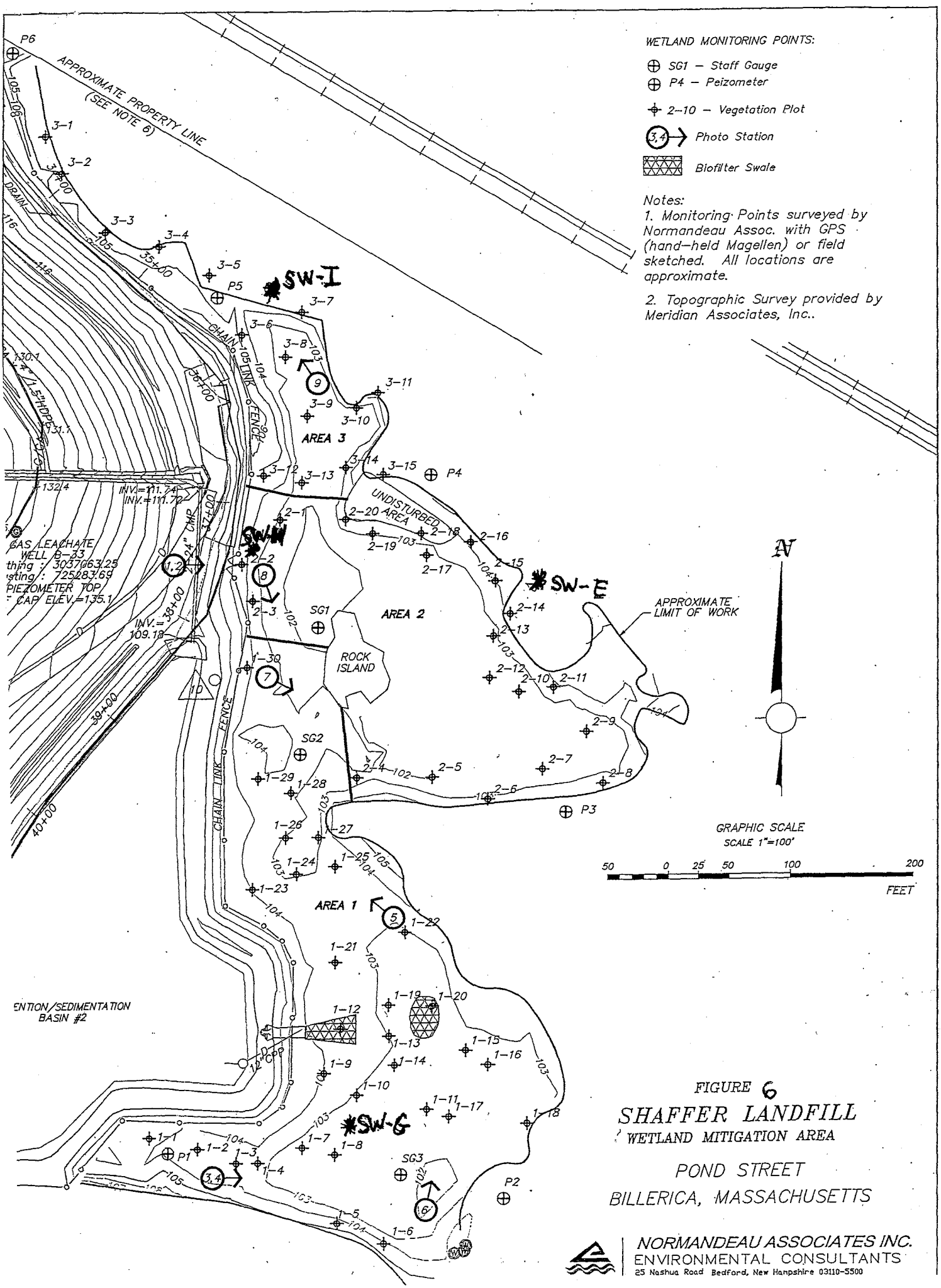


FIGURE 6

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 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 18	Round 19	Round 20
		Nov-08	Apr-09	Nov-09	Apr-10	Nov-10	Apr-11	Oct-11	Jul-12	Oct-12	Apr-13
Alkalinity (as $CaCO_3$)	mg/l	23.5	20	18.5	17.6	7.02	9.31	37	55	53	39
COD	mg/l	55.5	31.6	20.3	24.9	38.4	14.8	55	78	47	40
Chloride	mg/l	92.3	107	109	90.6	133	128	82	101	132	133
Iron (total)	ug/l	255	162	219	NS	597	241	428	2380	1450	223
Manganese (total)	ug/l	7.6	85.7	93.8	NS	422	164	58	682	308	301
Nitrogen, nitrate (as N)	mg/l	0.1 U	0.1 U	0.17	0.1 U	0.1 U	0.1 U	0.18	0.03 U	0.05	0.04
TDS	mg/l	210	219	212	176	294	233	224	224	228	224
Sulfate	mg/l	9.35	12.3	14.9	11.3	23.4	21.4	8	2 U	2 U	19
pH	s.u.	7.34	7.94	7.94	7.62	6.64	6.81	7.37	6.88	7.04	7.09
Temp	^oC	8.70	17.34	9.8	14.53	6.98	11.16	14.27	27.52	13.49	12.44
Specific Cond.	uS/cm	0.22	381	246	318	337	470	283	471	389	384
DO	mg/l	10.84	9.72	-6.84	14.78	6.09	9.4	7.63	5.18	7.17	8.38
ORP	mV	78.7	66.3	25.3	123.4	102.1	172.8	183.7	33.9	-6.4	40.6
turbidity	NTU	51.3	52.9	1.56	1.92	2.92	3.8	10.6	2.2	NM	4.7
Antimony	ug/l	6 U	6 U	ND	6 U	6 U	6 U	29	6 U	6 U	4
Arsenic	ug/l	0.2	5 U	ND	4 U	5 U	4 U	5 U	5 U	5 U	3 U
Barium	ug/l	18.2	17.3	30.2	20.6	39.9	29.7	7	33	28	17
Beryllium	ug/l	2 U	2 U	ND	2 U	2 U	2 U	4 U	4 U	4 U	1 U
Cadmium	ug/l	0.2 U	0.2 U	ND	0.2 U	2.5 U	2.5 U	2 U	2 U	2 U	1 U
Cadmium (dissolved)	ug/l	2.5 U	0.2 U	ND	0.4 U	2.5 U	2.5 U	2 U	2 U	2 U	5 U
Chromium (total)	ug/l	0.8	5 U	ND	5 U	5 U	5 U	10 U	10 U	10 U	1 U
Copper	ug/l	5 U	5 U	ND	5 U	5 U	5 U	9 U	9 U	9 U	5 U
Cyanide	ug/l	10 U	10 U	ND	5 U	5 U	5 U	5 U	10 U	10 U	10 U
Lead (total)	ug/l	2.8	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	1
Lead (dissolved)	ug/l	7.5 U	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	5 U
Magnesium	ug/l	NS	NS	NS	2420	NS	NS	2000 U	2,770	3080	2,860
Mercury	ug/l	0.2 U	0.2 U	ND	0.2 U	0.3 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U
Nickel	ug/l	5 U	5 U	ND	5 U	5 U	5 U	40 U	40 U	40 U	1
Selenium	ug/l	0.2 U	0.3	ND	5 U	15 U	15 U	5 U	10	5 U	8
Silver	ug/l	0.2 U	0.25 U	ND	0.2 U	5 U	5 U	18	1 U	3 U	1 U
Thallium	ug/l	NS	0.2 U	7	0.2 U	5 U	5 U	2 U	2 U	2 U	0.5 U
Zinc	ug/l	22	38.8	16.3	14.4	35.1	5.5	20 U	20 U	20 U	11
Acetone	ug/l	10 U	10 U	ND	10 U	10 U	10 U	5 U	6.3	5 U	5 U
2-Butanone (MEK)	ug/l	10 U	10 U	ND	10 U	10 U	10 U	5 U	6.9	5 U	5 U
Phenols (none detected)											

The only organics (VOCs and Phenols) presented are those which were detected in one of the sampling rounds.
Round 13 raw laboratory data unavailable. ND = non-detect; detection limits are unavailable.
U - Not detected; value presented is reporting limit
NS - not sampled/analyzed
Note that Round 11 and Round 12 metals are reversed (results shown as total are actually dissolved and vice versa)

SW-B		Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 18	Round 19	Round 20
		Nov-08	Apr-09	Nov-09	Apr-10	Nov-10	Apr-11	Oct-11	Jul-12	Oct-12	Apr-13
Alkalinity (as $CaCO_3$)	mg/l	39.5	57.3	39.5	36.8	42.4	36.4	39	58	55	59
COD	mg/l	23.8	17.7	11	9.27	17.8	8.57	20 U	20 U	26	38
Chloride	mg/l	88.6	120	90.4	92.6	105	100	53	90	117	138
Iron (total)	ug/l	178	290	1320	NS	1990	748	244	193	1620	355
Manganese (total)	ug/l	104	702	277	NS	506	138	21	588	366	76
Nitrogen, nitrate (as N)	mg/l	0.12	0.13	ND	0.2	0.1	0.12	0.16	0.2	0.04	0.09
TDS	mg/l	304	244	186	195	222	220	132	224	280	296
Sulfate	mg/l	11.4	14.5	11	13.6	13.3	14.6	14	3	10	18
pH	s.u.	7.02	7.29	7.18	7.22	6.71	6.99	6.99	6.55	6.57	6.91
Temp	^oC	7.61	18	8.35	13.36	6.86	10.79	13.78	22.63	12.88	12.68
Specific Cond.	uS/cm	0.216	435	220	345	286	441	207	424	378	398
DO	mg/l	5.1	6.33	0.2	10.44	1.38	8.36	5.73	1.28	8.1	7.76
ORP	mV	87.4	51.9	21.2	98.6	57.1	65.9	240.6	7.4	-18.8	132.7
turbidity	NTU	67.9	57.4	2.93	1.17	3.36	6.16	4.7	21.6	NM	3.4
Antimony	ug/l	6 U	6 U	ND	6 U	6 U	6 U	9	6 U	6 U	3
Arsenic	ug/l	0.2 U	5 U	ND	4 U	5 U	4 U	5 U	5 U	5 U	3 U
Barium	ug/l	36	61.3	45	37.6	50.5	41.4	7	40	52	31
Beryllium	ug/l	2 U	2 U	ND	2 U	2 U	2 U	4 U	4 U	4 U	1 U
Cadmium	ug/l	0.2 U	0.2 U	ND	0.2 U	2.5 U	2.5 U	2 U	2 U	2 U	1 U
Cadmium (dissolved)	ug/l	2.5 U	0.2 U	ND	0.4 U	2.5 U	2.5 U	2 U	2 U	2 U	5 U
Chromium (total)	ug/l	0.8	5 U	ND	5 U	5 U	5 U	10 U	10 U	10 U	1 U
Copper	ug/l	5 U	5 U	ND	5 U	5 U	5 U	9 U	9 U	9 U	5 U
Cyanide	ug/l	10 U	10 U	11.8	5 U	5 U	5 U	5 U	10 U	10 U	10 U
Lead (total)	ug/l	1.3	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	1 U
Lead (dissolved)	ug/l	7.5 U	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	5 U
Magnesium	ug/l	NS	NS	NS	2940	NS	NS	2000 U	2,090	3100	2,860
Mercury	ug/l	0.2 U	0.2 U	ND	0.2 U	0.3 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U
Nickel	ug/l	5 U	5 U	ND	5 U	5 U	5 U	40 U	40 U	40 U	1 U
Selenium	ug/l	0.2 U	0.4	ND	5 U	15 U	15 U	5	10	5 U	11
Silver	ug/l	0.2 U	0.25 U	ND	0.2 U	5 U	5 U	3 U	1 U	3 U	1 U
Thallium	ug/l	NS	0.2 U	ND	0.2 U	5 U	5 U	2 U	2 U	2 U	0.5 U
Zinc	ug/l	24.2	55.8	28.4	15.9	37	15.7	20 U	20 U	20 U	8
Trichloroethene	ug/l	1 U	1.2	ND	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Phenols (none detected)											

The only organics (VOCs and Phenols) presented are those which were detected in one of the sampling rounds.
Round 13 raw laboratory data unavailable. ND = non-detect; detection limits are unavailable.
U - Not detected; value presented is reporting limit
NS - not sampled/analyzed
Note that Round 11 and Round 12 metals are reversed (results shown as total are actually dissolved and vice versa)

SW-C		Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 18	Round 19	Round 20
		Nov-08	Apr-09	Nov-09	Apr-10	Nov-10	Apr-11	Oct-11	Jul-12	Oct-12	Apr-13
Alkalinity (as $CaCO_3$)	mg/l	NS	NS	53.6	70.9	28.9	65.7	45	NS	67	79
COD	mg/l	NS	NS	138	24.2	1540	26.3	42	NS	20 U	52
Chloride	mg/l	NS	NS	90.6	85.8	81.8	57.7	24	NS	102	61
Iron (total)	ug/l	NS	NS	13500	NS	315000	21100	1,250	NS	4030	9760
Manganese (total)	ug/l	NS	NS	879	NS	1520	1430	84	NS	373	1220
Nitrogen, nitrate (as N)	mg/l	NS	NS	ND	0.1 U	0.1 U	0.1 U	0.16	NS	0.08	0.03 U
TDS	mg/l	NS	NS	190	197	168	174	156	NS	252	212
Sulfate	mg/l	NS	NS	3.51	2.25	6.7	1.04	3	NS	2	2
pH	s.u.	NS	NS	7.48	6.81	7.43	6.46	6.57	NS	5.89	6.82
Temp	^oC	NS	NS	9.51	16.07	7.47	13.16	13.9	NS	11.47	10.78
Specific Cond.	uS/cm	NS	NS	250	465	276	370	167	NS	342	267
DO	mg/l	NS	NS	2.62	3.63	2.83	1.66	2.46	NS	3.9	1.69
ORP	mV	NS	NS	40.6	-70.8	38.5	125	96.7	NS	-12.1	16.2
turbidity	NTU	NS	NS	43.9	17.8	NS	12.6	20.1	NS	NM	5.2
Antimony	ug/l	NS	NS	ND	6 U	60 U	6 U	6 U	NS	6 U	3 U
Arsenic	ug/l	NS	NS	44.6	25.2	683	51	5	NS	5 U	18
Barium	ug/l	NS	NS	62.6	35.1	288	38.4	6	NS	46	28
Beryllium	ug/l	NS	NS	ND	2 U	20 U	2 U	4 U	NS	4 U	1 U
Cadmium	ug/l	NS	NS	ND	0.2 U	25 U	2.5 U	2 U	NS	2 U	1 U
Cadmium (dissolved)	ug/l	NS	NS	ND	0.4 U	2.5 U	2.5 U	2 U	NS	2 U	5 U
Chromium (total)	ug/l	NS	NS	6	5 U	63	5 U	10 U	NS	10 U	1 U
Copper	ug/l	NS	NS	21.6	5 U	196	5 U	9 U	NS	9 U	5 U
Cyanide	ug/l	NS	NS	ND	5 U	135	5 U	5 U	NS	10 U	10 U
Lead (total)	ug/l	NS	NS	35.2	7.5 U	357	7.5 U	10 U	NS	10 U	2
Lead (dissolved)	ug/l	NS	NS	ND	7.5 U	7.5 U	7.5 U	10 U	NS	10 U	5 U
Magnesium	ug/l	NS	NS	NS	3660	NS	NS	2000 U	NS	2900	2940
Mercury	ug/l	NS	NS	ND	0.2 U	1.2 U	0.2 U	0.1 U	NS	0.1 U	0.2 U
Nickel	ug/l	NS	NS	6	5 U	50 U	5 U	40 U	NS	40 U	1 U
Selenium	ug/l	NS	NS	ND	5 U	150 U	15 U	5	NS	5 U	3 U
Silver	ug/l	NS	NS	ND	0.2	50 U	5 U	3 U	NS	3 U	1 U
Thallium	ug/l	NS	NS	ND	0.2 U	50 U	5 U	2 U	NS	2 U	0.5 U
Zinc	ug/l	NS	NS	98	29.1	1,060	17.8	20 U	NS	20 U	6
VOCs (none detected)		NS	NS						NS		
Phenols (none detected)		NS	NS						NS		

The only organics (VOCs and Phenols) presented are those which were detected in one of the sampling rounds.
Round 13 raw laboratory data unavailable. ND = non-detect; detection limits are unavailable.
U - Not detected; value presented is reporting limit
NS - not sampled/analyzed
Note that Round 11 and Round 12 metals are reversed (results shown as total are actually dissolved and vice versa)

In Oct 2009, location SW-C was relocated due to several rounds being dry at the time of sampling. The new location is identified as SW-C1.
SW-C1 could not be located in July 2012 due to severe overgrowth of vegetation.

SW-D		Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 18	Round 19	Round 20
		Nov-08	Apr-09	Nov-09	Apr-10	Nov-10	Apr-11	Oct-11	Jul-12	Oct-12	Apr-13
Alkalinity (as $CaCO_3$)	mg/l	37.1	50.1	37.4	30.3	37.8	28.2	33	53	59	49
COD	mg/l	35.8	23.9	21.2	13.2	28.6	16.6	20 U	20 U	40	20 U
Chloride	mg/l	86.8	103	95.6	93.1	108	94	58	89	99	101
Iron (total)	ug/l	385	267	1410	NS	2350	601	467	1,630	902	348
Manganese (total)	ug/l	92.8	409	289	NS	1030	130	45	794	181	80
Nitrogen, nitrate (as N)	mg/l	0.1 U	0.1 U	0.17	0.34	0.1 U	0.29	0.2	0.05	0.13	0.14
TDS	mg/l	318	212	194	198	217	213	176	200	212	316
Sulfate	mg/l	10.1	12	11.3	13.4	19.2	15.6	3	4	19	24
pH	s.u.	6.9	7.68	6.21	7.32	7.03	7.54	6.71	6.96	7.12	7.25
Temp	^{o}C	6.04	17.35	10.71	16.44	7.09	10.36	14.8	24.15	12.02	13.65
Specific Cond.	uS/cm	0.209	401	226	368	292	417	223	440	333	392
DO	mg/l	6.96	7.55	5.63	12.91	6.98	10.26	5.02	5.18	6.13	9.49
ORP	mV	69.2	-8.2	-76.7	64	87.7	66.5	162.6	4.4	-4.7	175.6
turbidity	NTU	70.2	51.8	3.47	1.1	3.01	4.86	10.6	8.6	NM	2.8
Antimony	ug/l	6 U	6 U	ND	6 U	6 U	6 U	6 U	6 U	6 U	4
Arsenic	ug/l	0.2	5 U	ND	4 U	5 U	4 U	5 U	5 U	5 U	3 U
Barium	ug/l	34.4	46.1	42.5	39.2	68.5	35.7	9	44	43	33
Beryllium	ug/l	2 U	2 U	ND	2 U	2 U	2 U	4 U	4 U	4 U	1 U
Cadmium	ug/l	0.2 U	0.2 U	ND	0.2 U	2.5 U	2.5 U	2 U	2 U	2 U	1 U
Cadmium (dissolved)	ug/l	2.5 U	0.2 U	ND	0.4 U	2.5 U	2.5 U	2 U	2 U	2 U	5 U
Chromium (total)	ug/l	1	5 U	ND	5 U	5 U	5 U	10 U	10 U	10 U	1 U
Copper	ug/l	5 U	5 U	ND	5 U	5 U	5 U	9 U	9 U	9 U	5 U
Cyanide	ug/l	10 U	10 U	ND	5 U	69.9	5 U	5 U	10 U	10 U	10 U
Lead (total)	ug/l	2.4	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	1 U
Lead (dissolved)	ug/l	7.5 U	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	5 U
Magnesium	ug/l	NS	NS	NS	2810	NS	NS	2000 U	3090	3070	3030
Mercury	ug/l	0.2 U	0.2 U	ND	0.2 U	0.3 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U
Nickel	ug/l	5 U	5 U	ND	5 U	5 U	5 U	40 U	40 U	40 U	1 U
Selenium	ug/l	0.2 U	0.4	ND	5 U	15 U	15 U	5 U	14	5 U	13
Silver	ug/l	0.2 U	0.25 U	ND	0.2 U	5 U	5 U	3 U	1 U	3 U	1 U
Thallium	ug/l	NS	0.2	ND	0.2 U	5 U	5 U	2 U	2 U	2 U	0.5 U
Zinc	ug/l	21.6	48.5	21.4	17.3	63.3	11.6	20 U	20 U	20 U	9
VOCs (none detected)											
Phenols (none detected)											

The only organics (VOCs and Phenols) presented are those which were detected in one of the sampling rounds.
Round 13 raw laboratory data unavailable. ND = non-detect; detection limits are unavailable.
U - Not detected; value presented is reporting limit
NS - not sampled/analyzed
Note that Round 11 and Round 12 metals are reversed (results shown as total are actually dissolved and vice versa)

SW-E		Round 11	Round 12	Round 13*							
		Nov-08	Apr-09	Nov-09							
Alkalinity (as $CaCO_3$)	mg/l	36.6	142								
COD	mg/l	92.8	41.1								
Chloride	mg/l	33.5	49.8								
Iron (total)	ug/l	552	650								
Manganese (total)	ug/l	12.2	836								
Nitrogen, nitrate (as N)	mg/l	0.1 U	0.1 U								
TDS	mg/l	352	223								
Sulfate	mg/l	1 U	3.46								
pH	s.u.	6.84	7.19								
Temp	^{o}C	4.67	20.37								
Specific Cond.	uS/cm	0.096	393								
DO	mg/l	8.58	7.46								
ORP	mV	8193	106								
turbidity	NTU	75.8	53.7								
Antimony	ug/l	6 U	6 U								
Arsenic	ug/l	5.2	10.9								
Barium	ug/l	10.1	32.3								
Beryllium	ug/l	2 U	2 U								
Cadmium	ug/l	0.2 U	0.2 U								
Cadmium (dissolved)	ug/l	2.5 U	0.2 U								
Chromium (total)	ug/l	1.2	5 U								
Copper	ug/l	5 U	5 U								
Cyanide	ug/l	10 U	10 U								
Lead (total)	ug/l	2.8	7.5 U								
Lead (dissolved)	ug/l	7.5 U	7.5 U								
Magnesium	ug/l	NS	NS								
Mercury	ug/l	0.2 U	0.2 U								
Nickel	ug/l	5 U	5 U								
Selenium	ug/l	0.3	0.5								
Silver	ug/l	0.2 U	5.08								
Thallium	ug/l	NS	0.2 U								
Zinc	ug/l	33.4	49.2								
Acetone	ug/l	16.4	23.8								
Toluene	ug/l	3.7	1 U								
Phenols (none detected)											

The only organics (VOCs and Phenols) presented are those which were detected in one of the sampling rounds.

* location eliminated from program October 2009

U - Not detected; value presented is reporting limit

NS - not sampled/analyzed

Note that Round 11 and Round 12 metals are reversed (results shown as total are actually dissolved and vice versa)

Shaffer Landfill Surface Water Sampling

SW-F		Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 18	Round 19	Round 20
		Nov-08	Apr-09	Nov-09	Apr-10	Nov-10	Apr-11	Oct-11	Jul-12	Oct-12	Apr-13
Alkalinity (as $CaCO_3$)	mg/l	46.5	45.7	43.3	30.1	43.7	31.6	42	58	63	45
COD	mg/l	53	35.2	63.6	17.7	36.1	19.1	52	26	58	45
Chloride	mg/l	94.3	96	99.9	94.3	111	95.4	55	95	110	128
Iron (total)	ug/l	391	473	6,260	NS	1770	930	262	6,490	1990	965
Manganese (total)	ug/l	3.2	309	418	NS	373	192	32	3,800	456	178
Nitrogen, nitrate (as N)	mg/l	0.25	0.26	0.29	0.33	0.39	0.29	6.94	0.47	0.5	0.18
TDS	mg/l	223	227	216	208	279	205	148	208	300	344
Sulfate	mg/l	9.33	9.43	11.3	12.9	27.9	15.9	3	3	19	24
pH	s.u.	7.07	7.36	7.8	7.62	6.63	7.48	6.72	7.21	6.89	7.32
Temp	^oC	7.23	19.82	10.16	13.62	7.22	8.95	14.01	23.46	13.75	13.98
Specific Cond.	uS/cm	0.28	389	257	350	340	430	327	435	397	393
DO	mg/l	11.19	8.36	9.15	12.94	8.97	10.81	5.66	8.48	5.04	9.79
ORP	mV	67.9	44.5	-35.1	36.7	100.8	174.3	200.5	4	-3.2	115.6
turbidity	NTU	53.7	54.1	14	1.98	5.42	5.44	3.5	8.2	NM	5.6
Antimony	ug/l	6 U	6 U	ND	6 U	6 U	6 U	6 U	6 U	6 U	5
Arsenic	ug/l	1	5 U	18.6	4.6	7.2	4 U	5 U	23	5 U	4
Barium	ug/l	26.9	38.5	54	33.9	43.8	31.6	8	105	36	31
Beryllium	ug/l	2 U	2 U	ND	2 U	2 U	2 U	4 U	4 U	4 U	1 U
Cadmium	ug/l	0.2 U	0.2 U	ND	0.2 U	2.5 U	2.5 U	2 U	2 U	2 U	1 U
Cadmium (dissolved)	ug/l	2.5 U	0.2 U	ND	0.4 U	2.5 U	2.5 U	2 U	2 U	2 U	5 U
Chromium (total)	ug/l	1	5 U	ND	5 U	5 U	5 U	10 U	10 U	10 U	1 U
Copper	ug/l	5 U	5 U	ND	5 U	5 U	5 U	9 U	9 U	9 U	5 U
Cyanide	ug/l	10 U	10 U	ND	5 U	69	5 U	5 U	10 U	10 U	10 U
Lead (total)	ug/l	3.7	7.5 U	7.8	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	1
Lead (dissolved)	ug/l	7.5 U	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	5 U
Magnesium	ug/l	NS	NS	NS	2970	NS	NS	2000 U	3,680	3480	3110
Mercury	ug/l	0.2 U	0.2 U	ND	0.2 U	0.3 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U
Nickel	ug/l	5 U	5 U	ND	5 U	5 U	5 U	40 U	40 U	40 U	2
Selenium	ug/l	0.2 U	0.2	ND	5 U	15 U	15 U	5 U	53	5 U	3 U
Silver	ug/l	0.2 U	0.87	ND	0.2 U	5 U	5 U	3 U	1 U	3 U	1 U
Thallium	ug/l	NS	0.2 U	5.1	0.2 U	5 U	5 U	2 U	2 U	2 U	0.5 U
Zinc	ug/l	25.2	52.9	35.4	16.2	25.9	7.6	20 U	29	20 U	7
VOCs (none detected)											
Phenols (none detected)											

The only organics (VOCs and Phenols) presented are those which were detected in one of the sampling rounds.
Round 13 raw laboratory data unavailable. ND = non-detect; detection limits are unavailable.
U - Not detected; value presented is reporting limit
NS - not sampled/analyzed
Note that Round 11 and Round 12 metals are reversed (results shown as total are actually dissolved and vice versa)

SW-G		Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 18	Round 19	Round 20
		Nov-08	Apr-09	Nov-09	Apr-10	Nov-10	Apr-11	Oct-11	Jul-12	Oct-12	Apr-13
Alkalinity (as $CaCO_3$)	mg/l	466	600	544	443	489	359	146	370	319	493
COD	mg/l	238	2520	130	77.6	102	72.9	81	131	1328	118
Chloride	mg/l	159	146	230	166	227	153	9	140	113	133
Iron (total)	ug/l	72.7	284	27800	NS	15600	3050	1,010	11,700	133,000	200
Manganese (total)	ug/l	433	536	776	NS	1390	152	22	232	3370	238
Nitrogen, nitrate (as N)	mg/l	0.48	10 U	0.12	0.23	1.46	0.27	0.35	0.22	0.31	0.08
TDS	mg/l	606	644	694	571	721	492	252	584	444	408
Sulfate	mg/l	14.1	1 U	4.49	3.33	9.95	8.84	28	2 U	48	2 U
pH	s.u.	6.79	7.24	7.55	7.13	6.92	7.45	7.13	7.48	6.93	7.03
Temp	^oC	5.42	18.44	10.22	20.26	7.24	11.49	15.45	32.42	10.23	15.71
Specific Cond.	uS/cm	0.762	1,414	1,003	1,570	1,128	1,240	312	792	723	1088
DO	mg/l	5.41	1.17	1.5	6.26	2.95	5.83	5.5	2.97	3.45	9.01
ORP	mV	-68.3	196.3	69.3	-116.3	38.5	19.6	-9.3	-108	-36.9	10.8
turbidity	NTU	114.4	114.1	NM	56.4	39.6	15	56.1	30.3	NM	45.1
Antimony	ug/l	6 U	6 U	ND	6 U	6 U	6 U	6 U	6 U	6 U	5
Arsenic	ug/l	5.8	18.7	288	174	77	58.1	14	305	563	3 U
Barium	ug/l	117	1.5	259	176	170	69	11	190	986	72
Beryllium	ug/l	2 U	2 U	ND	2 U	2 U	2 U	4 U	4 U	4 U	1 U
Cadmium	ug/l	0.2 U	0.2 U	ND	1 U	2.5 U	2.5 U	2 U	2 U	15	1 U
Cadmium (dissolved)	ug/l	2.5 U	2.5 U	ND	0.4 U	2.5 U	2.5 U	2 U	2 U	2 U	5 U
Chromium (total)	ug/l	1.4	5 U	ND	5 U	5 U	5 U	10 U	10 U	26	2
Copper	ug/l	5 U	5 U	ND	5 U	5 U	5 U	9 U	9 U	56	5 U
Cyanide	ug/l	10 U	10 U	ND	5 U	5 U	5 U	5 U	10 U	10 U	10 U
Lead (total)	ug/l	6	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	95	1 U
Lead (dissolved)	ug/l	12.9	72.1	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	5 U
Magnesium	ug/l	NS	NS	ND	9990	NS	NS	2000 U	10,600	12800	9,900
Mercury	ug/l	0.2 U	0.2 U	ND	0.22	0.3 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U
Nickel	ug/l	10.9	10	17.3	12.5	13.9	12.8	40 U	40 U	40 U	10
Selenium	ug/l	2.3	3	ND	5 U	15 U	15 U	5 U	5 U	5 U	9
Silver	ug/l	0.2 U	0.26	ND	1.2 U	5 U	5 U	3 U	1 U	3	1 U
Thallium	ug/l	NS	0.2 U	5.4	0.2 U	5 U	5 U	2 U	2 U	2 U	0.5 U
Zinc	ug/l	20.2	41.6	21.6	23.8	27.6	5 U	20 U	20 U	190	20
Acetone	ug/l	10 U	12.1	11.4	10 U	10 U	10 U	5 U	8.5	6.4	15
Benzene	ug/l	1 U	1.1	1.2	1 U	1 U	1 U	1 U	1 U	1 U	1.5
Chlorobenzene	ug/l	1.2	2.5	2.7	1.6	1	1 U	1 U	1 U	1 U	3.2
1,4-Dichlorobenzene	ug/l	1.5	2.8	2.2	1.9	1.3	1 U	1 U	1 U	1 U	2.6
Isopropylbenzene	ug/l	1 U	1.2	2.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	ug/l	1.5	4.8	ND	1 U	1 U	1 U	1 U	1.5	1 U	1 U
Tetrahydrofuran	ug/l	48.4	35.6	47	26.2	24.1	8.5	1 U	5	9.5	51
Ethyl ether (diethyl ether)	ug/l	5.2	4	ND	2.3	4.4	1 U	1 U	1 U	1.8	7.3
tert-Butyl alcohol	ug/l	37.4	29.8	ND	23.4	33	14	NS	1 U	1 U	28
1,4-Dioxane	ug/l	309	170	ND	151	305	133	NS	250 U	250 U	250 U
Phenols (none detected)											

The only organics (VOCs and Phenols) presented are those which were detected in one of the sampling rounds.
Round 13 raw laboratory data unavailable. ND = non-detect; detection limits are unavailable.
U - Not detected; value presented is reporting limit
NS - not sampled/analyzed
Note that Round 11 and Round 12 metals are reversed (results shown as total are actually dissolved and vice versa)

SW-H		Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 18	Round 19	Round 20
		Nov-08	Apr-09	Nov-09	Apr-10	Nov-10	Apr-11	Oct-11	Jul-12	Oct-12	Apr-13
Alkalinity (as $CaCO_3$)	mg/l	452	388	518	412	460	360	161	318	319	552
COD	mg/l	99.3	81	101	94.4	105	74.6	69	82	184	107
Chloride	mg/l	186	161	219	168	236	148	62	195	205	191
Iron (total)	ug/l	71.9	486	1990	NS	6980	3740	200	1,540	31,000	1200
Manganese (total)	ug/l	369	439	554	NS	279	193	17	147	577	157
Nitrogen, nitrate (as N)	mg/l	0.1 U	0.1 U	0.16	0.1 U	0.12	0.14	1.31	0.03 U	0.45	0.16
TDS	mg/l	604	551	88	575	735	499	304	348	576	584
Sulfate	mg/l	15.6	8.67	9.07	3.76	15.9	10	10	2 U	32	2 U
pH	s.u.	6.58	7.24	6.84	7.11	6.67	7.43	7.19	7.71	7.22	7.64
Temp	^oC	8.68	18.69	14.04	20.09	7.98	10.8	15.54	31.45	13.5	16.95
Specific Cond.	uS/cm	0.802	1,199	1,092	1,442	1,151	1,248	478	1448	590	1163
DO	mg/l	6.66	6.04	5.15	7.14	3.97	4.5	6.49	4.16	3.21	6.67
ORP	mV	23.1	119.6	-22.7	-52.3	96.1	117.5	-39.8	30	-93.9	184.7
turbidity	NTU	114.1	98.7	14	20.4	19.5	22.6	46.7	34.5	NM	14.4
Antimony	ug/l	6 U	6 U	ND	6 U	6 U	6 U	6 U	6 U	6 U	3 U
Arsenic	ug/l	5.8	24	45.8	114	139	89.2	6	129	196	35
Barium	ug/l	64.7	106	97.2	121	95.1	76.7	11	113	157	68
Beryllium	ug/l	2 U	2 U	ND	2 U	2 U	2 U	4 U	4 U	4 U	1 U
Cadmium	ug/l	0.2 U	0.2 U	ND	1 U	2.5 U	2.5 U	2 U	2 U	2 U	1 U
Cadmium (dissolved)	ug/l	2.5 U	0.2 U	ND	0.4 U	2.5 U	2.5 U	2 U	2 U	2 U	5 U
Chromium (total)	ug/l	1.4	5 U	ND	5 U	5 U	5 U	10 U	10 U	13	1
Copper	ug/l	5 U	5 U	ND	5 U	5 U	5 U	9 U	9 U	38	5 U
Cyanide	ug/l	10 U	10 U	ND	5 U	5 U	5 U	5 U	10 U	10 U	10 U
Lead (total)	ug/l	3.6	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	81	1
Lead (dissolved)	ug/l	7.5 U	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	5 U
Magnesium	ug/l	NS	NS	ND	13900	NS	NS	2000 U	11,200	13600	11,200
Mercury	ug/l	0.2 U	0.2 U	ND	0.2 U	0.3 U	0.2 U	0.1 U	0.1 U	0.3	0.2 U
Nickel	ug/l	13.4	12.3	16.2	14.8	18	12.4	40 U	40 U	40 U	12
Selenium	ug/l	2.2	3.6	ND	5 U	15 U	15 U	5 U	5 U	5 U	3 U
Silver	ug/l	0.2 U	0.25 U	ND	1.2 U	5 U	5 U	3 U	1 U	3 U	1 U
Thallium	ug/l	NS	0.2 U	ND	1.2 U	5 U	5 U	2 U	2 U	2 U	0.5 U
Zinc	ug/l	25	44.2	12	25	34.3	5 U	20 U	20 U	120	9
Acetone	ug/l	10 U	10 U	ND	10 U	10 U	10 U	5 U	6.7	6.4	5 U
Benzene	ug/l	1 U	1 U	1.8	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	ug/l	1.9	1	3.7	1	1.2	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	ug/l	1.6	1.3	3.9	1.3	1	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	ug/l	1	1 U	2.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Naphthalene	ug/l	3.4	1 U	ND	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	ug/l	1 U	1 U	ND	1 U	1 U	1 U	1 U	1 U	1	1 U
Tetrahydrofuran	ug/l	34.9	16.9	62	16.2	23.4	15.8	1 U	6.1	1 U	11
Ethyl ether (diethyl ether)	ug/l	2.8	1.8	ND	1.5	2.4	1.4	1 U	1 U	1 U	1
tert-Butyl alcohol	ug/l	39	24.4	ND	23.5	46	20.9	NS	1 U	1 U	1 U
1,4-Dioxane	ug/l	176	116	ND	135	232	157	NS	250 U	250 U	250 U
Phenols (none detected)											

The only organics (VOCs and Phenols) presented are those which were detected in one of the sampling rounds.
Round 13 raw laboratory (ND = non-detect; detection limits are unavailable.
U - Not detected; value pr.e presented is reporting limit
NS - not sampled/analyzes sampled/analyzed
Note that Round 11 and F) (results shown as total are actually dissolved and vice versa)

SW-I		Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 18	Round 19	Round 20
		Nov-08	Apr-09	Nov-09	Apr-10	Nov-10	Apr-11	Oct-11	Jul-12	Oct-12	Apr-13
Alkalinity (as $CaCO_3$)	mg/l	124	285	535	435	482	322	158	172	158	286
COD	mg/l	70.1	107	282	90	111	68.9	39	51	188	51
Chloride	mg/l	31.9	15	200	182	263	131	44	86	105	87
Iron (total)	ug/l	108	179	40700	NS	8400	9500	258	4,810	10100	1110
Manganese (total)	ug/l	512	935	1060	NS	384	326	16	267	595	257
Nitrogen, nitrate (as N)	mg/l	0.1 U	0.1 U	ND	0.1 U	0.1 U	0.1	0.32	0.16	0.19	0.05
TDS	mg/l	219	343	720	593	723	439	288	240	312	264
Sulfate	mg/l	2.72	6.32	16	4.31	14.5	9.25	23	2 U	44	3
pH	s.u.	6.87	7.3	6.98	7.12	6.64	7.22	7.39	7.06	6.99	7.24
Temp	^oC	5.91	15.28	18.53	18.23	8.18	9.66	17.24	30.42	12	14.98
Specific Cond.	uS/cm	0.237	533	305	1,481	1,257	930	247	750	470	643
DO	mg/l	2.35	4.7	4.61	10.69	4.89	4.2	9.85	2.57	2.53	7.18
ORP	mV	-60.7	-4.5	12.3	107.8	81.3	4.1	218.8	-45	-77.2	123.8
turbidity	NTU	52.9	75.7	101	34.3	47.2	35.1	5.7	67	NM	18
Antimony	ug/l	6 U	6 U	ND	6 U	6 U	6 U	6 U	6 U	6 U	5
Arsenic	ug/l	2.4	5 U	497	102	118	117	5	26	36	4
Barium	ug/l	31.7	32.7	154	101	91.7	72.5	9	67	56	38
Beryllium	ug/l	2 U	2 U	ND	2 U	2 U	2 U	4 U	4 U	4 U	1 U
Cadmium	ug/l	0.2 U	0.2 U	ND	1 U	2.5 U	2.5 U	2 U	2 U	2 U	1 U
Cadmium (dissolved)	ug/l	2.5 U	0.2 U	ND	0.4 U	2.5 U	2.5 U	2 U	2 U	2 U	5 U
Chromium (total)	ug/l	0.7	5 U	ND	5 U	5 U	5 U	10 U	10 U	10 U	1 U
Copper	ug/l	5 U	5 U	ND	5 U	5 U	5 U	9 U	9 U	9 U	5 U
Cyanide	ug/l	10 U	10 U	ND	5 U	5 U	5 U	5 U	10 U	10 U	10 U
Lead (total)	ug/l	3.8	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	1
Lead (dissolved)	ug/l	7.5 U	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	5 U
Magnesium	ug/l	NS	NS	ND	12900	NS	NS	2000 U	7170	7930	8,170
Mercury	ug/l	0.2 U	0.2 U	ND	0.2 U	0.3 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U
Nickel	ug/l	5 U	5 U	17.8	13	18	9.6	40 U	40 U	40 U	5
Selenium	ug/l	0.2 U	0.7	ND	5 U	15 U	15 U	5 U	5 U	5 U	6
Silver	ug/l	0.2 U	5.4	ND	31.7	5 U	5 U	3 U	1 U	3 U	1 U
Thallium	ug/l	NS	0.2 U	6.6	1.2 U	5 U	5 U	2 U	2 U	2 U	0.5 U
Zinc	ug/l	21.4	46.2	28.2	12.4	21.6	5 U	20 U	20 U	20 U	5
Acetone	ug/l	10 U	10 U	29	10 U	10 U	10 U	5 U	5 U	8.8	5 U
Benzene	ug/l	1 U	1 U	2.3	1 U	1.6	1 U	1 U	1 U	1 U	1 U
2-Butanone (MEK)	ug/l	12.6	10 U	ND	10 U	10 U	10 U	5 U	5 U	5 U	5 U
Chlorobenzene	ug/l	1 U	1 U	6.1	1.4	3.6	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	ug/l	1 U	1 U	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	ug/l	1 U	1 U	5.3	1.7	2.9	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	ug/l	1 U	1 U	2.2	1 U	2.3	1 U	1 U	1 U	1 U	1 U
4-Isopropyltoluene	ug/l	1 U	1 U	4.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	ug/l	1	1 U	ND	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrahydrofuran	ug/l	10 U	10 U	23.8	14.3	29.6	10.6	4.7	1 U	1 U	1 U
Ethyl ether (diethyl ether)	ug/l	1 U	1 U	ND	1.7	4.7	1.2	1 U	1 U	1 U	1 U
tert-Butyl alcohol	ug/l	10 U	10 U	ND	24.2	62.1	16	NS	1 U	1 U	1 U
1,4-Dioxane	ug/l	20 U	20 U	ND	120	213	93.1	NS	250 U	250 U	250 U
Phenols (none detected)											

The only organics (VOCs and Phenols) presented are those which were detected in one of the sampling rounds.
Round 13 raw laboratory data unavailable. ND = non-detect; detection limits are unavailable.
U - Not detected; value presented is reporting limit
NS - not sampled/analyzed
Note that Round 11 and Round 12 metals are reversed (results shown as total are actually dissolved and vice versa)

SW-J		Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 18	Round 19	Round 20
		Nov-08	Apr-09	Nov-09	Apr-10	Nov-10	Apr-11	Oct-11	Jul-12	Oct-12	Apr-13
Alkalinity (as $CaCO_3$)	mg/l	86.6	72.4	49	dry	dry	dry	140	58	59	91
COD	mg/l	40.2	52.6	50.2	dry	dry	dry	53	85	91	55
Chloride	mg/l	71.2	85.4	87.3	dry	dry	dry	7	68	101	7
Iron (total)	ug/l	376	500	6070	dry	dry	dry	400	3,110	1600	2020
Manganese (total)	ug/l	2.1	4.4	233	dry	dry	dry	32	307	285	183
Nitrogen, nitrate (as N)	mg/l	0.1 U	0.1 U	ND	dry	dry	dry	0.79	0.18	0.09	0.03 U
TDS	mg/l	238	225	196	dry	dry	dry	200	344	332	220
Sulfate	mg/l	14.2	8.33	13.2	dry	dry	dry	24	2 U	22	2 U
pH	s.u.	7.16	7.44	7.39	dry	dry	dry	7.08	6.46	6.65	7.27
Temp	^oC	5.81	14.03	7.44	dry	dry	dry	15	27.11	10.72	16.6
Specific Cond.	uS/cm	0.216	383	223	dry	dry	dry	315	357	337	292
DO	mg/l	5.34	5.51	-12.31	dry	dry	dry	5.25	1.95	2.19	7.34
ORP	mV	93	57	64.2	dry	dry	dry	43.7	-87.3	-2.3	3.4
turbidity	NTU	56.4	53.9	6.9	dry	dry	dry	30.6	22	NM	7.2
Antimony	ug/l	6 U	6 U	ND	dry	dry	dry	6 U	6 U	6 U	3 U
Arsenic	ug/l	0.2 U	5 U	ND	dry	dry	dry	5 U	5 U	5 U	3 U
Barium	ug/l	36	34.9	62	dry	dry	dry	12	49	68	42
Beryllium	ug/l	2 U	2 U	ND	dry	dry	dry	4 U	4 U	4 U	1 U
Cadmium	ug/l	0.2 U	0.2 U	ND	dry	dry	dry	2 U	2 U	2 U	1 U
Cadmium (dissolved)	ug/l	2.5 U	0.2 U	ND	dry	dry	dry	2 U	2 U	2 U	5 U
Chromium (total)	ug/l	0.7	0.2 U	ND	dry	dry	dry	10 U	10 U	10 U	1 U
Copper	ug/l	5 U	5 U	9.5	dry	dry	dry	9 U	9 U	9 U	5 U
Cyanide	ug/l	10 U	10 U	ND	dry	dry	dry	5 U	10 U	10 U	10 U
Lead (total)	ug/l	1.9	7.5 U	8.4	dry	dry	dry	10 U	10 U	10 U	1 U
Lead (dissolved)	ug/l	7.5 U	7.5 U	ND	dry	dry	dry	10 U	10 U	10 U	5 U
Magnesium	ug/l	NS	NS	ND	dry	dry	dry	2000 U	2,510	3270	2920
Mercury	ug/l	0.2 U	0.2 U	ND	dry	dry	dry	0.1 U	0.1 U	0.2	0.2 U
Nickel	ug/l	5 U	5 U	5.4	dry	dry	dry	40 U	40 U	40 U	3
Selenium	ug/l	0.2 U	0.4	ND	dry	dry	dry	5	8	5 U	3
Silver	ug/l	0.2 U	0.25 U	ND	dry	dry	dry	3 U	1 U	3 U	1 U
Thallium	ug/l	NS	0.2 U	ND	dry	dry	dry	2 U	2 U	2 U	0.5 U
Zinc	ug/l	22.2	49	58.6	dry	dry	dry	20 U	31	67	7
Toluene	ug/l	1 U	1 U	ND	dry	dry	dry	1 U	6.1	1 U	1 U
Phenols (none detected)					dry	dry	dry				

The only organics (VOCs and Phenols) presented are those which were detected in one of the sampling rounds.
Round 13 raw laboratory data unavailable. ND = non-detect; detection limits are unavailable.
U - Not detected; value presented is reporting limit
NS - not sampled/analyzed
Note that Round 11 and Round 12 metals are reversed (results shown as total are actually dissolved and vice versa)

SW-K		Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 18	Round 19	Round 20
		Nov-08	Apr-09	Nov-09	Apr-10	Nov-10	Apr-11	Oct-11	Jul-12	Oct-12	Apr-13
Alkalinity (as $CaCO_3$)	mg/l	35.6	52.1	41.6	79.9	33.3	35.5	50	58	53	83
COD	mg/l	53.6	25.5	10.1	34.9	52.9	10.7	55	41	21	37
Chloride	mg/l	98	89.2	89.9	43.7	90.2	112	36	76	112	96
Iron (total)	ug/l	191	112	1740	NS	1490	782	232	1,160	2350	232
Manganese (total)	ug/l	29.6	8.6	185	NS	382	140	21	163	356	49
Nitrogen, nitrate (as N)	mg/l	0.19	0.1 U	ND	0.31	0.1 U	0.25	0.1	0.14	0.09	0.03 U
TDS	mg/l	221	191	192	175	238	227	216	188	260	232
Sulfate	mg/l	12.1	12.1	11.1	14.6	21.8	15.4	2 U	2 U	22	20
pH	s.u.	7.4	7.38	7.13	6.65	6.2	6.95	6.79	6.67	6.75	7.3
Temp	^{o}C	6.71	16.39	7.92	16.62	5	13.83	14.06	26.69	12.74	15.77
Specific Cond.	uS/cm	0.226	356	217	304	254	456	185	380	361	378
DO	mg/l	5.35	6.23	6.27	8.04	2.42	11.3	5.48	5.39	4.27	7.6
ORP	mV	59.6	87	58.1	57.6	120.2	136.4	281	29	2.3	96.3
turbidity	NTU	53.3	49.8	4.92	14.1	2.6	6.06	3.1	3.6	NM	7.54
Antimony	ug/l	6 U	6 U	ND	6 U	6 U	6 U	27	6 U	7	4
Arsenic	ug/l	0.2 U	5 U	ND	4 U	5 U	4 U	5 U	5 U	5 U	3 U
Barium	ug/l	41.2	33.5	48.8	63.7	47.3	44.4	6	37	51	32
Beryllium	ug/l	2 U	2 U	ND	2 U	2 U	2 U	4 U	4 U	4 U	1 U
Cadmium	ug/l	0.2 U	0.2 U	ND	1 U	2.5 U	2.5 U	2 U	2 U	2 U	1 U
Cadmium (dissolved)	ug/l	2.5 U	0.2 U	ND	0.4 U	2.5 U	2.5 U	2 U	2 U	2 U	5 U
Chromium (total)	ug/l	0.8	5 U	ND	5 U	5 U	5 U	10 U	10 U	10 U	1 U
Copper	ug/l	5 U	5 U	ND	5 U	5 U	5 U	9 U	9 U	9 U	5 U
Cyanide	ug/l	10 U	10 U	ND	5 U	5 U	5 U	5 U	10 U	10 U	10 U
Lead (total)	ug/l	3.5	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	1 U
Lead (dissolved)	ug/l	7.5 U	7.5 U	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	5 U
Magnesium	ug/l	NS	NS	ND	3820	NS	NS	2000 U	2,780	2800	2,920
Mercury	ug/l	0.2 U	0.2 U	ND	0.2 U	0.3 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U
Nickel	ug/l	5 U	5 U	ND	5 U	5.2	5 U	40 U	40 U	40 U	1
Selenium	ug/l	0.2 U	0.3	ND	5 U	15 U	15 U	5 U	5 U	5 U	13
Silver	ug/l	0.2 U	0.25 U	ND	1.2 U	5 U	5 U	15	1 U	3 U	1 U
Thallium	ug/l	NS	0.2 U	ND	0.2 U	5 U	5 U	2 U	2 U	2 U	0.5 U
Zinc	ug/l	26.2	47.8	25.5	28.2	97.1	12	20 U	31	20	8
VOCs (none detected)											
Phenols (none detected)											

The only organics (VOCs and Phenols) presented are those which were detected in one of the sampling rounds.

[1]New location as of 4/30/07 SW-K1

Round 13 raw laboratory data unavailable. ND = non-detect; detection limits are unavailable.

U - Not detected; value presented is reporting limit

NS - not sampled/analyzed

Note that Round 11 and Round 12 metals are reversed (results shown as total are actually dissolved and vice versa)

SW-L		Round 11	Round 12	Round 13	Round 14	Round 15	Round 16	Round 17	Round 18	Round 19	Round 20
		Nov-08	Apr-09	Nov-09	Apr-10	Nov-10	Apr-11	Oct-11	Jul-12	Oct-12	Apr-13
Alkalinity (as $CaCO_3$)	mg/l	199	NS	320	29	37	28.8	127	50	53	53
COD	mg/l	63.8	NS	145	13.1	21.6	11.7	50	20 U	20 U	61
Chloride	mg/l	57.8	NS	6.35	94	104	93.8	5	91	106	138
Iron (total)	ug/l	876	NS	3440	NS	1180	582	52	1,810	1230	343
Manganese (total)	ug/l	823	NS	463	NS	321	126	29	1,020	252	81
Nitrogen, nitrate (as N)	mg/l	0.1 U	NS	ND	0.38	0.1 U	0.26	0.09	0.21	0.12	0.3
TDS	mg/l	351	NS	442	201	232	208	244	212	256	276
Sulfate	mg/l	22.2	NS	70.9	13.5	20.5	14.8	30	3	21	24
pH	s.u.	7.44	NS	7.06	7.5	7.32	7.11	7.04	6.8	6.54	7.81
Temp	^{o}C	6.12	NS	10.57	16.61	7.18	10.81	13.3	24.61	14.5	15.74
Specific Cond.	uS/cm	0.295	NS	416	370	286	413	227	441	353	423
DO	mg/l	4.24	NS	8.86	13.06	6.97	9.81	6.04	4	4.37	10.29
ORP	mV	-62.5	NS	71.1	-12.1	81.3	91	213.7	33.4	41.2	168.3
turbidity	NTU	75.7	NS	5.17	1.06	2.86	4.41	3.6	32.5	NM	2.3
Antimony	ug/l	6 U	NS	ND	6 U	6 U	6 U	6 U	6 U	6 U	3 U
Arsenic	ug/l	1	NS	ND	4 U	5.2	4 U	5 U	5 U	5 U	3 U
Barium	ug/l	28.7	NS	39.8	38.8	45	36	5	49	46	33
Beryllium	ug/l	2 U	NS	ND	2 U	2 U	2 U	4 U	4 U	4 U	1 U
Cadmium	ug/l	0.2 U	NS	ND	1 U	2.5 U	2.5 U	2 U	2 U	2 U	1 U
Cadmium (dissolved)	ug/l	2.5 U	NS	ND	0.4 U	2.5 U	2.5 U	2 U	2 U	2 U	5 U
Chromium	ug/l	1	NS	ND	5 U	5 U	5 U	10 U	10 U	10 U	1 U
Copper	ug/l	5 U	NS	ND	5 U	5 U	5 U	9 U	9 U	9 U	5 U
Cyanide	ug/l	10 U	NS	ND	5 U	5 U	5 U	5 U	10 U	10 U	10 U
Lead (total)	ug/l	3.9	NS	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	2
Lead (dissolved)	ug/l	7.5 U	NS	ND	7.5 U	7.5 U	7.5 U	10 U	10 U	10 U	5 U
Magnesium	ug/l	NS	NS	ND	2860	NS	NS	2000 U	2,890	3150	3,020
Mercury	ug/l	0.2 U	NS	ND	0.2 U	0.3 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U
Nickel	ug/l	5 U	NS	ND	5 U	5 U	5 U	40 U	40 U	40 U	2
Selenium	ug/l	0.2 U	NS	ND	5 U	15 U	15 U	5 U	11	7	4
Silver	ug/l	0.3	NS	ND	1.2 U	5 U	5 U	3 U	1 U	3 U	1 U
Thallium	ug/l	NS	NS	ND	0.2 U	5 U	5 U	2 U	2 U	2 U	0.5 U
Zinc	ug/l	20.2	NS	26.2	16.5	37.3	9.5	20 U	20 U	20 U	14
VOCs (none detected)			NS								
Phenols (none detected)			NS								

The only organics (VOCs and Phenols) presented are those which were detected in one of the sampling rounds.
Round 13 raw laboratory data unavailable. ND = non-detect; detection limits are unavailable.
U - Not detected; value presented is reporting limit
NS - not sampled/analyzed
Note that Round 11 and Round 12 metals are reversed (results shown as total are actually dissolved and vice versa)

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:** July 16, 2013
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/85°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 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: One section west of landfill damaged from a fallen tree. Temporary repairs have already been made. 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
_____
_____
_____
_____

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_____ _____		
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. With the reduced landfill gas production and issues with flare shutdown (due to low amounts of LFG, changing to candlestick flares may be appropriate in the near future.

Appendix D
Information Related to the OU-3 Review

D.1 – Documents Reviewed

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*.

D.2 – Lead Cleanup Level Revision Memorandum

MEMO

Subject: Change in Lead-in-Soil Cleanup Level for Iron Horse Park – Adult Exposure
To: Don McElroy, Project Manager
From: Margaret McDonough, Human Health Risk Assessor
Date: March 11, 2009

The cleanup level for lead in soil for non-residential adult exposure was based on EPA's Adult Lead Methodology, *Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposure to Lead in Soil*, 1996, 2003. This document is available at http://www.epa.gov/superfund/health/contaminants/lead/products.htm
This methodology focuses on estimating fetal blood lead concentration in women exposed to lead contaminated soils. Two important parameters in this methodology have been updated based on the National Health and Nutrition Evaluation Survey (NHANES III) conducted by CDC. These parameters are 1) the estimated geometric mean (GM) background blood lead levels, and 2) the estimated value of the individual geometric standard deviation (GSD) blood lead concentrations. Changes in the values for these parameters results in lower (more conservative) Remediation Goals for lead-in-soil.

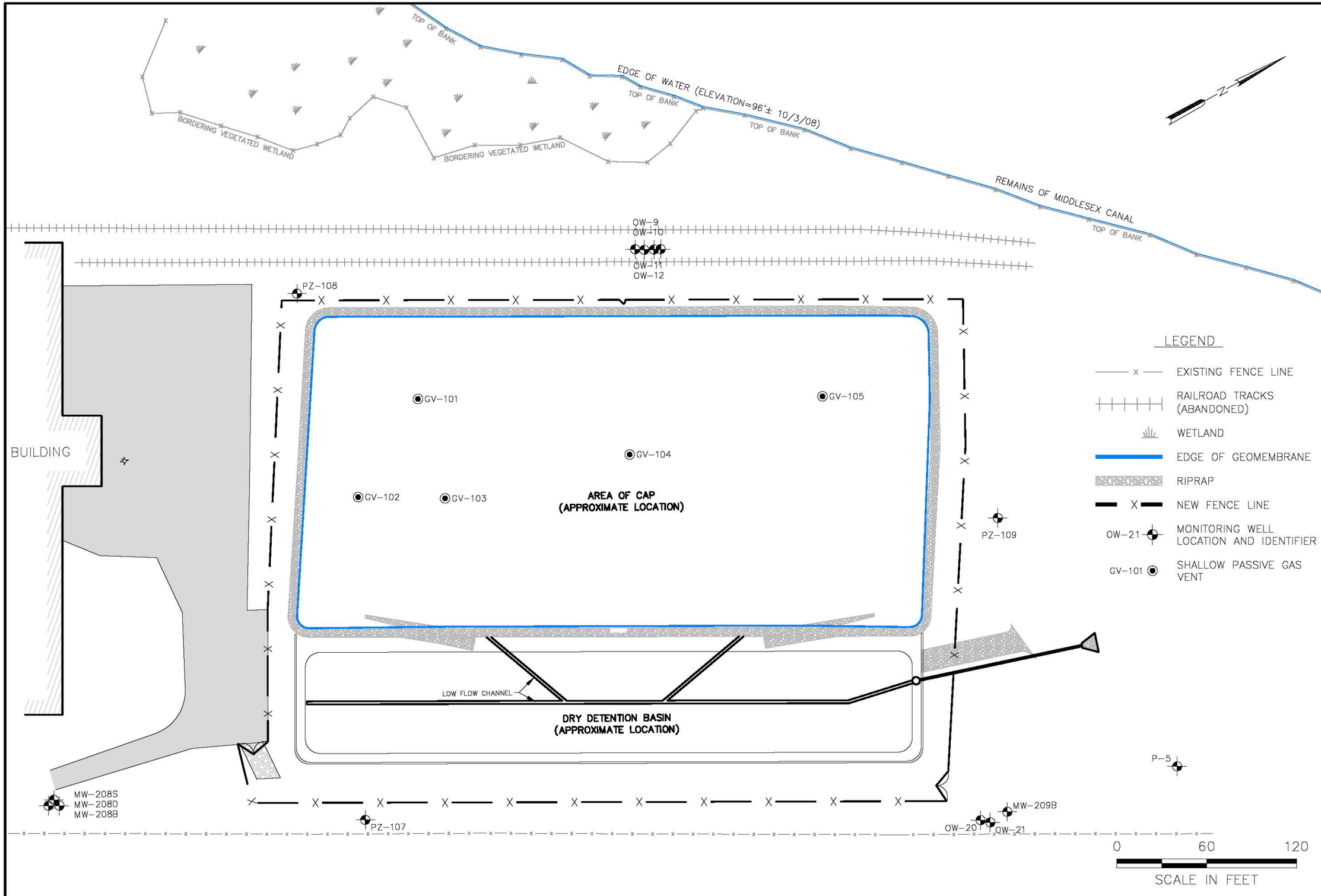
EPA's Technical Review Workgroup for Lead provides summary statistics for these updated parameters in *Blood Lead Concentrations of U.S. Adult Females: Summary Statistics from Phases 1 and 2 of the National Health and Nutrition Evaluation Survey (NHANES III)*, OSWER #9285.7-52, March 2002. Statistics for the GM and GSD for blood lead concentration in women 17 to 45 years of age are presented.

These changes to the GM and GSD impact Remediation Goals calculated based on the Adult Lead Methodology. The GM and GSD are selected based on race/ethnicity. The race/ethnicity of the potentially exposed population at the Iron Horse Park site is assumed to be most similar to the Northeast non-Hispanic white group. The GM and GSD for this group is 1.93 and 2.00, respectively. The resulting Remediation Goal is 1,107 mg/kg.

Values for all other parameters remain unchanged and are as follows:

Exposure Variable	Description of Exposure Variable	Units	Value
$PbB_{fetal, 0.95}$	95th percentile PbB in fetus	ug/dL	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.05
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	219
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365

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

			Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Cobalt	Copper	Iron	Magnesium	Manganese	Nickel	Potassium	Sodium	Zinc
		PAL	200	10	2000	4	5	5000	50	1300	300	5000	840	100	35000	5000	500
		MDL	26	0.34	0.36	0.03	0.026	88	0.053	0.16	26	37	0.3	0.12	460	1900	5.1
		QL	50	0.4	10	0.4	0.5	150	1	5	50	150	1	5	2000	2000	10
MW-208B	Pre-Cap Construction	4/23/2009	<100	<5	19	<5	<4	36000	<20	<10	15000	7500	178	<25	3800	18000	<50
		7/27/2009	<100	<5	18	<4	<4	37000	<20	<10	210	7600	185	<25	3700	17000	<50
		10/29/2009	<100	<5	18	<5	<4	38000	<20	<10	250	7900	192	<25	3700	17000	<50
		1/22/2010	<100	5	20	<4	<4	38000	<20	<10	250	8500	188	<25	4100	18000	<50
	Post-Cap Construction	5/2/2012	<50	2	18	<0.4	<0.5	40000	5.8	<5	240	8400	190	<5	3900	18000	<10
		10/3/2012	<26	2	18	<0.082	<0.029	40000	5.6	<0.13	230	8300	190	<0.22	3800	17000	<1.3
MW-208D	Pre-Cap Construction	4/23/2009	<100	<5	30	<5	<4	16000	<20	<10	<50	3200	1630	<25	<2500	15000	<50
		7/27/2009	<100	<5	31	<4	<4	18000	<20	<10	<50	3400	1600	<25	<2500	14000	<50
		10/28/2009	<100	<5	31	<5	<4	19000	<20	<10	<50	3800	1770	<25	<2500	15000	<50
		1/22/2010	<100	<5	35	<4	<4	18000	<20	<10	<50	4400	1760	<25	<2500	14000	<50
	Post-Cap Construction	5/2/2012	<50	0.4	55	<0.4	<0.5	31000	1.3	<5	<50	6800	2900	<5	2700	22000	<10
		10/3/2012	<26	<0.25	52	<0.082	<0.029	32000	1.4	<0.13	<26	6700	2700	<0.22	2700	22000	<1.3
MW-208S	Pre-Cap Construction	4/23/2009	<100	42	18	<5	<4	7200	<20	<10	14000	1500	724	<25	<2500	6800	<50
		7/27/2009	<100	43	23	<4	<4	8200	<20	<10	16000	1700	749	<25	<2500	7900	<50
		10/29/2009	<100	49	25	<5	<4	8400	<20	<10	16000	1800	785	<25	<2500	7700	<50
		1/22/2010	<100	48	26	<4	<4	9000	<20	<10	16000	2000	814	<25	<2500	8200	<50
	Post-Cap Construction	5/2/2012	<50	48	39	<0.4	<0.5	14000	3.3	<5	23000	35000	1200	<5	3000	13000	<10
		10/3/2012	<26	51	36	<0.082	<0.029	14000	3.1	<0.13	18000	2800	1200	<0.22	2500	14000	<1.3
MW-209B	Pre-Cap Construction	4/20/2009	<100	5	45	<5	<4	55000	<20	<10	3800	22000	1230	<25	7200	28000	<50
		7/28/2009	<100	<5	47	<4	<4	57000	<20	<10	3000	22000	1170	<25	7200	28000	<50
		10/29/2009	<100	6	47	<5	<4	57000	<20	<10	4200	22000	1160	<25	7000	27000	<50
		1/21/2010	<100	7	44	<4	<4	56000	<20	<10	4300	22000	1130	<25	6400	28000	<50
	Post-Cap Construction	5/3/2012	<50	4.3	43	<0.4	<0.5	64000	1.9	<5	1900	25000	1300	<5	7300	29000	<10
		10/2/2012	<26	4.2	41	<0.082	<0.029	58000	1.8	<0.13	1600	23000	1200	<0.22	6600	25000	<1.3
OW-10	Pre-Cap Construction	4/22/2009	670	<5	24	<5	<4	37000	39	<10	150	7600	2500	28	3000	61000	60
		7/27/2009	600	<5	25	<4	<4	38000	37	<10	180	7700	2480	27	2900	58000	51
		10/28/2009	690	<5	27	<5	<4	45000	44	<10	220	9100	2970	32	3200	64000	<50
		1/20/2010	490	<5	21	<4	<4	26000	<20	<10	120	5500	1770	<25	<2500	38000	<50
	Post-Cap Construction	5/1/2012	910	<0.4	28	1	<0.5	45000 J	35	6.4	120	9400	2800	27	3200	66000	52
		10/1/2012	950	<0.25	37	1.4	0.59	63000	53	5.1	180	13000	4100	40	4100	94000	68
OW-11	Pre-Cap Construction	4/22/2009	<100	26	<10	<5	<4	16000	<20	<10	5400	2200	1140	<25	<2500	25000	<50
		7/27/2009	<100	24	13	<4	<4	18000	<20	<10	5800	2500	1250	<25	<2500	33000	<50
		10/28/2009	<100	310	10	<5	<4	13000	<20	<10	6600	1600	824	<25	<2500	36000	<50
		1/20/2010	<100	30	<10	<4	<4	10000	<20	<10	4200	1400	692	<25	<2500	30000	<50
	Post-Cap Construction	5/1/2012	<50	36	<10	<0.4	<0.5	18000 J	3.9	<5	7800	2100	990	<5	<2000	9900	<10
		10/1/2012	<26	32	<0.34	<0.082	<0.029	20000	2.8	<0.13	7600	2300	1100	<0.22	<460	9500	<1.3
OW-12	Pre-Cap Construction	4/22/2009	110	8	14	<5	<4	29000	<20	<10	1200	300	166	<25	13000	36000	<50
		7/28/2009	150	7	16	<4	<4	32000	<20	<10	420	180	111	<25	16000	41000	<50
		10/28/2009	270	12	15	<5	<4	28000	<20	<10	1200	440	158	<25	12000	43000	<50
		1/20/2010	120	10	14	<4	<4	28000	<20	<10	700	440	130	<25	12000	35000	<50
	Post-Cap Construction	5/2/2012	89	9	18	<0.4	<0.5	63000	<1	<5	810	2300	130	<5	16000	58000	<10
		10/2/2012	280	12	16	<0.082	2.2	40000	<0.016	<0.13	1800	1500	240	<0.22	11000	41000	<1.3
OW-20	Pre-Cap Construction	4/20/2009	<100	15	57	<5	<4	28000	21	<10	12000	5000	2390	<25	5500	76000	<50
		7/28/2009	<100	13	48	<4	<4	23000	<20	<10	8400	4400	2010	<25	4700	74000	<50
		10/29/2009	<100	14	42	<5	<4	21000	<20	<10	8200	3900	1770	<25	4200	59000	<50
		1/21/2010	<100	18	43	<4	<4	21000	<20	<10	8000	4100	1760	<25	4500	63000	<50
	Post-Cap Construction	5/3/2012	<50	13	52	<0.4	<0.5	33000	19	<5	10000	5900	2700	10	4500	63000	<10
		10/3/2012	<26	10	45	<0.082	<0.029	25000	17	<0.13	6000	4900	2000	10	3900	69000	<1.3
OW-21	Pre-Cap Construction	4/20/2009	150	<5	37	<5	<4	3200	<20	<10	1200	430	1610	<25	<2500	<2000	298
		7/28/2009	<100	<5	44	<4	<4	6800	<20	<10	4000	750	1770	<25	<2500	2300	137
		10/29/2009	<100	7	54	<5	<4	7000	<20	<10	6400	800	1410	<25	<2500	7600	126
		1/21/2010	150	<5	36	<4	<4	4500	<20	<10	4300	520	1450	<25	<2500	2400	134
	Post-Cap Construction	5/3/2012	110	0.41	68	<0.4	<0.5	15000	3.3	<5	97	1700	310	6.1	3700	3700	110
		10/2/2012	<26	4.5	56	<0.082	<0.029	9100	3.3	<0.13	1800	1300	740	<0.22	3300	10000	43
OW-9	Pre-Cap Construction	4/23/2009	800	<5	116	<5	<4	370000	434	<10	1800	81000	28100	333	20000	510000	151
		7/27/2009	870	5	116	4	<4	390000	442	<10	1500	82000	27600	334	20000	510000	207
		10/28/2009	760	6	128	<5	<4	420000	483	<10	2000	91000	30100	361	22000	540000	205
		1/20/2010	800	5	116	<4	<4	370000	474	<10	1200	76000	27800	359	20000	510000	250
	Post-Cap Construction	5/1/2012	890	1.1	120	3.4	1	440000 J	510	12	740	89000	29000	370	22000	680000	340
		10/1/2012	910	0.8	120	5	1.4	430000	590	13	740	89000	30000	350	22000	670000	280

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

			Aluminum	Arsenic	Barium	Beryllium	Cadmium	Calcium	Cobalt	Copper	Iron	Magnesium	Manganese	Nickel	Potassium	Sodium	Zinc
		PAL	200	10	2000	4	5	5000	50	1300	300	5000	840	100	35000	5000	500
		MDL	26	0.34	0.36	0.03	0.026	88	0.053	0.16	26	37	0.3	0.12	460	1900	5.1
		QL	50	0.4	10	0.4	0.5	150	1	5	50	150	1	5	2000	2000	10
P-5	Pre-Cap Construction	4/20/2009	<100	5	20	<5	<4	4000	37	<10	7200	1100	8140	<25	<2500	3000	<50
		7/28/2009	720	7	23	<4	<4	4800	32	<10	7100	1000	6360	<25	<2500	3900	<50
		10/29/2009	<100	7	20	<5	<4	4700	35	<10	7200	970	6200	<25	<2500	3600	<50
		1/21/2010	130	8	21	<4	<4	5700	37	<10	8500	1300	6820	<25	<2500	4200	<50
	Post-Cap Construction	5/2/2012	530	5.5	22	<0.4	<0.5	6400	22	<5	7300	1000	3500	10	2100	6500	<10
		10/2/2012	710	7.9	34	<0.082	<0.029	9800	6	<0.13	13000	1500	3400	<0.22	2400	15000	<1.3
PZ-107	Pre-Cap Construction	4/23/2009	<100	<5	24	<5	<4	86000	<20	<10	2700	4400	714	<25	7300	13000	<50
		7/28/2009	<100	10	31	<4	<4	99000	<20	<10	2400	4800	616	<25	9800	11000	<50
		10/29/2009	<100	10	33	<5	<4	120000	<20	<10	1900	5000	611	<25	10000	14000	<50
		1/21/2010	<100	7	23	<4	<4	91000	<20	<10	1700	5100	629	<25	6900	10000	<50
	Post-Cap Construction	5/3/2012	<50	3	38	<0.4	<0.5	140000	<1	<5	2000	6000	770	<5	11000	18000	<10
		10/3/2012	<26	4.5	35	<0.082	<0.029	120000	<0.016	<0.13	1500	4500	660	<0.22	10000	12000	<1.3
PZ-108	Pre-Cap Construction	4/23/2009	<100	6	35	<5	<4	120000	<20	<10	2200	8700	901	<25	7800	7600	<50
		7/28/2009	160	15	42	<4	<4	120000	<20	<10	2300	9000	804	<25	8300	6400	<50
		10/30/2009	<100	10	38	<5	<4	120000	<20	<10	1700	7800	723	<25	9300	8600	<50
		1/22/2010	<100	11	30	<4	<4	110000	<20	<10	2100	8000	904	<25	6700	6700	<50
	Post-Cap Construction	5/2/2012	<50	8.3	25	<0.4	<0.5	74000	<1	<5	1000	4300	590	<5	7900	37000	<10
		10/2/2012	<26	4.7	44	<0.082	<0.029	120000	<0.016	<0.13	950	6400	590	5	11000	45000	<1.3
PZ-109	Pre-Cap Construction	4/22/2009	<100	7	35	<5	<4	140000	<20	<10	8300	3800	882	<25	6500	48000	<50
		7/28/2009	<100	7	28	<4	<4	110000	<20	<10	6600	3200	725	<25	5900	31000	<50
		10/29/2009	<100	30	22	<5	<4	120000	<20	<10	3600	3400	420	<25	6400	6200	<50
		1/21/2010	<100	14	19	<4	<4	100000	<20	<10	5500	3100	646	<25	4800	8900	<50
	Post-Cap Construction	5/2/2012	<50	23	44	<0.4	<0.5	170000	<1	<5	6200	4100	820	8.1	6300	77000	<10
		10/2/2012	<26	58	18	<0.082	<0.029	78000	<0.016	<0.13	1700	2400	140	<0.22	5800	26000	<1.3

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 6-5, as revised on 4/12/12
5. All results are presented in units of micrograms per liter (ug/L)
6. J or UJ = Result is qualified as estimated based on data validation
7. NT = Not Tested
8. "<" indicates the result was not detected above the laboratory QL, as indicated.
9. Blue highlighted cells indicate an exceedance of the Project Action Limit
10. This table presents results for only those analytes with at least one detection above laboratory QLs ("hits only")

Table 4-5
Volatile Organic Compound Analytical Data Summary - Hits Only
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,4-Dioxane	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	Ethylbenzene	Methyl tert butyl ether	Naphthalene	n-Propylbenzene	o-Xylene	p/m-Xylene	p-Isopropyltoluene	Tetrachloroethene	Trichloroethene
		PAL	70	7	15	600	5	6.1	5	100	70	700	70	140	0.5	10000	10000	0.5	5	5
		MDL	0.09	0.1	0.06	0.06	0.09	0.33	0.05	0.05	0.05	0.05	0.05	0.21	0.04	0.05	0.07	0.06	0.14	0.12
		QL	1	1	1	1	1	2	1	1	1	1	1	2	0.5	1	2	0.5	1	1
MW-208B	Pre-Cap Construction	4/23/2009	<0.75	<0.5	<2.5	NT	1.4	<250	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/27/2009	<0.75	<0.5	<2.5	NT	1.7	<250	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/29/2009	<0.75	<0.5	<2.5	NT	1.8	<250	<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	<2	NT	1.5	<250	<1	<1	<1	<1	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	NT	<1	<2	<1	<1	<1	<1	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/3/2012	<0.09	<0.1	<0.06	NT	1.2	<0.33	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	<0.14	<0.12
MW-208D	Pre-Cap Construction	4/23/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/27/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/28/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<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	<2	NT	<1	<250	<1	<1	<1	<1	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/3/2012	<0.09	<0.1	<0.06	NT	<0.09	<0.33	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	<0.14	<0.12
MW-208S	Pre-Cap Construction	4/23/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	0.56	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/27/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/29/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<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	<2	NT	<1	<250	<1	<1	<1	<1	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	NT	<1	<2	<1	<1	<1	<1	<1	NT	<0.5	<1	<2	<0.5	<1	<1
		10/3/2012	<0.09	<0.1	<0.06	NT	<0.09	<0.33	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	<0.14	<0.12
MW-209B	Pre-Cap Construction	4/20/2009	1.9	<0.5	<2.5	NT	10	<250	<0.5	0.86	0.63	<0.5	1.9	NT	<0.5	<1	<1	<0.5	1.9	<0.5
		7/28/2009	1.7	<0.5	<2.5	NT	12	<250	<0.5	<0.5	0.56	<0.5	1.8	<2.5	<0.5	<1	<1	<0.5	0.79	<0.5
		10/29/2009	1.3	<0.5	<2.5	NT	17	<250	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	0.64	<0.5
		1/21/2010	1.4	<1	<2	NT	12	<250	<1	<1	<1	<1	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/3/2012	1.1	<1	<1	NT	13	2.9	<1	<1	<1	<1	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/2/2012	<0.09	<0.1	<0.06	NT	14	<0.33	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	<0.14	<0.12
OW-10	Pre-Cap Construction	4/22/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/27/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/28/2009	<0.75	<0.5	<2.5	NT	0.53	<250	<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	<2	NT	<1	<250	<1	<1	<1	<1	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/1/2012	<1	<1	<1	NT	<1	<2	<1	<1	<1	<1	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/1/2012	<0.09	<0.1	<0.06	NT	<0.09	<0.33	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	<0.14	<0.12
OW-11	Pre-Cap Construction	4/22/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/27/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/28/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<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	<2	NT	<1	<250	<1	<1	<1	<1	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/1/2012	<1	<1	<1	NT	<1	<2 J	<1	<1	<1	<1	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/1/2012	<0.09	<0.1	<0.06	NT	<0.09	<0.33	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	<0.14	<0.12
OW-12	Pre-Cap Construction	4/22/2009	<1.9	<1.2	<6.2	<6.2	<1.2	<620	<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	<0.75	<0.5	6.6	NT	<0.5	<250	<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	<0.75	<0.5	4.8	NT	<0.5	<250	<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	2.8	NT	<1	<250	<1	<1	<1	<1	<2	NT	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	1.8	NT	<1	<2	<1	<1	<1	<1	2.2	NT	<0.5	<1	<2	<0.5	<1	<1
		10/2/2012	<0.09	<0.1	1.4	NT	<0.09	<0.33	<0.05	<0.05	<0.05	<0.05	2.5	NT	<0.04	<0.05	<0.07	<0.06	<0.14	<0.12
OW-20	Pre-Cap Construction	4/20/2009	1.8	0.64	<2.5	NT	<0.5	<250	<0.5	1.2	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	4.4	0.66
		7/28/2009	2.1	0.64	<2.5	NT	<0.5	<250	<0.5	1.1	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	3.8	0.57
		10/29/2009	1.6	<0.5	<2.5	NT	<0.5	<250	<0.5	0.88	0.7	<0.5	<1	NT	<0.5	<1	<1	<0.5	3.3	0.71
		1/21/2010	1.3	<1	<2	NT	<1	<250	<1	<1	<1	<1	<2	<5	<2	<1	<2	<2	3.2	<1
	Post-Cap Construction	5/3/2012	1.6	<1	<1	NT	<1	<2	<1	1.9	<1	<1	<1	<2	<0.5	<1	<2	<0.5	2.4	<1
		10/3/2012	3.9	<0.1	<0.06	NT	<0.09	<0.33	<0.05	6	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	7.6	1.1
OW-21	Pre-Cap Construction	4/20/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/28/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/29/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<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	<2	NT	<1	<250	<1	<1	<1	<1	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/3/2012	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/2/2012	<0.09	<0.1	<0.06	NT	<0.09	<0.33	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	<0.14	<0.12
OW-9	Pre-Cap Construction	4/23/2009	4.6	1.6	<2.5	NT	2.4	<250	<0.5	0.83	0.9	<0.5	<1	NT	<0.5	<1	<1	<0.5	4.7	3.5
		7/27/2009	5	1.8	<2.5	NT	2.6	<250	<0.5	0.82	0.82	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	4	3.5
		10/28/2009	5.2	1.8	<2.5	NT	2.9	<250	<0.5	0.89	0.92	<0.5	<1	NT	<0.5	<1	<1	<0.5	4.6	3.9
		1/20/2010	4.3	1.4	<2	1.2	2.3	<250	<1	<1	<1	<1	<2	<5	<2	<1	<2	<2	4.9	3.2
	Post-Cap Construction	5/1/2012	4.1	1.8	<1	1	<1	3.1	<1	<1	<1	<1	<1	<2	<0.5	<1	<2	<0.5	4.4	3.4
		10/1/2012	3.1	1.5	<0.06	NT	<0.09	<0.33	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	4.9	3.8

Table 4-5
Volatile Organic Compound Analytical Data Summary - Hits Only
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,4-Dioxane	Benzene	Chlorobenzene	cis-1,2-Dichloroethene	Ethylbenzene	Methyl tert butyl ether	Naphthalene	n-Propylbenzene	o-Xylene	p/m-Xylene	p-Isopropyltoluene	Tetrachloroethene	Trichloroethene
		PAL	70	7	15	600	5	6.1	5	100	70	700	70	140	0.5	10000	10000	0.5	5	5
		MDL	0.09	0.1	0.06	0.06	0.09	0.33	0.05	0.05	0.05	0.05	0.05	0.21	0.04	0.05	0.07	0.06	0.14	0.12
		QL	1	1	1	1	1	2	1	1	1	1	1	2	0.5	1	2	0.5	1	1
P-5	Pre-Cap Construction	4/20/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/28/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/30/2009	<0.75	<0.5	<2.5	<2.5	<0.5	<250	<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	<2	NT	<1	<250	<1	<1	<1	<1	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	NT	<1	<2	<1	<1	<1	<1	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/2/2012	<0.09	<0.1	<0.06	NT	<0.09	<0.33	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	<0.14	<0.12
PZ-107	Pre-Cap Construction	4/23/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	1.1	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/28/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/29/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	0.77	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/21/2010	<1	<1	<2	NT	<1	<250	<1	<1	<1	<1	<2	NT	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/3/2012	<1	<1	<1	NT	<1	<2	<1	<1	<1	<1	<1	NT	<0.5	<1	<2	<0.5	<1	<1
		10/3/2012	<0.09	<0.1	<0.06	NT	<0.09	<0.33	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	<0.14	<0.12
PZ-108	Pre-Cap Construction	4/23/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/28/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/30/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	0.68	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/22/2010	<1	<1	<2	NT	<1	<250	<1	<1	<1	<1	<2	NT	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	NT	<1	<2	<1	<1	<1	<1	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/2/2012	<0.09	<0.1	<0.06	NT	<0.09	<0.33	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	<0.14	<0.12
PZ-109	Pre-Cap Construction	4/22/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		7/28/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	<0.5	<1	<2.5	<0.5	<1	<1	<0.5	<0.5	<0.5
		10/29/2009	<0.75	<0.5	<2.5	NT	<0.5	<250	<0.5	<0.5	<0.5	0.64	<1	NT	<0.5	<1	<1	<0.5	<0.5	<0.5
		1/21/2010	<1	<1	<2	NT	<1	<250	<1	<1	<1	<1	<2	<5	<2	<1	<2	<2	<1	<1
	Post-Cap Construction	5/2/2012	<1	<1	<1	NT	<1	<2	<1	<1	<1	<1	<1	<2	<0.5	<1	<2	<0.5	<1	<1
		10/2/2012	<0.09	<0.1	<0.06	NT	<0.09	<0.33	<0.05	<0.05	<0.05	<0.05	<0.05	NT	<0.04	<0.05	<0.07	<0.06	<0.14	<0.12

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. J or UJ = Result is qualified as estimated based on data validation
7. NT = Not Tested
8. "<" indicates the result was not detected above the laboratory QL, as indicated.
9. Blue highlighted cells indicate an exceedance of the Project Action Limit
10. This table presents results for only those analytes with at least one detection above laboratory QLs ("hits only")

Table 4-6
Semi-Volatile Organic Compound Analytical Data Summary - Hits Only
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			1,2-Dichlorobenzene	2-Chloronaphthalene	2-Methylnaphthalene	Acenaphthene	Benzo[a]anthracene	Benzo[a]pyrene	Bis(2-ethylhexyl) phthalate	Diethyl phthalate	Di-n-butyl phthalate	Fluorene	Naphthalene	Pentachlorophenol
		PAL	600	2900	10	20	1	0.2	6	29000	800	30	140	1
		MDL	0.5	0.5	0.05	0.05	0.169	0.103	0.5	0.5	0.602	0.08	0.08	0.5
		QL	5	5	1	1	0.3	0.2	2	5	5	1	1	1
MW-208B	Pre-Cap Construction	4/23/2009	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<9.6
		7/27/2009	<5	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	<10
		10/29/2009	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
		1/22/2010	<4.9	<0.2	<0.2	<0.2	<0.2	<0.2	<4.9	<4.9	<4.9	<0.2	NT	<0.82
	Post-Cap Construction	5/2/2012	<4.7	<4.7	<0.94	<0.94	<0.28	<0.19	<1.9 UJ	<4.7	1.1	<0.94	NT	<0.94
		10/3/2012	<4.8	<4.8	<0.95	<0.95	0.20 J	0.15 J	<1.9	<4.8	<4.8	<0.95	<0.95	<0.95
MW-208D	Pre-Cap Construction	4/23/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<9.9
		7/27/2009	<5	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	<10
		10/28/2009	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
		1/22/2010	<5	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	<0.8
	Post-Cap Construction	5/2/2012	<4.7	<4.7	<0.93	<0.93	<0.28	<0.19	<1.9 UJ	<4.7	1.2	<0.93	<0.93	<0.93
		10/3/2012	<4.8	<4.8	<0.96	<0.96	<0.29	<0.19	<1.9	<4.8	<4.8	<0.96	<0.96	<0.96
MW-208S	Pre-Cap Construction	4/23/2009	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
		7/27/2009	<5.3	<0.21	<0.21	<0.21	<0.21	<0.21	<5.3	<5.3	<5.3	<0.21	NT	<10
		10/29/2009	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
		1/22/2010	<5	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	<0.8
	Post-Cap Construction	5/2/2012	<4.7	<4.7	<0.95	<0.95	<0.28	<0.19	0.48 UJ	<4.7	1.1	<0.95	0.099 J	<0.95
		10/3/2012	<4.8	<4.8	<0.96	<0.96	<0.29	<0.19	<1.9	<4.8	<4.8	<0.96	<0.96	<0.96
MW-209B	Pre-Cap Construction	4/20/2009	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
		7/28/2009	<4.8	<0.19	<0.19	<0.19	<0.19	<0.19	<4.8	<4.8	<4.8	<0.19	NT	<9.6
		10/29/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<9.9
		1/21/2010	<5	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	<0.8
	Post-Cap Construction	5/3/2012	<4.8	<4.8	<0.95	<0.95	<0.29	<0.19	<1.9	<4.8	0.67	<0.95	NT	<0.95
		10/2/2012	<4.9	<4.9	<0.97	<0.97	<0.29	<0.19	0.60 J	<4.9	<4.9	<0.97	<0.97	<0.97
OW-10	Pre-Cap Construction	4/22/2009	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
		7/27/2009	<5	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	<10
		10/28/2009	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<9.6
		1/20/2010	<5	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	<0.8
	Post-Cap Construction	5/1/2012	<4.9	<4.9	<0.97	<0.97	<0.29	<0.19	<1.9	<4.9	<4.9	<0.97	NT	<0.97
		10/1/2012	<4.8	<4.8	<0.95	<0.95	<0.29	<0.19	0.61 J	<4.8	<4.8	<0.95	<0.95	<0.95
OW-11	Pre-Cap Construction	4/22/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<9.9
		7/27/2009	<5	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	<10
		10/28/2009	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
		1/20/2010	<5	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	1
	Post-Cap Construction	5/1/2012	<5 UJ	<5	<0.99	0.30 J	<0.3	<0.2	0.57 J	<5	0.79 U	<0.99	NT	<0.99
		10/1/2012	<4.7	<4.7	<0.95	0.31 J	<0.28	<0.19	<1.9	<4.7	<4.7	<0.95	<0.95	<0.95
OW-12	Pre-Cap Construction	4/22/2009	NT	<5	<5	<5	<5	<5	<5	<5	<5	<5	NT	<10
		7/28/2009	<4.9	<0.2	3.2	<0.2	<0.2	<0.2	<4.9	<4.9	<4.9	0.36	NT	<9.8
		10/28/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	NT	<9.8
		1/20/2010	<5	<1	<1	<1	<1	<1	<5	<5	<5	<1	1.2	<4
	Post-Cap Construction	5/2/2012	<4.7	<4.7	0.60 J	<0.94	<0.28	<0.19	<1.9 UJ	<4.7	1	0.31 J	0.69 J	<0.94
		10/2/2012	<4.9	<4.9	2.5	0.70 J	<0.29	<0.19	<1.9	<4.9	<4.9	0.56 J	1.9	<0.97
OW-20	Pre-Cap Construction	4/20/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<9.9
		7/28/2009	<4.9	<0.2	<0.2	<0.2	<0.2	<0.2	<4.9	<4.9	<4.9	<0.2	NT	<9.8
		10/29/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<9.9
		1/21/2010	<5	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	<0.8
	Post-Cap Construction	5/3/2012	<5	<5	<1	<1	<0.3	<0.2	<2	<5	0.86	<1	NT	<1
		10/3/2012	<4.8	<4.8	<0.97	<0.97	<0.29	<0.19	<1.9	<4.8	<4.8	<0.97	<0.97	<0.97
OW-21	Pre-Cap Construction	4/20/2009	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<9.5
		7/28/2009	<4.8	<0.19	<0.19	<0.19	<0.19	<0.19	<4.8	<4.8	<4.8	<0.19	NT	<9.5
		10/29/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<9.9
		1/21/2010	<5	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	<0.8
	Post-Cap Construction	5/2/2012	<4.8	<4.8	0.057 J	<0.96	<0.29	<0.19	<1.9 UJ	<4.8	1.1	<0.96	<0.96	<0.96
		10/2/2012	<4.8	<4.8	<0.96	<0.96	0.095 J	<0.19	0.63 J	<4.8	2.7 J	<0.96	<0.96	<0.96

Table 4-6
Semi-Volatile Organic Compound Analytical Data Summary - Hits Only
Iron Horse Park Superfund Site, AOC 7 / OU3, Billerica, MA

			1,2-Dichlorobenzene	2-Chloronaphthalene	2-Methylnaphthalene	Acenaphthene	Benzo[a]anthracene	Benzo[a]pyrene	Bis(2-ethylhexyl) phthalate	Diethyl phthalate	Di-n-butyl phthalate	Fluorene	Naphthalene	Pentachlorophenol
		PAL	600	2900	10	20	1	0.2	6	29000	800	30	140	1
		MDL	0.5	0.5	0.05	0.05	0.169	0.103	0.5	0.5	0.602	0.08	0.08	0.5
		QL	5	5	1	1	0.3	0.2	2	5	5	1	1	1
OW-9	Pre-Cap Construction	4/23/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<9.9
		7/27/2009	<5.6	<0.22	<0.22	<0.22	<0.22	<0.22	<5.6	<5.6	<5.6	<0.22	NT	<11
		10/28/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<9.9
		1/20/2010	NT	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	<0.8
	Post-Cap Construction	5/1/2012	0.67 J	<4.9	<0.98	<0.98	<0.29	<0.2	<2	<4.9	0.8 U	<0.98	NT	<0.98
		10/1/2012	0.57 J	<4.7	<0.94	<0.94	<0.28	<0.19	0.99 J	<4.7	<4.7	<0.94	<0.94	<0.94
P-5	Pre-Cap Construction	4/20/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<9.8
		7/28/2009	<4.8	<0.19	<0.19	<0.19	<0.19	<0.19	<4.8	<4.8	<4.8	<0.19	NT	<9.6
		10/29/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<9.9
		1/21/2010	<5	<0.2	<0.2	<0.2	<0.2	<0.2	71	<5	<5	<0.2	NT	<0.8
	Post-Cap Construction	5/2/2012	<4.8	<4.8	<0.95	<0.95	<0.29	<0.19	<1.9 UJ	<4.8	0.88	<0.95	NT	<0.95
		10/2/2012	<4.9	<4.9	<0.97	<0.97	<0.29	<0.19	0.77 J	<4.9	<4.9	<0.97	<0.97	<0.97
PZ-107	Pre-Cap Construction	4/23/2009	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
		7/28/2009	<4.9	<0.2	<0.2	0.33	<0.2	<0.2	<4.9	<4.9	<4.9	0.36	NT	<9.8
		10/29/2009	<5	<5	<5	0.53	<5	<5	<5	<5	<5	0.5	1.1	<10
		1/21/2010	<5	<0.2	<0.2	0.27	<0.2	<0.2	<5	<5	<5	0.29	0.25	<0.8
	Post-Cap Construction	5/3/2012	<4.9	<4.9	<0.98	0.39 J	<0.29	<0.2	<2	<4.9	0.84	0.32 J	0.60 J	<0.98
		10/3/2012	<4.9	<4.9	<0.98	0.56 J	<0.29	<0.2	0.60 J	<4.9	<4.9	<0.98	1.4	<0.98
PZ-108	Pre-Cap Construction	4/23/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<9.9
		7/28/2009	<4.8	<0.19	<0.19	<0.19	<0.19	<0.19	<4.8	<4.8	<4.8	<0.19	NT	<9.7
		10/30/2009	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<9.8
		1/22/2010	<4.9	<0.2	<0.2	<0.2	<0.2	<0.2	<4.9	<4.9	<4.9	<0.2	0.33	<0.82
	Post-Cap Construction	5/2/2012	<4.7	<4.7	<0.94	<0.94	<0.28	<0.19	<1.9 UJ	4.3 J	1.1	<0.94	NT	<0.94
		10/2/2012	<4.9	<4.9	<0.97	<0.97	<0.29	<0.19 UJ	0.75 J	<4.9	<4.9	<0.97	<0.97	<0.97
PZ-109	Pre-Cap Construction	4/22/2009	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<9.7
		7/28/2009	<4.8	<0.19	<0.19	<0.19	<0.19	<0.19	<4.8	<4.8	<4.8	<0.19	NT	<9.6
		10/29/2009	<4.8	0.24	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	0.4	0.63	<9.7
		1/21/2010	<5	<0.2	<0.2	<0.2	<0.2	<0.2	<5	<5	<5	<0.2	NT	<0.8
	Post-Cap Construction	5/2/2012	<4.7	<4.7	<0.94	<0.94	<0.28	<0.19	<1.9 UJ	<4.7	0.81	<0.94	NT	<0.94
		10/2/2012	<4.8	<4.8	<0.97	<0.97	<0.29	<0.19	<1.9	<4.8	<4.8	<0.97	<0.97	<0.97

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 6-8, as revised on 4/26/12
5. All results are presented in units of micrograms per liter (ug/L)
6. J or UJ = Result is qualified as estimated based on data validation
7. NT = Not Tested
8. "<" indicates the result was not detected above the laboratory QL, as indicated.
9. Blue highlighted cells indicate an exceedance of the Project Action Limit
10. This table presents results for only those analytes with at least one detection above laboratory QLs ("hits only")

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

			Total Alkalinity	Chemical Oxygen Demand	Chloride	Total Cyanide	Nitrogen as Nitrate	Total Dissolved Solids	Sulfate
		PAL	NE	NE	NE	0.2	NE	NE	NE
		MDL	0.78	7.8	0.68	0.009	0.036	7.7	1.4
		QL	1	15	1	0.01	0.05	10	2
MW-208B	Pre-Cap Construction	4/23/2009	49	NT	70	<0.005	0.13	230	23
		7/27/2009	55	NT	68	<0.005	<0.5	270	23
		10/29/2009	53	NT	66	<0.005	<0.1	220	24
		1/22/2010	55	NT	73	<0.005	<0.1	230	22
	Post-Cap Construction	5/2/2012	55	<15	75	<0.01	<0.05	200	9.3
		10/3/2012	55 J	<7.8	76	<0.008	<0.036	260 J	20
MW-208D	Pre-Cap Construction	4/23/2009	58	NT	18	<0.005	<0.1	120	<10
		7/27/2009	59	NT	21	<0.005	<0.5	120	<10
		10/28/2009	58	NT	22	<0.005	<0.1	140	<10
		1/22/2010	56	NT	30	<0.005	<0.1	130	<10
	Post-Cap Construction	5/2/2012	59	<15	61	<0.01	<0.05	180	9.3
		10/3/2012	59 J	<7.8	75	<0.008	<0.036	1000 J	8.2 J
MW-208S	Pre-Cap Construction	4/23/2009	54	NT	10	<0.005	<0.5	85	<10
		7/27/2009	66	NT	10	<0.005	<1	88	<10
		10/29/2009	57	NT	13	<0.005	0.12	110	<10
		1/22/2010	57	NT	17	<0.005	<0.1	100	<10
	Post-Cap Construction	5/2/2012	61	29	40	<0.01	0.055	140	<2
		10/3/2012	88 J	<7.8	27	<0.008	0.091	150 J	<2
MW-209B	Pre-Cap Construction	4/20/2009	54	NT	130	<0.005	<0.1	460	84
		7/28/2009	46	NT	130	<0.005	<0.5	430	86
		10/29/2009	40	NT	110	<0.005	<0.1	370	100
		1/21/2010	45	NT	130	<0.005	<0.1	420	91
	Post-Cap Construction	5/3/2012	34	<15	140	<0.01	<0.05	370	57
		10/2/2012	32 J	19	170	<0.008	<0.036	260 J	89 J
OW-10	Pre-Cap Construction	4/22/2009	16	NT	150	<0.005	<0.1	360	31
		7/27/2009	16	NT	160	<0.005	<0.1	420	33
		10/28/2009	17	NT	170	<0.005	<0.1	410	36
		1/20/2010	16	NT	100	<0.005	<0.1	240 J	28
	Post-Cap Construction	5/1/2012	13	<15	180	0.051	<0.05	340	21
		10/1/2012	13 J	19	340	<0.008	<0.036	390 J	26
OW-11	Pre-Cap Construction	4/22/2009	59	NT	33	<0.005	<0.5	150	14
		7/27/2009	61	NT	47	<0.005	<1	170	22
		10/28/2009	64	NT	34	<0.005	<0.1	170	21
		1/20/2010	66	NT	22	<0.05	<0.1	130 J	14
	Post-Cap Construction	5/1/2012	57	<15	18	<0.01	<0.05	78	4.4
		10/1/2012	68 J	<7.8	20	<0.008	0.051	78 UJ	<2
OW-12	Pre-Cap Construction	4/22/2009	160	NT	9.5	<0.005	<0.1	220	<10
		7/28/2009	180	NT	8.5	<0.005	<0.1	220	<10
		10/28/2009	160	NT	19	<0.005	<0.1	240	<10
		1/20/2010	160	NT	15	<0.005	<0.1	210 J	<10
	Post-Cap Construction	5/2/2012	200	60	57	<0.01	<0.05	350	13
		10/2/2012	180 J	61	50	<0.008	<0.036	200 J	<2 UJ
OW-20	Pre-Cap Construction	4/20/2009	66	NT	140	<0.005	<0.5	360	20
		7/28/2009	62	NT	120	<0.005	<2	320	20
		10/29/2009	71	NT	93	<0.005	<0.1	270	21
		1/21/2010	70	NT	100	<0.005	<0.1	300	20
	Post-Cap Construction	5/3/2012	49	23	150	<0.01	<0.05	340	11
		10/3/2012	53 J	<7.8	140	<0.008	0.08	310 J	17

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

			Total Alkalinity	Chemical Oxygen Demand	Chloride	Total Cyanide	Nitrogen as Nitrate	Total Dissolved Solids	Sulfate
		PAL	NE	NE	NE	0.2	NE	NE	NE
		MDL	0.78	7.8	0.68	0.009	0.036	7.7	1.4
		QL	1	15	1	0.01	0.05	10	2
OW-21	Pre-Cap Construction	4/20/2009	8.6 U	NT	1.9	<0.005	<0.1	78 J	<10
		7/28/2009	18	NT	5.2	<0.005	<0.5	46	12
		10/29/2009	13	NT	7.9	<0.005	<0.1	82	26
		1/21/2010	12	NT	3	<0.005	<0.1	46	17
	Post-Cap Construction	5/3/2012	27	<15	4.3 U	<0.01	2.1	78	6.1 J
		10/2/2012	20 J	<7.8	14	<0.008	0.089	22 J	14 J
OW-9	Pre-Cap Construction	4/23/2009	14	NT	1600	0.008	<0.1	3400	74
		7/27/2009	12	NT	1800	<0.005	<0.5	3400	78
		10/28/2009	11	NT	1800	0.153	<0.1	3400	84
		1/20/2010	11	NT	2000	0.006	<0.1	3400 J	72
	Post-Cap Construction	5/1/2012	5.2	93	2600	0.056	<0.05	4500	71
		10/1/2012	3.8 J	110	2500	<0.008	<0.036	3000 J	78
P-5	Pre-Cap Construction	4/20/2009	31	NT	4.4	0.01	<0.5	56	15
		7/28/2009	32	NT	3.4 U	<0.005	<1	57	14
		10/29/2009	32	NT	2.8	<0.005	<0.1	52 U	14
		1/21/2010	39	NT	5.9	<0.005	<0.1	59	<10
	Post-Cap Construction	5/2/2012	34	<15	7.7	<0.01	<0.05	82	5.1
		10/2/2012	54 J	28	34	<0.008	0.081	18 J	<2 UJ
PZ-107	Pre-Cap Construction	4/23/2009	280	NT	3.9	<0.005	0.1	330	<10
		7/28/2009	300	NT	4 U	<0.005	<0.1	380	<10
		10/29/2009	340	NT	4.6	<0.005	<0.1	400	<10
		1/21/2010	280	NT	3.7	<0.005	<0.1	340	<10
	Post-Cap Construction	5/3/2012	380	55	27	<0.01	<0.05	470	13
		10/3/2012	360 J	33	11	<0.008	<0.036	390 J	<2
PZ-108	Pre-Cap Construction	4/23/2009	360	NT	2.7	<0.005	<0.1	430	21
		7/28/2009	370	NT	2.8 U	<0.005	<0.1	450	21
		10/30/2009	340	NT	2	<0.005	<0.1	400	<10
		1/22/2010	320	NT	4	<0.005	<0.1	390	15
	Post-Cap Construction	5/2/2012	220	29	24	<0.01	<0.05	330	29
		10/2/2012	350 J	52	56	<0.008	<0.036	390 J	14 J
PZ-109	Pre-Cap Construction	4/22/2009	330	NT	100	<0.005	0.14	590	<10
		7/28/2009	340	NT	30	<0.005	<0.5	430	<10
		10/29/2009	330	NT	2.9	<0.005	<0.1	420	<10
		1/21/2010	300	NT	11	<0.005	<0.1	370	12
	Post-Cap Construction	5/2/2012	420	63	130	<0.01	<0.05	640	64
		10/2/2012	190 J	91	32	<0.008	<0.036	280 J	39 J

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 6-9, as revised on 4/26/12
5. All results are presented in units of milligrams per liter (mg/L)
6. J or UJ = Result is qualified as estimated based on data validation
7. NT = Not Tested
8. NE = None Established
8. "<" indicates the result was not detected above the laboratory QL, as indicated.
9. This table presents results for only those analytes with at least one detection above laboratory QLs ("hits only")

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	7/27/11	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
	1/24/12	12:36	0.0	0.0	20.6	0.0	0
	4/18/12	8:01	0.0	0.2	20.6	0.3	1
	7/24/12	9:21	0.0	0.0	15.5	3.1	0
	11/1/12	10:26	0.0	0.0	14.9	2.4	0
GV-102	7/27/11	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
	1/24/12	12:30	0.0	0.0	18.0	1.2	0
	4/18/12	7:57	0.0	0.0	20.7	0.3	0
	7/24/12	9:13	0.0	0.0	18.3	1.6	0
	11/1/12	10:20	0.0	0.0	18.6	1.5	0
GV-103	7/27/11	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
	1/24/12	12:33	0.0	0.0	11.7	0.1	0
	4/18/12	7:59	0.0	0.0	20.6	0.3	0
	7/24/12	9:17	0.0	0.0	20.2	0.0	0
	11/1/12	10:23	0.0	0.0	16.1	2.2	0
GV-104	7/27/11	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
	1/24/12	12:41	0.0	0.0	20.3	0.2	0
	4/18/12	8:03	0.0	0.6	10.5	6.7	0
	7/24/12	9:26	0.0	5.5	4.4	8.0	0
	11/1/12	10:28	0.3	1.6	6.7	5.9	0
GV-105	7/27/11	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
	1/24/12	12:45	0.0	0.0	20.6	0.1	0
	4/18/12	8:05	0.0	0.5	17.6	2.0	0
	7/24/12	9:30	0.0	0.0	18.8	1.3	0
	11/1/12	10:30	0.0	0.2	17.0	2.9	0

Notes:
1. Volatile Organic Compounds (VOCs) were measured with a 10.6-eV MiniRAE 2000 photoionization detector (PID).
2. Methane (CH_4), Oxygen (O_2), Carbon Dioxide (CO_2), and Hydrogen Sulfide (H_2S) were measured with a CES-Landtec GEM 2000 Plus landfill gas meter.
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 ppm.

D.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-3; AOC7	**Date of inspection:** July 16, 2013
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/90°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: Two groundhog burrows were observed near the base of the landfill; one on the northeast side and one on the southeast side.

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

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

Appendix E
Information Related to the OU-4 Review

E.1 – ROD Cleanup Levels/Performance Standards

Table L-1: Sediment Cleanup Levels for the Protection of Ecological Receptors

Habitat Type/Name	Exposure Medium	COC	Protective Level	Units	Basis[1]	Assessment Endpoint
BENTHIC INVERTEBRATE COMMUNITY						
Unnamed Brook and B&M Pond	Sediment	Total PAHs	4,834	ug/kg	Site-specific MATC	- Survival and growth of benthic invertebrates communities
		4,4'-DDD	16	ug/kg	Site-specific MATC	
		Total PCBs [2]	1 [3]	mg/kg	See note (3)	
		Chromium	22	mg/kg	Site-specific MATC	
		Copper	63	mg/kg	Site-specific MATC	
		Lead	115	mg/kg	Site-specific MATC	
		Vanadium	23	mg/kg	Site-specific MATC	
		Zinc	128	mg/kg	Site-specific MATC	

Notes:

(1) The MATC (set as the geometric mean between the NOEC and LOEC values) has been selected as the protective level for each COC except Total PCBs.

(2) See Appendix A of the Feasibility Study (M&E, 2010) for discussion of Total PCBs Preliminary Remediation Goal (PRG) development.

(3) EPA selected an average Total PCB concentration of 1 mg/kg as sediment protective level based on TSCA 40 CFR 761.61(c) risk-based cleanup level.

COC - Chemical of Concern

NOEC - No observed effect concentration. The NOEC was set as the higher of the concentrations observed at locations with no observed effects.

LOEC - Lowest observed effect concentration. The LOEC was set as the lower of the concentrations observed at locations with observed toxicity to benthic invertebrates.

MATC - Maximum Acceptable Toxic Concentration.

Table L-2: Groundwater Performance Standards - Residential Scenario

Carcinogenic Chemical of Concern	Cancer Classification	Performance Standard (ug/L)	Basis
1,2-Dichloroethane	B2	5	MCL
1,4-Dichlorobenzene	C	5	MMCL
Benzene	A	5	MCL
Carbon Tetrachloride	B2	5	MCL
cis-1,3-Dichloropropene	B2	0.49	1E-6 risk
Tetrachloroethene	B2	5	MCL
Trichloroethene	C-B2	5	MCL
Vinyl Chloride	A	2	MCL
Atrazine	C	3	MCL
Bis(2-chloroethyl)ether	B2	0.5	PQL
Dibenz(a,h)anthracene	B2	0.1	PQL
Dieldrin	B2	0.01	PQL
Arsenic	A	10	MCL
Non-Carcinogenic Chemical of Concern	**Target Endpoint**	**Performance Standard (ug/L)**	**Basis**
1,2-Dichloroethane	N/A	5	MCL
1,4-Dichlorobenzene	N/A	5	MMCL
Benzene	Immune System	5	MCL
Carbon Tetrachloride	Liver	5	MCL
cis-1,3-Dichloropropene	GI System	0.49	risk
Tetrachloroethene	Liver	5	MCL
Vinyl Chloride	Liver	2	MCL
Atrazine	General Toxicity/Cardiovascular	3	MCL
Bis(2-chloroethyl)ether	N/A	0.5	PQL
Dibenz(a,h)anthracene	N/A	0.1	PQL
Dieldrin	Liver	0.01	PQL
Arsenic	Skin	10	MCL
Cadmium	Kidney	5	MCL
Lead [1]	CNS	15	Action Level
Manganese	CNS	300	Health Adv.

Key

Health Advisory - Health Advisory on Manganese presented in EPA-822-R-04-003; January 2004

MCL - Maximum Contaminant Level

MMCL - Massachusetts Maximum Contaminant Level

PQL - Practical Quantification Limit; While it may be possible to achieve lower limits, those that are reasonably achievable have been included.

HQ - Hazard Quotient

N/A - Not Available or Not Applicable

(1) Lead was identified in the Supplemental HHRA as a risk-driver, however, it was not quantitatively evaluated. Therefore, the performance standard has been established as the EPA Drinking Water Action Level.

E.2 – Asbestos Evaluation

SDMS DocID 529195

Superfund Records Center
SITE: IRON HORSE
BREAK: 8.3
OTHER: 529195

Addendum to Iron Horse Park Five Year Review

Evaluation of Asbestos-Containing Soils Using Activity-Based Sampling

December, 2012

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Addendum to Iron Horse Park Five Year Review

Evaluation of Asbestos-Containing Soils Using Activity-Based Sampling

December, 2012

1.0 INTRODUCTION

This report presents results of an investigation conducted to evaluate the potential human health risks associated with inhalation of asbestos fibers in surface soil under current and future potential uses of the Iron Horse Park Superfund Site (the Iron Horse Park site). An adjoining property, referred to as the Zonolite property, is included in this evaluation. An asbestos investigation was conducted on the Zonolite property because asbestos-containing vermiculite was used in product manufacturing at this location

In Section 7 of the third Five-Year Review for the Iron Horse Park site dated September 26, 2008, EPA identified the need to collect additional data on asbestos This need was based on historical asbestos contamination and new information regarding potential health threats associated with low levels of asbestos in soil In 2004, EPA issued OSWER Directive Memorandum 9345.4-05 entitled "Clarifying Cleanup Goals and Identification of New Assessment Tools for Evaluating Asbestos at Superfund Cleanups." This memorandum indicates that soils containing less than one percent asbestos may pose an unacceptable risk to human health if asbestos fibers become airborne and are subsequently inhaled. In September 2008, EPA issued OSWER Directive #9200.0-68 entitled "Framework for Investigating Asbestos-Contaminated Superfund Sites" (the "Framework"). The Framework provides a recommended process for assessing Superfund sites, including sites such as the Iron Horse Park site, that were formerly addressed using the 1% definition of Asbestos Containing Material under the National Emissions Standard for Hazardous Air Pollutants (NESHAP), 40 CFR, Part 61

The potential for soils at the Iron Horse Park site containing less than 1% asbestos or "residual" asbestos to pose a current or potential future human health risk was investigated using the steps outlined in the Framework. These steps included a review of historical use of asbestos at the site; sampling and analysis of soil to delineate the extent of residual asbestos, an assessment of potential exposure scenarios; sampling and analysis of airborne asbestos using activity-based sampling, and a quantitative and qualitative risk assessment.

2.0 ASBESTOS AT THE IRON HORSE PARK SITE: HISTORICAL AND CURRENT

2.1 Historical Use of Asbestos

The site occupies approximately 553 acres in North Billerica, Massachusetts, near the Tewksbury town line, approximately 20 miles northwest of Boston (Figure 2-1). The site is bounded on the north by the B&M 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 2-2) The Middlesex Canal flows through the site to the east, where it joins Content Brook at the southeastern edge of the Shaffer Landfill. It then flows to the Shawsheen River and ultimately to the Merrimack River to the north There are abundant wetlands and forested areas at the site.

The site has historically been identified with asbestos contamination due to asbestos manufacturing and landfilling operations by Johns-Manville over a 32-year period. The Asbestos Landfill was the primary disposal area for asbestos-containing waste Three unlined lagoons also received an asbestos slurry which was periodically dredged and disposed of in the landfill. The asbestos lagoons, which were capped in 2010, contain residual asbestos

contamination. In addition, a deposit of asbestos was discovered during excavation of the B&M Wastewater Lagoons in 2003. The asbestos material was covered and left in place.

Historical information indicates that, between 1953 and 1964, the Zonolite Company leased a building on the B&M property for the manufacture of insulation, concrete, and fill material using asbestos-contaminated vermiculite.

EPA capped the Asbestos Landfill in 1984 to prevent exposure to asbestos-containing soils However, sampling in October/November 1985 and March 1986 (CDM, 1987) indicated the presence of asbestos in 28 of 40 surface soil samples (0-3 inches and 0-1 foot) collected across the site. At six of these locations (see Figure 2-3) asbestos was detected at greater than 1%, the historical limit of detection at the time. Surface soil sampling (0-3 inches) of 20 adjacent residential properties was conducted in December 1986 (see Figure 2-4), with asbestos only detected in a sample collected from a residence on High Street In December 1986, focused sampling at the locations (see Figure 2-4) with asbestos levels greater than one percent confirmed the presence of asbestos at depths up to 24 inches below ground surface. In December 2000, EPA conducted surface soil sampling at the former Zonolite facility location (see Figure 2-5). Asbestos was detected in 8 of 12 surface soil samples collected (USEPA, 2010a).

2.2 Asbestos in Soil at the Iron Horse Park and Zonolites Sites

In July 2009, Weston Solution, Inc (Weston), under EPA's Superfund Technical Assessment and Response Team (START) contract, performed surface soil sampling, including 99 on-site soil samples and 6 off-site soil samples, for asbestos analysis Sampling locations were selected to provide overall coverage of the site, soil types and current or future potential

exposure areas. Table 2-1 provides descriptions of soil for each sampling location Figures 2-6 and 2-7 show the locations of soil samples

Milling was used to prepare each sample for analysis by electron microscopy with a detection limit of 0 1% (USEPA, 2010a and 2010b). Chrysotile and/or amosite asbestos were detected on-site at nine locations, with a maximum total asbestos concentration of 0.50%. Asbestos was not detected in off-site locations. Tables 2-2 and 2-3 present asbestos results for each soil sample

3.0 POTENTIAL INHALATION EXPOSURE SCENARIO EVALUATION

3.1 Current Exposures

Iron Horse Park - Workers, ATV riders and trespassers currently use the site The majority of the site is currently zoned for commercial/ industrial use. The Wastewater Lagoon area and the Asbestos Lagoon areas attract All-Terrain-Vehicle (ATV) riders. Evidence of trespassing was found in areas of the site closest to the residential neighborhood to the east.

Zonolite – Workers may come into contact with soils at the former Zonolite property.

3.2 Future Potential Exposures

In addition to the current exposures described above, future residential land use could occur in an undeveloped, wooded area in the southeastern corner of the site. For all other areas of the site, the future site uses and potential exposures are anticipated to be the same as the current uses.

4.0 SAMPLING AND ANALYSIS OF AIRBORNE ASBESTOS USING ACTIVITY-BASED SAMPLING

This Five Year Review addendum evaluates the results obtained from the activity-based sampling (ABS) effort. Asbestos fibers in soil are not inherently hazardous, unless the asbestos is released from the source material into air where it can be inhaled. If inhaled, asbestos fibers can increase the risk of developing lung cancer, mesothelioma, pleural fibrosis, and asbestosis Activities that disturb the soil at the Iron Horse Park Site may cause a release of fibers. Current activities include workers or trespassers walking on the site, use of forklifts in the lumber yard and all-terrain vehicle (ATV) riding Future residential land use for a portion of the Iron Horse Park site was evaluated also. EPA collected air samples while simulating site activities in order to evaluate the potential for release of asbestos fibers to air from surface soil. This sampling is referred to as Activity-based Sampling, or ABS. Results of the ABS provide the data for quantifying inhalation risks associated with the release of asbestos fibers from disturbed surface soil at the site.

Scenarios evaluated include: worker, trespasser, ATV rider and resident. These scenarios are briefly described below. Figures 4-1, 4-2 and 4-3 show the ABS sampling locations for Iron Horse Park and the Zonolite property and Table 4-1 describes these locations Tables 4-2 and 4-3 provide descriptions of the activity used to resemble current, and if applicable, future use for the Iron Horse Park and Zonolite sites, respectively.

4.1 ABS Scenarios

Worker and Trespasser

Worker simulations included:

- Slow forward driving, backing up, turning of a vehicle (ATV) used to simulate movement of a forklift in the lumberyard;
- Walking to simulate workers, and
- Raking/Walking.

ATV Riding

ATV riding simulations included:

- One person riding non-stop forward, and
- Two people simultaneously driving non-stop forward with one person consistently in the lead, and the other person consistently the following ATV driver.

The ATV speeds reached generally ranged from approximately 10 to 20 mph during these simulations

Raking

Future residential land use was conservatively simulated by raking areas that could potentially be developed in the future.

4.2 Description of Activity-based Sampling

Activity-based sampling was conducted in October/November 2009 to determine exposure of potential receptor populations to asbestos fibers Twenty locations for activity-based sampling were selected based on the results of the surface soil sampling and current and future land use. The activity-based sampling at each location reflected the potentially exposed individuals under current land use including workers, trespassers, and ATV riders. Current and future site uses are assumed the same for all but one area. ABS to reflect both current and future land uses were conducted in that one area to simulate trespassing and future residential use. A total of 78 activity-based asbestos air samples (including personal and perimeter samples), 15 reference

samples and 5 lot/field blanks were collected during October and November, 2009 throughout a five-day sampling event.

The following text summarizes the activity-based sampling event. Sample locations and activity descriptions are found in Tables 4-1 through 4-3, and shown on Figures 4-1, 4-2, and 4-3 Sampling procedures are described in greater detail in the Sampling and Analysis Plan (Weston, 2009a and 2009b)

4.2.1. Current and Future Potential Worker Scenario (35 samples total)

Current and future potential worker exposure areas include areas AA01, AA02, AA03, AA11, AA12, AA13, AA14, AA15, and AA16 Sampling for asbestos fibers in these areas was conducted while soil was disturbed by walking across the property for 50 minutes (location AA03 included raking) Sampling was also conducted at locations AA01, AA02, AA12, AA14, and AA15 while surface soils were disturbed by driving a vehicle across the property (to simulate a forklift) for 50 minutes.

4.2.2. Current and Future Potential Trespasser Scenario (40 samples total)

Current and future potential trespasser exposure areas include ABS locations AA04, AA05, AA06, AA07, AA08, AA09, AA10, AA17, AA18, and AA19. Sampling for asbestos fibers in air was conducted in these locations while soil was disturbed by walking. Samples were also collected while soil was disturbed by ATV riding at locations AA05, AA06, AA08, AA17, AA18, and AA19 to represent observers of the ATV riders.

4.2.3. Current and Future ATV Riding Scenario (25 samples total)

ATV riding is observed at the Asbestos and Wastewater Lagoons as well as at other locations across the site Sample locations for ATV riding include AA05, AA06, AA17, AA18, and AA19. ATV riders collected air samples via personal monitors while riding. Sample location AA08 included both ATV riding and walking.

4.2.4. Future Residential Scenario (12 samples total)

Wooded areas near Pond Street are potential future residential areas Sampling for asbestos fibers in air was conducted while soil was disturbed by walking and raking. Sample locations for the future residential scenario include AA08, AA09, AA10, and AA20 Sampling was also conducted at location AA08 while soil was disturbed by ATV riding because this area could potentially be used by ATV riders which could also impact neighboring residences.

4.2.5. Reference Locations (15 samples total)

Three high-volume (4,600 to 6,700 L) reference (background) pumps were established at an off-site location near Shaffer Landfill One set of reference samples (three samples) was collected during each day of ABS activities, for the duration of ABS.

The size and location of each personal sampling area was selected based on site-specific conditions. Fixed samplers at the perimeter of the activity area or "perimeter samples" were also used. The placement of perimeter air sampling pumps was determined based on the prevailing wind patterns at the time of sampling, as well as on characteristics of the activity and the personal sampling area. Perimeter samples were collected from upwind and downwind locations if a steady and directional wind was detected at the initiation of sampling activities at a

location. All air samples were collected at breathing height, approximately 4 to 5 feet above ground surface.

4.3 Analytical Methods for Asbestos Fibers in Air

Phase Contrast Microscopy (PCM) can be used to detect fibers but cannot differentiate asbestos fiber types and other non-asbestos fiber types. Fibers longer than 5 µm with an aspect ratio $\geq$ 3.1 and a width $\geq$ 0.25 µm and $\leq$ 3 µm are measured with this method and reported as fibers per cubic centimeter of air (f/cc). In occupational studies that are the basis of EPA's inhalation toxicity value, asbestos fibers in air were measured using PCM.

Transmission Electron Microscopy (TEM) can be used to determine the concentration and identification of potential airborne asbestos fibers The TEM method is more powerful than the PCM method since TEM can also be used to detect asbestos fibers at lower concentrations, distinguish asbestos fiber types, and measure the size and dimension of each detected fiber TEM results are reported as structures per cubic centimeter of air (s/cc).

The analysis of asbestos fibers in air was by TEM However, because toxicity assessment for inhalation of asbestos fibers was based on PCM measurements, only the TEM asbestos fibers that meet the definition of fibers that can be measured by the PCM method are considered for the risk assessment. Those TEM asbestos fibers are called PCM-equivalent (PCMe) and are defined, similar to above, as having a length greater than 5 µm, a width range between 0 25 µm and 3 µm in diameter, and an aspect ratio (ratio of length to width) greater than or equal to 3:1.

4.4 Sampling Results

Sampling results are found in Table 4-4 and summarized in Table 4-5.

4.4.1. Worker Scenario

Iron Horse Park
Seven areas across the site were evaluated for worker exposure. Asbestos fibers (PCMe) were detected in 6 of the 7 areas. The maximum concentration detected is 0.005 f/cc.

Zonolite
Two areas on the Zonolite property were sampled Libby amphibole asbestos fibers were detected in each area The maximum concentration is 0 0074 f/cc.

4.4.2. Trespasser Scenario

Asbestos fibers (PCMe) were detected in 3 out of 40 samples. The maximum detected concentration is 0.00085 f/cc

4.4.3. ATV Rider Scenario

Asbestos fibers (PCMe) were detected in 2 out of 25 samples. The maximum detected concentration is 0.00085 f/cc

4.4.4. Future Residential Scenario

No asbestos fibers were detected in any of the 12 samples in future residential areas.

5.0 RISK EVALUATION

5.1 Hazard Identification

Asbestos is a human carcinogen EPA's weight-of-evidence classification is based on observations of increased mortality and increased lung cancer, mesothelioma and gastrointestinal cancer in occupational exposed workers Asbestos also causes the non-cancer disease, asbestosis. Asbestosis is the irritation and scarring of lung tissue that can result from breathing asbestos fibers

Air samples were analyzed via transmission electron microscopy (TEM). Only fibers with a width range between 0.25 µm and 3 0 µm are used in the risk assessment because EPA's toxicity value was derived from occupational studies in which only fibers of this width range were measured using methods available at the time of the study. Sample results are presented in Table 4-4.

Data from both perimeter and personal air samplers were used in the evaluation of human exposure because, in addition to the individual actually engaged in an activity at the site, it is possible that other individuals could be in the area near the activity. Use of results from both sampling methods provides the most conservative estimation of exposures occurring during each activity.

The results of the ABS are summarized in Table 4-5.

5.2 Exposure Assessment

Potential reasonable maximum exposure (RME) scenarios under current and future land uses are assumed in the risk assessment Potential current uses of the IHP site include ATV riding,

trespassing by older children, and worker use A future residential use was considered for a portion of the IHP site.

ATV riders and trespassers were assumed to be older children (aged 7 to 16) who may use the site 52 days per year over a 10 year period

Outdoor workers were assumed to be outdoors at the site 8 hours per day for 100 days per year over a 25 year period

Future resident exposure was assumed to occur from birth and the duration is assumed to be 350 days per year for 30 years.

Office workers were assumed to be outdoors 50 days per year for 2 hours each day These workers were assumed to occasionally use an outdoor area for lunch or other activities during warm weather.

The current and future use of the Zonolite property is assumed to be commercial, and, therefore, only a worker exposure scenario was assumed

The exposure point concentration (EPC) is expressed in fibers per cubic centimeter (f/cc) of Phase Contrast Microscopy-equivalent (PCMe) concentrations measured using transmission electron microscopy (TEM).

The exposure assumptions used in this evaluation are summarized in Table 5-1.

5.3 Toxicity Assessment

An inhalation unit risk (IUR) value is available on EPA's IRIS database for asbestos fibers The concentration-response function on which the asbestos IUR is based varies as a function of time since first exposure (USEPA, 1986) Consequently, estimates of cancer risk depend not only on exposure frequency and duration, but also on age at first exposure. Therefore, it is essential to use an IUR value that matches the exposure period of interest (duration and age of first exposure). A table of IURs adjusted based on age of first exposure and duration of exposure is provided in Table E-4 of the Framework. The adjusted IURs are described below and summarized in Table 5-2.

ATV Rider – The age of first exposure is assumed to be age 7. The duration is assumed to be 10 years. Accordingly, from Table E-4 of the Framework, the applicable IUR is 6 4E-02 $(f/cc)^{-1}$.

Older child trespasser – The age of first exposure is assumed to be age 7. The duration is assumed to be 10 years. Accordingly, from Table E-4 of the Framework, the applicable IUR is 6.4E-02 $(f/cc)^{-1}$.

Worker – The age of first exposure is assumed to be age 20. The duration is assumed to be 25 years. Accordingly, from Table E-4 of the Framework, the applicable IUR is 6 9E-02 $(f/cc)^{-1}$.

Resident – Exposure is assumed to occur from birth and the duration is assumed to be 30 years Accordingly, from Table E-4 of the Framework, the applicable IUR is 1.7E-01 $(f/cc)^{-1}$

5.4 Risk Characterization

Risk Characterization is the final step of the risk assessment that combines the Exposure and Toxicity Assessments to numerically estimate the potential cancer risk resulting from inhalation of asbestos under the current and future land uses assumed The cancer risk estimated is the incremental increase in the probability that an individual will develop asbestos-related cancer as a result of inhaling asbestos fibers at the Iron Horse Park site. This increased probability is calculated as follows:

EPC x TWF x IUR = Cancer Risk (unitless)

Where:

EPC = Exposure Point Concentration in f/cc

TWF = Time Weighting Factor

$$= \frac{\text{Exposure Time (hrs/day)}}{\text{24 hrs/day}} \times \frac{\text{Exposure Frequency (days/year)}}{\text{365 days/year}}$$

IUR_{adj} = Inhalation Unit Risk in $(f/cc)^{-1}$ adjusted for age of first exposure and duration

The cancer risk is compared to the EPA acceptable cancer risk range of 1×10^{-4} (1 in 10,000) to 1×10^{-6} (1 in 1,000,000)

Table 5-2 presents the results of the risk assessment.

5.4.1. ATV Rider/Trespasser

The estimated risk for exposure to asbestos fibers while riding an ATV and or trespassing onsite is 6×10^{-7}, or 6 in 10 million. This risk is lower than the EPA acceptable risk range of 10^{-6} to 10^{-4}

5.4.2. Worker – IHP

The estimated risk for an outdoor worker on the Iron Horse Park property is 3×10^{-5}, or 3 in 100,000. This risk is within the EPA acceptable risk range.

The estimated risk for an office worker who may occasionally use an outdoor area is 4×10^{-6}, or 4 in 1,000,000. This is at the lower end of the EPA acceptable risk range

5.4.3. Worker – Zonolite

The estimated risk for a worker on the Zonolite property is 5×10^{-5} or 5 in 100,000. This risk is within the EPA acceptable risk range. The estimated risk for an office worker who may occasionally use an outdoor area is 6×10^{-6}, or 6 in 1,000,000. This is at the lower end of the EPA acceptable risk range.

5.4.4. Future Resident

The estimated risk for a future resident was not quantitatively assessed because no asbestos fibers were detected in air during the activity-based sampling The cancer risk can be qualitatively estimated to be less than 1×10^{-4} (1 in 10,000) based on the sensitivity of the analytical methods.

5.4.5. Uncertainty

The uncertainties are inherent in the multiple steps of a risk assessment. Some uncertainties associated with this assessment include:

Activity-based sampling

Activities that simulate current or future land use were used to disturb soil and measure fiber concentrations resulting from the activities. There is uncertainty associated with whether the activities are identical to current and future activities. The activities used may over or underestimate exposure

Sampling was conducted during a season with relatively high rainfall. It is uncertain whether more asbestos fibers would be released if sampling were conducted during a period of relatively low rainfall Sampling during a season of higher rainfall may tend to underestimate exposure Activity-based sampling disturbs the top layer of surface soil. It is not know whether asbestos fibers could be released via disturbance of soils below the surface.

Analysis of Air Samples

Many samples were "non-detect" A lower sensitivity (analogous to detection limit) would reduce uncertainty

Toxicity

Toxicity values are not available for different types of asbestos fibers. This may result in an over or underestimate of risk. Toxicity values are not available for noncancer effects. This underestimates the potential for noncancer hazard

6. REFERENCES

CDM 1987. Camp Dresser and McKee, Draft Phase 1A Remedial Investigation for the Iron Horse Park Site, Billerica, MA. Report Prepared for the U S Environmental Protection Agency. July 1987.

USEPA 1986 Airborne Asbestos Health Assessment Update Office of Research and Development June 1986.

USEPA 2004. Memorandum 9345.4-05, Clarifying Cleanup Goals and Identification of New Assessment Tools for Evaluating Asbestos at Superfund Cleanups.

USEPA 2008a Third Five-Year Review Report, Iron Horse Park Superfund Site Operable Unites 1,2,3,4, North Billerica, Massachusetts, September 26, 2008

USEPA 2008b. OSWER Directive 9200 0-68; Framework for Investigating Asbestos-Contaminated Superfund Sites. September 2008.

USEPA 2010a. Removal Program Preliminary Assessment/Site Investigation Report

for the Zonolite/WR Grace Iron Horse Park Site North Billerica, Middlesex County, Massachusetts 13 April 2009, 26 June 2009, 7 through 8 July 2009, 29 July 2009, and 10 November 2009. April 2010.

USEPA 2010b. Removal Program Site Investigation Report for the Iron Horse Park Site, Billerica, Middlesex County, Massachusetts, 13 April; 26 June, 6 through 10 and 29 July, 27 and 30; October; and 3, 4, and 10 November 2009. November 2010.

Weston Solutions, Inc (Weston) 2009a. Sampling and Analysis Plan for the Zonolite Co./WR Grace site, North Billerica, Massachusetts. 1 July.

Weston Solutions, Inc (Weston) 2009b. Sampling and Analysis Plan for the Iron Horse Park site, North Billerica, Massachusetts. 1 July

TABLE 2-1
SOIL SAMPLE DESCRIPTIONS AND CLASSIFICATIONS
ZONOLITE CO./WR GRACE AND IRON HORSE PARK SITES
NORTH BILLERICA, MASSACHUSETTS

Grid Number	Notes	Date Collected	Soil Description	Soil Classification
1		8-Jul-09	Dark brown, SILT and fine sand, moist.	ML
2		8-Jul-09	Dark brown, SILT, trace fine sand and roots, moist.	ML
3	Duplicate = 87	8-Jul-09	Dark brown, fine-to-medium SAND, poorly-graded, moist	SP
4		8-Jul-09	Dark gray, SILT, trace fine sand, roots, and organics, spongy, moist.	ML
5		8-Jul-09	Brown, fine SAND, poorly-graded, moist.	SP
6		8-Jul-09	Brown, fine SAND, trace roots, poorly-graded, moist.	SP
7		8-Jul-09	Orange-brown, fine SAND, trace roots, poorly-graded, moist.	SP
8		8-Jul-09	Orange-brown, fine SAND, trace fine gravel, poorly-graded, moist.	SP
9		8-Jul-09	Dark brown, SILT and fine sand, little roots and organics, spongy, moist.	OL
10	Duplicate = 88	10-Jul-09	Gray, fine SAND, trace silt and roots, poorly-graded, moist.	SP
11		10-Jul-09	Gray, fine SAND, trace silt and roots, poorly-graded, moist.	SP
12		10-Jul-09	Gray, fine SAND, trace silt and roots, poorly-graded, moist.	SP
13		9-Jul-09	Dark brown, SILT, little organics and roots, trace fine gravel, spongy, moist.	OL
14		9-Jul-09	Black, fine SAND, trace fine gravel, poorly-graded, moist.	SP
15		7-Jul-09	Dark brown, fine SAND, trace silt and roots, poorly-graded, moist	SP
16		7-Jul-09	Black, SILT, trace fine sand and fine gravel, very moist.	ML
17		9-Jul-09	Dark gray to black, SILT, little organics and roots, trace fine gravel, moist.	OL
18		9-Jul-09	Brown to black, fine-to-coarse SAND, trace silt, roots, and fine gravel, poorly graded, moist	SP
19		7-Jul-09	Black, fine-to-medium SAND, little silt and organics, trace fine gravel, wet	SM
20		7-Jul-09	Dark gray-to-black, fine SAND and silt, trace coarse gravel and roots, moist.	SM
21		7-Jul-09	Dark gray and dark brown, fine-to-medium SAND, trace fine gravel, well-graded, moist.	SW
22		7-Jul-09	Dark gray to black, fine-to-medium SAND, trace silt and fine gravel, well-graded, moist.	SW
24		9-Jul-09	Black, fine-to-medium SAND, trace fine gravel, poorly-graded, moist	SP
25		9-Jul-09	Dark gray and brown, fine-to-coarse SAND, trace fine-to-coarse gravel, poorly-graded, moist.	SP
26		9-Jul-09	Black, SILT, little organics and roots, trace clay, wet.	MH
28		9-Jul-09	Black, fine-to-medium SAND, trace silt and fine gravel, well-graded, wet.	SW
29		9-Jul-09	Dark brown, fine-to-medium SAND, trace fine gravel, poorly-graded, moist.	SP

Grid Number	Notes	Date Collected	Soil Description	Soil Classification
30		9-Jul-09	Dark brown, fine SAND, trace silt, roots, and fine-to-coarse gravel, poorly-graded, moist.	SP
31		9-Jul-09	Dark gray, fine SAND, trace silt and fine gravel, poorly-graded, moist	SP
32		9-Jul-09	Dark brown, fine SAND, trace silt, roots, and fine-to-coarse gravel, poorly-graded, moist.	SP
33		9-Jul-09	Dark gray, SILT, trace fine sand, roots, fine-to-coarse gravel, moist.	ML
34		9-Jul-09	Dark brown, fine SAND, trace silt and roots, poorly-graded, moist.	SP
35		9-Jul-09	Dark brown, fine SAND, trace silt and fine gravel, poorly-graded, moist	SP
36		9-Jul-09	Brown, fine-to-medium SAND, trace silt , roots, and fine gravel, well-graded, moist.	SW
37		9-Jul-09	Dark brown, fine SAND, trace silt and fine gravel, poorly-graded, moist.	SP
38		9-Jul-09	Orange-brown, fine SAND, trace fine gravel, poorly-graded, moist.	SP
39		9-Jul-09	Black, SILT and fine sand, trace coarse gravel and roots, moist.	ML
40		9-Jul-09	Black, SILT, trace fine sand, roots and organics, slightly spongy, moist.	OL
41		7-Jul-09	Dark gray-to-black, SILT, some roots and organics, trace fine sand, spongy, moist.	OL
42	Duplicate = 86	7-Jul-09	Dark gray-to-black, SILT, little roots and organics, trace fine sand, spongy, moist.	OL
43		9-Jul-09	Brown and black, fine SAND and silt, trace roots and fine-to-coarse gravel, moist.	SM
45		6-Jul-09	Dark gray, SILT, trace fine sand and roots, dry.	ML
46		6-Jul-09	Light brown, fine-to-medium SAND, trace fine gravel, poorly-graded, dry.	SP
47		6-Jul-09	Dark gray SILT and fine sand, trace fine gravel, dry.	ML
48	Duplicate = 85	6-Jul-09	Dark gray-to-black, SILT, little fine sand and organics, spongy, dry.	OL
49		6-Jul-09	Dark gray, fine SAND, trace silt and fine gravel, poorly-graded, dry	SP
50		6-Jul-09	Dark gray, SILT, some fine sand, moist	ML
51		7-Jul-09	Light brown, fine SAND, trace silt and roots, poorly-graded, moist.	SP
52		9-Jul-09	Dark brown, fine SAND, little silt, trace fine gravel, moist.	SM
53		9-Jul-09	Black, SILT, little fine sand, trace roots, moist.	ML
54		7-Jul-09	Dark gray-to-black, SILT, little roots and organics, trace fine sand, spongy, moist	OL
55		6-Jul-09	Light brown, fine-to-coarse SAND, trace fine gravel, well-graded, dry	SW
56		6-Jul-09	Dark gray, fine SAND. little silt, trace fine gravel.	SM
57		6-Jul-09	Dark gray fine SAND and silt, trace roots, moist.	SM
58		6-Jul-09	Dark gray, fine SAND, some silt, trace fine gravel and roots, moist	SM
59		6-Jul-09	Dark gray-to-black, SILT, some roots and organics, spongy, moist.	OL
60		6-Jul-09	Dark gray-to-black, SILT, some roots and organics, spongy, moist	OL
61		6-Jul-09	Dark gray-to-black, SILT, some roots and organics, spongy, dry.	OL
62		6-Jul-09	Dark gray-to-black, SILT, some roots and organics, spongy, dry.	OL
63		6-Jul-09	Dark gray-to-black, SILT, some roots and organics, spongy, dry.	OL

Grid Number	Notes	Date Collected	Soil Description	Soil Classification
64		6-Jul-09	Dark gray-to-black, SILT, some roots and organics, spongy, dry.	OL
65		6-Jul-09	Dark gray-to-black, SILT, some roots and organics, spongy, dry.	OL
66		6-Jul-09	Light brown, fine-to-medium SAND, poorly graded, moist.	SP
67		6-Jul-09	Dark gray-to-black, SILT, some roots and organics, spongy, dry.	OL
68		6-Jul-09	Dark gray-to-black, SILT, some roots and organics, spongy, dry.	OL
69		6-Jul-09	Dark brown, fine-to-medium SAND, trace silt and fine gravel, poorly-graded, moist	SP
70		6-Jul-09	Dark gray, fine SAND and silt, trace roots, moist	SM
71		7-Jul-09	Light brown, fine-to-medium SAND, poorly-graded, moist.	SP
72		7-Jul-09	Dark gray-to-black, SILT and fine sand, little organics and roots, spongy, moist	OL
73		7-Jul-09	Dark gray, SILT and fine sand, trace roots and organics, moist.	ML
74		7-Jul-09	Dark gray-to-black, SILT, little roots and organics, trace fine sand, spongy, moist	OL
75		7-Jul-09	Dark gray fine SAND, little silt, trace roots, poorly-graded, moist.	SP
76		7-Jul-09	Dark brown, fine SAND, some silt, trace roots and organics, moist	SM
77		7-Jul-09	Dark gray SILT, little fine sand, trace roots, moist	ML
79		9-Jul-09	Dark brown, SILT, little organics and roots, trace clay, spongy, moist.	OL
80		9-Jul-09	Dark brown, SILT and fine sand, trace fine-to-coarse gravel, roots, moist	ML
81		9-Jul-09	Black, fine SAND and silt, little fine-to-coarse gravel and roots, moist.	SM
82		9-Jul-09	Dark brown, fine SAND, LITTLE silt, trace fine gravel and roots, moist.	SM
85	Duplicate sample	6-Jul-09	Dark gray-to-black, SILT, little fine sand and organics, spongy, dry.	OL
86	Duplicate sample	7-Jul-09	Dark gray-to-black, SILT, little roots and organics, trace fine sand, spongy, moist	OL
87	Duplicate sample	8-Jul-09	Dark brown, fine-to-medium SAND, poorly-graded, moist.	SP
88	Duplicate sample	10-Jul-09	Gray, fine SAND, trace silt and roots, poorly-graded, moist.	SP
90		8-Jul-09	Dark gray, fine SAND, trace fine gravel, poorly-graded, moist	SP
91		8-Jul-09	Black, fine SAND, trace silt and fine gravel, poorly-graded, moist.	SP
92		8-Jul-09	Black, fine SAND, trace silt and fine gravel, poorly-graded, moist.	SP
93		9-Jul-09	Dark brown, fine-to-coarse SAND, trace silt and fine gravel, poorly-graded, moist.	SP
94		9-Jul-09	Black, fine-to-coarse SAND, trace silt and fine-to-coarse gravel, poorly-graded, moist.	SP
WR-01	Duplicate = WR-09	7-Jul-09	Brown, fine-to-medium SAND, trace silt, poorly-graded, very moist.	SP
WR-02		7-Jul-09	Dark brown, SILT, trace fine sand and roots, moist.	ML
WR-03		7-Jul-09	Dark brown, SILT, trace clay, fine gravel, and roots, very moist	OL

Grid Number	Notes	Date Collected	Soil Description	Soil Classification
WR-04		8-Jul-09	Gray, fine-to-medium SAND, little fine-to-coarse gravel, trace silt, well-graded, very moist.	SW
WR-05		8-Jul-09	Dark brown, fine-to-medium SAND, some fine-to-coarse gravel (glass), trace silt and clay, very moist.	SW
WR-06		8-Jul-09	Dark brown, SILT, little fine sand, trace roots, very moist	MH
WR-07		8-Jul-09	Dark brown, SILT, little fine SAND, trace silt and clay, moist	ML
WR-08		8-Jul-09	Dark gray, SILT, trace fine sand and roots, and organics, spongy, moist.	ML
WR-09	Duplicate sample	7-Jul-09	Brown, fine-to-medium SAND, trace silt, poorly-graded, very moist.	SP
WR-10		8-Jul-09	Brown, fine-to-medium SAND, trace silt and fine gravel, poorly-graded, moist	SP
WR-11		8-Jul-09	Dark brown, SILT, little organics and roots, trace fine gravel, spongy, moist.	OL
WR-12		8-Jul-09	Orange-brown, fine-to-medium SAND, trace silt and fine gravel, poorly-graded, moist.	SP
P3-01		8-Jul-09	Dark brown, fine-to-medium SAND and silt, trace roots, moist.	SM
P3-02		8-Jul-09	Dark brown, fine-to-medium SAND, little fine-to-coarse gravel, trace silt and roots, moist.	SW
P3-03		8-Jul-09	Dark brown, fine SAND, trace silt and roots, and fine-to coarse gravel, poorly-graded, moist.	SP
SS-01		8-Jul-09	Dark gray, fine-to-coarse SAND, little fine-to-coarse gravel, trace silt and roots, well-graded, moist	SW
SS-02		8-Jul-09	Light-to-dark gray, fine-to-coarse SAND, little fine-to-coarse gravel, trace silt, well-graded, moist.	SW
SS-05		8-Jul-09	Dark gray, fine-to-coarse SAND, trace fine gravel and silt, well-graded, moist.	SW
SS-06		8-Jul-09	Dark gray, fine-to-medium SAND, trace fine-to-coarse gravel and silt, well-graded, moist	SW
SS-08		8-Jul-09	Dark brown, fine-to-medium SAND, little fine gravel, trace silt and roots, well-graded, moist.	SW
SS-10		8-Jul-09	Black, fine SAND, little fine-to-coarse gravel, trace silt, well-graded, moist	SW
SS-11		8-Jul-09	Black, fine SAND, little fine-to-coarse gravel, trace silt, well-graded, moist	SW
SS-12		8-Jul-09	Dark gray and black, fine-to-coarse SAND, some fine-to-coarse gravel, trace silt, moist.	SW
SS-13		8-Jul-09	Dark gray, fine-to-medium SAND, little fine-to-coarse gravel, trace silt, well-graded, moist.	SW

NOTES:

1) Soil description is based on a combination of the Unified Soil Classification System and the Burmister System.
2) Soil classification designation is based on Unified Soil Classification System.

TABLE 2-2
SOIL SAMPLE MATRIX
ZONOLITE CO./WR GRACE AND IRON HORSE PARK SITES
NORTH BILLERICA, MASSACHUSETTS

Grid Number	Sample Notes	Vegetation Description	Description of Grid and Other Features	Sample Results Chrysotile (%)	Sample Results Amosite (%)	Soil Classification
1		None Trail adjacent to wooded areas	Linear, center point at intersection of 4 trails, 4 points 50 feet in each direction on trails	ND	ND	ML
2		Wooded	One point offset due to proximity of commuter rail line (50 feet away from center instead of 70 feet)	ND	ND	ML
3	Duplicate = 87	None Trail adjacent to wooded areas	Linear, on trail	ND	ND	SP
4		Lightly wooded area	Along Middlesex Canal	ND	ND	ML
5		Sparsely wooded, fairly open area along a trail	Linear, along trail Evidence of ATV activity	ND	ND	SP
6		Trail through wooded area (very minimal underbrush)	Linear, along trail	ND	ND	SP
7		None	Northern portion of open area with evidence of ATV activity	ND	ND	SP
8		None	Southern portion of open area with evidence of ATV activity	ND	ND	SP
9		Wooded (very minimal underbrush)		ND	ND	OL
10	Duplicate = 88	Grassy clearing Surrounded by a lightly wooded area	Condensed grid, each point 35 ft from center Near small-pox memorial and a trail with evidence of ATV activity	ND	ND	SP
11		Lightly wooded	Condensed grid, each point 35 ft from center Near pond	ND	ND	SP
12		Lightly wooded	Condensed grid, each point 35 ft from center Near pond and Middlesex Canal	ND	ND	SP
13		Wooded		**0.25**	**0.25**	OL
14		None Trail adjacent to wooded areas	Linear, along trail	ND	ND	SP
15		A clearing with exposed soil, partially vegetated with short grasses	Located adjacent to formerly active rail line	**<0.25**	ND	SP
16		None Trail adjacent to wooded areas	Linear, along trail Evidence of ATV activity	ND	ND	ML
17		Very densely wooded	Grid points hand-selected and slightly offset due to puddles Located near trails with evidence of ATV activity Slight differences in soil due to gravel content	ND	ND	OL
18		Little vegetation due to tracks Adjacent to wooded areas	Linear, along formerly active rail line	ND	ND	SP
19		Little vegetation due to tracks Adjacent to wooded areas	Linear, along rail line	ND	ND	SM
20		Wooded	Lots of metal debris nearby Very wet conditions Near formerly active rail lines	ND	ND	SM
21		Lightly wooded	Near former active rail lines Lots of metal debris nearby	ND	ND	SW
22		None Roadway adjacent to rail line Adjacent to wooded area	Linear, between one active and one formerly active rail line Wet conditions	ND	ND	SW

Grid Number	Sample Notes	Vegetation Description	Description of Grid and Other Features	Sample Results Chrysotile (%)	Sample Results Amosite (%)	Soil Classification
24		Some grassy patches, mostly not vegetated (trails/road)	Grid shifted due to flooding, modified to include center and 3 points on trails, one point in-between railroad tracks Evidence of vehicular use throughout	ND	ND	SP
25		Densely wooded	Linear, along formerly active rail line	ND	ND	SP
26		Densely wooded	Near formerly active rail lines	ND	ND	MH
28		Grass, shrubs, lightly wooded	Grid condensed due to flooded conditions	ND	ND	SW
29		None	Linear, along road/cleared areas in-between active railroad tracks (evidence of vehicular use) Piles of various metal and wooden debris, and a pile of fibrous material, located nearby	**0.50**	ND	SP
30		Mostly tall grasses, some shrubs	Various wood and metal debris	ND	ND	SP
31		None Trail adjacent to grassy and cleared areas	Linear, along trail/road Near areas that appeared to be used for staging of railroad materials	ND	ND	SP
32		Tall grasses Non-vegetated trails and some small trees and shrubs nearby	Grid offset slightly to avoid aspen stand Evidence of ATV activity Miscellaneous metal debris nearby	ND	ND	SP
33		Very densely wooded (predominantly aspen stands)		ND	ND	ML
34		Densely wooded	Containing several piles of debris (wood, metal, etc)	ND	ND	SP
35		None Trail adjacent to grassy and lightly wooded areas	Linear, along trail encircling a fence-enclosed area (Grid 32)	ND	ND	SP
36		Tall grasses and small brush		ND	ND	SW
37		Tall grasses and small brush	Near formerly active rail lines and debris piles	ND	ND	SP
38		Some grassy patches, mostly not vegetated (clearing)	Sample points hand-selected Along power line right-of-way Evidence of ATV activity	ND	ND	SP
39		None Trails adjacent to grassy and lightly wooded areas	Linear, along trails adjacent to active rail lines (4 points on trail and 1 center point in-between trail and railroad tracks)	ND	ND	ML
40		Wooded	Linear, along creek Grid offset due to RSI landfill and creek	ND	ND	OL
41		Wooded	Grid offset slightly due to pond	ND	ND	OL
42	Duplicate = 86	Lightly wooded	Grid condensed to remain located in a lightly wooded area and avoid Asbestos Landfill	ND	ND	OL
43		Tall grasses and some small shrubs	Sample points hand-selected Evidence of use (beverage containers) Near active rail line, trail, and commercial buildings	ND	ND	SM
45		Wooded	Near fence surrounding Asbestos Landfill	ND	ND	ML
46		None	Evidence of ATV activity	ND	ND	SP
47		Meadow-like, tall grasses, flowers	Grid does not include trail winding through meadow	ND	ND	ML
48	Duplicate = 85	Densely vegetated undergrowth, some trees	Grid does not include trail winding through to sandy open area	ND	ND	OL
49		None Trail near grassy and open areas	Linear, along trail near former wastewater lagoons Evidence of ATV activity	ND	ND	SP
50		None Trail near grassy and open areas	Linear, grid adjusted to include only 4 composite points, due to one sample point consisting of different soil type	ND	ND	ML
51		None Trails adjacent to wooded areas	Linear, along trails Evidence of ATV activity	ND	ND	SP

Grid Number	Sample Notes	Vegetation Description	Description of Grid and Other Features	Sample Results Chrysotile (%)	Sample Results Amosite (%)	Soil Classification
52		Clearing containing small plants/grasses Adjacent to a lightly wooded area	Grid bordered by wooded areas, a small vacant building, a creek, and a paved area used for railroad equipment storage	ND	ND	SM
53		Dense vegetation (underbrush)	Grid hand-selected and condensed due to parking lot and creek	ND	ND	ML
54		Wooded	Grid center point offset slightly due to man-made pond	ND	ND	OL
55		None Trail adjacent to wooded areas	Linear, along trail	ND	ND	SW
56		None Trail adjacent to wooded areas	Linear, along trail	ND	ND	SM
57		Wooded	Grid adjusted slightly to exclude slope of a former wastewater lagoon	ND	ND	SM
58		None Road adjacent to wooded areas	Linear, along gravel/dirt road	ND	ND	SM
59		Wooded	Grid located near fence line	ND	ND	OL
60		Wooded, fairly dense underbrush		ND	ND	OL
61		Wooded		ND	ND	OL
62		Wooded		ND	ND	OL
63		Wooded		ND	ND	OL
64		None Trail adjacent to wooded areas	Linear, along trail Evidence of ATV activity Near Pond Street	ND	ND	OL
65		Lightly vegetated clearing near trail and road		ND	**<0.25**	OL
66		None Clearing adjacent to wooded and grassy areas	Evidence of ATV activity	ND	ND	SP
67		None Trail adjacent to wooded areas	Linear, along trail Evidence of ATV activity, and beverage containers observed nearby Near Pond Street	ND	ND	OL
68		Lightly wooded	Evidence of use (beverage containers, garbage/debris, ATV tracks/trails)	ND	**<0.25**	OL
69		None Adjacent to wooded areas	Linear, along trail Evidence of ATV activity Near Pond Street	ND	ND	SP
70		Wooded		**<0.25**	ND	SM
71		None Open area surrounded by tall grasses and shrubs	Grid condensed, sampling points hand-selected Evidence of ATV activity	ND	ND	SP
72		Woods and edge of woods	Adjacent to power line right-of-way	ND	ND	OL
73		Lightly wooded		ND	ND	ML
74		Wooded (minimal underbrush)		ND	ND	OL
75		Some grassy patches, mostly not vegetated Trails adjacent to wooded areas	Linear, trail along eastern side of power-line right-of-way	ND	ND	SP
76		Wooded		ND	ND	SM
77		Wooded area near wetland		ND	ND	ML
79		Wooded, fairly dense underbrush	Grid condensed, 50 feet in 4 directions from center point Grid slightly offset due to boulder field and wetland	ND	ND	OL
80		Open meadow-like area with tall grasses and flowers	Rear of vacant former factory building	ND	ND	ML
81		Wooded, very dense underbrush	Grid condensed, 50 feet in 4 directions from center point Near formerly active rail lines	ND	ND	SM

Grid Number	Sample Notes	Vegetation Description	Description of Grid and Other Features	Sample Results Chrysotile (%)	Amosite (%)	Soil Classification
82		Tall grasses and flowers	Near parking lot of abutting property Portions of grid atop a capped landfill	ND	ND	SM
85	Duplicate sample			**<0.25**	ND	OL
86	Duplicate sample			ND	ND	OL
87	Duplicate sample			ND	ND	SP
88	Duplicate sample			ND	ND	SP
90	was previously labeled SS-04	None	In staging area for various railroad materials and equipment, near paved areas and active rail lines	ND	ND	SP
91	was previously labeled SS-07	None	Linear In staging area for various railroad materials and equipment, near active rail lines and paved areas	ND	ND	SP
92	was previously labeled SS-09	None	Linear, various small debris (metal, wood, etc) Near paved areas and active rail lines	ND	ND	SP
93	was previously labeled SS-15	None	Various debris (metal, wood, etc) Near paved areas and active rail lines	ND	ND	SP
94	was previously labeled SS-14	None	Linear, among various debris (metal, wood, etc) and near paved areas and active rail lines	ND	ND	SP
WR-01	Duplicate = WR-09	None	Near Spincraft equipment staging areas and paved parking lot Sample points hand-selected	ND	ND	SP
WR-02		Mowed grass, few small trees (plantings)	Linear, bordered by Spincraft driveway and former Zonolite Co property	ND	ND	ML
WR-03		Mowed grass	Sample points hand-selected Grid located adjacent to parking lot in rear of Spincraft building	ND	ND	OL
WR-04		Grassy patches, mostly not vegetated	Area planned to be paved by Spincraft Sample points hand-selected	ND	ND	SW
WR-05		Grass and gravel	Sample points hand-selected On former Zonolite Co property	ND	ND	SW
WR-06		Grasses, weeds Bordering wooded area	Sample points hand-selected On former Zonolite Co property	ND	ND	MH
WR-07		Grasses, weeds, small trees	Area partially used for staging equipment Sample points hand-selected On former Zonolite Co property	**<0.25**	ND	ML
WR-08		Grasses, weeds, small trees	Sample points hand-selected On former Zonolite Co property	**<0.25**	ND	ML
WR-09	Duplicate sample			ND	ND	SP
WR-10		Mowed grass, shrubs and small trees (plantings)	On Spincraft property, adjacent to High Street Sample points hand-selected	ND	ND	SP
WR-11		Wooded		ND	ND	OL
WR-12		None Trail adjacent to grassy and wooded areas	Linear, along trail adjacent to BNZ parking lot	ND	ND	SP
P3-01		Mowed grass (lawn)	Sample points hand-selected On Corporate Reserve Supply property	ND	ND	SM
P3-02		Mowed grass (front lawn)	Sample points hand-selected On Corporate Reserve Supply property	ND	ND	SW

Grid Number	Sample Notes	Vegetation Description	Description of Grid and Other Features	Sample Results Chrysotile (%)	Amosite (%)	Soil Classification
P3-03		Mowed grass	Sample points hand-selected On Corporate Reserve Supply property	ND	ND	SP
SS-01		Grassy area on edges of road	Linear, along edge of road On Eastern Terminals property	ND	ND	SW
SS-02		None	Linear, along road On Eastern Terminals property	ND	ND	SW
SS-05		Little grass	On Eastern Terminals property	ND	ND	SW
SS-06		Grassy area on edges of road	On Eastern Terminals property	ND	ND	SW
SS-08		Grassy patches, mostly not vegetated	Linear, along road On Eastern Terminals property	ND	ND	SW
SS-10		None	On Eastern Terminals property	ND	ND	SW
SS-11		None	Linear, along road On Eastern Terminals property	ND	ND	SW
SS-12		None	On Eastern Terminals property	ND	ND	SW
SS-13		None	On Eastern Terminals property	ND	ND	SW

NOTES:

1) Soil classification designation is based on Unified Soil Classification System
2) Unless otherwise noted, grids consisted of one center point and 4 points 70 feet from center in each direction
3) ND = Not detected
4) ATV = All-terrain vehicle

TABLE 2-3
SURFACE SOIL SAMPLE RESULTS
ZONOLITE/WR GRACE IHP
NORTH BILLERICA, MASSACHUSETTS

Sample Location	Sample Number	Sample Date	USCS Soil Classification	PLM Results % by volume	TEM Results No. of structures (% by weight)
WR-01	D23101	7/7/09	SP	ND	---
WR-02	D23102	7/7/09	ML	ND	---
WR-03	D23103	7/7/09	OL	ND	---
WR-04	D23104	7/8/09	SW	ND	---
WR-05	D23105	7/8/09	SW	ND	---
WR-06	D23106	7/8/09	MH	ND	---
WR-07	D23107	7/8/09	ML	<0.25 Chrysotile	1 structure (0.1%) Chrysotile
WR-08	D23108	7/8/09	ML	<0.25 Chrysotile	47 structures (0.1%) Chrysotile
WR-09	D23109	7/7/09	SP	ND	---
WR-10	D23110	7/8/09	SP	ND	---
WR-11	D23140	7/8/09	OL	ND	---
WR-12	D23141	7/8/09	SP	ND	---
RS-02	D23346	7/29/09	ML	ND	---
RS-03	D23347	7/29/09	ML	ND	---
RS-04	D23348	7/29/09	ML	ND	---
SS-95	D23671	11/4/09	OL	<0.1 Tremolite-Actinolite	---
SS-96	D23672	11/4/09	OL	0.3 Tremolite-Actinolite	---
SS-97	D23673	11/4/09	OL	0.4 Tremolite-Actinolite	---

Notes:

1) All samples were submitted for Polarized Light Microscopy (PLM) analysis of bulk samples for asbestos via EPA 600/R-93/116 Method with California Air Resources Board (CARB) 435 Prep (Milling) Level A for 0 25% Target Analytical Sensitivity
2) Samples collected in July 2009 were submitted to EMSL Analytical, Inc. in San Leandro, California. Ten percent of positive PLM samples were submitted for asbestos analysis of soil samples via Modified EPA 600/R-93/116 Method Utilizing Analytical Electron Microscopy [equivalent to Transmission Electron Microscopy (TEM)] with CARB 435 Prep (Milling) Level B for 0.1% Target Analytical Sensitivity. Analysis was modified to include Durable Mineral Fiber (DMF)
3) Samples collected in November 2009 were submitted to Reservoirs Environmental, Inc. in Denver, Colorado.
4) --- = Sample not analyzed
5) < = Less than
6) Unified Soil Classification System (USCS) definitions:
   - OL = Organic, Low plasticity
   - ML = Silt, Low plasticity
   - SP = Sand, Poorly graded (uniform particle size)
   - SW = Sand, Well graded (diversified particle size)
   - MH = Silt, High plasticity
7) No. = Number
8) % = Percent
9) ND = Not detected

TABLE 4-1
ASBESTOS ACTIVITY-BASED SAMPLING LOCATIONS
IRON HORSE PARK SUPERFUND SITE

Map Key	ABS Sampling Location	Description	Current/Future Uses	Sampling Activity
AA01	Eastern Terminals -northeast	Applies to northeast half of lumber yard	Workers/Forklift & walking	Slow ATV to simulate forklift, or walking
AA02	Eastern Terminals -southwest	Applies to southwest half of lumber yard	Workers/Forklift & walking	Slow ATV to simulate forklift, or walking
AA03	BNZ - Picnic Area	Picnic Area - applies to around the rest of the bldg	Workers/Picnicing	Raking/ Walking
AA04	Undeveloped northwest of BNZ	Woods - Dirt Bike/ATV	Trespassers/ATVs & dirt bikes	ATV or walking
AA05		Sparse/Trees - Hang out	Trespassers/Hang out	ATV or walking
AA06	Northeast of Asbestos Lagoons	Location 1 – Trail	Trespassers/ATVs & dirt bikes	ATV
AA07		Location 2 - Non-trail	Trespassers/Hang out	Walking/shuffling
AA08	Isolated area next to Pond St.	Hang out/grass/potential ATV	Trespassers/Hang out, grass dump, potential ATV	ATV or walking
AA09	Woods (Soil Sample # 70 location)	Current activity – walking	Trespassers/Not much use - could be hang out	Walking
AA10		Future activity – raking	Residents/If developed in the future, higher use	Raking
AA11	Next to Zonolite (SE side)	Walking/shuffling	Workers/Not used	Walking/shuffling
AA12	Zonolite/Spincraft equip storage	Forklift/walking	Workers/Forklift & walking	Slow ATV to simulate forklift, or walking/shuffling
AA13	Railyard-northeast (Soil Sample # 29 location)	Walking/shuffling	Workers & Trespassers/Walking	Walking/shuffling
AA14	Railyard-middle (Soil Sample # 91/92 location)	Walking/shuffling	Workers/Forklift & walking	Slow ATV to simulate forklift, or walking/shuffling
AA15	Northeast of RSI Landfill	Walking/shuffling/forklift/trespasser	Workers & Trespassers/Forklift & walking	Slow ATV to simulate forklift, or walking/shuffling
AA16	Railyard-southwest end (Soil Sample # 80/81 location)	Walking/shuffling	Workers & Trespassers/Walking	Walking/shuffling
AA17	Wastewater Lagoons (Soil Sample # 48 location)	Trail	Trespassers/ATVs & dirt bikes	ATV
AA18	In Wastewater Lagoons	In lagoons	Trespassers/ATVs & dirt bikes	ATV
AA19	Woods near WW lagoons (Soil Sample #51/54 location)	Trail - could apply to 71/66/69	Trespassers/ATVs & dirt bikes	ATV
AA20	Woods near Pond St (Soil Sample # 59-63 location)	Walking	Trespassers/Walking	Walking/shuffling

TABLE 4-2
ACTIVITY-BASED SAMPLE DESCRIPTIONS AND PERCENT SOLIDS IN SOIL RESULTS
IRON HORSE PARK
BILLERICA, MASSACHUSSETTS

ABS Location	Sample Date	Sample Time	ABS Activity	Personal Sampling Area Dimensions	ABS Location Description	Closest soil sample location	Soil Type	Weather Conditions	Perimeter Air Sample Location Description	Figure	Solids in Soil (%)
AA01	11/10/2009	1245	Slow ATV and Walking	3,825 ft^2	Gravel and dirt area adjacent to lumber staging areas.	SS-12	SW	Light wind to the east	Upwind (1), downwind (2), and adjacent (1) locations within 10 ft of the personal sampling area	4A	100
AA02	11/10/2009	1210	Slow ATV and Walking	3,010 ft^2	Gravel and dirt area adjacent to lumber staging areas.	SS-01	SW	Light wind to the east.	Upwind (1), downwind (2), and adjacent (1) locations within 8 ft of the personal sampling area	4A	100
AA03	10/27/2009	1805	Raking	two 10- by 10-ft^2 areas	Lawn adjacent to BNZ Materials, Inc. facility, containing picnic tables, chairs, and walkways providing access to building.	None	N/A	Very little to no wind.	Perimeter locations (2), 25 ft NE of and 10 ft SW of the personal sampling area.	4A	95
AA04	10/27/2009	1310	Walking	1,875 ft^2	Lightly wooded area, evidence of trespassers (e.g. beverage cans, trash).	5	SP	Very little to no wind.	Perimeter locations (2), 4 ft E of and 12 ft W of the personal sampling area.	4A	85
AA05	10/27/2009	1250	2-person ATV	18,550 ft^2	Open area surrounded by woods; evidence of ATV use (e.g. tracks, ramp).	7 and 8	SP	Very little to no wind.	Perimeter locations (4) within 10 ft of the personal sampling area.	4A	95
AA06	10/27/2009	1610	2-person ATV	170-ft long trail	Trail surrounded by woods; evidence of ATV use.	14 and 16	SP and ML	Very little to no wind.	Perimeter location (1) at one end of the trail, and adjacent location (1) 9 ft W of the middle of the personal sampling area (trail).	4A	94
AA07	10/30/2009	1020	Walking	370 ft^2	Clearing in wooded area within 10 feet of formerly active rail lines; various metal debris observed on the ground surface.	15	SP	Very little to no wind.	Perimeter locations (2), within 8 ft and located N and W of the personal sampling area.	4A	97
AA08	11/3/2009	1400	ATV and Walking	4,675 ft^2	Lightly wooded area included parts of a trail; evidence of trespassers (e.g., ATV tracks, beverage containers, trash).	63	OL	Very little to no wind.	Perimeter locations (2), one location immediately E (between sampling location and residential area), and one location 5 ft S, of the personal sampling area.	4B	84
AA09	10/30/2009	1410	Walking	1,450 ft^2	Lightly wooded area off a trail; evidence of trespassers (e.g. beverage cans, trash).	70	SM	Light wind to the east	Upwind (1) and downwind (1) locations within 8 ft of the personal sampling area.	4B	83

Notes:

1) ABS = Activity-Based Sampling
2) ATV = All-terrain vehicle
3) ft = foot
4) ft^2 = square feet
5) % = percent
6) N = North
7) S = South
8) E = East
9) W = West
10) N/A = Not Applicable
11) Perimeter air sample locations include high-volume air sampling pumps located nearby the personal sampling areas. If a sustained, directional wind was observed prior to sampling activities, perimeter air sampling pumps were stationed upwind and downwind of the personal sampling area.
12) Personal sampling area dimensions and distance of perimeter air sample locations from personal sampling areas are approximate.
13) ABS Activity Descriptions:
Walking = walking in an area for approximately 100 minutes
Slow ATV/Walking = walking for approximately 50 minutes and slow ATV riding for approximately 50 minutes, to simulate worker activities
Raking = raking an area for approximately 100 minutes, to simulate a a vigorous soil disturbance scenario
2-person ATV = two ATVs being driven simultaneously through an area for approximately 100 minutes, to simulate trespasser activities
ATV/Walking = walking for approximately 50 minutes and ATV riding for approximately 50 minutes, to simulate trespasser activities

14) Unified Soil Classification System (USCS) definitions:
OL = Organic, Low plasticity
ML = Silt, Low plasticity
SP = Sand, Poorly graded (uniform particle size)
SW = Sand, Well graded (diversified particle size)
MH = Silt, High plasticity
SM = Sand and Silt

TABLE 4-2 (Cont.)

ABS Location	Sample Date	Sample Time	ABS Activity	Personal Sampling Area Dimensions	ABS Location Description	Closest soil sample location	Soil Type	Weather Conditions	Perimeter Air Sample Location Description	Figure	Solids in Soil (%)
AA10	10/30/2009	1655	Raking	100 ft^2	Lightly wooded area off a trail, evidence of trespassers (e.g. beverage cans, trash).	70	SM	Light wind to the east.	Downwind location (1) 25 ft, and upwind location (1) 50 ft, of the personal sampling area.	4B	86
AA13	11/4/2009	1015	Walking	3,200 ft^2, and a 135 ft length	Dirt area adjacent to rail lines, a roadway, and piles of soil, debris, and construction materials.	94	SP	Light wind to the north/northeast	Downwind locations (2) 50 ft and 35 ft E, and upwind location (1) 35 ft S, of the personal sampling area	4B	92
AA14	11/4/2009	0955	Slow ATV and Walking	4,400 ft^2	Dirt area including a roadway, adjacent to rail lines and piles of soil, debris, and construction materials.	92	SP	Light wind to the north/northeast	Perimeter location (1) 40 ft W, and downwind location (1) 12 ft N, of the personal sampling area.	4B	90
AA15	11/3/2009	1435	Slow ATV and Walking	4,560 ft^2	Clearing, partially surrounded by a fence, containing various piles of railroad ties and other materials.	32	SP	Light wind to the east/northeast.	Downwind locations (2) 10 and 20 ft E, and upwind location (1) 2 ft W, of the personal sampling area.	4B	98
AA16	11/4/2009	1255	Walking	4,325 ft^2	Open area of minimal (stressed) vegetation, ground covered with various debris (metal, plastic, etc.), south of vacant former manufacturing building.	80	ML	Light wind to the east.	Perimeter locations (3), two locations 45 ft E, one location 20 ft W, of the personal sampling area	4A	92
AA17	10/30/2009	1605	2-person ATV	700-ft long trail (loop)	Loop around former B&M wastewater lagoons. Evidence of ATV activity.	49, 50, and 56	SP, ML, and SM	Very little to no wind.	Perimeter locations (3), 10 ft S, 35 ft E, and 15 ft N of personal sampling area (loop)	4B	90
AA18	10/30/2009	1205	2-person ATV	400-ft long trail (loop)	Loop within the former B&M wastewater lagoons Evidence of ATV activity.	46	SP	Very little to no wind.	Perimeter locations (3), locations 30 ft E and S and 40 ft N of personal sampling area (loop), and one location 5 ft S of middle of the loop	4B	97
AA19	11/3/2009	1035	2-person ATV	225-ft long trail	Trail in woods near pond and former B&M wastewater lagoons. Evidence of ATV activity.	51	SP	Very little to no wind.	Perimeter locations (2) 5 ft N and 20 ft S of personal sampling area (trail).	4B	92
AA20	11/3/2009	1055	Walking	230-ft long trail	Trail through woods, accessible from Pond Street.	62	OL	Very little to no wind.	Adjacent location (1) immediately E of the middle of the personal sampling area (trail), and perimeter location (1) 25 ft S of one end of the trail	4B	82

Notes:

1) ABS = Activity-Based Sampling
2) ATV = All-terrain vehicle
3) ft = foot
4) ft^2 = square feet
5) % = percent
6) N = North
7) S = South
8) E = East
9) W = West
10) N/A = Not Applicable
11) Perimeter air sample locations include high-volume air sampling pumps located nearby the personal sampling areas. If a sustained, directional wind was observed prior to sampling activities, perimeter air sampling pumps were stationed upwind and downwind of the personal sampling area.
12) Personal sampling area dimensions and distance of perimeter air sample locations from personal sampling areas are approximate
13) ABS Activity Descriptions:
Walking = walking in an area for approximately 100 minutes
Slow ATV/Walking = walking for approximately 50 minutes and slow ATV riding for approximately 50 minutes, to simulate worker activities
Raking = raking an area for approximately 100 minutes, to simulate a a vigorous soil disturbance scenario
2-person ATV = two ATVs being driven simultaneously through an area for approximately 100 minutes, to simulate trespasser activities
ATV/Walking = walking for approximately 50 minutes and ATV riding for approximately 50 minutes, to simulate trespasser activities

14) Unified Soil Classification System (USCS) definitions:
OL = Organic, Low plasticity
ML = Silt, Low plasticity
SP = Sand, Poorly graded (uniform particle size)
SW = Sand, Well graded (diversified particle size)
MH = Silt, High plasticity
SM = Sand and Silt

TABLE 4-3
ACTIVITY-BASED SAMPLING DESCRIPTIONS
ZONOLITE/WR GRACE IHP

ABS Location	Sample Date	ABS Activity	Dimensions of ABS Area	Location Description	Closest Soil Sample	Soil Type	Weather Conditions	Figure
AA11	11/10/2009	Walking	2160 ft^2	Vegetated	WR07	ML	Calm	4-3
AA12	11/10/2009	ATV and walking	5650 ft^2	Grass and gravel	WR04/WR05	SW	Calm	4-3

Table 4-4
Activity-Based Air Sample Results
Iron Horse Park and Zonolite Co./WR Grace IHP Sites
North Billerica, Massachusetts

Sample No	Scenario Location	Pump Location/Type	Sample Flow Rate	Sample Date	ABS Activity	Sample Volume (L)	No of Grids Counted	TEM Results (No and Type of Structure)	PCMe Results (No and Type of Structure)	Requested Sensitivity (1/cc)	Requested Detection Limit (1/cc)	Lab Achieved Sensitivity (1/cc)	Method	TEM Results (str./cc)	PCMe Results (str /cc)
D23670	AA01	Perimeter-Upwind	High	11/10/2009	Worker	1027	40	0	0	0 001	0 003	0 00082	Direct	0	0
D23655	AA01	Perimeter-Downwind W	High	11/10/2009	Worker	1051 5	37	1 - anthophyllite 3 - Solid Soln Trem - Act	0	0 001	0 003	0 0009	Direct	0 0036	0
D23654	AA01	Personal-Low	Low	11/10/2009	Worker	296 5	47	5 - Solid Soln Trem - Act	2 - Solid Soln Trem - Act	0 003	0 009	0 0025	Direct	0 0125	0 005
D23657	AA01	Perimeter-Adjacent E	High	11/10/2009	Worker	1025	39	1 - Solid Soln Trem - Act	0	0 001	0 003	0 00088	Direct	0 00088	0
D23656	AA01	Perimeter-Downwind E	High	11/10/2009	Worker	1083	37	1 - amosite	0	0 001	0 003	0 00087	Direct	0 00087	0
D23659	AA02	Personal-Low	Low	11/10/2009	Worker	303 75	42	3 - chrysotile	0	0 003	0 009	0 0027	Direct	0 0081	0
D23661	AA02	Perimeter-Adjacent	High	11/10/2009	Worker	986 75	40	0	0	0 001	0 003	0 00089	Direct	0	0
D23663	AA02	Perimeter-Upwind	High	11/10/2009	Worker	1068	40	0	0	0 001	0 003	0 00082	Direct	0	0
D23660	AA02	Perimeter-Downwind E	High	11/10/2009	Worker	1017	40	0	0	0 001	0 003	0 00086	Direct	0	0
D23662	AA02	Perimeter-Downwind W	High	11/10/2009	Worker	1044	41	2 - amosite	2 - amosite	0 001	0 003	0 00082	Direct	0 00164	0 00164
D23548	AA03	Personal-High	High	10/27/2009	Raking	633 49	61	6 - chrysotile 5 - amosite	2 - amosite	0 001	0 003	0 00091	Direct	0 01001	0 00182
D23551	AA03	Perimeter-West	High	10/27/2009	Raking	655 14	60	0	0	0 001	0 003	0 00089	Direct	0	0
D23550	AA03	Perimeter-East	High	10/27/2009	Raking	620 37	60	0	0	0 001	0 003	0 00094	Direct	0	0
D23552	AA04	Personal-High	High	10/27/2009	Walking	1014 2	40	0	0	0 001	0 003	0 00086	Direct	0	0
D23555	AA04	Perimeter-East	High	10/27/2009	Walking	1054	40	0	0	0 001	0 003	0 00083	Direct	0	0
D23554	AA04	Perimeter-West	High	10/27/2009	Walking	1071	40	0	0	0 001	0 003	0 00082	Direct	0	0
D23556	AA05	Personal-High (Back)	High	10/27/2009	2 person ATV	1045 5	40	2 - chrysotile 1 - Solid Soln Trem - Act	1 - chrysotile	0 001	0 003	0 00084	Direct	0 00252	0 00084
D23557	AA05	Personal-High (Front)	High	10/27/2009	2 person ATV	1032 5	40	0	0	0 001	0 003	0 00085	Direct	0	0
D23562	AA05	Perimeter-North	High	10/27/2009	2 person ATV	1012 9	42	0	0	0 001	0 003	0 00082	Direct	0	0
D23563	AA05	Perimeter-South	High	10/27/2009	2 person ATV	1009 5	45	0	0	0 001	0 003	0 00077	Direct	0	0
D23560	AA05	Perimeter-West	High	10/27/2009	2 person ATV	1046	40	0	0	0 001	0 003	0 00084	Direct	0	0
D23561	AA05	Perimeter-East	High	10/27/2009	2 person ATV	1036 5	40	0	0	0 001	0 003	0 00084	Direct	0	0
D23564	AA06	Personal-High (Back)	High	10/27/2009	2 person ATV	612 9	65	0	0	0 001	0 003	0 00088	Direct	0	0
D23565	AA06	Personal-High (Front)	High	10/27/2009	2 person ATV	672 21	61	4 - chrysotile	0	0 001	0 003	0 00085	Direct	0 0034	0
D23568	AA06	Perimeter-Adjacent	High	10/27/2009	2 person ATV	610 14	65	0	0	0 001	0 003	0 00088	Direct	0	0
D23569	AA06	Perimeter-End of Trail	High	10/27/2009	2 person ATV	651 6	68	0	0	0 001	0 003	0 00079	Direct	0	0
D23601	AA07	Personal-High	High	10/30/2009	Walking	1001 5	40	0	0	0 001	0 003	0 00087	Direct	0	0
D23604	AA07	Perimeter-West	High	10/30/2009	Walking	1156 5	40	0	0	0 001	0 003	0 00076	Direct	0	0
D23603	AA07	Perimeter-North	High	10/30/2009	Walking	1032 5	39	0	0	0 001	0 003	0 00087	Direct	0	0
D23617	AA08	Personal-High	High	11/3/2009	Trespasser	989 25	39	0	0	0 001	0 003	0 00091	Direct	0	0
D23620	AA08	Perimeter-South	High	11/3/2009	Trespasser	1069 5	40	0	0	0 001	0 003	0 00082	Direct	0	0
D23619	AA08	Perimeter-East	High	11/3/2009	Trespasser	1031	40	1 - chrysotile	0	0 001	0 003	0 00085	Direct	0 00085	0
D23578	AA09	Personal-High	High	10/30/2009	Walking	843 2	50	0	0	0 001	0 003	0 00083	Direct	0	0
D23580	AA09	Perimeter-Downwind	High	10/30/2009	Walking	1020	40	0	0	0 001	0 003	0 00086	Direct	0	0
D23581	AA09	Perimeter-Upwind	High	10/30/2009	Walking	1172 5	41	1 - chrysotile	0	0 001	0 003	0 00073	Direct	0 00073	0
D23597	AA10	Personal-High	High	10/30/2009	Raking	1083 5	40	0	0	0 001	0 003	0 00081	Direct	0	0
D23599	AA10	Perimeter-Downwind	High	10/30/2009	Raking	1013	41	0	0	0 001	0 003	0 00084	Direct	0	0
D23600	AA10	Perimeter-Upwind	High	10/30/2009	Raking	1220	40	0	0	0 001	0 003	0 00072	Direct	0	0
D23644	AA11	Personal-High	High	11/10/2009	Walking	1053 5	38	15 - Libby amphibole 2 - Solid Soln Trem - Act	7 - Libby amphibole	0 001	0 003	0 00087	Direct	0 01479	0 00609
D23646	AA11	Perimeter-North	High	11/10/2009	Walking	1014	37	16 - Libby amphibole 1 - Solid Soln Trem - Act	8 - Libby amphibole	0 001	0 003	0 00093	Direct	0 01581	0 00744

Table 4-4
Activity-Based Air Sample Results
Iron Horse Park and Zonolite Co./WR Grace HIP Sites
North Billerica, Massachusetts

Sample No	Scenario Location	Pump Location/Type	Sample Flow Rate	Sample Date	ABS Activity	Sample Volume (L)	No. of Grids Counted	TEM Results (No and Type of Structure)	PCMe Results (No and Type of Structure)	Requested Sensitivity (1/cc)	Requested Detection Limit (1/cc)	Lab Achieved Sensitivity (1/cc)	Method	TEM Results (str./cc)	PCMe Results (str /cc)
D23647	AA11	Perimeter-South	High	11/10/2009	Walking	1086 5	40	1 - Solid Soln Trem - Act	0	0 001	0 003	0 00081	Direct	0 00081	0
D23648	AA12	Personal-High	High	11/10/2009	Worker	1020	40	3 - Libby amphibole	2 - Libby amphibole	0 001	0 003	0 00086	Direct	0 00258	0 00172
D23652	AA12	Perimeter-East	High	11/10/2009	Worker	1075 5	40	0	0	0 001	0 003	0 00081	Direct	0	0
D23650	AA12	Perimeter-North	High	11/10/2009	Worker	996 85	40	1- Libby amphibole	1 - Libby amphibole	0 001	0 003	0 00088	Direct	0 00088	0 00088
D23651	AA12	Perimeter-South	High	11/10/2009	Worker	1033	40	0	0	0 001	0 003	0 00085	Direct	0	0
D23634	AA13	Personal-High	High	11/4/2009	Walking	1017 2	20	66 - chrysotile 2 - amosite 1 - crocidolite	0	0 001	0 003	0 0017	Direct	0 1173	0
D23636	AA13	Perimeter-Downwind E	High	11/4/2009	Walking	1034	40	0	0	0 001	0 003	0 00085	Direct	0	0
D23637	AA13	Perimeter-Downwind W	High	11/4/2009	Walking	1017 5	37	9 - chrysotile	0	0 001	0 003	0 00093	Direct	0 00837	0
D23638	AA13	Perimeter-Upwind	High	11/4/2009	Walking	1076 5	41	0	0	0 001	0 003	0 00079	Direct	0	0
D23630	AA14	Personal-High	High	11/4/2009	Worker	1042 5	35	56 - chrysotile	0	0 001	0 003	0 00096	Direct	0 05376	0
D23632	AA14	Perimeter	High	11/4/2009	Worker	1069	40	0	0	0 001	0 003	0 00082	Direct	0	0
D23633	AA14	Perimeter-Downwind	High	11/4/2009	Worker	1034 5	40	24 - chrysotile 1 - amosite	1 - chrysotile	0 001	0 003	0 00085	Direct	0 02125	0 00085
D23608	AA15	Personal-High	High	11/3/2009	Worker	1041 5	37	2 - chrysotile 6 - amosite 1 - Solid Soln Trem - Act	4 - amosite	0 001	0 003	0 00091	Direct	0 00819	0 00364
D23611	AA15	Perimeter-Downwind E	High	11/3/2009	Worker	1039 5	41	0	0	0 001	0 003	0 00082	Direct	0	0
D23612	AA15	Perimeter-Upwind	High	11/3/2009	Worker	1042 5	40	1 - Solid Soln Trem - Act	1 - Solid Soln Trem - Act	0 001	0 003	0 00084	Direct	0 00084	0 00084
D23610	AA15	Perimeter-Downwind W	High	11/3/2009	Worker	1079 5	39	2 - chrysotile	0	0 001	0 003	0 00083	Direct	0 00166	0
D23639	AA16	Personal-High	High	11/4/2009	Walking	1002 9	31	60 - chrysotile	2 - chrysotile	0 001	0 003	0 0011	Direct	0 066	0 0022
D23641	AA16	Perimeter-West	High	11/4/2009	Walking	1028	39	6 - chrysotile	0	0 001	0 003	0 00087	Direct	0 00522	0
D23643	AA16	Perimeter-North	High	11/4/2009	Walking	1012 7	40	1 - chrysotile	0	0 001	0 003	0 00086	Direct	0 00086	0
D23642	AA16	Perimeter-South	High	11/4/2009	Walking	1070 5	10	3 - chrysotile	0	0 001	0 003	0 0033	Direct	0 0099	0
D23590	AA17	Personal-High (Back)	High	10/30/2009	2 person ATV	1026 5	40	1 - chrysotile	0	0 001	0 003	0 00085	Direct	0 00085	0
D23591	AA17	Personal-High (Front)	High	10/30/2009	2 person ATV	983 65	42	1 - chrysotile 1 - amosite	1 - amosite	0 001	0 003	0 00085	Direct	0 0017	0 00085
D23596	AA17	Perimeter-East	High	10/30/2009	2 person ATV	1069 5	45	0	0	0 001	0 003	0 00073	Direct	0	0
D23595	AA17	Perimeter-South	High	10/30/2009	2 person ATV	1018 5	40	1 - chrysotile	0	0 001	0 003	0 00086	Direct	0 00086	0
D23594	AA17	Perimeter-North	High	10/30/2009	2 person ATV	1039 36	40	0	0	0 001	0 003	0 00084	Direct	0	0
D23582	AA18	Personal-High (Back)	High	10/30/2009	2 person ATV	1009 5	40	1 - amosite	0	0 001	0 003	0 00087	Direct	0 00087	0
D23583	AA18	Personal-High (Front)	High	10/30/2009	2 person ATV	984 15	44	1 - chrysotile	0	0 001	0 003	0 00081	Direct	0 00081	0
D23588	AA18	Perimeter-East	High	10/30/2009	2 person ATV	1157 76	40	0	0	0 001	0 003	0 00076	Direct	0	0
D23589	AA18	Perimeter-Middle	High	10/30/2009	2 person ATV	1012 5	40	0	0	0 001	0 003	0 00086	Direct	0	0
D23587	AA18	Perimeter-South	High	10/30/2009	2 person ATV	1039 89	42	0	0	0 001	0 003	0 0008	Direct	0	0
D23586	AA18	Perimeter-North	High	10/30/2009	2 person ATV	1060	40	0	0	0 001	0 003	0 00083	Direct	0	0
D23621	AA19	Personal-High (Back)	High	11/3/2009	2 person ATV	1028 3	39	0	0	0 001	0 003	0 00087	Direct	0	0
D23622	AA19	Personal-High (Front)	High	11/3/2009	2 person ATV	1000 05	40	0	0	0 001	0 003	0 00087	Direct	0	0
D23626	AA19	Perimeter-North	High	11/3/2009	2 person ATV	1038 5	40	0	0	0 001	0 003	0 00084	Direct	0	0
D23625	AA19	Perimeter-South	High	11/3/2009	2 person ATV	1074 5	35	0	0	0 001	0 003	0 00093	Direct	0	0
D23613	AA20	Personal-High	High	11/3/2009	Walking	1015 7	40	0	0	0 001	0 003	0 00086	Direct	0	0
D23615	AA20	Perimeter-End	High	11/3/2009	Walking	1650 5	41	0	0	0 001	0 003	0 00052	Direct	0	0
D23616	AA20	Perimeter-Adjacent	High	11/3/2009	Walking	1026	40	0	0	0 001	0 003	0 00085	Direct	0	0
D23572	RF01	Reference-North	High	10/27/2009	Reference	6323 84	44	1 - Solid Soln Trem - Act	1 - Solid Soln Trem - Act	0 000167	0 0005	0 00013	Direct	0 00013	0 00013

Table 4-4
Activity-Based Air Sample Results
Iron Horse Park and Zonolite Co./WR Grace IHP Sites
North Billerica, Massachusetts

Sample No	Scenario Location	Pump Location/Type	Sample Flow Rate	Sample Date	ABS Activity	Sample Volume (L)	No of Grids Counted	TEM Results (No and Type of Structure)	PCMe Results (No. and Type of Structure)	Requested Sensitivity (1/cc)	Requested Detection Limit (1/cc)	Lab Achieved Sensitivity (1/cc)	Method	TEM Results (str./cc)	PCMe Results (str /cc)
D23571	RF01	Reference-South	High	10/27/2009	Reference	6367 22	45	0	0	0 000167	0 0005	0 00012	Direct	0	0
D23570	RF01	Reference-Central	High	10/27/2009	Reference	6268 41	10	0	0	0 000167	0 0005	0 00056	Direct	0	0
D23576	RF02	Reference-North	High	10/30/2009	Reference	6649 3	45	0	0	0 000167	0 0005	0 00012	Direct	0	0
D23575	RF02	Reference-South	High	10/30/2009	Reference	6566 7	45	0	0	0 000167	0 0005	0 00012	Direct	0	0
D23574	RF02	Reference-Central	High	10/30/2009	Reference	6501 8	45	0	0	0 000167	0 0005	0 00012	Direct	0	0
D23607	RF03	Reference-North	High	11/3/2009	Reference	5547 5	49	0	0	0 000167	0 0005	0 00013	Direct	0	0
D23606	RF03	Reference-South	High	11/3/2009	Reference	5530	45	0	0	0 000167	0 0005	0 00014	Direct	0	0
D23605	RF03	Reference-Central	High	11/3/2009	Reference	5310	45	0	0	0 000167	0 0005	0 00015	Direct	0	0
D23629	RF04	Reference-North	High	11/4/2009	Reference	5939 38	37	0	0	0 000167	0 0005	0 00016	Direct	0	0
D23628	RF04	Reference-South	High	11/4/2009	Reference	5934 5	41	0	0	0 000167	0 0005	0 00014	Direct	0	0
D23627	RF04	Reference-Central	High	11/4/2009	Reference	5965 38	45	0	0	0 000167	0 0005	0 00013	Direct	0	0
D23664	RF04	Reference-North	High	11/10/2009	Reference	4728 6	52	0	0	0 000167	0 0005	0 00014	Direct	0	0
D23666	RF04	Reference-South	High	11/10/2009	Reference	4637 95	43	0	0	0 000167	0 0005	0 00018	Direct	0	0
D23665	RF04	Reference-Central	High	11/10/2009	Reference	4639 8	43	0	0	0 000167	0 0005	0 00018	Direct	0	0
D23573	Lot Blank	8636-7D9PASK-236	NA	10/30/2009	Blank	0	15	0	0	0 000167	0 0005	blank	Direct	0	0
D23667	Lot Blank	7687-7D9PASK-091	NA	11/9/2009	Blank	0	10	0	0	0 000167	0 0005	blank	Direct	0	0
D23577	Field Blank #1	Field Blank	NA	10/30/2009	Blank	0	15	0	0	0 000167	0 0005	blank	Direct	0	0
D23668	Field Blank #2	Field Blank	NA	11/4/2009	Blank	0	10	0	0	0 000167	0 0005	blank	Direct	0	0
D23669	Field Blank #3	Field Blank	NA	11/10/2009	Blank	0	10	0	0	0 000167	0 0005	blank	Direct	0	0

Notes-

ABS = Activity Based Sampling
No = Number
L = Liters
TEM = Transmission Electron Microscopy
PCMe = Phase Contrast Microscopy equivalent
1/cc = one fiber per cubic centimeter
Solid Soln = Solid Solution
Trem - Act = Tremolite to Actinolite
ATV = All Terrain Vehicle
W = west
E = east

Activity Descriptions

Worker = walking for approximately 50 minutes and slow ATV riding (forklift simulation) for approximately 50 minutes
Raking = raking an area for approximately 100 minutes
Walking = walking in an area for approximately 100 minutes
2 Person ATV = 2 ATVs being driven for approximately 100 minutes ("Front" and "Back" designations refer to the lead and following ATV rider, respectively)
Trespasser = walking for approximately 50 minutes and ATV riding for approximately 50 minutes

TABLE 4-5
SUMMARY OF ABS RESULTS

	Scenario	Area	Min Conc (s/cc)	Max. Conc (s/cc)
Current/Future	ATV rider	5,6,17,18,19	ND	0.00085
	Trespasser	4,5,6,7,8,9, 10,17,18,19	ND	0 00085
	Worker – All areas	1,2,3,11,12,13,14,15,16	ND	0.007
	Worker – IHP areas	1,2,3,13,14,15,16	ND	0.005
	Worker – Zonolite	11,12	ND	0 007
Future	Resident	8,9,10,20	ND	ND

TABLE 5-1
EXPOSURE PARAMETERS

Scenario		Area[1]	Receptor	Receptor Age	Exposure Time (hrs/day)	Exposure Frequency (days/yr)	Exposure Duration (years)
Current/ Future	ATV rider	5,6,17,18,19	Older child	7 to 16 yrs	2	52	10
	Trespasser	4,5,6,7,8,9, 10,17,18,19	Older child	7 to 16 yrs	2	52	10
	Worker	1,2,3,11,12,13,14,15,16	Adult	20 to 45 yrs	8	100	25
					2	50	25
Future	Resident	8,9,10,20	Child and Adult	0 to 30 years	24	350	30

[1] See Figures 4-1, 4-2 and 4-3

Table 5-2
RISK SUMMARY

Receptor	Age of Onset of Exposure (yrs)	Exposure Point Conc. (f/cc)	Basis of Exposure Point Conc.	Exposure Time (hrs/day)	Exposure Frequency (days/yr)	Exposure Duration (years)	Inhalation Unit Risk $(f/cc)^{-1}$	Risk
ATV Rider	7	0.00085	Maximum	2	52	10	6.40E-02	6E-07
Trespasser	7	0.00085	Maximum	2	52	10	6.40E-02	6E-07
Worker								
Zonolite - 8 hr	20	0.0074	Maximum	8	100	25	6.90E-02	5E-05
Zonolite - 2 hr	20	0.0074	Maximum	2	50	25	6.90E-02	6E-06
IHP - 8 hr	20	0.005	Maximum	8	100	25	6.90E-02	3E-05
IHP - 2 hr	20	0.005	Maximum	2	50	25	6.90E-02	4E-06
Resident	birth	0	no fibers detected	24	350	30	1.70E-01	< 1 x10-4 (qualitative)

FIGURES

Figure 2-1

Site Location Map

Iron Horse Park
High Street
Billerica, Massachusetts

EPA Region I
Superfund Technical Assessment and Response Team (START) III
Contract No. EP-W-05-042

TDD Number:	01-09-06-0001
Created by:	C. Imbres
Created on:	12 October 2009
Modified by:	C. Imbres
Modified on:	14 April 2010

Data Sources: Topos: MicroPath/USGS
Quadrangle Names: Billerica, Wilmington, MA
All other data: START

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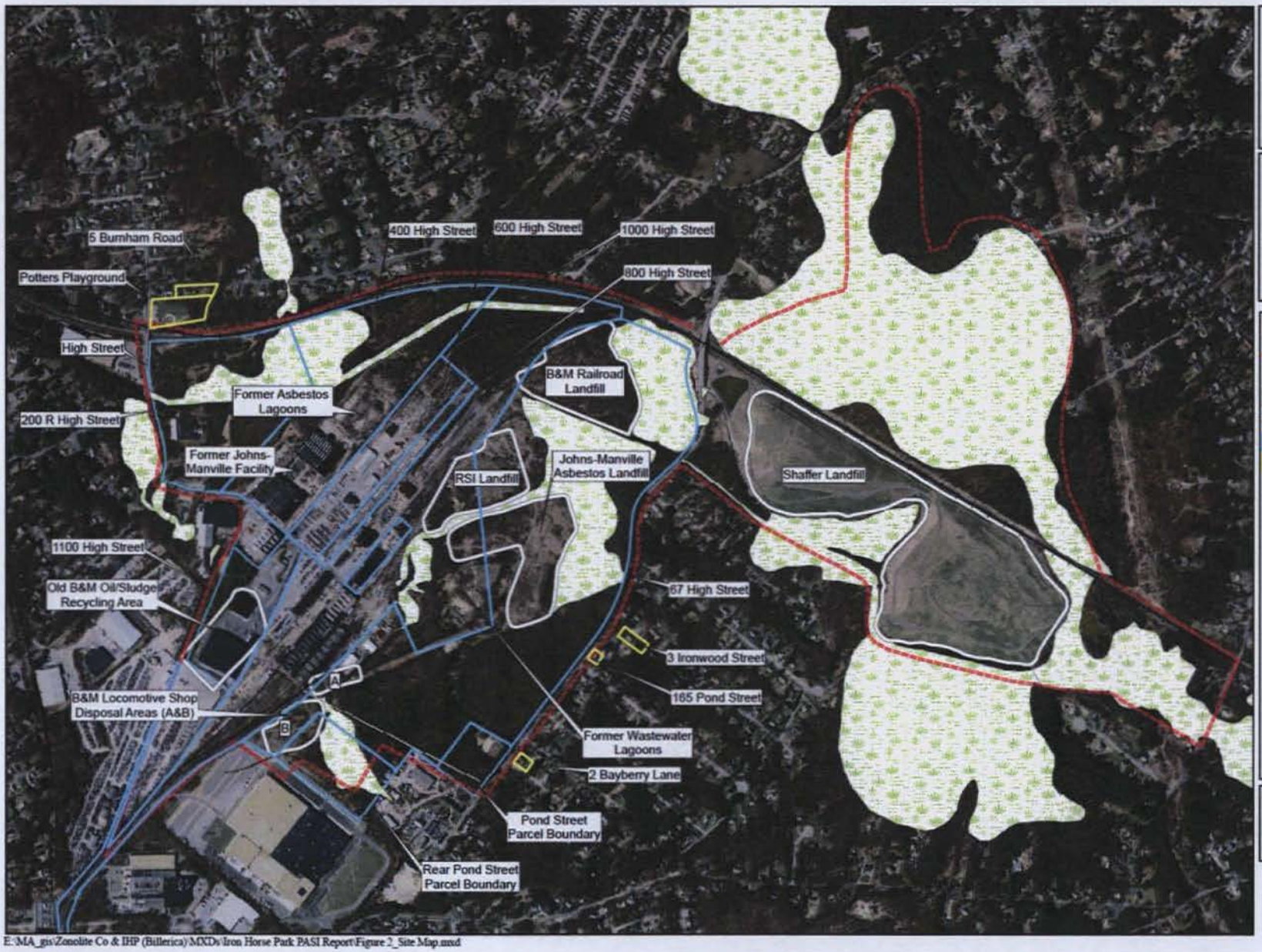

Figure 2-2

Site Map

Iron Horse Park
High Street
Billerica, Massachusetts

EPA Region I
Superfund Technical Assessment and Response Team (START) III
Contract No. EP-W-05-042

TDD Number:	01-09-06-0001
Created by:	C. Inibres
Created on:	20 April 2010
Modified by:	C. Inibres
Modified on:	2 November 2010

Legend

- Iron Horse Park Site Boundary
- Disposal Area
- Wetlands
- Railroad
- On-site Parcel Boundary
- Off-site Parcel Boundary

N

0 500 1,000 Feet

Data Sources:
Imagery: Massachusetts Geographic Information Systems (MassGIS)
Wetlands & Disposal Areas: AECOM
All other data: START

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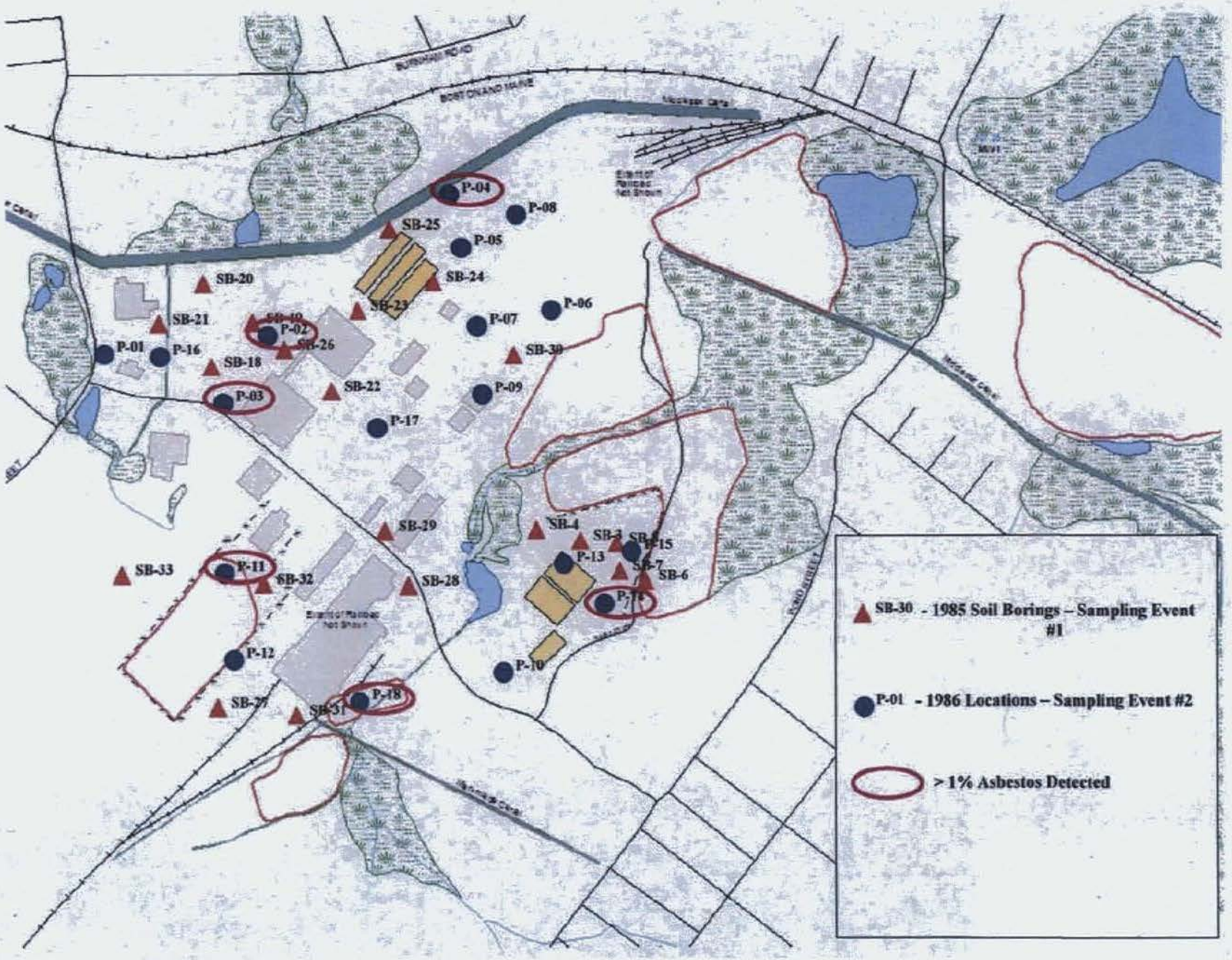

FIGURE 2-3: HISTORICAL SAMPLING ACROSS SITE

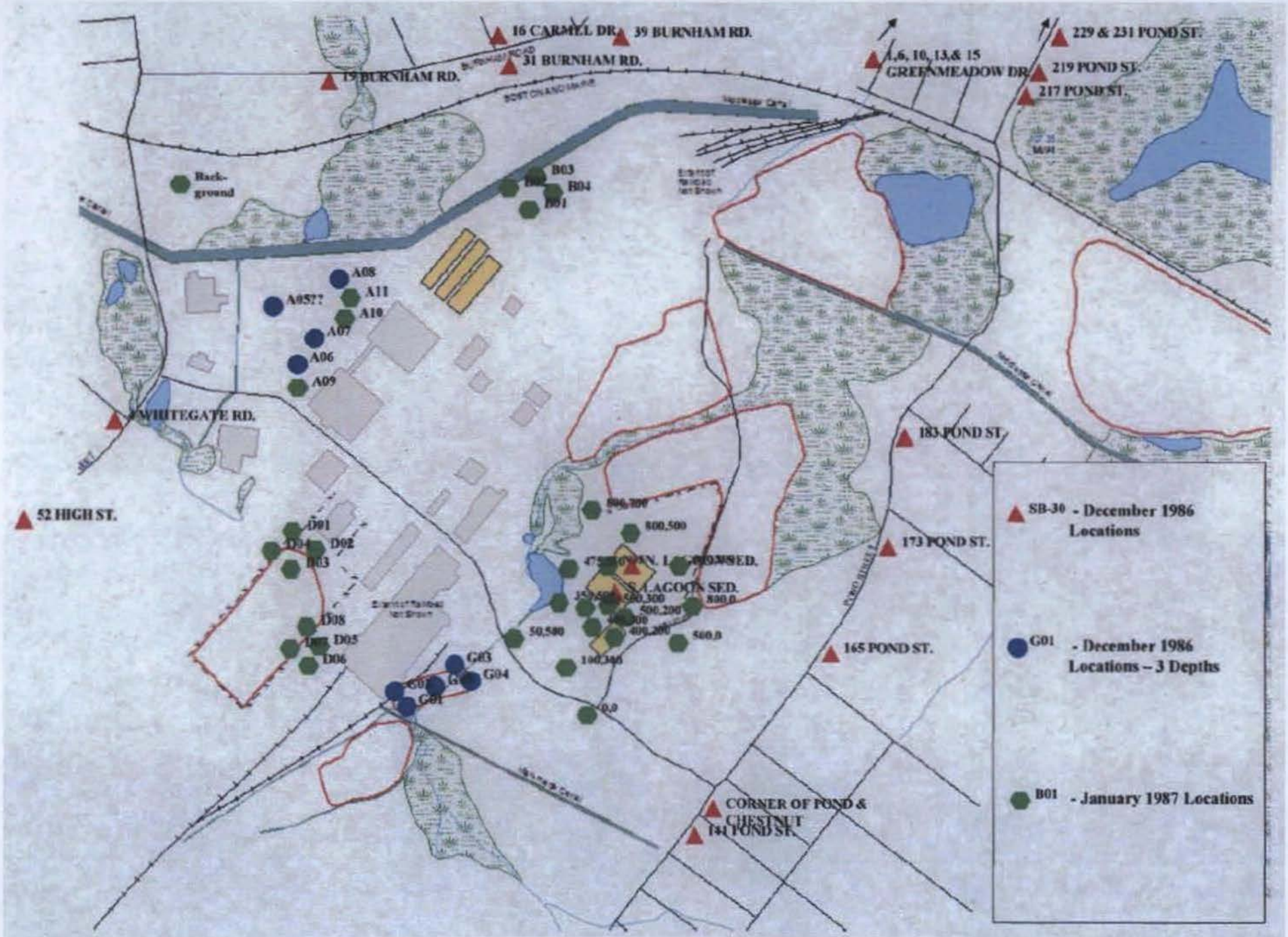

FIGURE 2-4: ASBESTOS SAMPLING DURING EVENT #5

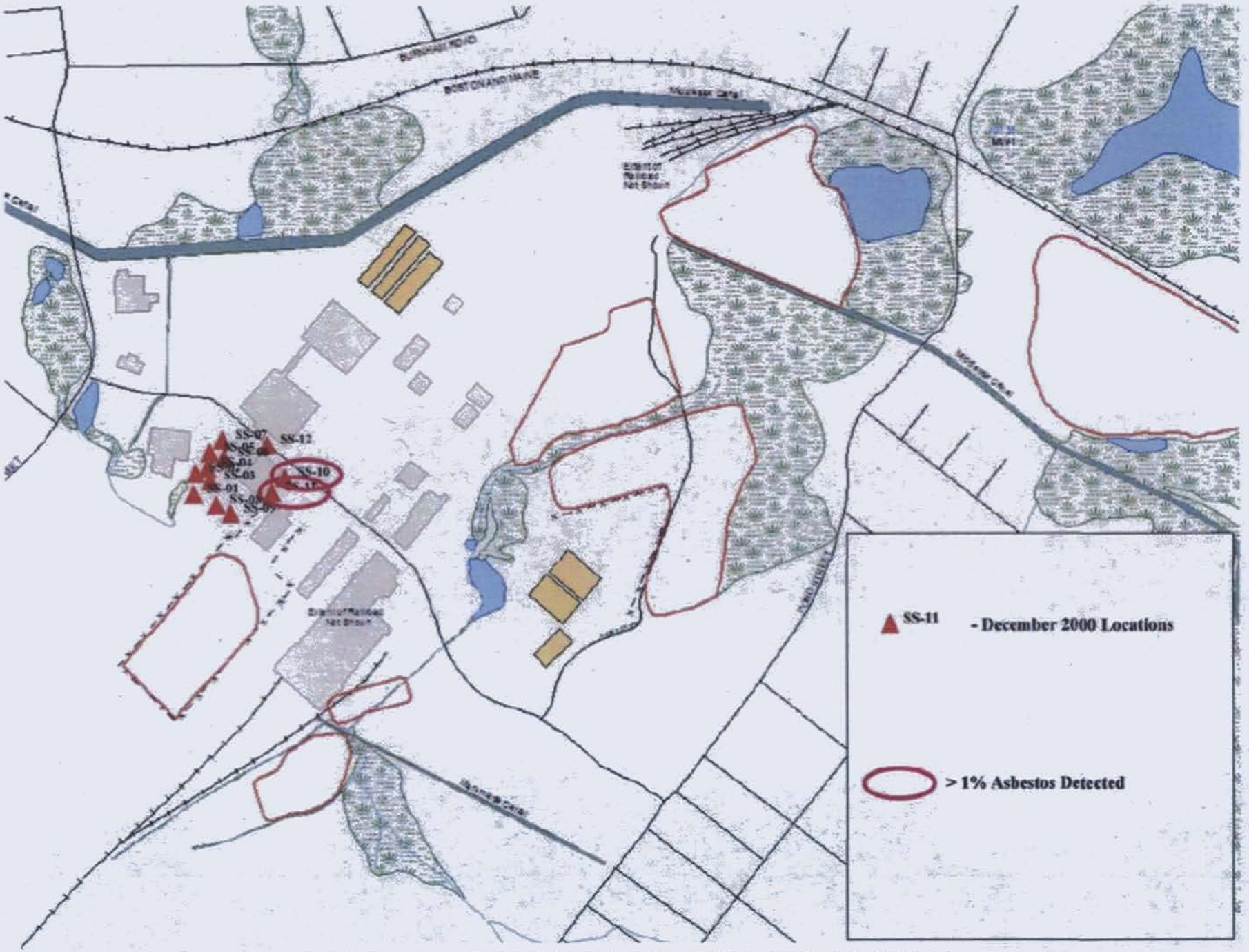

FIGURE 2-5: ASBESTOS SAMPLING AT ZONOLITE FACTORY

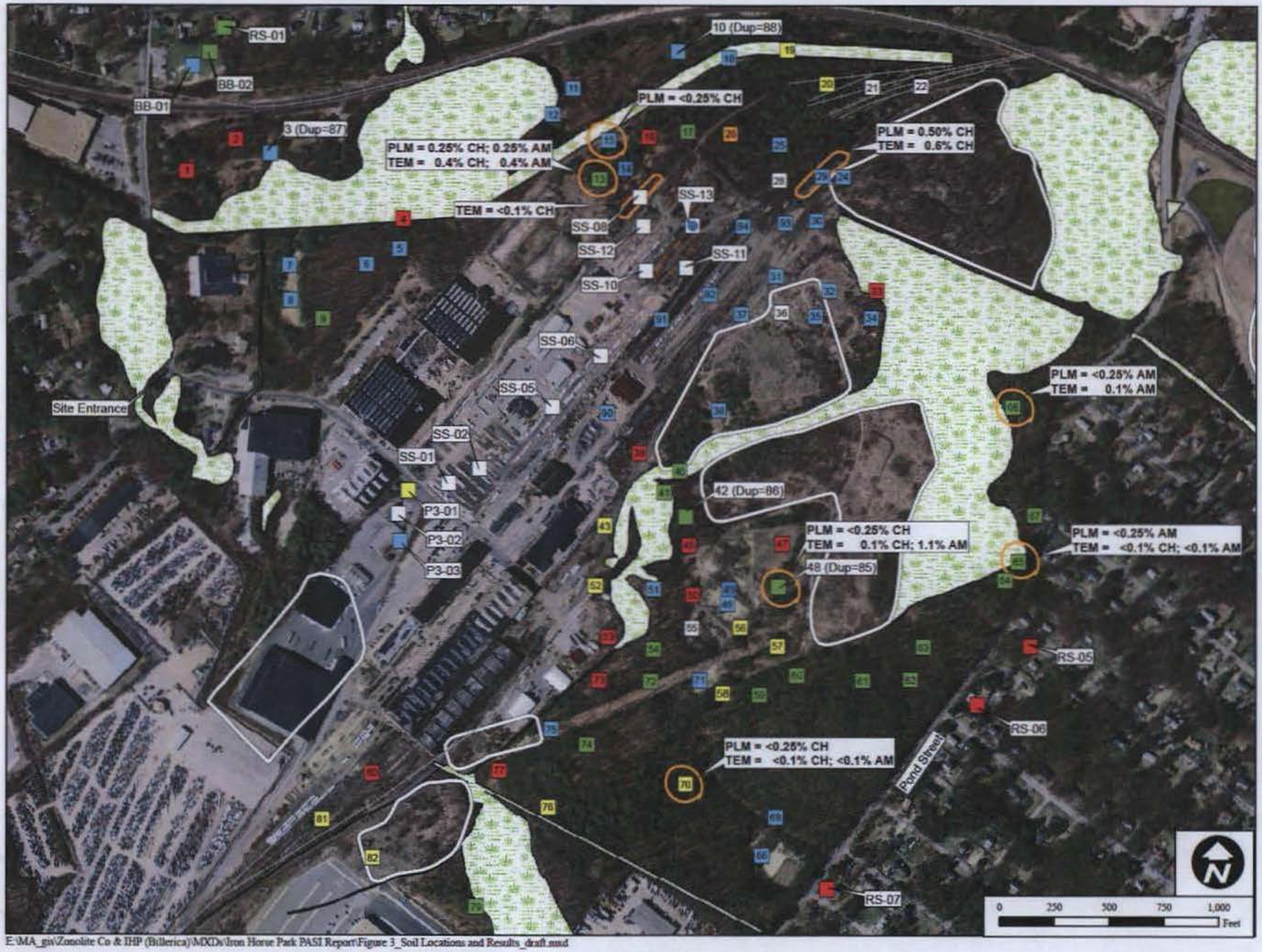

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Figure 2-6

Surface Soil Sample Locations and Results Map

Iron Horse Park
High Street
Billerica, Massachusetts

EPA Region I
Superfund Technical Assessment and Response Team (START) III
Contract No. EP-W-05-042

TDD Number:	01-09-06-0001
Created by:	C. Imbres
Created on:	15 June 2009
Modified by:	C. Imbres
Modified on:	2 November 2010

Legend:

Surface Soil Sample Location & Soil Type

- MH
- ML
- OL
- SM
- SP
- SW
- Disposal Area
- Area of Asbestos Detected
- Wetlands
- Railroad*

Notes:
1) Soil samples locations are the approximate center point of each composite sample, designated by sample location number.
2) Soil classifications are based on the Unified Soil Classification System (USCS). See Appendix B, Table 1 for soil descriptions.
3) < = Less than
4) Results are concentrations of asbestos, in percent (%) by volume, detected via Polarized Light Microscopy (PLM); and concentrations of asbestos, in % by weight, detected via Transmission Electron Microscopy (TEM).
5) AM = Amosite asbestos
6) CH = Chrysotile asbestos
7) DUP = Duplicate sample location
8) Area of asbestos detected encompasses the area of the composite sample for which asbestos results were greater than non-detect.
* Full Extent of railroad lines not shown on map.

Data Sources:
Imagery: Massachusetts Geographic Information Systems (MassGIS)
Wetlands & Disposal Area: AECOM
All other data: START

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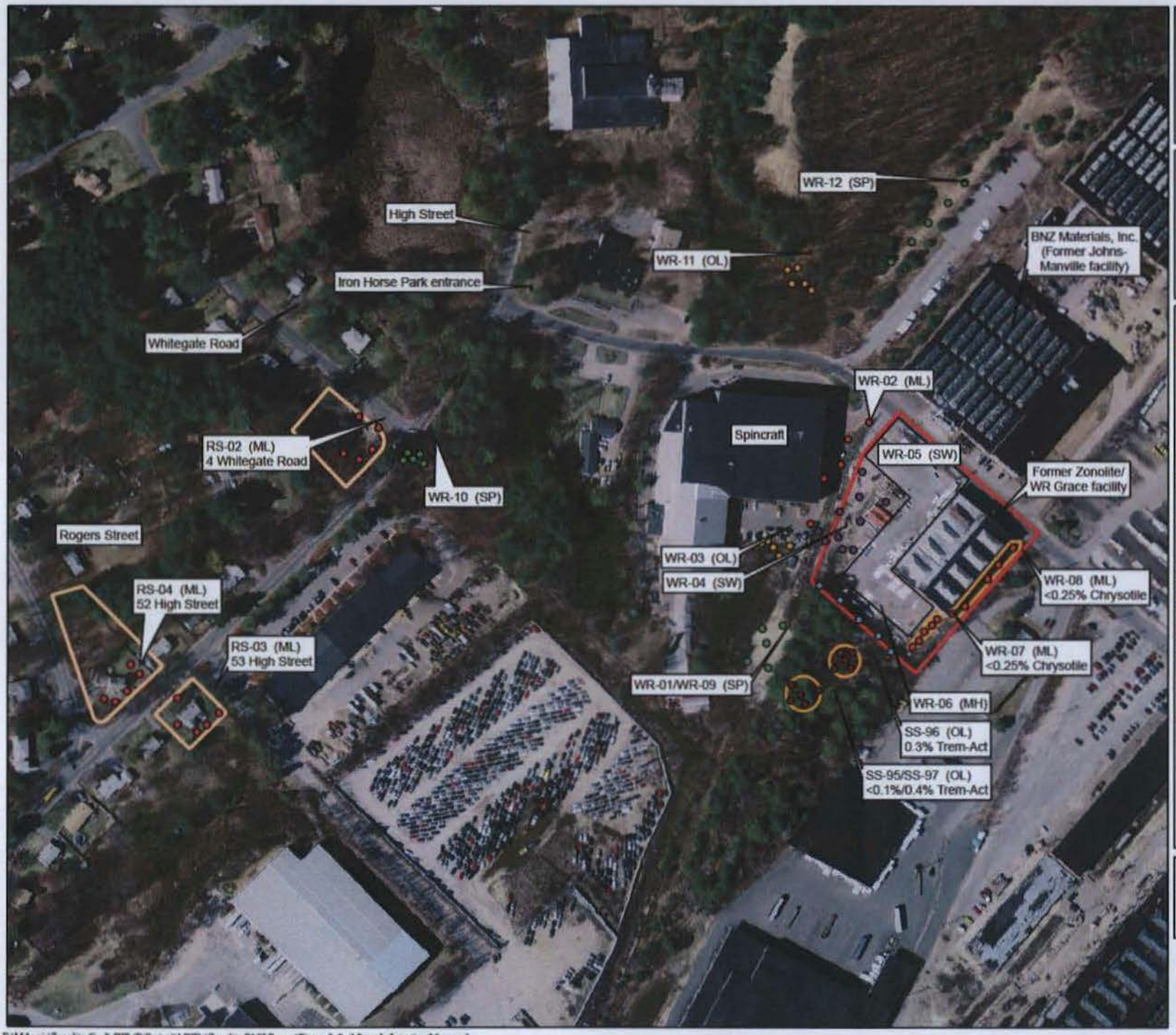

Figure 2-7

Soil Sample Locations and Results Map

Zonolite/WR Grace IHP
900 High Street
North Billerica, Massachusetts

EPA Region I
Superfund Technical Assessment and Response Team (START) III
Contract No. EP-W-05-042

TDD Number: 01-08-11-0008
Created by: C. Imbres
Created on: 22 February 2010
Modified by: C. Imbres
Modified on: 23 April 2010

Legend

- Site Boundary
- Residential Property Boundaries

Soil Sample Points

- MH
- ML
- OL
- SP
- SW

- Areas of asbestos detected
- Paved area

Notes:

1) Soil samples are composite samples consisting of five sample points.
2) Soil classifications (provided in parentheses) are based on the Unified Soil Classification System (USCS). See Appendix B, Table 1 for soil descriptions.
3) < = Less than
4) Results are provided for all samples greater than non-detect for asbestos. Results are concentrations of asbestos (% by volume) detected via Polarized Light Microscopy (PLM).
5) Trem-Act = Tremolite-Actinolite

0 50 100 150 200 Feet

Data Sources:

Imagery and Parcel data: Massachusetts Geographical Information Systems (MassGIS)

All other data: START

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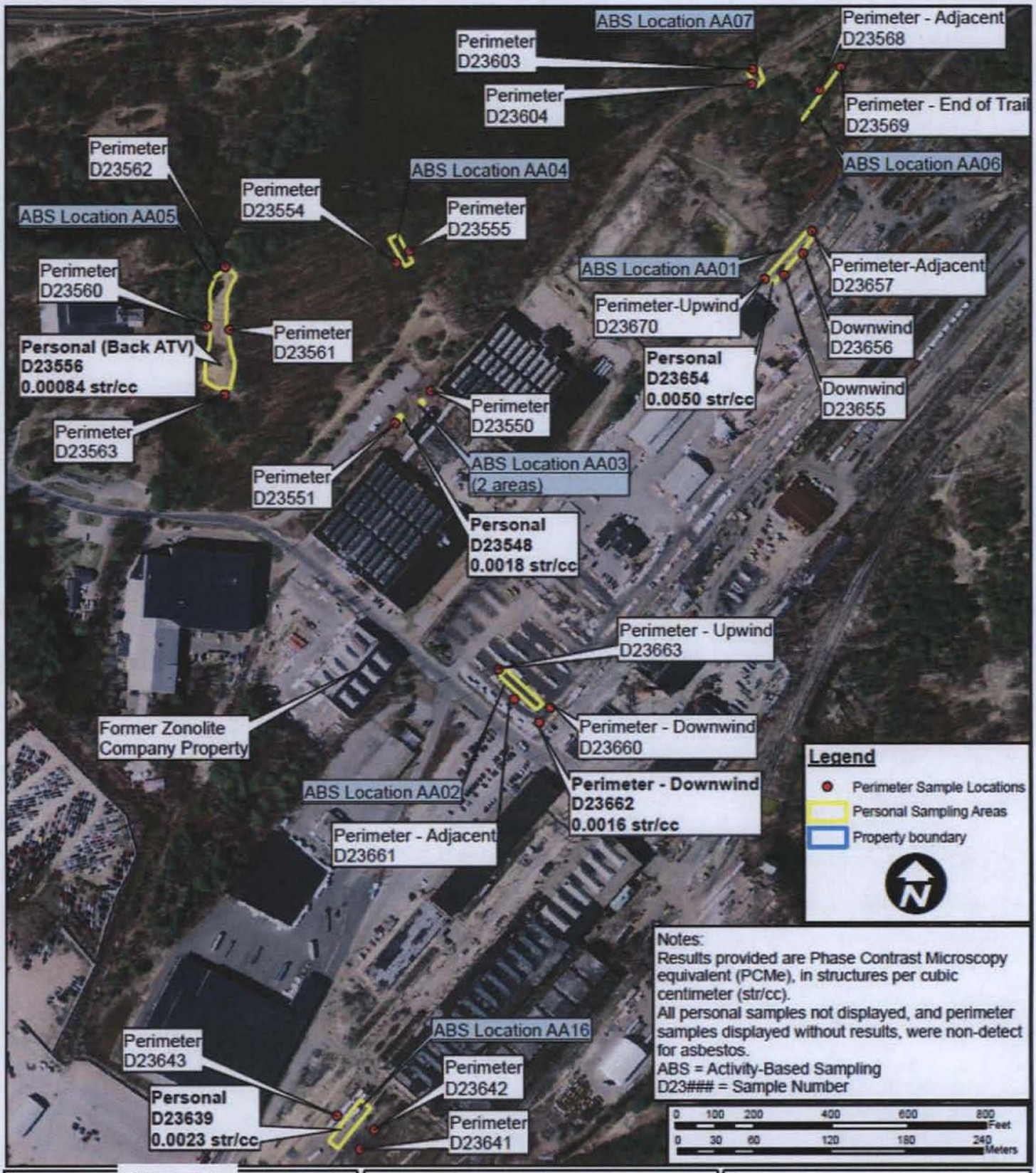

Figure 4-1

Activity-Based Sample Locations and Asbestos Results Map (Western Properties)

Iron Horse Park
High Street
Billerica, Massachusetts

EPA Region I
Superfund Technical Assessment and Response Team (START) III
Contract No. EP-W-05-042

TDD Number:	01-09-06-0001
Created by:	C. Imbres
Created on:	23 March 2010
Modified by:	C. Imbres
Modified on:	2 November 2010

Data Sources:
Imagery and Parcel Data: Massachusetts Geographic Information Systems (MassGIS)
All other data: START

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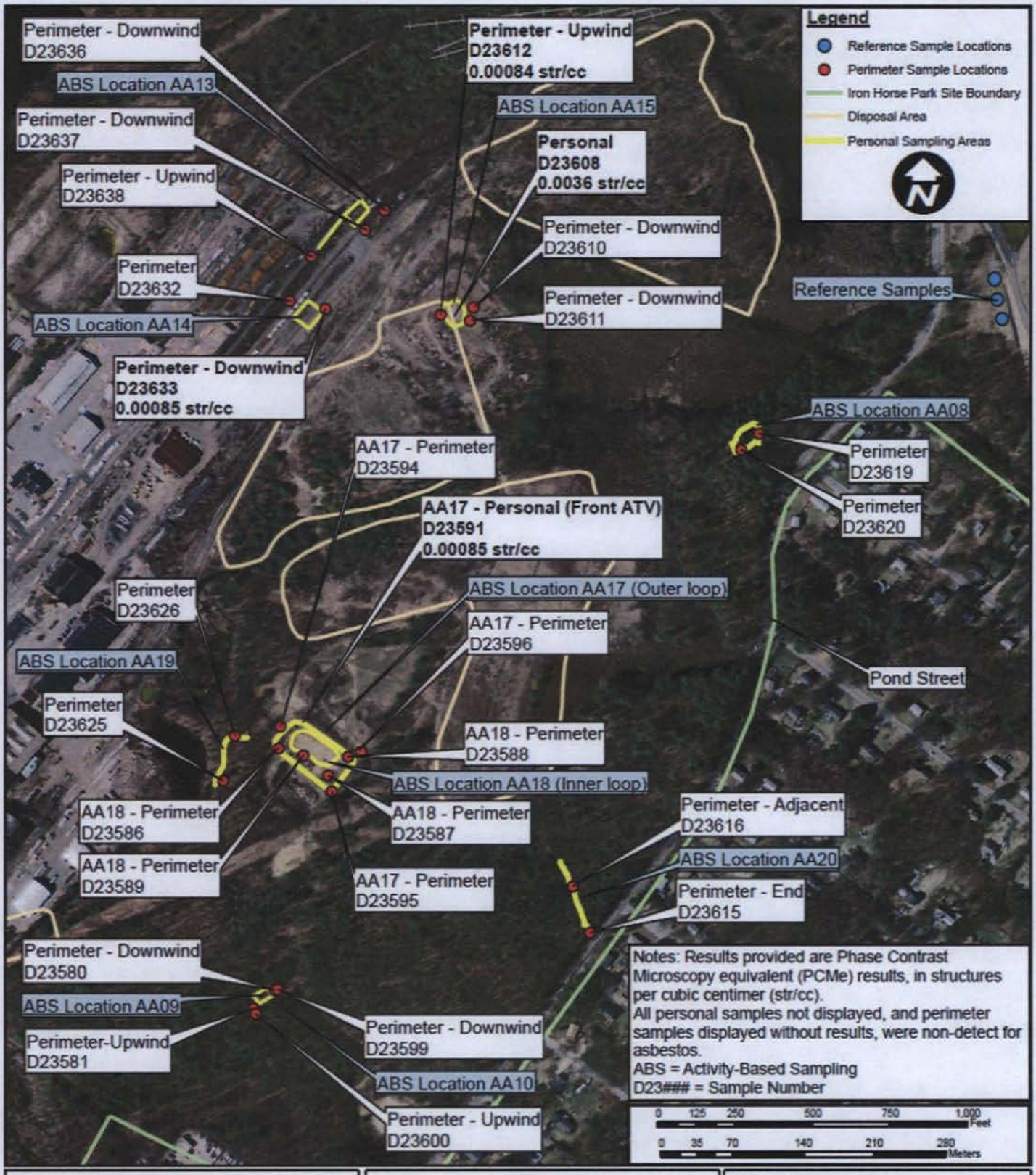

Figure 4-2

Activity-Based Sample Locations and Asbestos Results Map (Eastern Properties)

Iron Horse Park
High Street
Billerica, Massachusetts

EPA Region I
Superfund Technical Assessment and Response Team (START) III
Contract No. EP-W-05-042

TDD Number:	01-09-06-0001
Created by:	C. Imbres
Created on:	23 March 2010
Modified by:	C. Imbres
Modified on:	2 November 2010

Data Sources:
Imagery: Massachusetts Geographic Information Systems (MassGIS)
All other data: START

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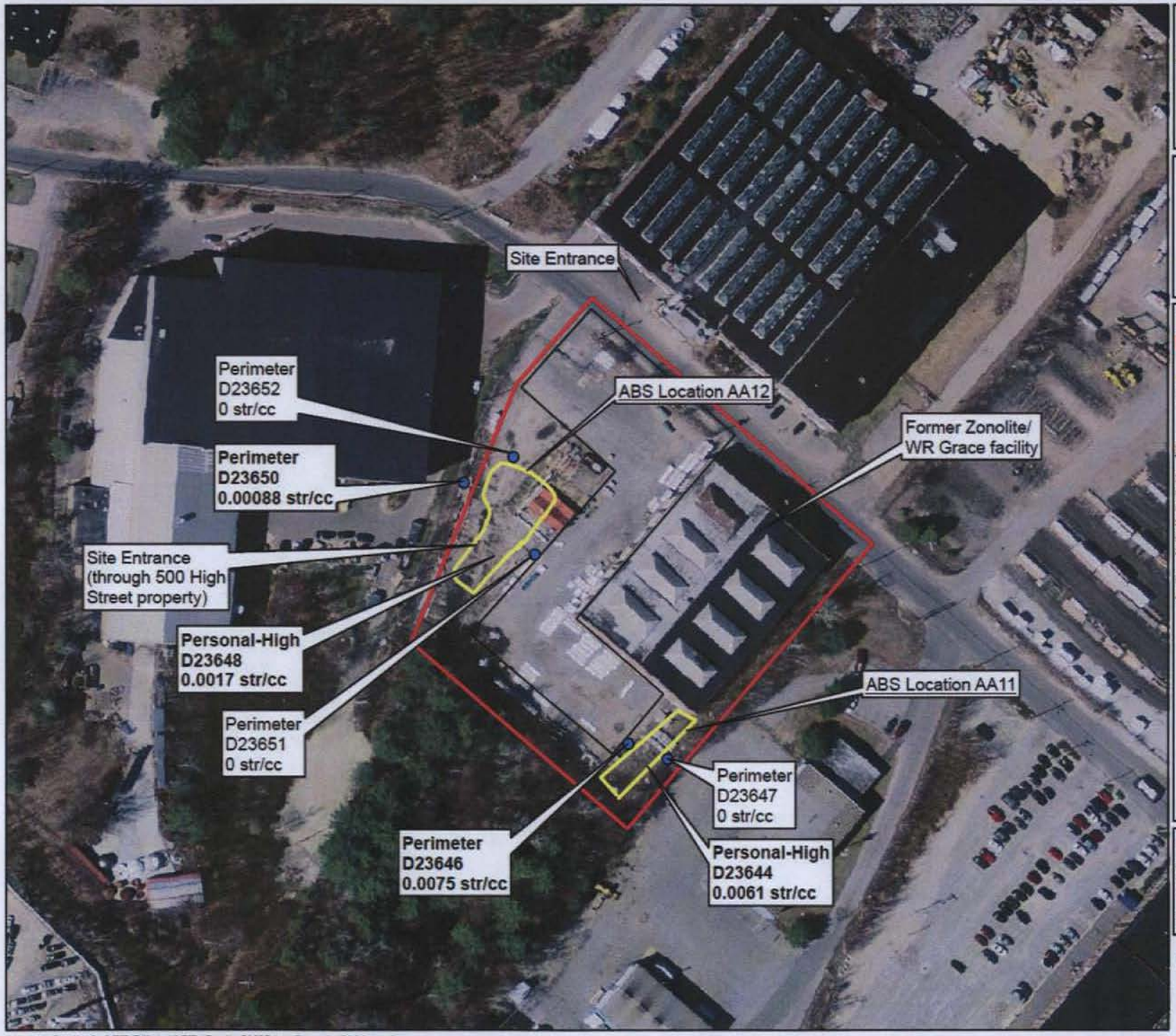

Figure 4-3

Activity-Based Sample Locations and Asbestos Results Map

Zonolite/WR Grace IHP
900 High Street
North Billerica, Massachusetts

EPA Region I
Superfund Technical Assessment and Response Team (START) III
Contract No. EP-W-05-042

TDD Number: 01-08-11-0008
Created by: C. Imbres
Created on: 23 February 2010
Modified by: C. Imbres
Modified on: 23 April 2010

Legend

- Site Boundary
- ABS Perimeter Locations
- ABS Personal Sampling Areas
- Paved area

Notes:

Sample results provided are Phase Contrast Microscopy Equivalent (PCME) fiber concentrations in structures per cubic centimeter (str/cc). Results that are bolded are positive for asbestos.

D236## = Sample Number
ABS = Activity-Based Sampling

N

0 30 60 120 Feet

Data Sources:

Imagery and Parcel data: Massachusetts Geographical Information Systems (MassGIS)

All other data: START

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