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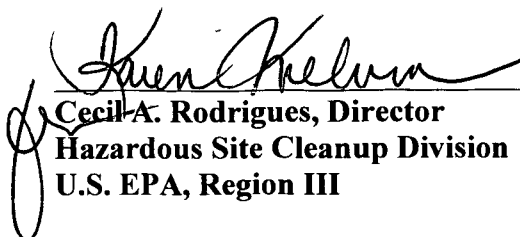
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**FIVE-YEAR REVIEW REPORT FOR
LORD-SHOPE LANDFILL SUPERFUND SITE
ERIE COUNTY, PENNSYLVANIA**

ORIGINAL

September 2014

**Prepared By:
United States Environmental Protection Agency
Region 3
Philadelphia, Pennsylvania**


Cecil A. Rodrigues, Director
Hazardous Site Cleanup Division
U.S. EPA, Region III

SEP 9 2014

Date

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LIST OF ABBREVIATIONS

| | |
|--------|--|
| ARAR | Applicable or Relevant and Appropriate Requirement |
| CD | Consent Decree |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CFR | Code of Federal Regulations |
| CIC | Community Involvement Coordinator |
| COC | Contaminant of Concern |
| EPA | United States Environmental Protection Agency |
| FYR | Five-Year Review |
| GMUC | Ground Water Migration Under Control |
| GPRA | Government Performance and Results Act |
| HEPR | Human Exposure Controlled and Protective Remedy in Place |
| IC | Institutional Control |
| ISVS | In-Situ Vapor Stripping |
| MCL | Maximum Contaminant Level |
| MEK | Methyl Ethyl Ketone |
| MIBK | Methyl Isobutyl Ketone |
| µg/L | micrograms per Liter |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NPDES | National Pollutant Discharge Elimination System |
| NPL | National Priorities List |
| O&M | Operation and Maintenance |
| OU | Operable Unit |
| PADEP | Pennsylvania Department of Environmental Protection |
| PADER | Pennsylvania Department of Environmental Resources |
| PCE | Tetrachloroethene |
| ppm | Parts per Million |
| PRP | Potentially Responsible Party |
| RAO | Remedial Action Objective |
| RI/FS | Remedial Investigation/Feasibility Study |
| ROD | Record of Decision |
| RPM | Remedial Project Manager |
| SWRAU | Sitewide Ready for Anticipated Use |
| TCE | Trichloroethene |
| VOC | Volatile Organic Compound |

EXECUTIVE SUMMARY

Introduction

The Lord-Shope Landfill Superfund site (the Site) covers about 25 acres in Girard Township, Erie County, Pennsylvania. Due to disposal and spillage of wastes and subsequent leaching of contaminants, soils, landfill materials, and ground water are contaminated with volatile organic compounds and heavy metals. The remedy includes in-situ vapor stripping (ISVS) of landfill materials and contaminated soils, a ground water extraction and treatment system, security fencing to protect the cap, and institutional controls to restrict the use of contaminated ground water.

The triggering action for this five-year review (FYR) was the signing of the previous FYR on September 10, 2009.

The remedy currently protects human health and the environment because the cap and fencing prevent human and ecological contact with soil contaminants, the ground water treatment and ISVS systems are removing contaminants, and there are no exposures to contaminated ground water.

However, in order for the remedy to be protective in the long term, the following actions need to be taken:

1. Collect sufficient ground water data to fully characterize the location of the downgradient plume.
2. Modify extraction system to capture Site related contamination that is not being captured downgradient of recovery wells.
3. Analyze for inorganic ground water contaminants of concern (COCs) to make sure concentrations have remained at acceptable levels.
4. Institutional controls to prevent use of contaminated ground water should be finalized if the plume has migrated north to an adjacent downgradient property.

Government Performance and Results Act (GPRA) Measure Review

As part of this FYR, the GPRA Measures have also been reviewed. The GPRA Measures and their status are provided as follows:

Environmental Indicators

Human Health: Human Exposure Controlled and Protective Remedy in Place (HEPR)

Ground Water Migration: Insufficient Data

Sitewide Ready for Anticipated Use (SWRAU)

The Site achieved the SWRAU Measure on June 27, 2008. EPA will re-evaluate the SWRAU Measure upon review of additional ground water data.

FIVE-YEAR REVIEW SUMMARY FORM

| SITE IDENTIFICATION | | |
|---|--|--|
| Site Name: Lord-Shope Landfill | | |
| EPA ID: PAD980508931 | | |
| Region: 3 | State: PA | City/County: Girard Township/Erie |
| SITE STATUS | | |
| NPL Status: Final | | |
| Multiple OUs? No | Has the site achieved construction completion? Yes | |
| REVIEW STATUS | | |
| Lead agency: EPA If "Other Federal Agency" selected above, enter Agency name: | | |
| Author name: David Turner and Nick Tymchenko, with additional support provided by Skeo Solutions | | |
| Author affiliation: EPA Region 3 | | |
| Review period: January 9, 2014 – September 10, 2014 | | |
| Date of site inspection: March 26, 2014 | | |
| Type of review: Statutory | | |
| Review number: 4 | | |
| Triggering action date: September 10, 2009 | | |
| Due date (five years after triggering action date): September 10, 2014 | | |

FIVE-YEAR REVIEW SUMMARY FORM (CONTINUED)

Issues/Recommendations

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

Issues and Recommendations Identified in the Five-Year Review:

| | | | | |
|--------------------------------------|---|---------------------------|------------------------|-----------------------|
| OU(s): OU1 | Issue Category: Institutional Controls | | | |
| | Issue: The ROD calls for institutional controls to prevent the use of contaminated ground water. Such controls are not in place on the adjacent property north monitoring wells 43A/B and 44A/B. | | | |
| | Recommendation: Institutional controls to prevent use of contaminated ground water should be finalized if the plume has migrated north to an adjacent downgradient property. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Implementing Party | Oversight Party | Milestone Date |
| No | Yes | PRP | EPA | 09/10/2015 |

| | | | | |
|--------------------------------------|--|---------------------------|------------------------|-----------------------|
| OU(s): OU1 | Issue Category: Remedy Performance | | | |
| | Issue: Vinyl chloride concentrations have shown increasing trends in downgradient wells W-43A/B W-44A. | | | |
| | Recommendation: Modify extraction system to capture Site related contamination that is not being captured downgradient of recovery wells. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Implementing Party | Oversight Party | Milestone Date |
| No | Yes | PRP | EPA | 03/01/2015 |

| | | | | |
|--------------------------------------|--|---------------------------|------------------------|-----------------------|
| OU(s): OU1 | Issue Category: Remedy Performance | | | |
| | Issue: There is not sufficient data to fully characterize the location of the plume. | | | |
| | Recommendation: Collect sufficient data to fully characterize the location of the plume downgradient of extraction wells. | | | |
| Affect Current Protectiveness | Affect Future Protectiveness | Implementing Party | Oversight Party | Milestone Date |
| No | Yes | PRP | EPA | 03/01/2015 |

Sitewide Protectiveness Statement

Protectiveness Determination
Short-term Protective

Addendum Due Date (if applicable)

Protectiveness Statement

The remedy currently protects human health and the environment because the cap and fencing prevent human and ecological contact with contaminants, the ground water treatment and ISVS systems are removing contaminants, and there are no exposures to contaminated ground water

However, in order for the remedy to be protective in the long term, the following actions need to be taken

- 1 Collect sufficient ground water data to fully characterize the location of the downgradient plume.
- 2 Modify extraction system to capture Site related contamination that is not being captured downgradient of recovery wells
- 3 Analyze for inorganic ground water contaminants of concern (COCs) to make sure concentrations have remained at acceptable levels
- 4 Institutional controls to prevent use of contaminated ground water should be finalized if the plume has migrated north to an adjacent downgradient property

Fourth Five-Year Review Report for Lord-Shope Landfill Superfund Site

1.0 Introduction

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

The United States Environmental Protection Agency prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Section 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The EPA interpreted this requirement further in the NCP, 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which 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 initiation of the selected remedial action.

EPA Region 3 with contractor support prepared this report regarding the remedy implemented at the Lord-Shope Landfill Superfund site (the Site) in Girard Township, Erie County, Pennsylvania. EPA conducted this FYR from January to September 2014. EPA is the lead agency for developing and implementing the remedy for the potentially responsible party (PRP)-financed cleanup at the Site. The Pennsylvania Department of Environmental Protection (PADEP), as the support agency representing the Commonwealth of Pennsylvania, has reviewed all supporting documentation and provided input to EPA during the FYR process.

This is the fourth FYR for the Site. The triggering action for this statutory review is the previous FYR. The FYR is required because hazardous substances, pollutants or contaminants remain at

the Site above levels that allow for unlimited use and unrestricted exposure. The Site consists of one operable unit (OU).

2.0 Site Chronology

Table 1 lists the dates of important events for the Site.

Table 1: Chronology of Site Events

| Event | Date |
|--|--------------------|
| About 4 million cubic feet of solid debris and industrial waste were deposited at the Lord-Shope Landfill | 1959-1979 |
| Pennsylvania Department of Environmental Resources (PADER) conducted a preliminary assessment of the Site | July 1, 1980 |
| Lord Corporation (the potentially responsible party, or PRP) began removal actions to address drums of waste, landfill leachate and the landfill cap | 1982 |
| Lord Corporation entered into a Consent Decree (CD) with PADER to implement remedial measures and continued site monitoring | July 1982 |
| EPA listed the Site on the National Priorities List (NPL) | September 8, 1983 |
| Lord Corporation completed a Focused Remedial Investigation Report | August 25, 1987 |
| Lord Corporation entered into a CD with PADER to conduct the remedial investigation and feasibility study | November 12, 1987 |
| Lord Corporation completed the Phase II Remedial Investigation Report | July 11, 1989 |
| Lord Corporation completed the Phase II Feasibility Study Report | July 18, 1989 |
| EPA began negotiations with site PRPs | March 21, 1990 |
| EPA issued the Record of Decision (ROD) for the Site | June 29, 1990 |
| Lord Corporation entered into a CD with EPA to complete the remedial design and remedial action | September 27, 1991 |
| EPA approved the proposed remedial design | July 20, 1994 |
| Remedial action phase started | October 31, 1994 |
| In-situ vapor stripping treatment system started operating | November 1995 |
| Ground water treatment system started operating | June 5, 1996 |
| EPA conducted a pre-certification of completion inspection of the Site | August 8, 1996 |
| Remedial action phase completed and EPA approved the Site's Preliminary Close-Out Report | September 30, 1996 |
| EPA signed the Site's first Five-Year Review (FYR) Report | November 4, 1999 |
| EPA authorized reduction of ground water monitoring from quarterly to semi-annually | August 2002 |
| EPA signed the Site's second FYR Report | September 10, 2004 |
| Lord Corporation suspended operation of the in-situ vapor stripping treatment system due to a mechanical failure | May 9, 2007 |
| A replacement vapor treatment system started operating | April 2008 |
| EPA approved a reduction of residential well sampling from semi-annually to annually | February 2009 |
| EPA signed the Site's third FYR Report | September 10, 2009 |

3.0 Background

3.1 Physical Characteristics

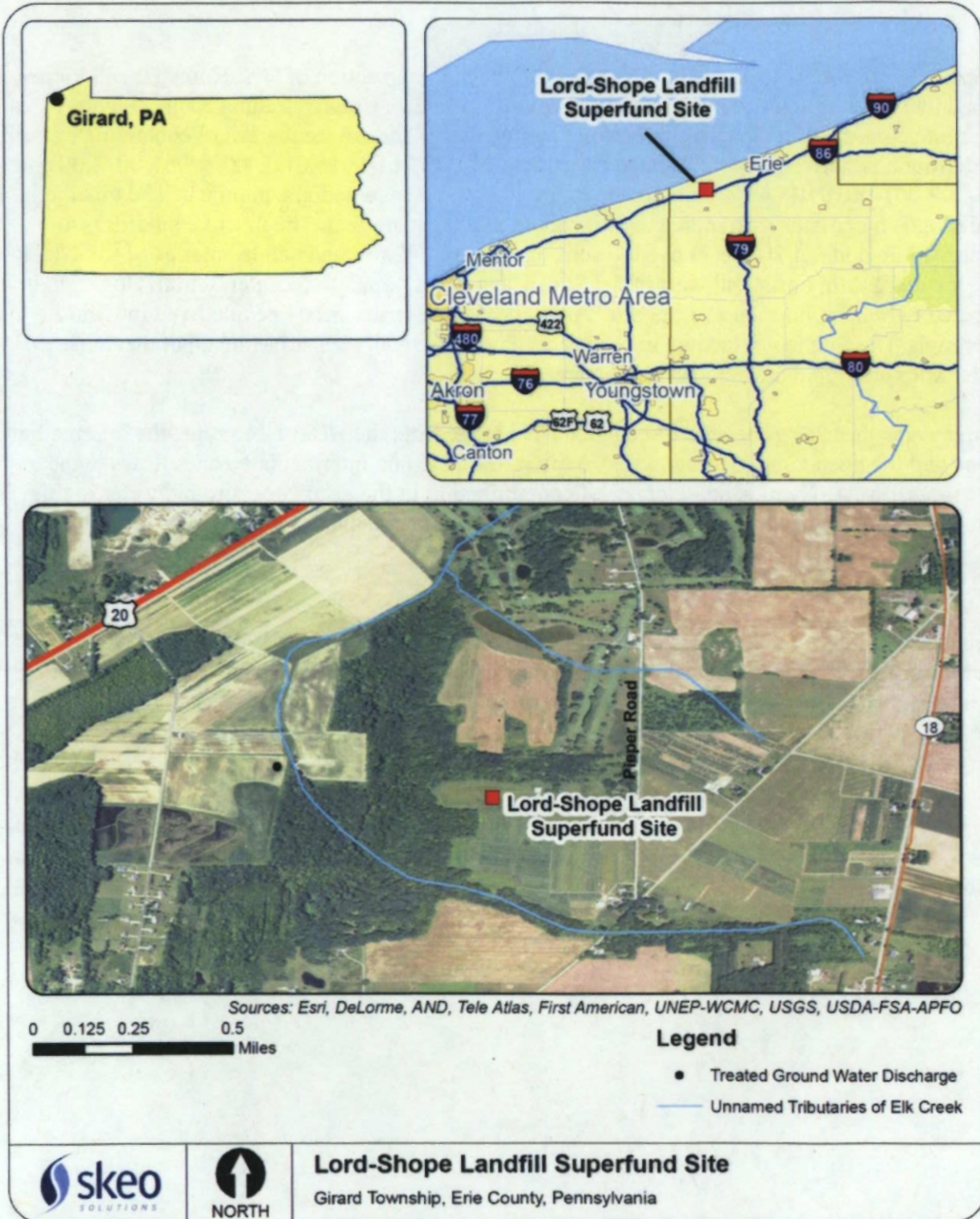
The 25.2-acre Site is located about a mile south of the intersection of U.S. Route 20 and Pieper Road in a rural agricultural part of Girard Township in Erie County, Pennsylvania (Figure 1). The Site consists of an inactive hazardous waste landfill and adjacent areas of contaminated soil and ground water. The Site is located on parcels 24-009-061-0016.01, 24-009-061-0018.00 and 24-009-061-0018.01. An on-site treatment building houses remedial equipment. The treatment building is a one-story structure covering about 5,000 square feet. The inactive landfill is a grassy mound about 20 feet above the surrounding land. Two unnamed tributaries of Elk Creek are located south, north and west of the Site. The nearest population center, Girard Borough, is located two miles northeast of the Site. As of the 2010 Census, 3,104 people lived in Girard Borough. The Site is not located in or near an environmentally sensitive area, but the unnamed tributaries are popular steelhead fishing areas.

Three water-bearing zones have been identified at the Site: the water table zone, the intermediate zone and the deep zone. Ground water in the water table and intermediate zones flows to the north-northwest. There is no evidence of contamination in the deep zone; ground water in this zone flows to the southwest. Figure 2 provides a detailed site map.

3.2 Land and Resource Use

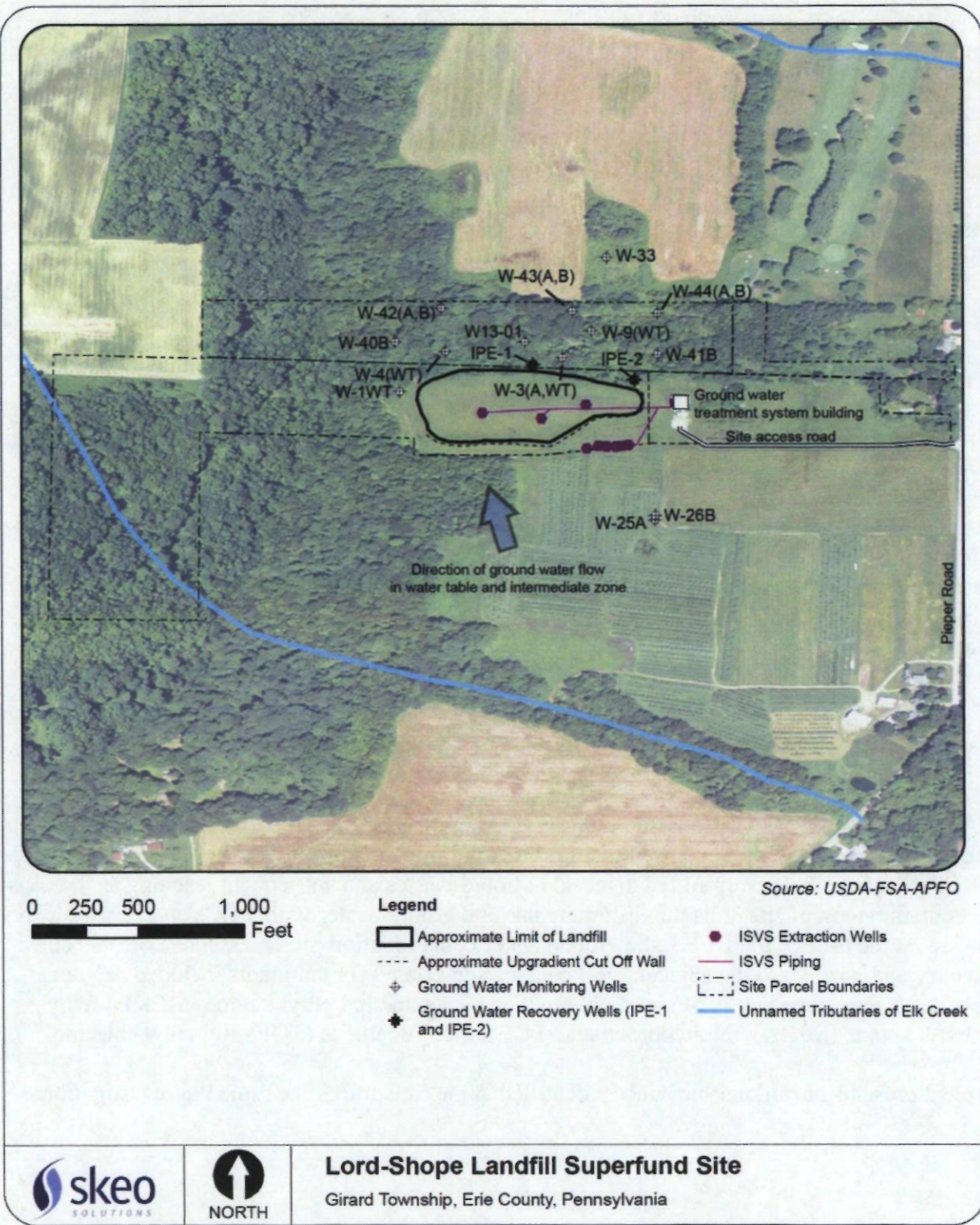
Four acres of the Site were used as a hazardous waste landfill; this landfill is currently inactive and the site property is vacant except for remedial components. This land use is not anticipated to change. The area surrounding the Site is primarily rural agricultural with scattered residential areas bordering the roads. An apple orchard and vineyard border the site property to the south. An evergreen nursery borders the site property to the west. A crop field and the Over Lake Golf Course border the site property to the north. The only nearby residences are located along Pieper Road to the east, about 1,000 feet from the landfill, and to the north, along Route 20 (West Ridge Road). All residences in the area use ground water as their potable water source. Surrounding land uses are not anticipated to change. Elk Creek, into which site runoff discharges, has a water intake about 4,800 feet downstream of the Site. The water from this intake is used to irrigate food crops.

Figure 1: Site Location Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Figure 2: Detailed Site Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

3.3 History of Contamination

From the late 1950s until 1979, industrial wastes, including spent adhesives, degreasing solvents, cutting oils, acids and caustics, along with paper, wood and rubber wastes, were disposed of at the Site. Mr. Melvin Shope, a Lord Corporation employee, owned and operated the property. The wastes were generated at Lord Corporation's manufacturing plants in Erie and Saegertown, Pennsylvania, and transported to the Shope property for disposal. On July 1, 1980, the Pennsylvania Department of Environmental Resources (PADER, now PADEP) conducted a preliminary assessment of the Site. Due to disposal and spillage of wastes and leaching of contaminants, the soils, landfill materials, and ground water became contaminated with volatile organic compounds (VOCs) and heavy metals.

3.4 Initial Response

In 1982, Lord Corporation, Mr. Shope and PADER entered into a Consent Order and Agreement that required monitoring and remedial measures at the Site. Lord Corporation implemented initial cleanup measures in 1982 and 1983, including removal and proper disposal of 81 exposed drums of waste, placement of a composite cap over the landfill, construction of a low permeability ground water cutoff wall upgradient (south) of the landfill, and regrading and revegetation of the Site. The objective of the cap and cutoff wall was to reduce contamination entering the ground water by reducing leachate production in the landfill and diverting ground water flow around the Site. EPA proposed listing the Site on the Superfund program's National Priorities List (NPL) on December 30, 1982. EPA listed the Site on the NPL on September 8, 1983.

3.5 Basis for Taking Action

In 1985, PADER and EPA requested that Lord Corporation conduct a focused remedial investigation and feasibility study (RI/FS). In 1987, Lord Corporation agreed to conduct the RI/FS under the terms of a Consent Order. Following evaluation of the Remedial Investigation Report, PADER and EPA requested that Lord Corporation conduct a Phase II RI/FS. The Phase II RI/FS Report cited uncontrolled disposal of liquid wastes and subsequent leaching as the cause for contamination of site soils, landfill materials and ground water with VOCs and various heavy metals. At the time of the RI/FS, the ground water contamination plume extended off the site property and north onto the adjacent golf course. Site-related contaminants included acetone, arsenic, barium, benzene, 1,2-trans-dichloroethene, lead, methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK), tetrachloroethene (PCE), trichloroethene (TCE) and vinyl chloride.

Table 2 presents hazardous substances identified at the Site during the remedial investigations.

Table 2: Hazardous Substances Identified During Site Remedial Investigations

| Chemical | Soil | Ground Water | Sediment | Seeps |
|---|------|--------------|----------|-------|
| PCE | X | X | | |
| Toluene | X | | | |
| Ethyl benzene | X | | | |
| Benzene | X | X | | |
| Methylene chloride | X | | | |
| TCE | X | X | | X |
| MIBK | | X | | |
| 4-Methyl-2-pentanol | X | X | | |
| Acetone | X | X | X | |
| MEK | X | X | | |
| Vinyl chloride | X | X | | |
| trans-1,2-Dichloroethene | | X | | |
| Cyclohexanone | | X | | |
| 2-Butanol | X | X | | |
| Isopropanol | | X | | |
| Tetrahydrofuran | | X | | |
| Chlorobenzene | | X | X | |
| 1,1-Dichloroethene | | X | | |
| Aluminum | | X | X | X |
| Arsenic | | X | X | X |
| Barium | | X | X | X |
| Cadmium | | X | X | |
| Chromium | | X | X | X |
| Cobalt | | X | X | |
| Copper | | X | X | X |
| Lead | | X | X | X |
| Mercury | | X | X | X |
| Nickel | | X | X | |
| Zinc | | X | X | X |
| Notes: For complete results, please see the Phase II Remedial Investigation Report. X = Found in medium. | | | | |

Human Health Risk Assessment

The original 1987 Baseline Public Health Evaluation focused on risks to humans from potential ingestion of contaminated ground water near the Site. The July 1989 Revised Baseline Public Health Evaluation used new Phase II remedial investigation data to evaluate other potential pathways, including ingestion of contaminated surface water and sediments, and inhalation of VOCs in surface water seeps.

The July 1989 Revised Baseline Public Health Evaluation found that potential exposures to ground water at the Site were associated with significant human health risks. Risks were highest for the ingestion of ground water. Risks related to ingestion of soils and sediments at the Site were within acceptable ranges. Although ingestion of water from contaminated surface seeps at the Site presented an unacceptable risk, the evaluation concluded that accidental ingestion of seep water was highly unlikely. The ground water cutoff wall and the landfill cap (described in Section 3.4) addressed the seeps, which are no longer present.

Risks related to potential ingestion of surface water from the two unnamed tributaries and from ingestion of the sediments were within EPA's acceptable range. Risks posed by inhalation of contaminants in the air at the Site were insignificant because of the very low concentrations of those contaminants and the low likelihood of any significant time of exposure.

Surface Water and Sediment

The environmental sampling, during the remedial investigation, of the surface water and sediments of the two small tributaries of Elk Creek provided information leading to a determination that the risks posed by those media were within EPA's acceptable range. Also, during the RI, it was determined that the small seeps found in the Site area were unlikely to provide a pathway for significant exposures. As stated above, the ground water cutoff wall and the landfill cap addressed the seeps, which are no longer present.

While surface water and sediment samples have not been collected as part of a post-ROD monitoring program to ensure that these media are not impacted, the ground water data to date does not suggest that there is a continuing release of ground water or contaminants in ground water which would currently pose an unacceptable ecological risk to aquatic receptors associated with the unnamed tributaries of Elk Creek.

Ecological risk assessments are most often conducted during the RI/FS phase of the Superfund process. They are used to evaluate the likelihood of adverse ecological effects occurring as a result of exposure to physical (site cleanup activities) or chemical (releases of hazardous substances) stressors, which are defined as any physical, chemical or biological entities that can induce adverse responses at a site. Since the time of the Site's RI and ROD, the ecological risk assessment process has evolved substantially. No formal ecological risk assessment has been conducted for the Site.

4.0 Remedial Actions

In accordance with CERCLA and the NCP, the overriding goals for any remedial action are protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). A number of remedial alternatives were considered for the Site. Final selection was made based on an evaluation of each alternative against nine evaluation criteria specified in Section 300.430(e)(9)(iii) of the NCP.

4.1 Remedy Selection

On June 29, 1990, EPA signed a Record of Decision (ROD) specifying EPA's selected remedial alternative. The remedial action objectives (RAOs) are to eliminate or reduce the risks posed by the potential ingestion of contaminated ground water and direct contact with the contaminated soils associated with the Site. The ROD included the following major remedy components:

- Ground water extraction and treatment to quickly stop further migration of contaminated ground water, with the long-term effect of returning the ground water to its most

beneficial use. Treated ground water is discharged to a tributary of Elk Creek adjacent to the Site, subject to National Pollutant Discharge Elimination System (NPDES) permit regulations.

- In-situ vapor stripping (ISVS), which uses vacuum wells to remove VOCs from the landfill materials and surrounding soils.
- Institutional controls to restrict the use of contaminated ground water and security fencing around the property to prevent direct human contact with contaminants at the Site.

According to the ROD, ground water will be cleaned up to background levels, as stipulated by Pennsylvania Code Title 25, Section 75.264(n). This section of the Pennsylvania Code is no longer in effect. Also, after EPA issued the ROD, the Commonwealth of Pennsylvania adopted a statute that does not require cleanup of contaminated ground water to background levels. However, EPA has not modified the ROD for the Site to allow for ground water cleanup levels to be Maximum Contaminant Levels (MCLs). In addition to stating that ground water will be cleaned up to background levels, the ROD also developed additional ground water cleanup goals. Some of these additional cleanup goals were set using existing or proposed federal MCLs; others were calculated based on human health risk. See Section 6.3 of this FYR for additional information.

4.2 Remedy Implementation

Lord Corporation fenced the site property in 1991 and started the remedial design on August 19, 1991. On September 27, 1991, Lord Corporation entered into a CD with the United States for design and implementation of the remedy selected in the Site's ROD. EPA approved the remedial design on July 20, 1994.

Lord Corporation started remedial action construction on October 31, 1994. In the spring of 1995, Lord Corporation began installing the ISVS and ground water treatment systems; this work continued through the fall of 1995. The ISVS system consists of a vapor extraction system, a vapor collection header system, a vapor treatment system (thermal oxidizer), monitoring components and controls. The ISVS system became operational in November 1995. The ground water recovery and treatment system became operational on June 5, 1996, when Lord Corporation completed physical construction of the remedy. The ground water recovery system includes two ground water recovery wells, an underground force main, controls and associated electrical equipment. The ground water treatment system provides metals removal through solids separation and VOC removal by air stripping. In accordance with the Site's Long-term Groundwater Monitoring Plan, Lord Corporation performs ground water monitoring of on-property wells, off-property perimeter wells and residential wells near the Site. Lord Corporation also analyzes the treated ground water point of discharge to the creek on a quarterly basis.

On October 17, 1991, Lord Corporation filed a Notice of Obligation, which allows access to the site property for remediation and monitoring, restricts interference with the remedy, and specifies that these obligations run with the land. EPA signed the Site's Preliminary Close-Out Report on September 30, 1996.

4.3 Operation and Maintenance (O&M)

O&M activities at the Site are performed according to the August 1996 Operation and Maintenance Manual for the ISVS and ground water treatment systems. The 1990 ROD estimated average annual O&M costs of \$310,000 for a standardized duration of 30 years. O&M activities include maintenance of the landfill cap and fencing, operation of the vapor stripping system and the thermal oxidation system, pumping and treatment of contaminated ground water, discharge of treated ground water, and monitoring of site wells and residential wells. O&M costs are presented in Table 3. These costs are inclusive and incorporate property tax, insurance, utilities, miscellaneous maintenance, ground water monitoring, landscaping, equipment and waste disposal.

Table 3: Annual O&M Costs

| Year | Total Cost |
|------|------------|
| 2009 | \$255,096 |
| 2010 | \$225,342 |
| 2011 | \$231,746 |
| 2012 | \$258,508 |
| 2013 | \$310,292 |

5.0 Progress Since the Last Five-Year Review

The protectiveness statement from the Site's 2009 FYR Report stated:

The constructed remedy is functioning as intended by the ROD. The landfill cap and Site fencing provide two lines of defense to prevent any potential for direct contact with contaminated soil. The groundwater extraction system is functioning as designed and the discharge of treated effluent to the unnamed tributary of Elk Creek consistently meets or exceeds NPDES standards. There are no exposures to Site-related groundwater contaminants. The ISVS system is also functioning as designed. The institutional controls are in place and are being maintained on the deed to the property thereby providing an effective warning to any potential future owners of the property regarding the contamination. Because there are no current exposures and because the potential for future exposures is minimal, the remedy at the Site remains protective of human health and the environment.

The 2009 FYR Report did not include any issues or recommendations.

6.0 Five-Year Review Process

6.1 Administrative Components

EPA Region 3 initiated the FYR in January 2014 and scheduled its completion for September 2014. EPA remedial project manager (RPM) David Turner led the EPA site review team, which also included EPA community involvement coordinator (CIC) Alexander Mandell and contractor

support provided to EPA by Skeo Solutions. The review schedule consisted of the following activities:

- Community notification.
- Document review.
- Data collection and review.
- Site inspection.
- Local interviews.
- FYR Report development and review.

6.2 Community Involvement

In April 2014, EPA published a public notice in the *Erie Times* newspaper announcing the commencement of the FYR process for the Site, providing contact information for EPA CIC Alexander Mandell and EPA RPM David Turner, and inviting community participation. The press notice is available in Appendix B. No one contacted EPA as a result of the advertisement.

EPA will make the final FYR Report available to the public. EPA will place copies of the document in the designated site repository: Rice Avenue Community Public Library, located at 705 Rice Avenue in Girard, Pennsylvania.

6.3 Document Review

This FYR included a review of relevant, site-related documents, including the ROD, remedial action reports and recent monitoring data. Appendix A provides a complete list of the documents reviewed.

ARARs Review

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain “a degree of cleanup of hazardous substance, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment.” The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate.

Ground Water ARARs

According to the Site’s 1990 ROD, ground water will be cleaned up to background levels, as stipulated by Pennsylvania Code Title 25, Section 75.264(n). This section of the Pennsylvania Code is no longer in effect. Also, after EPA issued the ROD, the Commonwealth of Pennsylvania adopted a statute, the Land Recycling and Environmental Remediation Standards Act (Act 2) of 1995, which does not require that contaminated ground water be cleaned up to background levels. However, EPA has not modified the ROD to allow for cleanup levels less stringent than background levels.

In addition to stating that ground water will be cleaned to background levels, the 1990 ROD developed additional ground water cleanup goals. Some of these additional cleanup goals were

set using existing or proposed federal MCLs; others were calculated based on human health risk (see Table 4). This FYR compared the ARARs from the 1990 ROD with current MCLs (Table 4). The ARARs for arsenic, cadmium, lead and toluene have become more stringent since the 1990 ROD. These changes do not affect the protectiveness of the remedy, because the ground water cleanup goals are set at background levels, which are more stringent than both the MCLs and the risk-based levels in the ROD. The ARARs for barium and chromium have become less stringent since the 1990 ROD. All other ARARs remain unchanged.

Table 4: ARAR Review for Ground Water Contaminants of Concern (COCs)

| COC | 1990 ROD ARAR (µg/L) | Current ARAR (µg/L) ¹ | ARAR Change |
|--|---|----------------------------------|--|
| Acetone | Not based on ARAR | No MCL | No change |
| Arsenic | Risk-based: 2 ARAR: 50 ¹ | 10 | More stringent (cleanup levels not based on ARARs) |
| Barium | 1,000 ¹ | 2,000 | Less stringent |
| Benzene | 5 ¹ | 5 | No change |
| Cadmium | 10 ¹ | 5 | More stringent (cleanup levels not based on ARARs) |
| Chlorobenzene | 100 ² | 100 | No change |
| Chromium | 50 ¹ | 100 | Less stringent |
| Trans-1,2-dichloroethene | 100 ² | 100 | No change |
| Lead | Risk-based: 15 ARAR: 50 ¹ | 15 | More stringent (cleanup levels not based on ARARs) |
| MEK | Not based on ARAR | No MCL | No change |
| MIBK | Not based on ARAR | No MCL | No change |
| PCE | 5 ² | 5 | No change |
| Toluene | 2,000 ² | 1,000 | More stringent (cleanup levels not based on ARARs) |
| TCE | 5 ¹ | 5 | No change |
| Vinyl chloride | 2 ¹ | 2 | No change |
| Notes: 1. Federal MCL. Current MCLs are available at: http://water.epa.gov/drink/contaminants/index.cfm (accessed 1/31/2014). 2. Proposed federal MCL. 3. µg/L = micrograms per liter. | | | |

It is important to note that while individual COCs may be at or below their respective MCLs resulting in acceptable ground water concentrations, multiple COCs may result in unacceptable risks due to cumulative cancer risks, or through the effect on hazard quotients by multiple contaminants acting on the same target organ or system. It is also important to recognize that MCLs are not entirely toxicity-based values but also take into account the technical means to remove or reduce a COC in water. Also, because MCLs and toxicity values may change in the future, protectiveness is best assessed when it is believed that ground water cleanup is approaching MCLs. Therefore, it is recommended that ground water risks be evaluated near the end of the remedy (when cleanup numbers are approaching MCLs) to ensure protectiveness at that time.

Surface Water ARARs

The 1990 ROD stated that “treatment and discharge of contaminated groundwater to an unnamed tributary of Elk Creek will cause the requirements of Pennsylvania’s NPDES program to apply.” Lord Corporation performs sampling and analysis of the NPDES outfall on a quarterly basis. Historic analytic results indicate the NPDES discharge analysis are in compliance of permitted limits. On February 22, 2013, PADEP issued a discharge permit to Lord Corporation, effective March 1, 2013, through February 28, 2018. Table 5 presents the effluent limitations from the 2013 permit.

Table 5: Effluent Limitations from 2013 Discharge Permit

| Parameter | Effluent Limitations (mg/L) | | |
|----------------|-----------------------------|---------------|-----------------------|
| | Average Monthly | Maximum Daily | Instantaneous Maximum |
| Aluminum | 1.6 | 3.2 | 4 |
| Barium | 1.7 | 3.4 | 4.3 |
| Iron (total) | 1.6 | 3.2 | 4 |
| Cadmium | 0.00068 | 0.0014 | 0.0017 |
| Copper | 0.023 | 0.05 | 0.058 |
| Zinc | 0.06 | 0.12 | 0.15 |
| Mercury | 0.0000013 | 0.0000026 | 0.0000032 |
| TCE | 0.018 | 0.036 | 0.045 |
| Vinyl chloride | 0.00038 | 0.0008 | 0.001 |
| MEK | 3.4 | 6.8 | 8.5 |
| MIBK | 3.4 | 6.8 | 8.5 |
| Acetone | 6.7 | 13.4 | 16.8 |
| pH | | | 9.0 (minimum = 6.0) |
| Phosphorus | 1.0 | | |

Air ARARs

The 1990 ROD states that the ISVS system will meet the National Emission Standards for Hazardous Air Pollutants. The emission standard for vinyl chloride plants (10 parts per million, or ppm, averaged over a three-hour period) has not changed since the ROD was issued.

Institutional Control Review

On April 9, 2014, Skeo Solutions staff conducted research using the Erie County Office of the Recorder of Deeds online system and found deed information pertaining to the Site. This information is listed in Table 6.

Table 6: Deed Documents from Erie County Public Records

| Date | Type of Document | Description | Book # | Page # |
|----------|----------------------|--|--------|--------|
| 9/27/91 | CD | Specifies that Lord Corporation will perform design and implementation of the remedy selected in the ROD. | 0180 | 2091 |
| 10/17/91 | Notice of Obligation | Allows access to the site property for remediation and monitoring, restricts interference with the remedy, and specifies that these obligations run with the land. | 0180 | 2263 |

Table 7 lists the institutional controls associated with areas of interest at the Site. Figure 3 provides a map of parcels affected by the institutional controls. Figure 3 also includes the parcels located above the plume, which may include parcel 24-009-061-0013.00, to the north of the site property.

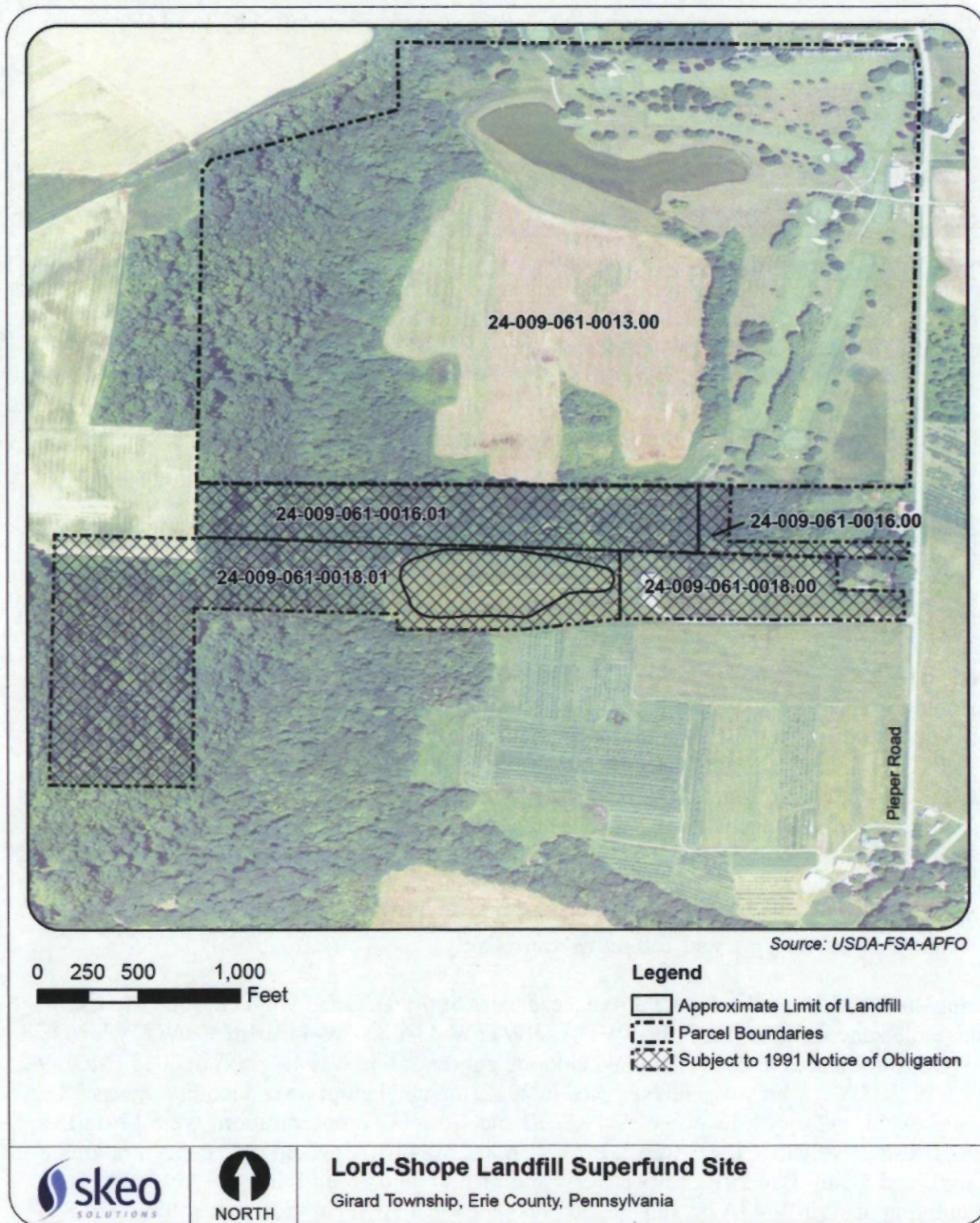
Table 7: Institutional Control (IC) Summary Table

| Area of Interest – Lord-Shope Landfill Site (Parcels: 24-009-061-0016.01, 24-009-061-0018.00, 24-009-061-0018.01, 24-009-061-0013.00) | | | | | | |
|--|------------|--------------------------------------|--|--|---|---|
| Media | ICs Needed | ICs Called for in Decision Documents | Impacted Parcel(s) | IC Objective | Instrument in Place | Notes |
| Ground Water | Yes | Yes | 24-009-061-0016.01 24-009-061-0018.00 24-009-061-0018.01 | Restrict use of contaminated ground water. | CD and Notice of Obligations | EPA has determined the CD and Notice of Obligation is sufficient to restrict use of ground water on these parcels |
| Ground Water | Yes | Yes | 24-009-061-0013.00 | Restrict use of contaminated ground water. | None | (golf course property) |
| Soil | Yes | No | 24-009-061-0018.01 | Prevent damage to the landfill cap. | Addressed in CD and 1991 Notice of Obligation | Although the cap is not part of the remedy, long-term protectiveness may be compromised if the cap is damaged. |

The 1990 ROD specifies that the remedy include institutional controls to prevent the use of contaminated ground water; no instrument is in place for this restriction for the property on the northern portion of the Site. The ROD did not specify institutional controls to restrict activities that could damage the cap, but these controls are in place through the CD and the 1991 Notice of Obligation. The 1991 Notice of Obligation states that:

- The United States of America and its representatives shall have access at all reasonable times to the property for purposes of effectuating and monitoring compliance with the terms of the CD, all as provided in Section X (Access) of the CD.
- No grantee or successor-in-title shall interfere with, obstruct or disturb the performance, support or supervision of any remedial or response actions taken or to be taken on the property, including any operation and maintenance activities conducted in connection with the terms of the CD.
- The grantee or successor-in-title shall inform any person or entity that subsequently acquires any title, easement, leasehold or other interest in the property or any portion thereof of the requirements, conditions and operative effect of Section X (Access) of the CD.

Figure 3: Institutional Control Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

According to the Notice of Obligation, these restrictions apply to the site parcels (24-009-061-0016.01, 24-009-061-0018.00, 24-009-061-0018.01) and any other properties located adjacent or contiguous to the site parcels that are subsequently acquired or controlled by Lord Corporation (24-009-061-0016-00) (Figure 3).

6.4 Data Review

Ground Water

The ground water monitoring program includes semi-annual hydraulic monitoring at 60 monitoring points, annual ground water quality VOC sampling and natural attenuation parameter measurement of 18 monitoring wells, quarterly water quality monitoring of the treatment system discharge, and ground water quality VOC monitoring of 13 residential wells. See Section 3.1 for a summary of the Site's geology.

Ground Water Quality Sampling

Refer to Figure 4 below for monitoring well locations. Figure 4 also depicts approximate historical VOC plume extents, as interpreted by Lord Corporation.

In 2012 and 2013, no VOCs were detected above MCLs in off-property monitoring wells. VOC concentrations were below the MCLs in many of the on-property monitoring wells.

However, exceedances of the MCLs were observed at three on-property intermediate zone wells in 2012 and 2013 (W-3A/3AR, W-3/3R and W-43B). In 2013, W-3A/3AR, which was not sampled in 2012, had vinyl chloride (6,100 µg/L) and cis-1,2-dichloroethene (1,100 µg/L) concentrations above the MCLs (2 µg/L and 70 µg/L, respectively). In W-3/3R, the 2012 and 2013 concentrations of cis-1,2-dichloroethene were 510 µg/L and 780 µg/L, respectively (MCL = 70 µg/L) and vinyl chloride concentrations were 2,900 µg/L and 3,900 µg/L, respectively (MCL = 2 µg/L). W-3/3R and W-3A/3AR are located between the two extraction wells; these high and increasing concentrations indicate an area of the plume that is not being captured by the recovery system. In W-43B, the 2012 and 2013 vinyl chloride concentrations were 62 µg/L and 250 µg/L, respectively (MCL = 2 µg/L). Lord Corporation agreed to complete a supplementary sampling event of wells W-43A and W-43B on July 25, 2014 which resulted in vinyl chloride concentrations of 8.5 µg/L and 160 µg/L, respectively

During 2012 and 2013, there were also exceedances of the TCE and vinyl chloride MCLs in water table zone wells W-1WT, W-3WT, W-9WT, W-43A and W-44A. In W-1WT, which had no MCL exceedances in 2012, the vinyl chloride concentration was 4.4 µg/L in 2013 (MCL = 2 µg/L). In W-3WT, which was not sampled in 2012, the vinyl chloride concentration was 38 µg/L in 2013 (MCL = 2 µg/L). In W-9WT, the 2012 and 2013 TCE concentrations were 18 µg/L and 8 µg/L, respectively (MCL = 5 µg/L). In W-43A and W-44A, vinyl chloride concentrations were 20 µg/L and 5.5 µg/L in 2012, respectively, and 11 µg/L and 16 µg/L in 2013, respectively. Resampling of well W-43A on July 25, 2014 resulted in a vinyl chloride concentration of 8.5 µg/L.

According to Lord Corporation's 2013 Annual Ground Water Monitoring Report, review of historical and current annual ground water monitoring data from 1996 to 2013 using linear regression analyses indicates that VOC concentrations are currently either decreasing or stable to the north of the landfill, with the exception of water table zone monitoring wells W-43A and W-44A and intermediate zone monitoring well W-43B. Vinyl chloride concentrations in wells W-43A and W-44A had an increasing trend since the last FYR. Vinyl chloride concentrations in well W-43B decreased between 1998 and 2007, but have been increasing rapidly since 2010. Lord Corporation's 2013 Annual Ground Water Monitoring Report acknowledges that "the capture in the WTZ [water table zone] is limited due to the partial hydraulic connectivity with the IZ [intermediate zone]." In addition, the increasing vinyl chloride concentrations in intermediate zone well W-43B since 2010 indicate that the existing ground water system may not be effectively capturing the plume in the intermediate zone. Ethane and Ethene concentrations are concurrently increasing with vinyl chloride concentrations, which is indicative of reductive dechlorination, the common degradation pathway for VOCs.

According to the approximate plume extents for the combined water table and intermediate zones, as interpreted by Lord Corporation in the 2013 Annual Ground Water Monitoring Report (see Figure 4), the VOC plume decreased significantly from 1989 to 1996, decreased further from 1996 to 2001, but then increased from 2001 to 2006/2011. This FYR finds that the current VOC plume covers at least the areas shown by the 2001 plume on Figure 4. However, there is not sufficient data to fully characterize the location of the plume. Well W-43A/B is located north of the landfill on the Lord Corporation property boundary and downgradient wells have been decommissioned as the plume decreased in size. However, in order for the current plume boundary to be accurately defined, additional ground water data is required.

In the past 10 years, as approved by EPA, ground water has not been sampled for inorganic COCs. During the 2014 FYR process, Lord Corporation agreed to sample for inorganic COCs in the future, and is currently working on a sampling schedule to submit to EPA.

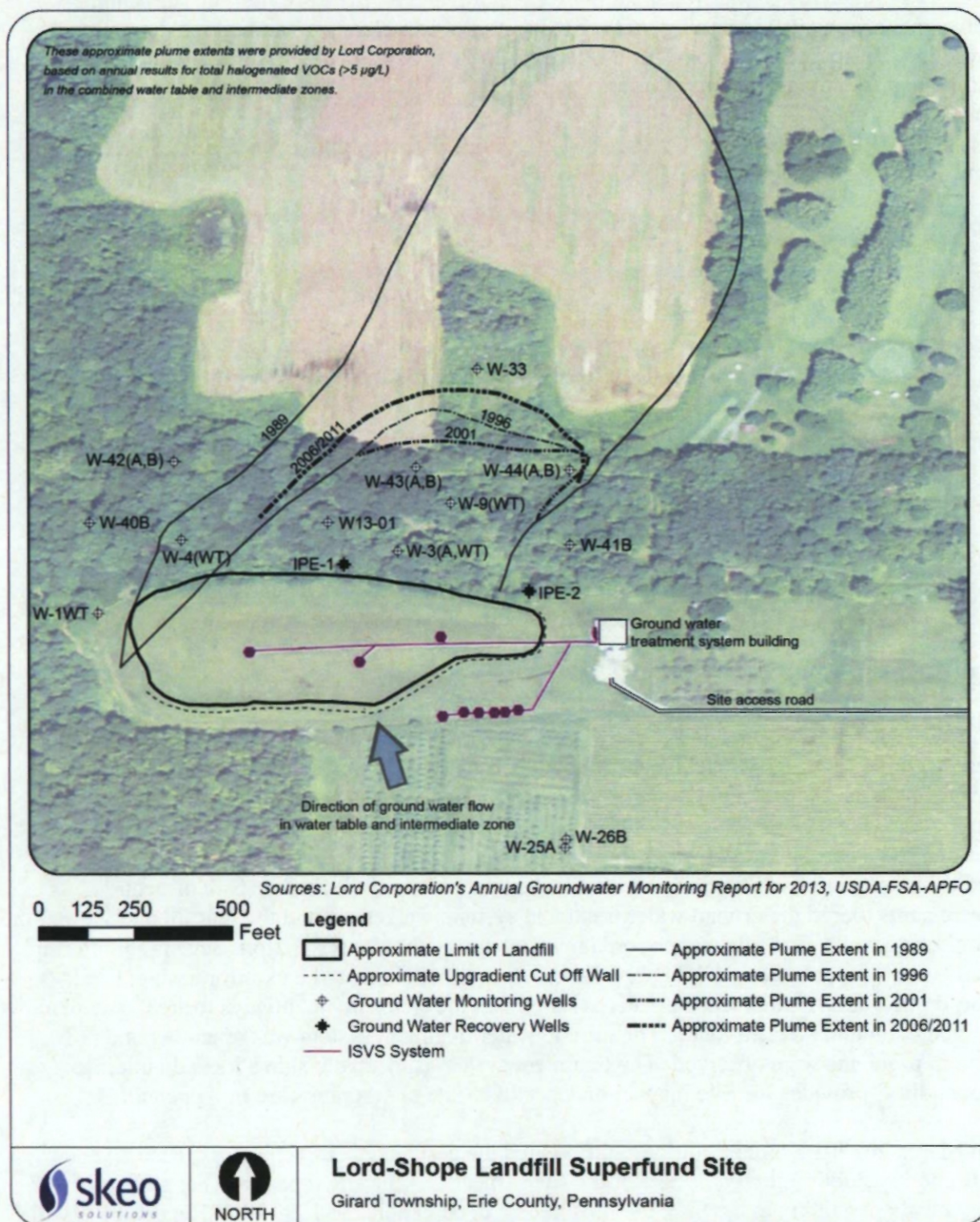
Ground water flow in the water table zone is to the north-northwest, but there do not appear to be monitoring wells to the north-northwest of water table well W-43A/B, which has vinyl chloride concentrations above the MCL and an increasing trend of vinyl chloride concentrations over time. The 2012 Annual Ground Water Monitoring Report states that W-33, in which vinyl chloride has been below the MCL since 2003 and was below the detection limit in 2012 and 2013, is downgradient of W-43A. However, if ground water flow is to the north-northwest, W-33 appears to be generally located crossgradient of W-43A/B.

Water Quality Monitoring of the Treatment System

On November 23, 2006, on behalf of Lord Corporation, remedial contractor Arcadis submitted an application for a NPDES permit from PADEP. In a letter dated July 31, 2007, PADEP issued (in lieu of the NPDES permit) effluent limits regulating discharge from the Site from the Environmental Cleanup Program effective May 29, 2007, and expiring on May 28, 2012. On March 29, 2012, Arcadis submitted the Application for NPDES Permit Renewal. PADEP directed Lord Corporation to continue to operate under the original permit pending evaluation of the renewal. On February 22, 2013, PADEP issued a discharge permit to Lord Corporation, effective March 1, 2013, through February 28, 2018.

VOC concentrations in ground water effluent have been below the daily maximum discharge limits from 2009 through 2013. System removal efficiencies range from 98 to 100 percent. From 2009 to 2013, the ground water system removed 22 pounds of VOCs per year, on average, and a total of 111 pounds of VOCs from 2009 through 2013. Currently, the VOC mass removed by the ground water treatment system consists primarily of vinyl chloride.

Figure 4: Approximate VOC Plume Extents Over Time



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Residential Well Sampling

Arcadis sampled residential water supply wells north and northeast of the Site semiannually between 2009 and 2011; starting in 2012, EPA approved a change to annual residential well sampling. Samples are analyzed for a select group of VOCs and other water quality parameters; inorganics are not included in sampling. Thirteen residential wells were sampled in June 2009, June 2010, June 2012 and June 2013; 12 residential wells were sampled in October 2009, October 2010, June 2011 and October 2011. During these sampling events, there were no VOC concentrations detected above MCLs.

ISVS System

Prior to 2007, the ISVS system operated continuously throughout the year. Since 2009, the ISVS system has operated for four months a year. In 2012, the ISVS system operated during May, July, September, and October, which is consistent with the EPA-approved schedule. Using EPA's emission factor information (PA AP-42, Fifth Edition, Volume 1, Chapter 1- External Combustion Sources, Section 1.4-Natural Gas Combustion, Table 1.4-2), about 67 percent less carbon dioxide is emitted on the four-month operating schedule than a continuous operating schedule. This equates to a reduction in carbon dioxide emissions of about 340,000 pounds per year. From 2009 to 2013, about 4,466 pounds of VOC mass was removed from the landfill by the ISVS system; on average, 893 pounds were removed per year during this timeframe. Recoveries during 2011 (1,488 pounds) and 2012 (1,793 pounds) were the highest of the past five years; 948 pounds were removed in 2013. The total annual VOC emissions have been below the 2.7 tons per year Pennsylvania requirements for 11 consecutive years (2003 through 2013).

6.5 Site Inspection

The site inspection was conducted on March 26, 2014. Site inspection participants included David Turner, EPA RPM; Alexander Mandell, EPA CIC; Gary Mechtly and Chris Saber, PADEP; George Kickel and Ben Witt, Lord Corporation; Jason Manzo, Arcadis; and Amanda Goyne and Hagai Nassau, Skeo Solutions. The landfill, monitoring wells on the site property, the thermal oxidizer, the ground water treatment system and the ISVS system are surrounded by a chain-link fence, which is secured with a locked gate at the site entrance. Site inspection participants toured the ground water treatment system, walked around the landfill and viewed the monitoring wells. The Site was covered in snow during the site inspection. Several monitoring wells were not locked (e.g., WTP-2, 3-B) or were not labelled on the exterior casing. Lord Corporation and Arcadis representatives stated that the wells are not always locked, but are all located behind the locked fence. The ground water treatment system was operating and no system problems were observed. The treatment system is located inside a locked building. Appendix C provides the Site Inspection Checklist. Site photographs are in Appendix D.

On March 26, 2014, Skeo Solutions staff visited the designated site repository, Rice Avenue Community Public Library, as part of the site inspection. The site repository has several documents pertaining to the Site; the most recent document is the 1999 FYR Report. EPA will update the repository with recent site documents.

6.6 Interviews

The FYR process included an interview with Bill Felege, Girard Township Supervisor/Emergency Management Coordinator. The purpose was to document the perceived status of the Site and any perceived problems or successes with the phases of the remedy implemented to date. The interview took place after the site inspection on March 26, 2014. The interview is summarized below.

Mr. Felege stated that he had not heard any inquiries regarding the Site from community members in the past five years. He thinks that not many people know about the Site. About 10 years ago the golf course owner was interested in developing part of the course for condominiums, but that has not happened and Mr. Felege has not heard since then about development plans. When asked what the best way would be to communicate with the community, Mr. Felege stated that the Township has a Web page and a Facebook page; information from EPA could be placed on these pages. He stated that the best newspaper to reach the local community would be the *West County News-Journal*.

Mr. Felege asked some questions about the Site. These questions, as well as follow-up information gathered from Lord Corporation and shared with Mr. Felege after the interview, are included in Appendix C.

7.0 Technical Assessment

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

Yes. The remedy is generally functioning as intended by site decision documents. Overall, the ground water treatment system is effectively removing contaminants from the ground water and ground water contaminant concentrations have generally decreased over time. However, contaminant concentrations in some downgradient wells have increased. In addition, there do not appear to be monitoring wells to the north-northwest (downgradient) of water table well W-43A/B, which has vinyl chloride concentrations above the MCL and an increasing trend of vinyl chloride concentrations since the last FYR. There also appears to be a portion of the plume (between the extraction wells) that is not being treated by the existing system. This suggests an opportunity for optimization of the existing ground water remedy. Ground water monitoring is performed on a regular schedule, but analysis for inorganic COCs has not been performed in the past 10 years. During the 2014 FYR process, Lord Corporation agreed to sample for inorganic COCs in the future, and is currently working on a sampling schedule to submit to EPA. The ISVS system effectively removes contaminants from the landfill and contaminated soils. O&M activities are performed on a regular schedule as planned.

As required in the ROD, security fencing is in place around the site property to protect the cap. The fence surrounds the landfill, monitoring wells on the site property, the thermal oxidizer, the ground water treatment system and the ISVS system. This fencing was intact and in good condition during the site inspection. The ROD specifies that the remedy will include institutional controls to prevent the use of contaminated ground water; no instrument is in place for this restriction for parcel 24-009-061-0013.00. The 1991 Notice of Obligation allows access to the

site property for remediation and monitoring, restricts interference with the remedy, and specifies that these obligations run with the land.

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

Yes. The RAOs used at the time of remedy selection are still valid. The Site's ROD states that ground water will be cleaned up to background levels. The ROD also developed additional ground water cleanup goals. Some of these additional cleanup goals were set using existing or proposed federal MCLs; others were calculated based on human health risk. This FYR reviewed the additional ground water cleanup goals established in the ROD. For the MCL-based additional ground water cleanup goals, this FYR found that some MCLs have become more stringent since the ROD was issued. However, this does not affect the remedy's protectiveness because the ground water cleanup goals are set at background levels, which are more stringent than the MCLs. For the risk-based additional ground water cleanup goals, this FYR found that the additional cleanup goals for acetone, arsenic and MEK are still within EPA's range of acceptable risk. The additional ground water cleanup goal for MIBK (1,750 µg/L) is above EPA's current non-cancer screening level (1,000 µg/L); however, this does not affect the protectiveness of the remedy, because the background level (i.e., the cleanup goal) for MIBK is far lower than 1,000 µg/L. The additional ground water cleanup goal for lead established in the ROD (15 µg/L) is equivalent to the current action level for lead in drinking water. Because MCLs and toxicity values may change in the future, protectiveness is best assessed when it is believed that ground water cleanup approaching cleanup goals. Therefore, ground water risks will be evaluated at the end of the remedy (when cleanup numbers are approaching MCLs) to ensure protectiveness at that time.

A vapor intrusion exposure pathway evaluation was conducted for the Site during the 2009 FYR. The evaluation concluded that the vapor intrusion pathway was not a concern, primarily because: 1) VOCs have never been detected in off-property residential wells; 2) the ground water plume is crossgradient to existing and/or planned structures; 3) the leading edge of the plume is about 300-500 feet away from the nearest inhabited structure; 4) there are no inhabited structures above the ground water plume. Although the plume may have shifted in the past five years, these conditions have not changed overall since the 2009 evaluation. In addition, the ground water treatment system building is crossgradient from the plume and is rarely occupied. Given these factors, vapor intrusion sampling was not performed.

7.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

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

7.4 Technical Assessment Summary

The remedy is generally functioning as intended by site decision documents. Overall, the ground water treatment system is removing contaminants from the ground water and ground water

contaminant concentrations have generally decreased over time. However, increases in vinyl chloride concentrations downgradient of the recovery wells indicate the need to expand the capture zones of the existing ground water remedy. O&M activities are performed on a regular schedule as planned.

As required in the ROD, security fencing is in place around the Site to protect the cap. The ROD specifies that the remedy will include institutional controls to prevent the use of contaminated ground water; no instrument is in place for this restriction.

The exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of remedy selection are still valid; changes that have occurred since remedy selection do not affect protectiveness of the remedy. No other information has come to light that could call into question the protectiveness of the remedy.

8.0 Issues

Table 8 summarizes the current site issues.

Table 8: Current Site Issues

| Issue | Affects Current Protectiveness? | Affects Future Protectiveness? |
|---|---------------------------------|--------------------------------|
| There is not sufficient data to fully characterize the extent of the plume to the adjacent property north of wells 43A/B and 44A/B. | No | Yes |
| Vinyl chloride concentrations have shown increasing trends in downgradient wells W-43A, W-43B and W-44A. | No | Yes |
| Inorganic ground water COCs have not been analyzed in the past 10 years. | No | Yes |
| The ROD calls for institutional controls to prevent the use of contaminated ground water. Such controls are not in place on the adjacent parcel north of wells 43-A/B and 44A/B | No | Yes |

9.0 Recommendations and Follow-up Actions

Table 9 provides recommendations to address the current site issues.

Table 9: Recommendations to Address Current Site Issues

| Issue | Recommendation / Follow-Up Action | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness? | |
|---|---|-------------------|------------------|----------------|-------------------------|--------|
| | | | | | Current | Future |
| There is not sufficient data to fully characterize the location of the plume. | Collect ground water data downgradient of MW-43A/B and 44A to determine extent of ground water contaminants. | PRP | EPA | 09/01/2015 | No | Yes |
| Vinyl chloride concentrations have shown increasing trends in downgradient wells W-43A/B W-44A. | Modify extraction system to capture Site related contamination that is not being captured downgradient of recovery wells. | PRP | EPA | 09/01/2015 | No | Yes |
| Inorganic ground water COCs have not been analyzed in the past 10 years. | Analyze for inorganic ground water COCs to make sure concentrations have remained at acceptable levels. | PRP | EPA | 11/01/2014 | No | Yes |
| The ROD calls for institutional controls to prevent the use of contaminated ground water. Such controls are not in place. | ICs to prevent use of contaminated ground water should be finalized if the plume has migrated north to the adjacent downgradient property | PRP | EPA | 01/01/2016 | No | Yes |

The following additional item, though not expected to affect protectiveness, warrants additional follow up:

- EPA recommends that Lord Corporation ensure that all monitoring wells are secured and labelled.

10.0 Protectiveness Statement

The remedy currently protects human health and the environment because the cap and fencing prevent human and ecological contact with soil contaminants, the ground water treatment and ISVS systems are removing contaminants, and there are no exposures to contaminated ground water.

However, in order for the remedy to be protective in the long term, the following actions need to be taken:

1. Collect sufficient ground water data to fully characterize the location of the downgradient plume.
2. Modify extraction system to capture Site related contamination that is not being captured downgradient of recovery wells.
3. Analyze for inorganic ground water contaminants of concern (COCs) to make sure concentrations have remained at acceptable levels.
4. Institutional controls to prevent use of contaminated ground water should be finalized if the plume has migrated north to the adjacent downgradient property.

11.0 Next Review

The next FYR will be due within five years of the signature date of this FYR.

Appendix A: List of Documents Reviewed

1990 Record of Decision. Prepared by EPA Region 3. June 29, 1990.

Additional Response to U.S. EPA questions for the LORD Shope Landfill Superfund Site, Girard Township, Erie County, Pennsylvania. ARCADIS U.S. Inc. May 7, 2014.

Applicable or Relevant and Appropriate Requirements (ARARs) for Lord Corporation at the Lord-Shope Site. Issued by the Pennsylvania Department of Environmental Protection Water Management Program. May 29, 2002.

Baseline Public Health Evaluation Phase II Remedial Investigation for Lord/Shope Site. Prepared by Eckenfelder Inc. for Lord Corporation. July 1989.

Consent Decree. United States of America v. Lord Corporation, Civil Action No. 91-177E. September 27, 1991.

First Five-Year Review Report for Lord-Shope Landfill Superfund Site. Prepared by EPA Region 3. November 4, 1999.

Health Assessment Report, Lord Shope Landfill National Priorities List Site. Prepared by the Agency for Toxic Substances and Disease Registry Public Health Service. April 10, 1989.

ISVS System Optimization Request, LORD Shope Landfill, Girard, Pennsylvania. Prepared by ARCADIS US, Inc. for EPA Region 3. May 29, 2007.

LORD Corporation Annual Groundwater Monitoring Report for 2008, Shope Landfill, Girard Township, Pennsylvania. Prepared by ARCADIS for LORD Corporation. May 2009.

LORD Corporation Annual Groundwater Monitoring Report for 2009, Shope Landfill, Girard Township, Pennsylvania. Prepared by ARCADIS for LORD Corporation. May 2010.

LORD Corporation Annual Groundwater Monitoring Report for 2010, Shope Landfill, Girard Township, Pennsylvania. Prepared by ARCADIS for LORD Corporation. May 2011.

LORD Corporation Annual Groundwater Monitoring Report for 2011, Shope Landfill, Girard Township, Pennsylvania. Prepared by ARCADIS for LORD Corporation. May 2012.

LORD Corporation Annual Groundwater Monitoring Report for 2012, Shope Landfill, Girard Township, Pennsylvania. Prepared by ARCADIS for LORD Corporation. June 2013.

LORD Corporation Annual Groundwater Monitoring Report for 2013, Shope Landfill, Girard Township, Pennsylvania. Prepared by ARCADIS for LORD Corporation. May 2014.

National Pollutant Discharge Elimination System Discharge Monthly Monitoring Reports for 2009. Prepared by LORD Corporation for EPA Region 3. January 21, 2010.

National Pollutant Discharge Elimination System Discharge Monthly Monitoring Reports for 2010. Prepared by LORD Corporation for EPA Region 3. January 25, 2011.

National Pollutant Discharge Elimination System Discharge Monthly Monitoring Reports for 2011. Prepared by LORD Corporation for EPA Region 3. January 25, 2012.

National Pollutant Discharge Elimination System Discharge Monthly Monitoring Reports for 2012. Prepared by LORD Corporation for EPA Region 3. January 15, 2013.

National Pollutant Discharge Elimination System Discharge Monthly Monitoring Reports for 2013. Prepared by LORD Corporation for EPA Region 3. January 20, 2014.

Remedial Action Monthly Progress Reports for 2009. Prepared by LORD Corporation for EPA Region 3. January 15, 2010.

Remedial Action Monthly Progress Reports for 2010. Prepared by LORD Corporation for EPA Region 3. January 24, 2011.

Remedial Action Monthly Progress Reports for 2011. Prepared by LORD Corporation for EPA Region 3. December 19, 2011.

Remedial Action Monthly Progress Reports for 2012. Prepared by LORD Corporation for EPA Region 3. January 20, 2014.

Remedial Action Monthly Progress Report, February 2014. Prepared by LORD Corporation for EPA Region 3. March 13, 2014.

Request to Modify Residential Sampling Analytical Parameters, LORD Shope Landfill, Girard, Pennsylvania. Prepared by ARCADIS US, Inc. for EPA Region 3. October 23, 2008.

Response to U.S. EPA questions for the LORD Shope Landfill Superfund Site, Girard Township, Erie County, Pennsylvania. ARCADIS U.S. Inc. April 30, 2014.

Second Five-Year Review Report for Lord-Shope Landfill Superfund Site. Prepared by EPA Region 3. September 10, 2004.

Shope's Landfill Remedial Investigation Biological Report. Prepared by Eckenfelder Inc. for Lord Corporation. July 1989.

Superfund Preliminary Close Out Report for Lord Shope Landfill. Prepared by EPA Region 3. September 30, 1996.

Third Five-Year Review Report for Lord-Shope Landfill Superfund Site. Prepared by EPA Region 3. September 10, 2009.

Appendix B: Press Notice

U.S. Environmental Protection Agency Reviews Cleanup at Lord-Shope Landfill Superfund Site

The U.S. Environmental Protection Agency (EPA) is conducting a fourth Five-Year Review of the **Lord-Shope Landfill Superfund Site** located 17 miles west of Erie in Erie County. This regular review seeks to confirm that the cleanup conducted at the site, which included excavating and removing contaminated drums and soils, capping the site, and pumping and treating contaminated groundwater, continues to be protective of public health and the environment. EPA's last formal review of the site in 2009 determined that the cleanup remedy was working as designed and protective of public health and the environment. A summary of these activities and evaluation of the long-term protectiveness of the remedy will be included in the upcoming Five-Year Review report.

What is an EPA Five-Year Review?

EPA inspects sites regularly to ensure that cleanups conducted remain fully protective of human health and the environment. These reviews, required by federal law when contaminants remain on site, include:

- Inspection of the site and cleanup technologies;
- Review of monitoring and operating data, and maintenance records, and
- Determination if any new regulatory requirements have been established since EPA's original cleanup decision was finalized.

When will the Five-Year Review Report be available?

The Five-Year Review report will be available at <http://epa.gov/5yr> by July 2014.

For more information

The site Administrative Record (AR), which includes EPA decision documents, is available at www.epa.gov/arweb. You may also review the AR and other site information at:

Rice Avenue Community Public Library
705 Rice Avenue, Girard, PA 16417

OR

EPA Region 3 Public Reading Room
Attn: Paul Van Reed (3HS42)
1650 Arch Street, 6th floor
Philadelphia, PA 19103
Phone: (215) 814-3157 (Please call to make an appt.)

You may also contact

If you have any concerns or information about a change in current site conditions, contact:

Alexander Mandell

EPA Community Involvement Coordinator

Phone: (215) 814-5517 or (800) 553-2509

Email: mandell.alexander@epa.gov

OR

David Turner

EPA Remedial Project Manager

Phone: (215) 814-3216

Email: truner.david@epa.gov

For more site information, visit <http://go.usa.gov/Kwck>

Appendix C: Site Inspection Checklist

| FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST | | | | | | | | | | | | | |
|---|--|--|--|---|---|--|--|--|--|---|--|--|--|
| I. SITE INFORMATION | | | | | | | | | | | | | |
| Site Name: Lord-Shope Landfill | Date of Inspection: 3/26/2014 | | | | | | | | | | | | |
| Location and Region: Girard Township, PA, Region 3 | EPA ID: PAD980508931 | | | | | | | | | | | | |
| Agency, Office or Company Leading the Five-Year Review: EPA Region 3 | Weather/Temperature: clear, 17°F | | | | | | | | | | | | |
| Remedy Includes (Check all that apply) <table border="0" style="width: 100%;"> <tr> <td><input checked="" type="checkbox"/> Landfill cover/containment</td> <td><input type="checkbox"/> Monitored natural attenuation</td> </tr> <tr> <td><input checked="" type="checkbox"/> Access controls</td> <td><input checked="" type="checkbox"/> Ground water containment</td> </tr> <tr> <td><input checked="" type="checkbox"/> Institutional controls</td> <td><input checked="" type="checkbox"/> Vertical barrier walls</td> </tr> <tr> <td><input checked="" type="checkbox"/> Ground water pump and treatment</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Surface water collection and treatment</td> <td></td> </tr> <tr> <td colspan="2"><input checked="" type="checkbox"/> Other <u>In-situ vapor stripping and thermal oxidation</u></td> </tr> </table> | | <input checked="" type="checkbox"/> Landfill cover/containment | <input type="checkbox"/> Monitored natural attenuation | <input checked="" type="checkbox"/> Access controls | <input checked="" type="checkbox"/> Ground water containment | <input checked="" type="checkbox"/> Institutional controls | <input checked="" type="checkbox"/> Vertical barrier walls | <input checked="" type="checkbox"/> Ground water pump and treatment | | <input type="checkbox"/> Surface water collection and treatment | | <input checked="" type="checkbox"/> Other <u>In-situ vapor stripping and thermal oxidation</u> | |
| <input checked="" type="checkbox"/> Landfill cover/containment | <input type="checkbox"/> Monitored natural attenuation | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> Access controls | <input checked="" type="checkbox"/> Ground water containment | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> Institutional controls | <input checked="" type="checkbox"/> Vertical barrier walls | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> Ground water pump and treatment | | | | | | | | | | | | | |
| <input type="checkbox"/> Surface water collection and treatment | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> Other <u>In-situ vapor stripping and thermal oxidation</u> | | | | | | | | | | | | | |
| Attachments: <input checked="" type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached | | | | | | | | | | | | | |
| II. INTERVIEWS (check all that apply) | | | | | | | | | | | | | |
| 1. O&M Site Manager <table border="0" style="width: 100%;"> <tr> <td style="width: 40%;">Name _____</td> <td style="width: 20%;">Title _____</td> <td style="width: 40%; text-align: right;">mm/dd/yyyy Date</td> </tr> <tr> <td>Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone</td> <td>Phone _____</td> <td></td> </tr> <tr> <td colspan="3">Problems, suggestions <input type="checkbox"/> Report attached _____</td> </tr> </table> | | Name _____ | Title _____ | mm/dd/yyyy Date | Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone | Phone _____ | | Problems, suggestions <input type="checkbox"/> Report attached _____ | | | | | |
| Name _____ | Title _____ | mm/dd/yyyy Date | | | | | | | | | | | |
| Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone | Phone _____ | | | | | | | | | | | | |
| Problems, suggestions <input type="checkbox"/> Report attached _____ | | | | | | | | | | | | | |
| 2 O&M Staff <table border="0" style="width: 100%;"> <tr> <td style="width: 40%;">Name _____</td> <td style="width: 20%;">Title _____</td> <td style="width: 40%; text-align: right;">mm/dd/yyyy Date</td> </tr> <tr> <td>Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone</td> <td>Phone _____</td> <td></td> </tr> <tr> <td colspan="3">Problems/suggestions <input type="checkbox"/> Report attached _____</td> </tr> </table> | | Name _____ | Title _____ | mm/dd/yyyy Date | Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone | Phone _____ | | Problems/suggestions <input type="checkbox"/> Report attached _____ | | | | | |
| Name _____ | Title _____ | mm/dd/yyyy Date | | | | | | | | | | | |
| Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone | Phone _____ | | | | | | | | | | | | |
| Problems/suggestions <input type="checkbox"/> Report attached _____ | | | | | | | | | | | | | |

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices) Fill in all that apply.

Agency Girard Township

Contact Bill Felege
Name

Supervisor/EM 3/26/14

C
Title

Date

(814) 774-4738

Phone No

Problems/suggestions ☐ Report attached See end of site inspection checklist for additional questions from Mr. Felege and EPA/Lord Corporation responses.

Agency _____

Contact _____
Name

_____ Title

_____ Date

_____ Phone No

Problems/suggestions ☐ Report attached _____

Agency _____

Contact _____
Name

_____ Title

_____ Date

_____ Phone No

Problems/suggestions ☐ Report attached _____

Agency _____

Contact _____
Name

_____ Title

_____ Date

_____ Phone No

Problems/suggestions ☐ Report attached _____

Agency _____

Contact _____
Name

_____ Title

_____ Date

_____ Phone No

Problems/suggestions ☐ Report attached _____

4 **Other Interviews** (optional) ☐ Report attached. _____

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1 **O&M Documents**

☒ O&M manual ☒ Readily available ☒ Up to date ☐ N/A

☐ As-built drawings ☐ Readily available ☐ Up to date ☒ N/A

☒ Maintenance logs ☒ Readily available ☒ Up to date ☐ N/A

Remarks _____

2 **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A

☒ Contingency plan/emergency response plan ☒ Readily available ☒ Up to date ☐ N/A

Remarks _____

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

Remarks: _____

| | | | |
|--|--|--|---|
| 4 Permits and Service Agreements | | | |
| <input type="checkbox"/> Air discharge permit | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Effluent discharge | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A |
| <input type="checkbox"/> Waste disposal, POTW | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Other permits. _____ | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| Remarks _____ | | | |
| 5 Gas Generation Records | | | |
| | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| Remarks _____ | | | |
| 6 Settlement Monument Records | | | |
| | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| Remarks _____ | | | |
| 7 Ground Water Monitoring Records | | | |
| | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A |
| Remarks _____ | | | |
| 8. Leachate Extraction Records | | | |
| | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| Remarks: _____ | | | |
| 9 Discharge Compliance Records | | | |
| <input checked="" type="checkbox"/> Air | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Water (effluent) | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A |
| Remarks _____ | | | |
| 10 Daily Access/Security Logs | | | |
| | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| Remarks _____ | | | |
| IV. O&M COSTS | | | |
| 1 O&M Organization | | | |
| <input type="checkbox"/> State in-house | <input type="checkbox"/> Contractor for state | | |
| <input type="checkbox"/> PRP in-house | <input checked="" type="checkbox"/> Contractor for PRP | | |
| <input type="checkbox"/> Federal facility in-house | <input type="checkbox"/> Contractor for Federal facility | | |
| <input type="checkbox"/> _____ | | | |

2. **O&M Cost Records**

☒ Readily available

☒ Up to date

☒ Funding mechanism/agreement in place ☐ Unavailable

Original O&M cost estimate: \$310,000/year ☐ Breakdown attached

Total annual cost by year for review period if available

| | | | |
|-------------------------|-----------------------|------------------|---|
| From: <u>01/01/2009</u> | To: <u>12/31/2009</u> | <u>\$255,096</u> | <input type="checkbox"/> Breakdown attached |
| Date | Date | Total cost | |
| From: <u>01/01/2010</u> | To: <u>12/31/2010</u> | <u>\$225,342</u> | <input type="checkbox"/> Breakdown attached |
| Date | Date | Total cost | |
| From: <u>01/01/2011</u> | To: <u>12/31/2011</u> | <u>\$231,746</u> | <input type="checkbox"/> Breakdown attached |
| Date | Date | Total cost | |
| From: <u>01/01/2012</u> | To: <u>12/31/2012</u> | <u>\$258,508</u> | <input type="checkbox"/> Breakdown attached |
| Date | Date | Total cost | |
| From: <u>01/01/2013</u> | To: <u>12/31/2013</u> | <u>\$310,292</u> | <input type="checkbox"/> Breakdown attached |
| Date | Date | Total cost | |

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

Describe costs and reasons: _____

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

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A
Remarks: _____

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A
Remarks: Landfill is surrounded by several signs stating "Hazardous waste site unauthorized personnel keep out."

C. Institutional Controls (ICs)**1. Implementation and Enforcement**

Site conditions imply ICs not properly implemented

☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced

☐ Yes ☒ No ☐ N/AType of monitoring (e g , self-reporting, drive by) FYRFrequency: every five yearsResponsible party/agency EPAContact David Turner

RPM

mm/dd/yyyy

215-814-3216

Name

Title

Date

Phone no

Reporting is up to date

☒ Yes ☐ No ☐ N/A

Reports are verified by the lead agency

☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met

☐ Yes ☒ No ☐ N/A

Violations have been reported

☐ Yes ☒ No ☐ N/AOther problems or suggestions ☐ Report attached**2 Adequacy**☐ ICs are adequate☒ ICs are inadequate☐ N/ARemarks Additional institutional controls may be needed**D. General****1 Vandalism/Trespassing**☐ Location shown on site map☒ No vandalism evident

Remarks _____

2 Land Use Changes On Site☒ N/A

Remarks _____

3 Land Use Changes Off Site☒ N/A

Remarks _____

VI. GENERAL SITE CONDITIONS**A. Roads**☒ Applicable☐ N/A**1 Roads Damaged**☐ Location shown on site map☒ Roads adequate☐ N/A

Remarks _____

B. Other Site Conditions

Remarks _____

| VII. LANDFILL COVERS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A | | |
|--|--|--|
| A. Landfill Surface | | |
| 1. Settlement (low spots) | <input type="checkbox"/> Location shown on site map | <input checked="" type="checkbox"/> Settlement not evident |
| Arial extent. _____ | | Depth. _____ |
| Remarks <u>Landfill was covered with snow during the site inspection</u> | | |
| 2 Cracks | <input type="checkbox"/> Location shown on site map | <input checked="" type="checkbox"/> Cracking not evident |
| Lengths _____ | Widths _____ | Depths. _____ |
| Remarks: _____ | | |
| 3 Erosion | <input type="checkbox"/> Location shown on site map | <input checked="" type="checkbox"/> Erosion not evident |
| Arial extent _____ | | Depth _____ |
| Remarks: _____ | | |
| 4 Holes | <input type="checkbox"/> Location shown on site map | <input checked="" type="checkbox"/> Holes not evident |
| Arial extent _____ | | Depth _____ |
| Remarks: _____ | | |
| 5 Vegetative Cover | <input type="checkbox"/> Grass | <input checked="" type="checkbox"/> Cover properly established |
| <input checked="" type="checkbox"/> No signs of stress | <input type="checkbox"/> Trees/shrubs (indicate size and locations on a diagram) | |
| Remarks <u>Landfill was covered with snow during the site inspection</u> | | |
| 6 Alternative Cover (e g., armored rock, concrete) | | <input checked="" type="checkbox"/> N/A |
| Remarks _____ | | |
| 7 Bulges | <input type="checkbox"/> Location shown on site map | <input checked="" type="checkbox"/> Bulges not evident |
| Arial extent _____ | | Height _____ |
| Remarks: _____ | | |
| 8 Wet Areas/Water Damage | <input checked="" type="checkbox"/> Wet areas/water damage not evident | |
| <input type="checkbox"/> Wet areas | <input type="checkbox"/> Location shown on site map | Arial extent: _____ |
| <input type="checkbox"/> Ponding | <input type="checkbox"/> Location shown on site map | Arial extent: _____ |
| <input type="checkbox"/> Seeps | <input type="checkbox"/> Location shown on site map | Arial extent _____ |
| <input type="checkbox"/> Soft subgrade | <input type="checkbox"/> Location shown on site map | Arial extent _____ |
| Remarks. _____ | | |
| 9 Slope Instability | <input type="checkbox"/> Slides | <input type="checkbox"/> Location shown on site map |
| <input checked="" type="checkbox"/> No evidence of slope instability | | |
| Arial extent _____ | | |
| Remarks _____ | | |

B. Benches☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel)

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

Remarks _____

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

Remarks: _____

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

Remarks _____

C. Letdown Channels☐ Applicable ☒ N/A

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

1 **Settlement (Low spots)**☐ Location shown on site map☐ No evidence of settlement

Aerial extent. _____

Depth _____

Remarks _____

2. **Material Degradation**☐ Location shown on site map☐ No evidence of degradation

Material type: _____

Aerial extent _____

Remarks _____

3 **Erosion**☐ Location shown on site map☐ No evidence of erosion

Aerial extent _____

Depth: _____

Remarks. _____

4 **Undercutting**☐ Location shown on site map☐ No evidence of undercutting

Aerial extent _____

Depth: _____

Remarks _____

5. **Obstructions**

Type. _____

☐ No obstructions☐ Location shown on site map

Aerial 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

Aerial extent: _____

Remarks: _____

| | | | |
|--|--|---|---|
| D. Cover Penetrations | | <input checked="" type="checkbox"/> Applicable | <input type="checkbox"/> N/A |
| 1 | Gas Vents | <input type="checkbox"/> Active | <input checked="" type="checkbox"/> Passive |
| | <input checked="" type="checkbox"/> Properly secured/locked | <input checked="" type="checkbox"/> Functioning | <input type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition |
| | <input type="checkbox"/> Evidence of leakage at penetration | <input type="checkbox"/> Needs maintenance | <input type="checkbox"/> N/A |
| Remarks: _____ | | | |
| 2 | Gas Monitoring Probes | <input type="checkbox"/> Functioning | <input type="checkbox"/> Good condition |
| | <input type="checkbox"/> Properly secured/locked | <input type="checkbox"/> Routinely sampled | <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A |
| | <input type="checkbox"/> Evidence of leakage at penetration | | |
| Remarks: _____ | | | |
| 3 | Monitoring Wells (within surface area of landfill) | <input type="checkbox"/> Functioning | <input type="checkbox"/> Good condition |
| | <input type="checkbox"/> Properly secured/locked | <input type="checkbox"/> Routinely sampled | <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A |
| | <input type="checkbox"/> Evidence of leakage at penetration | | |
| Remarks: _____ | | | |
| 4 | Extraction Wells Leachate | <input type="checkbox"/> Functioning | <input type="checkbox"/> Good condition |
| | <input type="checkbox"/> Properly secured/locked | <input type="checkbox"/> Routinely sampled | <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A |
| | <input type="checkbox"/> Evidence of leakage at penetration | | |
| Remarks: _____ | | | |
| 5 | Settlement Monuments | <input type="checkbox"/> Located | <input type="checkbox"/> Routinely surveyed <input checked="" type="checkbox"/> N/A |
| Remarks: _____ | | | |
| E. Gas Collection and Treatment | | <input checked="" type="checkbox"/> Applicable | <input type="checkbox"/> N/A |
| 1 | Gas Treatment Facilities | <input checked="" type="checkbox"/> Thermal destruction | <input type="checkbox"/> Collection for reuse |
| | <input type="checkbox"/> Flaring | <input type="checkbox"/> Needs maintenance | |
| | <input checked="" type="checkbox"/> Good condition | | |
| Remarks: _____ | | | |
| 2 | Gas Collection Wells, Manifolds and Piping | <input type="checkbox"/> Needs maintenance | |
| | <input checked="" type="checkbox"/> Good condition | | |
| Remarks: _____ | | | |
| 3 | Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings) | <input type="checkbox"/> Needs maintenance | <input checked="" type="checkbox"/> N/A |
| | <input type="checkbox"/> Good condition | | |
| Remarks: _____ | | | |
| F. Cover Drainage Layer | | <input type="checkbox"/> Applicable | <input checked="" type="checkbox"/> N/A |
| 1 | Outlet Pipes Inspected | <input type="checkbox"/> Functioning | <input type="checkbox"/> N/A |
| Remarks: _____ | | | |
| 2. | Outlet Rock Inspected | <input type="checkbox"/> Functioning | <input type="checkbox"/> N/A |
| Remarks: _____ | | | |

| | | | | | |
|--|----------------------------|---|-------------|--|---|
| G. Detention/Sedimentation Ponds | | | | <input type="checkbox"/> Applicable | <input checked="" type="checkbox"/> N/A |
| 1 | Siltation | Area extent: _____ | Depth _____ | <input type="checkbox"/> N/A | |
| <input type="checkbox"/> Siltation not evident | | | | | |
| Remarks: _____ | | | | | |
| 2 | Erosion | Area extent: _____ | Depth _____ | | |
| <input type="checkbox"/> Erosion not evident | | | | | |
| Remarks: _____ | | | | | |
| 3 | Outlet Works | <input type="checkbox"/> Functioning | | | <input type="checkbox"/> N/A |
| Remarks: _____ | | | | | |
| 4. | Dam | <input type="checkbox"/> Functioning | | | <input type="checkbox"/> N/A |
| Remarks: _____ | | | | | |
| H. Retaining Walls | | | | <input type="checkbox"/> Applicable | <input checked="" type="checkbox"/> N/A |
| 1 | Deformations | <input type="checkbox"/> Location shown on site map | | <input type="checkbox"/> Deformation not evident | |
| Horizontal displacement: _____ | | Vertical displacement: _____ | | | |
| Rotational displacement: _____ | | | | | |
| Remarks: _____ | | | | | |
| 2 | Degradation | <input type="checkbox"/> Location shown on site map | | <input type="checkbox"/> Degradation not evident | |
| Remarks: _____ | | | | | |
| I. Perimeter Ditches/Off-Site Discharge | | | | <input type="checkbox"/> Applicable | <input checked="" type="checkbox"/> N/A |
| 1 | Siltation | <input type="checkbox"/> Location shown on site map | | <input type="checkbox"/> Siltation not evident | |
| Area extent: _____ | | Depth: _____ | | | |
| Remarks: _____ | | | | | |
| 2 | Vegetative Growth | <input type="checkbox"/> Location shown on site map | | <input type="checkbox"/> N/A | |
| <input type="checkbox"/> Vegetation does not impede flow | | | | | |
| Area extent: _____ | | Type: _____ | | | |
| Remarks: _____ | | | | | |
| 3. | Erosion | <input type="checkbox"/> Location shown on site map | | <input type="checkbox"/> Erosion not evident | |
| Area extent: _____ | | Depth: _____ | | | |
| Remarks: _____ | | | | | |
| 4 | Discharge Structure | <input type="checkbox"/> Functioning | | | <input type="checkbox"/> N/A |
| Remarks: _____ | | | | | |

C-10

| | | | |
|--|--|--|--|
| C. Treatment System | | <input checked="" type="checkbox"/> Applicable | <input type="checkbox"/> N/A |
| 1 Treatment Train (check components that apply) | | | |
| <input checked="" type="checkbox"/> Metals removal | <input type="checkbox"/> Oil/water separation | <input type="checkbox"/> Bioremediation | |
| <input checked="" type="checkbox"/> Air stripping | <input type="checkbox"/> Carbon adsorbers | | |
| <input checked="" type="checkbox"/> Filters. _____ | | | |
| <input type="checkbox"/> Additive (e g , chelation agent, flocculent): _____ | | | |
| <input type="checkbox"/> Others. _____ | | | |
| <input checked="" type="checkbox"/> Good condition | <input type="checkbox"/> Needs maintenance | | |
| <input checked="" type="checkbox"/> Sampling ports properly marked and functional | | | |
| <input checked="" type="checkbox"/> Sampling/maintenance log displayed and up to date | | | |
| <input checked="" type="checkbox"/> Equipment properly identified | | | |
| <input checked="" type="checkbox"/> Quantity of ground water treated annually <u>6 7 million gallons (2012 Annual Ground Water Report)</u> | | | |
| <input type="checkbox"/> Quantity of surface water treated annually _____ | | | |
| Remarks _____ | | | |
| 2 Electrical Enclosures and Panels (properly rated and functional) | | | |
| <input type="checkbox"/> N/A | <input checked="" type="checkbox"/> Good condition | <input type="checkbox"/> Needs maintenance | |
| Remarks _____ | | | |
| 3. Tanks, Vaults, Storage Vessels | | | |
| <input type="checkbox"/> N/A | <input checked="" type="checkbox"/> Good condition | <input type="checkbox"/> Proper secondary containment | <input type="checkbox"/> Needs maintenance |
| Remarks _____ | | | |
| 4 Discharge Structure and Appurtenances | | | |
| <input type="checkbox"/> N/A | <input checked="" type="checkbox"/> Good condition | <input type="checkbox"/> Needs maintenance | |
| Remarks _____ | | | |
| 5. Treatment Building(s) | | | |
| <input type="checkbox"/> N/A | <input checked="" type="checkbox"/> Good condition (esp roof and doorways) | <input type="checkbox"/> Needs repair | |
| <input checked="" type="checkbox"/> Chemicals and equipment properly stored | | | |
| Remarks. _____ | | | |
| 6 Monitoring Wells (pump and treatment remedy) | | | |
| <input type="checkbox"/> Properly secured/locked | <input checked="" type="checkbox"/> Functioning | <input checked="" type="checkbox"/> Routinely sampled | <input checked="" type="checkbox"/> Good condition |
| <input checked="" type="checkbox"/> All required wells located | <input checked="" type="checkbox"/> Needs maintenance | <input type="checkbox"/> N/A | |
| Remarks <u>Some wells were not locked.</u> | | | |
| D. Monitoring Data | | | |
| 1. Monitoring Data | | | |
| <input checked="" type="checkbox"/> Is routinely submitted on time | | <input checked="" type="checkbox"/> Is of acceptable quality | |

| | | | |
|---|--|--|--|
| 2. Monitoring Data Suggests: <input type="checkbox"/> Ground water plume is effectively contained <input checked="" type="checkbox"/> Contaminant concentrations are declining | | | |
| E. Monitored Natural Attenuation | | | |
| 1. Monitoring Wells (natural attenuation remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A Remarks: _____ | | | |
| X. OTHER REMEDIES | | | |
| If there are remedies applied at the site and 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 designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). <u>The remedy is designed to eliminate or reduce the risks posed by the potential ingestion of contaminated ground water and direct contact with the contaminated soils associated with the Site. The ground water treatment system is removing contaminants from the ground water, and ground water contaminant concentrations have generally decreased over time. However, contaminant concentrations in some downgradient wells have increased since the last FYR. There also appears to be a portion of the plume (between the extraction wells) that is not being treated by the existing system. Ground water monitoring is performed on a regular schedule, but analysis for inorganics has not been performed in the past 10 years. The ISVS system effectively removes contaminants from the landfill and contaminated soils. Site fencing protects the cap, which prevents exposure to contaminated soils and landfill materials. The ROD specified institutional controls to prevent the use of contaminated ground water, but no such controls are in place on the property north of wells 43A/B and 44A/B.</u> | | | |
| 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. <u>O&M activities are adequate.</u> | | | |
| 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. <u>Contaminant concentrations in some downgradient wells have increased. There also appears to be a portion of the plume (between the extraction wells) that is not being treated by the existing system. Analysis for inorganics has not been performed in the past 10 years.</u> | | | |
| D. Opportunities for Optimization Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. <u>Contaminant concentrations in some downgradient wells have increased. There also appears to be a portion of the plume (between the extraction wells) that is not being treated by the existing ground water treatment system.</u> | | | |

Inspection Team Roster

David Turner, EPA RPM
 Alexander Mandell, EPA CIC
 Gary Mechtly, PADEP
 Chris Saber, PADEP
 George Kickel, Lord Corporation
 Ben Witt, Lord Corporation
 Jason Manzo, Arcadis

Amanda Goyne, Skeo Solutions
Hagai Nassau, Skeo Solutions

Additional Questions from Mr. Felege and EPA/Lord Corporation Responses:

- Mr. Felege said a few years ago he saw a discharge permit/authorization from a publicly owned treatment works in Erie to Lord Corporation for the discharge of wastewater to the City of Erie's publicly owned treatment works. He asked what the wastewater was, and if Lord Corporation still discharges to the publicly owned treatment works. Lord Corporation responded that this was likely for the underground tank that holds the sewage from the toilet. It is pumped out by a local contractor and taken to Erie's publicly owned treatment works for disposal.
- Does Lord Corporation sample the creek? EPA responded that the Lord Corp. samples the outfall of the treatment system.
- How often does Lord Corporation submit reports? EPA responded that the company submits monthly treated ground water discharge results and annual reports.
- Are there any chemicals at the Site that may pose a fire/explosion hazard and that firefighters should be aware of? EPA and Lord Corporation stated that there are no flammables. Lord Corporation stated that everything is water based.
- Does Lord Corporation have an Emergency Site Management Plan for the Site? If so, could it be shared confidentially with Girard in case of emergency so they can respond properly? Lord Corporation responded that a health and safety plan was provided to the Girard Fire Department when remediation began. Lord Corporation will check the current phone numbers and give Mr. Felege a copy of the current plan.

Appendix D: Photographs from Site Inspection Visit



Site entrance (gate is normally locked)



Control system for treatment systems



Ground water treatment system



Thermal oxidizer and landfill



IPE-2 extraction well



WTP-2 (unlocked)