THIRD FIVE-YEAR REVIEW REPORT FOR REFUSE HIDEAWAY LANDFILL SUPERFUND SITE DANE COUNTY, WISCONSIN

Prepared by

U.S. Environmental Protection Agency
Region 5
Chicago, Illinois

Margaret M. Guerriero
Acting Director
Superfund Division

8/2/2017
Date

TABLE OF CONTENTS

Page

LIST OF ABBREVIATIONS & ACRONYMS 3

I. INTRODUCTION 4
FIVE-YEAR REVIEW SUMMARY FORM 5

II. RESPONSE ACTION SUMMARY 6
Basis for Taking Action 6
Response Actions 8
Status of Implementation 9
Institutional Controls 12
System Operations/Operation and Maintenance (O&M) 17
Groundwater Monitoring Operations 18
Source Area Response Operations 18
Landfill Cap 18
Landfill Leachate Collection and Transportation for Disposal 18
Landfill Gas Collection and Ground Flare Operations 18
Remedy Costs 19

III. PROGRESS SINCE LAST FIVE-YEAR REVIEW 19

IV. FIVE-YEAR REVIEW PROCESS 21
Community Notification and Involvement 21
Data Review 22
Site Inspection 23

V. TECHNICAL ASSESSMENT 23
Question A: Is the remedy functioning as required by decision documents? 23
Question B: Are the assumptions used at the time of remedy selection still valid? 24
Question C: Has any other information come to light that could call into question the protectiveness of the remedy? 25

VI. ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS 25

VII. PROTECTIVENESS STATEMENT(S) 26

VIII. NEXT REVIEW 26

APPENDIX A: REFERENCE LIST

APPENDIX B: FIGURES AND TABLES

LIST OF ABBREVIATIONS & ACRONYMS

Agencies	WDNR and EPA
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
ES	Enforcement Standard, as provided for by Wisconsin Administrative Code NR 140, (Groundwater Quality Standards)
FYR	Five-Year Review
gpm	gallons per minute
ICs	Institutional Controls
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
MMSD	Madison (WI) Metropolitan Sewerage District
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PAL	Preventive Action Limit, as provided for by Wisconsin Administrative Code NR 140, (Groundwater Quality Standards)
POE	Point-of-Entry water treatment units (installed in nearby residences)
ppb	parts per billion
ppm	parts per million
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
RHL	Refuse Hideaway Landfill
ROD	Record of Decision
RPM	Remedial Project Manager
Site	Refuse Hideaway Landfill Superfund Site
The State	The State of Wisconsin
UU/UE	Unlimited Use and Unrestricted Exposure
µg/L	micrograms per Liter, or parts per billion
VOCs	Volatile Organic Compounds
WDNR	Wisconsin Department of Natural Resources

I. INTRODUCTION

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

The United States Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP) (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the third FYR for the Refuse Hideaway Landfill Superfund Site (Site). The triggering action for this statutory review is the completion of the second FYR on August 29, 2012. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one operable unit (O.U.) which is addressed in this FYR. O.U. #1 addresses prevention of exposure to contaminated soil and waste fill material, containment of waste fill material left in place, control of methane gas and leachate from the landfill, and monitoring of groundwater contamination attributable to the Site. The remedy consists of landfill gas and leachate extraction systems, a landfill cap, an on-site flare to destroy methane gas, groundwater studies, and long-term groundwater monitoring.

The Refuse Hideaway Landfill Superfund Site FYR was led by John V. Fagiolo, EPA Remedial Project Manager (RPM). Participants included Timothy Zeichert, Hydrogeologist and Project Manager for the Wisconsin Department of Natural Resources (WDNR). The party implementing the remedy work under a Consent Decree is the State of Wisconsin (the State), and WDNR operates the remedy on the State's behalf. Although remedy operation and maintenance (O&M) is performed by WDNR, for this FYR WDNR was involved as the support agency. WDNR, representing the State, has reviewed all supporting documentation and provided input to EPA during the FYR process. The review began on November 17, 2016.

Site Background

The Refuse Hideaway Landfill (RHL) Site is in the SW 1/4, NW 1/4, Section 8, T7N, R8E portion of the Town of Middleton in Dane County, Wisconsin. The Site property is in a rural portion of the Town of Middleton, 2 miles west of the City of Middleton and 4 miles east of the Village of Cross Plains (see Figures 1 and 2), located approximately at 7562 U.S. Highway 14. Regional topography varies extensively in Dane County near the RHL Site. Bluffs are present along the north and west sides and a portion of the east side of the landfill, and ground elevation at the Site property drops as much as approximately 200 feet toward the south and east sides of the landfill. Surface drainage flows generally to the south and east. The area surrounding the RHL Site is predominantly agricultural with a wetland area located southeast of the landfill. The two residences nearest the landfill are approximately 2,400 feet to the southwest, adjacent to U.S.

Highway 14, with additional residences in the Deer Run Heights Subdivision located at least 4,800 feet to the southwest of the landfill. The Site property outside the fill boundary is occupied by a street improvement construction company, which serves as a storage area for trucks and construction equipment.

Municipal, commercial, and industrial wastes were placed in the 1.2 million cubic yard landfill, which is 23 acres in area. The landfill operated for 14 years between 1974 and 1988. The landfill owner reported receiving a variety of commercial and industrial wastes including: barrels of glue and paint, barrels of ink and ink washes, spray paint booth by-products and paint stripper sludge, and spill residues containing volatile organic compounds (VOCs). The landfill was designed with no liner, leaving the existing sandy soils and sandstone bedrock beneath the Site to attenuate any contaminants leaching from the Site. The Site was closed under court order in 1988 when VOCs were discovered in several private wells southwest of the Site. VOCs and elevated inorganic chemicals were detected in ground water surrounding the Site. Methane gas was also shown to be migrating from the waste mass.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Refuse Hideaway Landfill Superfund Site		
EPA ID: WID 980 610 604		
Region: 5	**State:** WI	**City/County:** City of Middleton, Dane County
SITE STATUS		
NPL Status: Final		
Multiple OUs? No.		**Has the site achieved construction completion?** Yes. Construction Completion Date: September 30, 1998
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): John V. Fagiolo		
Author affiliation: EPA		
Review period: November 17, 2016 - June 2, 2017		
Date(s) of Site inspection: May 23, 2017		
Type of review: Statutory		
Review number: 3		
Triggering action date: August 29, 2012		
Due date *(five years after triggering action date)*: August 29, 2017		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1995, a qualitative risk assessment was completed and identified human health hazards posed by current as well as future potential exposures to Site-related contamination. The standard used for selecting contaminants of concern for groundwater is the WDNR NR 140 Enforcement Standard (ES). This is a health-based standard developed for each of a list of contaminants in groundwater by the Wisconsin Division of Public Health and WDNR to be protective of human health. The Preventive Action Level (PAL) is significantly lower than the associated ES and is used to identify potential groundwater contamination problems. An exceedance of the PAL is not necessarily an indication of short- or long-term health hazards. Each Site environmental exposure pathway is summarized below, but the summary reports each pathway's status after the implementation of the operating remedy, which significantly reduces the risk of exposure.

Air. Landfill gas (consisting primarily of methane) has the potential to migrate from the Site and is a potential explosive hazard to persons living and/or working in buildings near the Site. Before installation of the current remedy, landfill gas was detected at potentially explosive levels in the commercial storage building adjacent to the landfill. Other toxic substances such as VOCs have the potential to co-migrate with landfill gas. It has been documented since the 1998 Remedial Design that the landfill gas collection and ground flare system successfully collect landfill gas and reduce the level of on-Site VOCs. Monthly monitoring for landfill gas in soil is conducted at 13 gas monitoring wells and ambient air monitoring locations around and outside of the landfill and within the nearest storage building adjacent to the Site. In 1989 and 1990, private homes were monitored for the presence of methane gas. The homes were all in excess of 1,600 feet from the landfill and no landfill gas was detected in any of the homes. Results of annual gas monitoring from 2012 to 2016 have shown no detection of any gas entering buildings adjacent to the Site, confirming that vapor intrusion is not a potential pathway. The water table depth throughout the area is at least 10 feet below grade, confirming that groundwater vapor intrusion is not a new or ongoing risk pathway to buildings at or near the Site. Using current data for contaminants in groundwater at residences, a screening of these low levels of contaminants suggests no possibility of a vapor intrusion exposure pathway into any home.

During initial Site investigation work, the following VOCs were detected in the on-Site landfill gas: benzene, PCE, toluene, TCE, and vinyl chloride. The air pathway has been addressed with the installation and operation of the landfill gas collection and ground flare systems. Emission stack testing has shown that the flare meets applicable ambient air standards, in accordance with NR 445, Wis. Adm. Code.

Groundwater. Residents living near the Site rely on groundwater for their drinking water and other domestic uses. The exposure routes from the domestic use of contaminated groundwater include ingestion, inhalation, and dermal contact. During Site investigation work, three nearby private wells were discovered to have VOC impacts. Two of the wells had point-of-entry (POE) treatment systems installed in 1990, but only one currently remains in operation. One POE system was removed after sampling consistently showed that the well adequately achieved drinking water standards. The third well supplied a home and farm buildings that have been

drinking water standards. The third well supplied a home and farm buildings that have been vacant since 1998 and have since been demolished. This FYR confirmed that this real estate remains vacant and that this third well is no longer in use.

With continued operation of the Site remedy and the existing POE unit, groundwater does not currently pose a public health hazard to nearby residents who obtain their drinking water from private wells. Residents using untreated contaminated groundwater could ingest contaminants when drinking water, inhale contamination released from the water during domestic uses (cooking, showering, etc.) and absorb contaminants through their skin while bathing and washing in contaminated water. By removing VOCs with landfill gas, the landfill gas collection and ground flare systems favorably affect the quality of Site groundwater. Although VOCs are still being detected in unfiltered water at the Site, sampling and analysis data over the past 16 years shows a reduction in concentrations of VOCs in groundwater.

Groundwater flow at the Site indicates that contaminated groundwater has the potential to flow through the wells in the Deer Run Heights neighborhood, located approximately one mile west-southwest of the Site. Selected wells in the Deer Run Heights neighborhood are sampled semi-annually or annually. No VOCs have been detected in these wells. In addition, two "sentinel" groundwater monitoring wells located up-gradient from Deer Run Heights are monitored semi-annually and consistently have not shown detectable levels of VOCs. Groundwater studies completed from 1991 to 1995 as part of Site characterization concluded the contaminant plume from the Site is limited to the upper 250 feet of the saturated zone. Several monitoring wells with deeper screens near the Site were recently shown as having no detectable levels of VOCs.

No new residential development has occurred since the last FYR in 2012. Because Site groundwater flows to the southwest, any private wells in areas to the north and east are, and will be, located up-gradient of the existing contamination. WDNR established a special drinking water supply well casing requirement which compels well drillers proposing to drill a new water supply well within the area which surrounds the Site to contact WDNR for a specific well casing depth requirement to avoid the zone of potentially contaminated groundwater.

Surface Water/Sediment Pathway. The Site groundwater flow regime is such that groundwater contaminants are not discharging into Black Earth Creek. Contaminants were detected in surface water on-Site in 1987 before the landfill clay cap was in place. No VOCs were detected in surface water samples collected in the drainage ditch south of the landfill and in Black Earth Creek in 1989. The installed cap prevents surface water from becoming contaminated. Sampling of Black Earth Creek and the ditch south of the landfill found no VOCs in 1989. In 1995, surface water was not considered to be a pathway of concern. There have been no changes to Site topography since 1995 and the landfill leachate collection system is effectively operating. Therefore, surface water and sediment do not remain pathways of concern.

Ecological Risk. Based on an environmental evaluation performed in 1995, the risk posed to environmental receptors from the Site is low. There are no known endangered or threatened species or critical habitats on or near the Site, as confirmed through visual Site inspections performed monthly by the operations contractor. Performance of this remedy has and will be accomplished by avoiding impacts to fish and wildlife habitats. If any fish or wildlife habitat is

negatively affected, the damage will be restored or replaced by WDNR to the extent practicable. For this FYR, it was confirmed through visual observations by the operations contractor that there is no indication of degradation in the wetland area to the southeast of the Site.

In the immediate vicinity of the Site, water table, potentiometric surface configuration, and vertical gradient information confirm that Black Earth Creek is not a regional divide, and the creek is not a major discharge point for groundwater in the area of the landfill. Groundwater flow is such that groundwater contaminants are not discharging into Black Earth Creek. Sampling of Black Earth Creek and the ditch south of the landfill in 1989 found no VOCs. In 1992, the area south of the Site was drained and dredged, and accumulated sediment was removed. This eliminated sediment as a pathway of concern. The current landfill cap was completed in 1990; therefore, there have been no contaminants in Site run-off to threaten wetland areas at or near the Site.

Actual or threatened releases of hazardous substances from this Site, if not addressed by the response action selected in the 1995 Record of Decision (ROD) and modified by Explanations of Significant Differences (ESDs) in 1998 and 2012, may have presented an imminent and substantial endangerment to public health, welfare, or the environment.

Response Actions

Table 5 in Appendix B shows a chronology of events that have taken place at the Site. The main components of the RHL Site remedy had been installed by WDNR by 1991. The 1995 ROD refined the remedy's requirements and provided for maintenance and potential future changes/additions to, or optimization of, the remedy. The selected remedy includes:
- Deed restrictions and zoning modifications;
- Warning signs posted around the perimeter of the property;
- Maintenance of the landfill cap, vegetation, and surface run-off controls;
- O&M of the existing landfill gas extraction and destruction system and of the leachate extraction and off-Site treatment and disposal system;
- Groundwater extraction and treatment with reinjection to enhance natural breakdown of contaminants;
- Groundwater monitoring on and near the Site;
- Maintenance of the existing POE system at one private well; and
- Installation of a POE system for any private well exhibiting contaminants with concentrations exceeding NR 140 Enforcement Standards [Federal Maximum Contaminant Levels (MCLs)].

The remedial action objectives (RAOs, or cleanup goals) shown in the 1995 ROD are:
- Prevent direct contact with landfill contents;
- Minimize contaminant leaching to groundwater;
- Prevent the migration of landfill gas;
- Control surface water run-off and erosion;
- Attain compliance with all identified Federal and State Applicable or Relevant and Appropriate Requirements (ARARs);
- Attain NR 140 PALs for all groundwater impacted by the RHL at and beyond the landfill boundary;

- Provide potable water to residences with contaminated water.

Table 7 in Appendix B summarizes the cleanup standards shown in the 1995 ROD. The standard used for selecting contaminants of concern for groundwater is the WDNR NR 140 ESs. This is a health-based standard developed by the Wisconsin Division of Public Health and WDNR to be protective of human health. These State groundwater goals are consistent with the NCP Section 300.430(a)(1)(iii)(F) which states that EPA expects to return groundwater at the Site to beneficial use wherever practicable, within a time frame that is reasonable given the circumstances of the Site. In 1995, the contaminants of concern exceeded NR 140, Wis. Adm. Code ESs (equal to Federal MCLs) beyond the landfill boundary. Iron and manganese also exceeded NR 140 ESs. However, those exceedances beyond the landfill boundary are primarily due to high concentrations that occur naturally.

Groundwater extraction with re-injection of treated water was deemed unnecessary and an ESD was issued in 1998. The September 30, 1998 ESD explained and documented that it was not necessary to implement the groundwater extraction and treatment component of the selected remedy. On June 22, 2012, EPA issued a second ESD that documents the decision to make the Wisconsin Groundwater Quality ESs the cleanup goals for the RHL Site. The 1995 ROD required NR 140 PALs as RAOs and the 2012 ESD explained and documented that attainment of PALs would no longer be required.

The Consent Decree (CD) for remedial action, which was entered in U.S. District Court on August 31, 2001, defined the State as the Settling Performing Party. Monetary settlements received under the CD have been used by WDNR for the continued remediation at the Site, with retention of some funds by EPA as contingency. As required by the 2001 remedial action CD, the State is successfully implementing all components of this remedy. The ROD requires deed restrictions and zoning modifications to prohibit: (1) excavation of soil, (2) construction on-Site, (3) groundwater extraction, and (4) interference with the remedy.

The State developed revisions to the Site O&M Plan for the Site-specific Continuing Obligations. Since June 3, 2006, Continuing Obligations are enforceable as authorized by s. 292.12, Wis. Stats. and can be established instead of placement of proprietary deed restrictions on properties. On December 16, 2013, WDNR established Continuing Obligations for this Site, which run with the property and apply to future property owners. Information on the Site's Continuing Obligations has been placed in the publicly accessible Wisconsin Remediation and Redevelopment Database (WRRD). The database is located at the web page: http://dnr.wi.gov/topic/Brownfields/wrrd.html.

Status of Implementation

Groundwater Response Action. Site groundwater monitoring evaluates the effectiveness of the gas extraction and leachate collection system and the progress of attenuation of Site contaminants. Natural attenuation processes of dispersion, degradation, and adsorption will probably remediate the plume down-gradient of the landfill in approximately 25 years. The definite length of time it will take to clean up the contaminated aquifer has not been determined. The gas and leachate collection systems have significantly reduced the migration of contaminants from the landfill.

However, it is difficult to predict when the contaminant source will be completely controlled and when Site groundwater will consistently meet the ROD's RAOs.

The landfill leachate collection system is successfully capturing leachate and its contaminants, making them unavailable for migration from the landfill and preventing further contamination of groundwater. Based on recent years' groundwater data, the groundwater plume should not move beyond its present boundaries and is expected to continue to slowly recede in extent. However, if other private home wells become contaminated in the future, the remedy requires installation of POE units at private wells impacted with contaminants above NR 140 ESs (based on Federal MCLs) or that are imminently at risk of becoming contaminated above NR 140 ESs.

Table 6 in Appendix B provides a summary of data that shows the reduction of contaminant concentrations in groundwater that has occurred over the past 10 years.

Source Control Action

Landfill Cap. Landfill caps reduce contaminant loading to the soil and groundwater beneath the landfill by preventing precipitation from leaching into waste fill material, thereby reducing consequent contamination of groundwater. The integrity of the landfill cap also affects the extraction efficiency of the landfill gas collection system. If the cap becomes too permeable, air can enter the landfill and reduce landfill gas extraction efficiency. Throughout the life of a landfill, settlement will take place due to consolidation and decomposition of wastes and the removal of leachate. A landfill's surface settles non-uniformly, requiring regular monitoring and repair of the landfill cap. Landfill caps are vegetated (usually with a grass cover) to help prevent erosion. At this time, the RHL Site has a fairly good vegetative cover. As part of the O&M of the Site remedy (if needed), WDNR will re-seed the landfill cover using plant species that are within constraints of cap integrity and post-remediation land uses.

Table 8 in Appendix B provides a summary of the amount of leachate collected at the Site over the past 5 years. The landfill cap is effective in reducing infiltration of precipitation, and hence leachate production. O&M of the landfill cap and landfill cap improvements are discussed in detail later in this report.

Landfill Leachate Collection and Transportation Off-Site for Disposal. Leachate levels in the collection wells are measured monthly using a bubbler tube and an electric water level meter. Leachate is collected in the bottom of 9 dual purpose gas extraction and leachate collection wells. Submersible pumps in the wells operate when leachate reaches a certain high level in the well. An air compressor located at the blower/flare station supplies compressed air for the pneumatic pumps. Leachate is conveyed from the pumps through High Density Polyethylene (HDPE) piping to a below-grade 25,000-gallon double-walled steel tank. The tank has a conductivity sensor which will interrupt power to the well pumps in the event moisture or a leak is detected between the tank walls. When a leak or high liquid level condition exists, operating personnel are notified by warning alarms and remote telemetry notification. The HDPE leachate conveyance piping is, depending on location, either located adjacent to and in the same trench as the landfill gas collection piping or is also used as gas conveyance piping. The leachate holding tank is emptied by vacuum truck before it becomes half-full, which means it is pumped out an

average of 1-2 times per week. Leachate is transported to the Madison Metropolitan Sewerage District (MMSD) treatment plant located approximately 15 miles to the southeast of the Site, in accordance with an annual agreement between WDNR and MMSD. A leachate sample is collected and analyzed quarterly to ensure that any contaminants present are within acceptable MMSD-defined limits.

Table 9 provides a data summary of data that shows contaminant concentrations in Site leachate are within acceptable limits for treatment by the MMSD. A discussion of O&M of the leachate collection system and leachate collection pumps and piping is included later in this report.

Landfill Gas Collection and Ground Flare Operations. The gas extraction system consists of a network of 13 vertical wells which connect to common header pipes and are grouped together in one of three branches. The collection system consists of 13 extraction wells, 4 drip legs, and associated gas and pneumatic header piping. Gas monitoring occurs at 11 locations on-Site and at locations for ambient air monitoring within the commercial storage buildings next to the Site. Wells are constructed to serve a dual purpose, as gas extraction wells and as collection points for leachate. The upper well sections are non-perforated polyvinyl chloride (PVC) pipe, extending into a lower section of perforated PVC pipe. Wells extend to the base of the landfill, approximately 36 to 81 feet in depth. Three gas header pipes from the northern, central, and southern areas of the landfill are connected to a blower, which draws landfill gas from the wells. As noted earlier, the integrity of the landfill cap affects the extraction efficiency of the landfill gas collection system. Regular monitoring and adjustments must be made to the landfill gas collection network, because of changes in gas generation rates in various areas of the landfill and changes in seasonal and longer-term weather trends. Landfill gas is typically saturated with moisture, which condenses on the walls of the gas collection piping. The landfill gas collection system is designed so that condensate is directed to low points in the pipe network (drip legs) and eventually to the leachate holding tank. Because settlement and shifting of fill material and the landfill cap sometimes changes the slope of piping, the landfill gas collection system requires regular monitoring, maintenance, and repair.

A fully enclosed ground flare was installed by WDNR to meet the combustion requirements of NR 445, Wisconsin Administrative Code. The ground flare is designed to destroy VOCs by maintaining a temperature of 1500 degrees Fahrenheit for a retention time of 0.5 seconds and a flow rate of 650 cubic feet per minute. Flare performance is monitored with a thermocouple for temperature sensing. Discharge gas has been sampled and analyzed to ensure adequate destruction of contaminants. A pedestal-type flare was the first flare installed at the Site, but has not been used since the installation of the ground flare. Ground flare operation and monitoring follows the requirements for landfill gas flares that are in Chapter NR 445 of the Wisconsin Administrative Code. Since its installation and start-up, the ground flare has been operating adequately and monitored in accordance with requirements specified by the WDNR's Air Management Program.

Landfill gas collection operational data has been assessed for this FYR and Table 10 provides a summary of data that shows that the collection efficiency for the landfill gas system has been within 68 to 92 percent for the past few years. O&M of (and improvements to) the landfill gas collection system are discussed later in this report.

Institutional Controls

To ensure the integrity of the remedial action, the 1995 ROD requires deed restrictions and zoning modifications to prohibit excavation of soils, construction on-Site, groundwater extraction, and any other interference with the remedy. Institutional Controls (ICs) for the RHL Site are required to be protective, effective and in good standing with the integrity of the remedy. For Site soils, the landfill cap was completed in 1988 and covers the approximately 23-acre landfill. Site groundwater is not anticipated to reach cleanup standards for 10 to 25 years, and the landfill cap is required to remain intact in perpetuity. The Site property is currently zoned for agricultural use but is not being used for that purpose. ICs implemented at the Site are summarized in the following Table 1:

Table 1: Institutional Controls Summary Table
Refuse Hideaway Landfill Superfund Site; Middleton, Wisconsin

Media, Engineered Controls and Areas that do not support UU/UE* for Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented (or planned)
Media: On-Site soil contamination. Engineered Controls: Multi-media landfill cap, landfill gas and leachate collection system, and ground flare. Site fencing and signage. Protective cover in areas known to have waste fill material underneath. Areas that Do Not Support UU/UE Based on Current Conditions Site Property as shown in Figures 3 and 4 (see Appendix B).	Yes	Yes.	RHL Site boundary (approx. 23 acres).	IC Objectives are to. - Prevent the Site Property from being used in any manner that would interfere with any aspect of the Work performed under and required by the ROD and CD. -- Prohibits use of land within the Site property boundary and assures integrity of landfill cap, landfill gas and leachate collection system, ground flare, and any other RA components - Limit well installation to prevent landfill cap breaches - Prevent landfill cap breaches or any other activity on-Site that could cause erosion, cracking, sliding, settlement of cap or other cap breaches. - Notify EPA within thirty 30 days of any event or action that constitutes a breach of the activity and use limitations of the Site Property.	**Implemented on December 16, 2013:** "Approval of Remedial Actions with Continuing Obligations, Refuse Hideaway Landfill, Middleton WI. WDNR BRRTS Activity # 02-13-000849, FID # 113112010. Information on the Site's Continuing Obligations has been placed in the WDNR's publicly accessible database, located at the web page: http://dnr.wi.gov/topic/Brownfields/wrrd.html. **Additionally Implemented:** Section 7 of "Refuse Hideaway Landfill Operation and Maintenance Manual," revised May 2016. WDNR is authorized to enforce State statutes, Wisconsin Administrative Codes NR 700-736, Act 418, and s.292.12, Wis. Stats., regarding long-term effectiveness.
Media. Groundwater underlying the Site. Engineered Controls: Groundwater monitoring program to track attenuation of contaminants	Yes.	Yes.	O U #1 (the Site)	IC Objectives are to: - Prevent any consumptive or other use of the groundwater underlying the Property - Limit well installation to prevent landfill cap breaches.	**Implemented on December 16, 2013:** "Approval of Remedial Actions with Continuing Obligations, Refuse Hideaway Landfill, Middleton WI. WDNR BRRTS Activity #. 02-13-000849, FID # 113112010.

Table 1: Institutional Controls Summary Table
Refuse Hideaway Landfill Superfund Site; Middleton, Wisconsin

Media, Engineered Controls and Areas that do not support UU/UE* for Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented (or planned)
in groundwater. Areas that Do Not Support UU/UE Based on Current Conditions. Site Property as shown in Figures 3 and 4 (see Appendix B).				- Prevent landfill cap breaches or any other activity on-Site that could cause erosion, cracking, sliding, settlement of cap or other cap breaches. - Notify EPA within thirty 30 days of any event or action that constitutes a breach of the activity and use limitations of the Site Property.	Information on the Site's Continuing Obligations has been placed in the WDNR's publicly accessible database, located at the web page: http://dnr.wi.gov/topic/Brownfields/wrrd.html. **Additionally Implemented:** Section 7 of "Refuse Hideaway Landfill Operation and Maintenance Manual," revised May 2016. WDNR is authorized to enforce State statutes, Wisconsin Administrative Codes NR 700-736, Act 418, and s.292.12, Wis. Stats., regarding long-term effectiveness. All proposed new wells within a 1,200-foot radius of the Site are required to have WDNR and Dane County Dept. of Human Services' Groundwater Protection Program approval before installation.
Media: Off-Site groundwater. Engineered Controls: Point of Entry Treatment Systems (if and where	Yes.	Yes.	Parcels Adjacent to the Site.	IC Objectives are to: - Prohibit use of untreated off-Site groundwater that contains contaminants at levels above Wisconsin ESs. - Regulate well installation within a 1,200-foot radius	**Implemented:** WDNR is authorized to enforce State statutes, Wisconsin Administrative Codes NR 700-736, Act 418, and s.292.12, Wis. Stats., regarding long-term effectiveness.

Table 1: Institutional Controls Summary Table
Refuse Hideaway Landfill Superfund Site; Middleton, Wisconsin

Media, Engineered Controls and Areas that do not support UU/UE* for Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented (or planned)
needed) and annual sampling and analysis. Areas that Do Not Support UU/UE Based on Current Conditions: There is no evidence of an exposure. Contamination in groundwater being used off-Site is not at levels that exceed State of Wisconsin ESs, or is being treated by Point of Entry Treatment Systems.				of the Site to prevent use of untreated groundwater that contains contaminants at levels above Wisconsin ESs. - Notify EPA within thirty 30 days of any event or action that constitutes a breach of the activity and use limitations of the Site Property.	All proposed new wells within a 1,200-foot radius of the Site are required to have WDNR and Dane County Dept. of Human Services' Groundwater Protection Program approval before installation

A map showing the approximate areas in which the ICs apply is included as Figure 7 in Appendix B. Existing governmental controls that currently apply to the Refuse Hideaway Landfill Site include:

- Title 9, Chapter 45 of the Code of Ordinances, Dane County, Wisconsin that requires application for, and approval of a permit from the Dane County Department of Public Health to install any new potable water well;

- Wisconsin Administrative Code NR 506.085 that prohibits establishment or construction of any buildings over a waste disposal area and prohibits excavation of a landfill's final cover or excavation of any waste materials;

- Wisconsin Administrative Code NR 812.08(4)(g) that requires a minimum separating distance of 1200 feet between any well and any source of contamination; and

- Wisconsin Administrative Code NR 812.10(5) that requires well drillers and well constructors to obtain WDNR approval of the location of any well and its casing pipe depth. Special requirements are required for well casings in any area where aquifers have been or may become contaminated.

The Site property boundary is the area that is protected by Continuing Obligations implemented by WDNR. Continuing Obligations are requirements that are part of a remedy that property owners are legally obligated to maintain. Since June 3, 2006, Continuing Obligations are enforceable as authorized by s. 292.12, Wis. Stats. and can be established instead of placement of proprietary deed restrictions on properties. Information on the Site's Continuing Obligations has been placed in the WDNR's publicly accessible database, located at the web page: http://dnr.wi.gov/topic/Brownfields/wrrd.html. The State is not the owner of the real estate on which the Site is located. However, the State performs the remedial action work at the Site as a Settling Performing Defendant and must comply with property-specific Continuing Obligations.

For the Refuse Hideaway Landfill Site, one Continuing Obligation for WDNR is maintaining all remedy components in functional order. In addition, WDNR is responsible for ensuring that there shall be no use of the groundwater, no residential or commercial use of the Site, and no installation or construction of structures, wells, or pipes unless approved by WDNR, in consultation with EPA. Compliance with these restrictions is necessary for the remedy to remain protective of human health and the environment. WDNR is authorized to implement Continuing Obligations under Wisconsin environmental restrictive covenant statutes, pursuant to Wisconsin Administrative Code NR 700-736 and Act 418. Continuing Obligations at the Site have been imposed by WDNR since the 2007 FYR Report under the additional authority of s.292.12, Wis. Stats., which became effective on June 3, 2006. The May 23, 2017 Site inspection confirmed that WDNR currently imposes Continuing Obligations on the real estate that comprises the Site, ensuring that no trespassing occurs and that the land and underlying groundwater are not used in ways that are incompatible with the implemented Site remedial action.

The Site is partially fenced and the gate is locked at the end of each work day by the users of the buildings adjacent to the landfill, Speedway Sand & Gravel, Inc.'s employees. Other access is

restricted by topography. The gate is checked as part of the Site operations contractor's weekly duties. The Continuing Obligations serve as restrictions for the Site that prevent development and use of Site real estate for purposes prohibited by State regulations. Continuing Obligations prevent use of groundwater within the boundary of the Site property, and assure the integrity of the landfill and other components of the remedial action.

The ROD states that groundwater use restrictions are necessary to prevent unacceptable exposure pathways to contamination and prohibit use of the groundwater that may interfere with the remedy. Consistent with the Site inspection made by WDNR and EPA, there is no current groundwater use at the Site. Continuing Obligations implemented and maintained for the Site property prohibit use of the property that may cause exposure to contaminated groundwater that may present a health risk. Continuing Obligations prohibit interference with the remedy and prohibit residential or commercial use on-Site. According to the Site inspection made by WDNR and EPA, the uses of the Site are currently consistent with these restrictions. Figure 6 in Appendix B is a groundwater plume contamination map that shows areas affected by groundwater contamination. The groundwater down-gradient of the Site contains contaminants that fluctuate to slightly below or above the State ESs. WDNR established a special casing requirement area in 2000 for all new water supply wells that are proposed for construction within a distance of the Site defined in the casing requirement area.

Under the authority of Wisconsin Administrative Code chapters NR 700-736 and s.292.12, Wis. Stats., WDNR maintains Continuing Obligations on the real estate that comprises the Site. This discourages trespassing and helps to ensure that the land and underlying groundwater are not used for purposes incompatible with RAOs. The Continuing Obligations run with the property, and therefore also apply to future property owners. Maintenance and long-term stewardship of Continuing Obligations are addressed in Section 7 of the Site O&M Plan.

System Operations/Operation and Maintenance (O&M)

Table 11 in Appendix B is the Site Inspection Form that describes the current state of the operating remedy. WDNR oversees an environmental contractor that performs remedy repair, upkeep, and O&M of the gas and leachate systems and the landfill cover. On a weekly basis, WDNR's contractor inspects the following systems and performs routine maintenance and repairs (when necessary) of the following: blower/flare control panel station, leachate tank, gas and leachate branch monitoring stations, flare inlet pipe, and the blower inlet pipe. Additional remedy components that receive similar attention on a monthly, quarterly, and annual basis include: gas/leachate extraction wells, gas probes, well pumps/controls, buried control valves, the air compressor (valves, oil change, etc.), the pneumatic system, blower drive belts, ground flare manual valve, air dryer desiccant, condensate driplegs, system cleanouts, tank load-out station, Site padlocks, and the landfill surface (including fencing).

Long-term maintenance of the Site landfill cap is ongoing and ensures containment of Site waste material. The landfill gas and flare system removes significant amounts of VOCs from the waste fill material that would otherwise be available for migration from the landfill. Since the last FYR in 2012, only minor repairs and improvements were made to improve performance of the system. The leachate collection system continues to be operable and leachate collection piping is cleaned

annually. In late 2009 and early 2010, photovoltaic units (solar panels) were installed at the Site to provide electrical power to Site remedy components. This solar energy system successfully reduces the amount of electricity needed from the local utility provider, and requires minimal maintenance.

Groundwater Monitoring Operations. Monitoring of groundwater on and around the RHL Site occurs semi-annually at 23 monitoring wells and 3 private water supply wells, and annually at 22 monitoring wells and 13 private wells. The current monitoring program was developed in 2001 based on Site data collected since 1989, and represents an optimized program that continues stringent Quality Assurance / Quality Control requirements that have been established for this Site. Sampling frequency and the number of data points in the current monitoring program have been optimized based on contaminant "non-detects" confirmed by nearly 20 years of Site data. In 2003, the groundwater monitoring program was revised to address increased groundwater quality information requests from surrounding landowners. Four new deep bedrock monitoring wells were installed in September 2003 to better define the horizontal and vertical extent of the contaminated groundwater in the mid-plume area.

EPA's review of groundwater monitoring data collected since 2003 found that the lateral extent of the plume of VOCs remains stable. Total VOC concentrations toward the edge of the plume continue to decrease, while some contaminants are still present at unacceptable levels near the landfill. Table 6 provides a summary of data for monitoring wells on- and off-Site that show a general downward trend of contaminant concentrations.

Landfill Cap. The clay and soil cap is inspected throughout the year for areas of erosion and stressed vegetation. The cover is typically mowed on a biennial basis, or more frequently if necessary. Generally, the cover is well-vegetated, with no significant erosion. Since 2001 when WDNR started remedial action activities, no stressed vegetation has been observed at the Site. No inordinate low-growth zones have been observed since the 2012 FYR.

Landfill Leachate Collection and Transportation for Disposal. Leachate header pipes are cleaned annually and there have been no problems with this cleaning since the 2012 FYR. Since the 2012 FYR, no major repair events took place, however, some pumps were cleaned since the last FYR. All leachate pumps are operational. Since the start of the leachate collection operations in 1991, there have been no major problems noted in vacuum truck, leachate tank emptying, or leachate transportation operations. WDNR renews its agreement with the MMSD every year and there were no problems noted in that procedure since the 2012 FYR. Table 8 shows the total leachate collected from 2012 to 2016, and Table 9 shows that operations at the RHL Site have been in compliance with MMSD requirements for the past few years.

Landfill Gas Collection and Ground Flare Operations. As noted previously in this report, with the removal of landfill gas, this system also removes significant amounts of VOCs from the waste that would otherwise be available for migration from the landfill. Although no major repairs to this system were necessary since the 2012 FYR, some lengths of leachate/landfill gas piping have settled and may need to be excavated and re-graded. WDNR is also considering replacement of the existing flare which has been operating for many years, and the possible replacement of controls for flare and blower operations.

In addition to routine sampling at gas probes around the perimeter of the Site property, a multi-gas analyzer is used at the Site on a continuous basis to measure methane, carbon dioxide, and oxygen as percent by volume. Methane is generally not detected in the gas probes surrounding the landfill, with the exception of seasonal low concentration detections in one or several probes located at the southwest corner of the landfill. Since the 2012 FYR, gas probe monitoring data indicates that landfill gas may be migrating only a short distance in the southwest corner of the landfill, and only seasonally from the landfill. Repairs to piping would correct this issue. Ground flare operational data have been assessed for this FYR and Table 10 provides a summary of data that shows collection efficiency at 68 to 92 percent for the past few years. This is consistent with national air pollutant emission guidance that says landfill collection efficiencies range from 60 to 85 percent.

O&M Manual Revisions. In 2014, the WDNR's environmental contractor started developing Section 7 of the Site O&M Plan to add requirements for maintenance and long-term stewardship of ICs in the form of Continuing Obligations. A revised O&M Plan was submitted to WDNR on September 4, 2014 but needed further revision. The document was re-submitted on May 25, 2015. After review by EPA and subsequent minor revisions, the O&M Plan was approved by EPA on May 27, 2016.

Remedy Costs. Current annual O&M and groundwater monitoring costs for the RHL Site reflect work for operation, maintenance, repair, and management of the Site remedy systems, and for groundwater, leachate, and landfill gas sampling and analysis. Average Site annual costs are within an approximate range of $75,000 to $100,000, but fluctuate depending on the degree of repair/upgrade to remedy components implemented throughout the year.

III. PROGRESS SINCE THE LAST REVIEW

Table 2: Protectiveness Determinations/Statements from the 2012 FYR

O.U. #	2012 Protectiveness Determination	2012 Protectiveness Statement
1, Sitewide	Short-term Protective	The remedy at the Refuse Hideaway Landfill Site currently protects human health and the environment in the short-term. Based upon the review of annual groundwater monitoring and other data and the April 17, 2012 Site inspection, there are no current exposures to human health and the environment. The remedy currently protects human health and the environment in the short-term because: the landfill cap and leachate/gas collection and flare systems are in place and operating properly; there is no evidence of a cap breach; the existing use of the RHL Site property is consistent with the objectives of the landfill cap and land use restrictions; and because there is no evidence of unacceptable levels of groundwater contaminants away from the Site property or unacceptable groundwater use in the area of the plume. However, in order for the remedy to

		be protective in the long-term, the remedy must attain long-term achievement of WDNR NR 140 groundwater Enforcement Standards and comply with land and groundwater use restrictions that: (1) prohibit interference with the hazardous waste cap; (2) prohibit residential, commercial, or any other use that allows the continued possibility of human exposure; and (3) restrict use of groundwater until groundwater cleanup standards are achieved throughout the plume area.

Table 3: Status of Recommendations from the 2012 FYR

O.U.	Issue	Recommendations/ Follow-up Actions	Current Status	Current Implementation Status Description	Completion Date
1	Low flows & varying pressure at south branch gas/leachate extraction wells GW-1, GW-2, & GW-3.	Short-term: Pump liquid out of piping at GW-1, GW-2, GW-3 locations. Long-term: Investigate and implement replacement of leachate/ landfill gas piping throughout the Site to restore proper vacuum and leachate flow. This will reduce elevated methane concentrations in perimeter gas probes and improve capture and staging of leachate.	Complete	In 2014, the O&M contractor procured design services. Upgrades of leachate/ landfill gas piping were completed in September 2014.	Sept. 26, 2014
1	Low vegetative growth in the southern portion of the landfill in the vicinity of GW-1, GW-2. and GW-3.	Re-seed, water, and fertilize small portions in the area. These cap improvements could occur as part of pipeline replacement work.	Complete	In 2014 and 2015 a landscaping contractor strategically re-seeded areas of the landfill cap.	Sept. 25, 2015
1	Low methane production.	Perform a Site-wide investigation to determine whether waste fill material has slowed its generation of gas. Replacement of flare and system controls should occur concurrently or shortly after pipeline replacement.	Complete	In 2013, the pedestal flare at the Site was rehabilitated.	July 26, 2013

O.U.	Issue	Recommendations/ Follow-up Actions	Current Status	Current Implementation Status Description	Completion Date
1	Institutional Controls for the RHL Site as required by the 1995 ROD are not in place.	Provide a Continuing Obligations Addendum to the Site O&M Plan. Continuing Obligations shall be maintained, consistent with WI Adm. Codes NR 700-736, Act 418, and s.292.12.	Complete	On December 16, 2013, WDNR issued a letter requiring implementation and maintenance of Continuing Obligations. The O&M Plan was revised to add Section 7 for Continuing Obligations and submitted to WDNR on September 4, 2014. Section 7 was revised and re-submitted on May 25, 2015. After minor revisions by EPA, the O&M Plan was approved by EPA on May 27, 2016.	Dec. 16, 2013 and May 27, 2016

IV. FIVE-YEAR REVIEW PROCESS

Community Notification and Involvement

The site's web page: http://www.epa.gov/superfund/refuse-hideaway-landfill was updated to provide information on this FYR and to invite community input. In addition, a public notice was made available in the Middleton Times-Tribune newspaper on April 6, 2017, and is included as Figure 8 in Appendix B of this report. The notice stated that there was a FYR and invited the public to submit any comments to EPA. Except for correspondence from WDNR, no public comments regarding the FYR have been received. The results of the review and the report will be made available on the web page and at the Site information repository located at:

Middleton Public Library
7425 Hubbard Avenue
Middleton, Wisconsin 53562

The Administrative Record may also be reviewed at the Middleton Public Library and:

U.S. EPA, Region 5
Superfund Records Center, 7th Floor
77 West Jackson Boulevard
Chicago, Illinois 60604

Interviews

Most of the area surrounding the Site is rural. Future use of the property is restricted by local zoning codes to agricultural activity, and the City does not anticipate any changes to the zoning of the Site. The contamination that exists at the Site does not affect any private residential well. Therefore, no community interviews were conducted for this FYR.

During the FYR process, questions and other correspondence were exchanged by electronic mail and telephone with WDNR. The purpose of correspondence and discussions since October 2016 was to document any perceived problems or successes with the implemented remedy. No problems have arisen regarding access to the Site.

Data Review

EPA and WDNR reviewed recent annual groundwater monitoring data and concluded that the area of VOC contamination at the Site continues to remain stable (i.e., the groundwater plume has not increased in lateral extent or depth). The Agencies also found that the contaminant concentrations remain stable or are decreasing. Total VOC concentrations near the end of the plume continue to decrease, while levels of some VOC compounds are still present at unacceptable levels below and near the Site. The areal extent of contaminants from the landfill continues to slowly recede at off-Site locations at the edge of the contaminant plume. The overall extent and concentration distribution of the prevalent contaminant, tetrachloroethene, has not changed significantly since 2002. VOCs continue to be removed each year, predominantly by the gas extraction system. Levels of total VOCs in groundwater have decreased from highest total values above 100 ug/L (parts per billion) in 1998, to a highest value of 91.5 ug/L in 2016. Table 6 provides a summary of Site groundwater data in chronological order.

EPA and WDNR reviewed recent O&M data to assess operational effectiveness of the landfill gas collection and ground flare system and the leachate collection and treatment system. WDNR reviews contractor reports on weekly, monthly, quarterly, and annual inspections, and O&M monitoring activities. Monthly and annual reports indicate that the gas and leachate system remedies operate almost 100% of each year, the exceptions being times for repairs. The leachate collection system has successfully collected leachate on a continual basis since its installation in 1991. Review of recent O&M data confirms that this system continues to operate successfully (See Tables 7 and 8). In recent years, gas generation rates have decreased and the operation of the landfill gas collection and flare systems was re-assessed. In July 2013, the pedestal flare at the site was rehabilitated.

The EPA and WDNR review of recent maintenance and inspection reports and the Site inspection confirmed that the landfill cap is in good operating condition. Long-term maintenance and regular inspection of the landfill cap is required and implemented to ensure that the remedy remains effective, and ensures containment of Site waste material. No major cap maintenance or replacement has been needed since 2003 to control erosion and improve surface drainage.

Site Inspection

The Site inspection was conducted on May 23, 2017. In attendance were John V. Fagiolo, EPA RPM and Timothy Zeichert of the WDNR. The purpose of the inspection was to assess the protectiveness of the remedy. The FYR Site inspection checklist was completed using information from this inspection and is included as Table 11 in Appendix B of this report. EPA and WDNR walked throughout the Site property and checked the components of the remedy including monitoring wells. Monitoring wells appeared to be secured, undamaged, and otherwise in good condition. The Site perimeter (fence line) was visually inspected. The Site was found to be in good condition during the inspection. There were no signs of unacceptable erosion or unacceptable discarding of materials or wastes. General Site housekeeping was good and the Site showed no signs of any vandalism or other disturbances. Fences on the north, east, south, and west sides were properly in place. Since the last FYR in 2012, EPA and WDNR consulted by electronic mail and telephone to discuss Site issues, including annual Site visits by EPA.

V. TECHNICAL ASSESSMENT

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

Yes. Components of the remedy selected by the 1995 ROD, as modified by the 1998 and 2012 ESDs, have been constructed and remain functional, operational, and effective. The implemented remedy does not yet achieve the RAOs because long-term achievement of the WDNR NR 140 groundwater Enforcement Standard (ES) within the Site boundary has not yet occurred. The remedy is considered protective in the short-term however, because there is no evidence that there is current human exposure. There is no cracking, sliding, settlement of the cap or other indicators of cap breaches; landfill gas and leachate are successfully being collected and adequately treated or disposed of; and residential POE systems are adequately maintained wherever they are used. To continue to ensure long-term protectiveness, effective ICs that prevent disturbance of the cap, landfill gas/leachate collection systems, and the ground flare must be maintained. ICs in the form of Site-specific Continuing Obligations and applicable sections of the O&M plan are in place to ensure the long-term protectiveness of the remedy and prevent exposure to contaminants. Site access and use is restricted by topography and a locked gate.

With continued maintenance and monitoring of the Site landfill cap, landfill gas/leachate collection, and ground flare systems inside the security perimeter fences, the source area remedies contain any soil contamination and ensure that no excess human health risks develop. Groundwater monitoring data were reviewed; indications from the data are that the source control systems (gas and leachate systems and the landfill cover) are effective in controlling contaminant input into the groundwater. The downward and lateral extent of the plume of VOCs continues to remain stable. Total VOC concentrations toward the end of the plume continue to decrease, while several VOC compounds remain above ESs within and close to the Site property boundaries. The overall extent and concentration distribution of VOCs has decreased since 2002. Additional monitoring wells down-gradient of the Site were installed in 2004 to better define the concentration and location of the groundwater contaminants in the middle portion of the contaminant plume.

Early Indicators of Potential Remedy Failure. No early indicators of potential remedy failure were noted during the review. Maintenance activities have been consistent with expectations, and groundwater monitoring adequately assesses the groundwater plume at the Site.

Implementation of Institutional Controls and Other Measures. The 1995 ROD included measures requiring the implementation of deed/access restrictions and/or other ICs to prevent future development of the Site, and assures the integrity of the remedial action. In order for the remedy to remain protective in the long-term, ICs in the form of Site-specific Continuing Obligations (and O&M procedures) prevent disturbance of: the cap, landfill gas/leachate collection systems, and the ground flare as envisioned in the 1995 ROD. Continuing Obligations and the ICs section of the Site O&M Plan prevent development and use of land within the Site property, prevents use of groundwater on-Site, prevents unacceptable use of groundwater off-Site, assures the integrity of the landfill and other components of the remedial action, and restricts any land use that will interfere with the remedial action. Continuing Obligations serve as restrictions for the Site that prevent development and use of Site real estate for purposes prohibited by State regulations, prevent use of groundwater within the boundary of the Site property, and assure the integrity of the landfill and other components of the remedial action.

Current Use Compatibility with Land and Groundwater Use Restriction. Any use that interferes with the landfill cap would not be protective of human health and the environment. According to Site inspections, there is no current use of the Site landfill, which has access restricted by a locked gate and by topography. Industrial uses on adjacent parcels are not anticipated to impact the Site landfill. The landfill cap must remain in place indefinitely to prevent exposure to underlying waste. The property is currently zoned for agricultural use but is not being used for that purpose. A specific section of the Site O&M Plan for the Site-specific Continuing Obligations is the mechanism in which WDNR and EPA benefit from the State statutes regarding long-term effectiveness (Wisconsin Administrative Code, NR 700-736, NR 140, Act 418, and s. 292.12).

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

Yes. The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection are still valid. Land and groundwater use at the Site is still consistent with the assumptions used to determine where cleanup would be performed. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. There have been no changes in expected land use at or near the Site, nor changes in human health exposure assumptions. There have been no changes in standards or to-be considereds (TBCs) for cleanup of Site contaminants since the 1995 remedy decision. Since the 2012 FYR there have been no newly identified contaminants or unanticipated toxic byproducts. Toxicity information and risk assessment methodologies used in the Site's remedy decision have not changed.

Changes in Standards and TBCs. Standards outlined in the 1995 ROD, as modified by the 1998 and 2012 ESDs, are still valid at the RHL Site. Site ICs remain effective under: the 2001 RHL Site remedial action CD, documents specifying the manner in which the Settling Performing Party will perform the remedial action, and the O&M plan which shows how the Site-specific

Continuing Obligations have been implemented and are maintained. Standards, ARARs and/or TBCs were the basis for the Site cleanup goals. No new information has called into question the remedy cleanup goals. ARARs that were identified in the ROD that have been evaluated but not yet achieved include those established by the Safe Drinking Water Act MCLs, for those Site contaminants that have MCLs. There have been no changes in these ARARs and no new standards or TBCs that may affect the protectiveness of the remedy.

Changes in Exposure Pathways. No changes in the Site conditions that affect exposure pathways were identified as part of the FYR. There are no current or known planned changes in the Site land use. The groundwater monitoring program adequately assesses the Site groundwater plume. The exposure assumptions used to develop the Human Health Risk Assessment have not changed, and there is no new information that would support a change to these exposure assumptions.

Changes in Toxicity and Other Contaminant Characteristics. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment. The assumptions used in the risk assessment are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels.

Changes in Risk Assessment Methods. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. Risk assessment methodologies used at the RHL Site since the 1995 ROD have not changed, and do not call into question the protectiveness of the remedy.

Expected Progress Towards Meeting RAOs. Remedial components put into place are successfully reducing contaminant levels; however, Site groundwater data still shows contaminants at concentrations that exceed the cleanup goals. Also, even though contaminants in Site groundwater have been attenuating and are declining in concentrations, it is unknown when Site groundwater cleanup goals will be attained. Before the next FYR in 2022, EPA and WDNR will develop an estimate of the remaining time interval for meeting Site groundwater cleanup goals.

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

No. Contaminant toxicity and exposure pathways that would affect the protectiveness of the remedy have not changed. There have been no newly identified ecological risks, nor have any natural disasters adversely impacted the Site remedy. No other events have affected the protectiveness of the remedy, and there is no other information that calls into question the short-term protectiveness of the remedy. The Site is zoned for agricultural purposes but is unused.

VI. ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 4 shows recommendations and follow-up actions resulting from this FYR, as well as an approximate completion schedule.

Table 4: Issues and Recommendations/Follow-up Actions

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): 1 (Site-wide)	**Issue Category: Operation and Maintenance**			
	Issue: Some lengths of leachate/landfill gas piping have settled and need to be excavated and re-graded.			
	Recommendation: Procure design and construction services to revise Site piping in strategic areas to improve collection and flow.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	Sept. 30, 2018

VII. PROTECTIVENESS STATEMENT

O.U. #1 and Sitewide Protectiveness Statement	
Operable Unit 1 (Site-wide)	*Sitewide Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The remedy at the Refuse Hideaway Landfill Superfund Site currently protects human health and the environment. The landfill cap and gas collection and flare systems are in place and operating properly; there is no evidence of a cap breach; the existing use of the RHL Site property is consistent with the objectives of the landfill cap and land use restrictions; and there is no evidence of unacceptable levels of groundwater contaminants away from the Site property or unacceptable groundwater use in the area of the plume. Land and groundwater use restrictions: prohibit interference with the hazardous waste cap; prohibit residential, commercial, or any other use that would allow human exposure; and restrict use of the groundwater until groundwater cleanup standards are achieved throughout the plume area. However, in order for the remedy to be protective in the long-term, the following action needs to be taken to ensure protectiveness: procure design and construction services to revise Site piping in strategic areas to improve collection and flow of landfill leachate and gas. The remedy must achieve groundwater cleanup standards throughout the plume area. Ongoing extraction and attenuation of contaminants in groundwater is expected to meet the groundwater cleanup standards in the long-term, and continued operation of the remedy and monitoring of groundwater is necessary until cleanup standards are achieved.	

VII. NEXT REVIEW

The next FYR report for the Refuse Hideaway Landfill Superfund Site is required no less than five years from EPA's signature date of this review.

APPENDIX A: REFERENCE LIST
Refuse Hideaway Landfill Superfund Site
Third Five-Year Review

RHL Site documents reviewed in preparation of this five-year review report include the following:

1. "Special Consent Order SOD-88-02A from WDNR relating to the closure and monitoring of the Refuse Hideaway Landfill," dated May 2, 1988.

2. "Special Notice and Information Request Letter from the State of Wisconsin," dated April 1991.

3. "Predesign and Additional Studies Report: Refuse Hideaway Landfill," dated July 1998.

4. "Remedial Investigation Report, Refuse Hideaway Landfill, Middleton, Wisconsin,", dated September 12, 1994.

5. "Feasibility Study Report, Refuse Hideaway Landfill, Middleton, Wisconsin," dated February 6, 1995.

6. Record of Decision, dated June 28, 1995.

7. Administrative Order on Consent, dated April 8, 1997.

8. Explanation of Significant Differences, dated September 30, 1998.

9. Preliminary Closeout Report, dated September 30, 1998.

10. First Five-Year Review Report, dated September 18, 2007.

11. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources 2010 Annual Report," dated January 26, 2011.

12. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources 2011 Annual Report," dated January 20, 2012.

13. Explanation of Significant Differences, dated June 22, 2012.

14. Second Five-Year Review Report, dated August 29, 2012.

15. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources 2012 Annual Report," dated January 10, 2013.

16. "Operation and Maintenance Annual Report: July 2012 Through June 2013; Refuse Hideaway Landfill." Leggette, Brashears, and Graham, dated September 2013.

17. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources 2013 Annual Report," dated January 6, 2014.

18. "Operation and Maintenance Annual Report: July 2013 Through June 2014; Refuse Hideaway Landfill." Leggette, Brashears, and Graham, dated September 2014.

19. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources 2014 Annual Report," dated April 21, 2017.

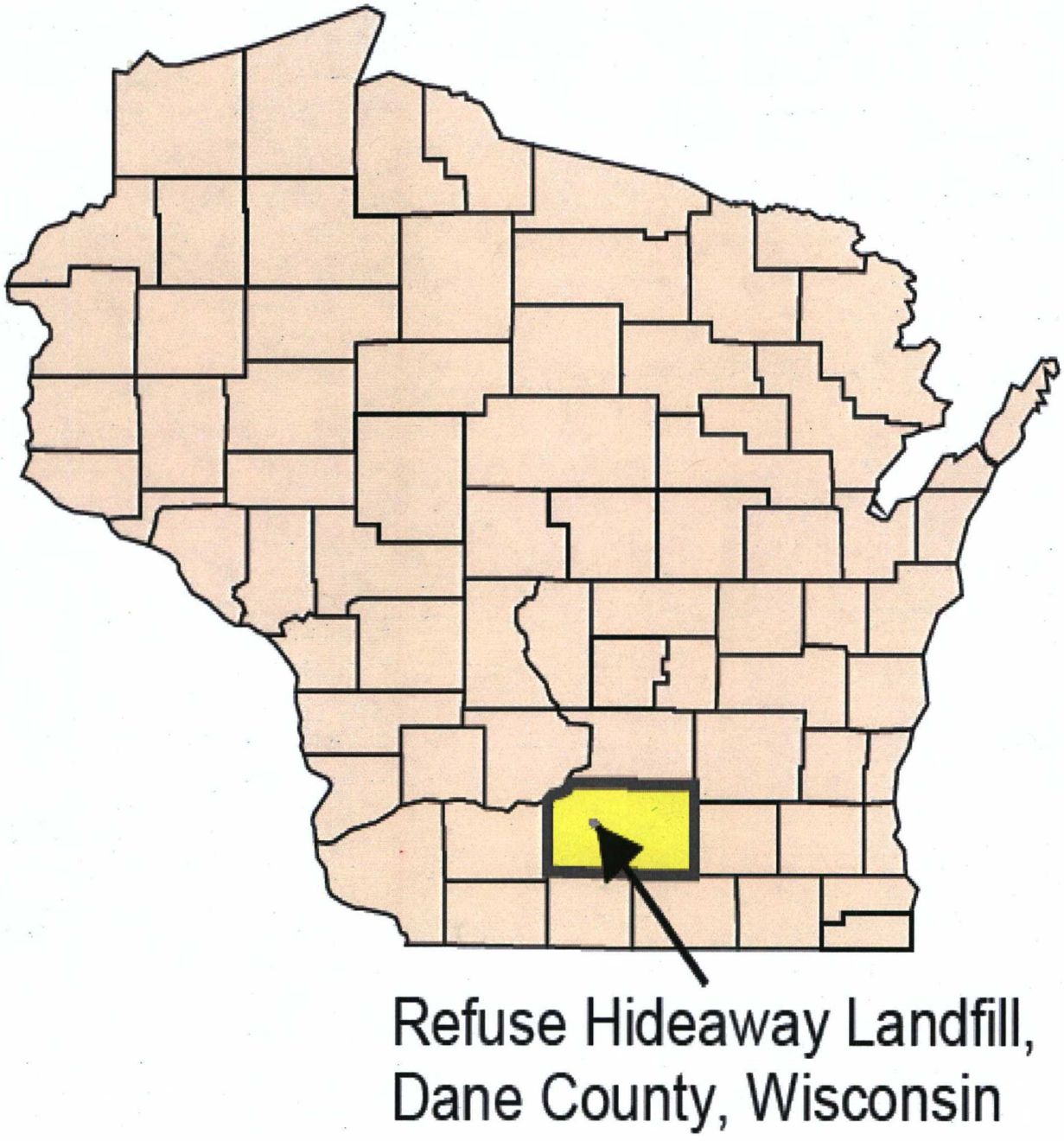
20. "Operation and Maintenance Annual Report: July 2014 Through June 2015; Refuse Hideaway Landfill." Leggette, Brashears, and Graham, dated November 2015.

21. "Refuse Hideaway Landfill; State of Wisconsin Department of Natural Resources 2015 Annual Report," dated April 21, 2017.

22. "Operation and Maintenance Annual Report: July 2015 Through June 2016; Refuse Hideaway Landfill." Leggette, Brashears, and Graham, dated August 2016.

APPENDIX B: FIGURES AND TABLES

Figure 1	Site Location Map - State of Wisconsin
Figure 2	Site Location Map - Local
Figure 3	Site Layout
Figure 4	Approximate Groundwater Sampling Locations
Figure 5	Approximate Gas/Leachate Extraction Well Locations
Figure 6	Approximate Site Plume Boundary Map
Figure 7	Approximate Institutional Control Area
Table 5	Chronology of Site Events
Table 6	Summary of Groundwater Sampling Results
Table 7	Summary of Cleanup Standards for the Refuse Hideaway Landfill Site
Table 8	Summary of Landfill Leachate Production
Table 9	Summary of Contaminant Concentrations in Landfill Leachate
Table 10	Collection Efficiency of Landfill Gas Collection System
Table 11	Site Inspection Checklist; 2017 Five Year Review



<u>FIGURE 1:</u> Site Location Map;
State of Wisconsin

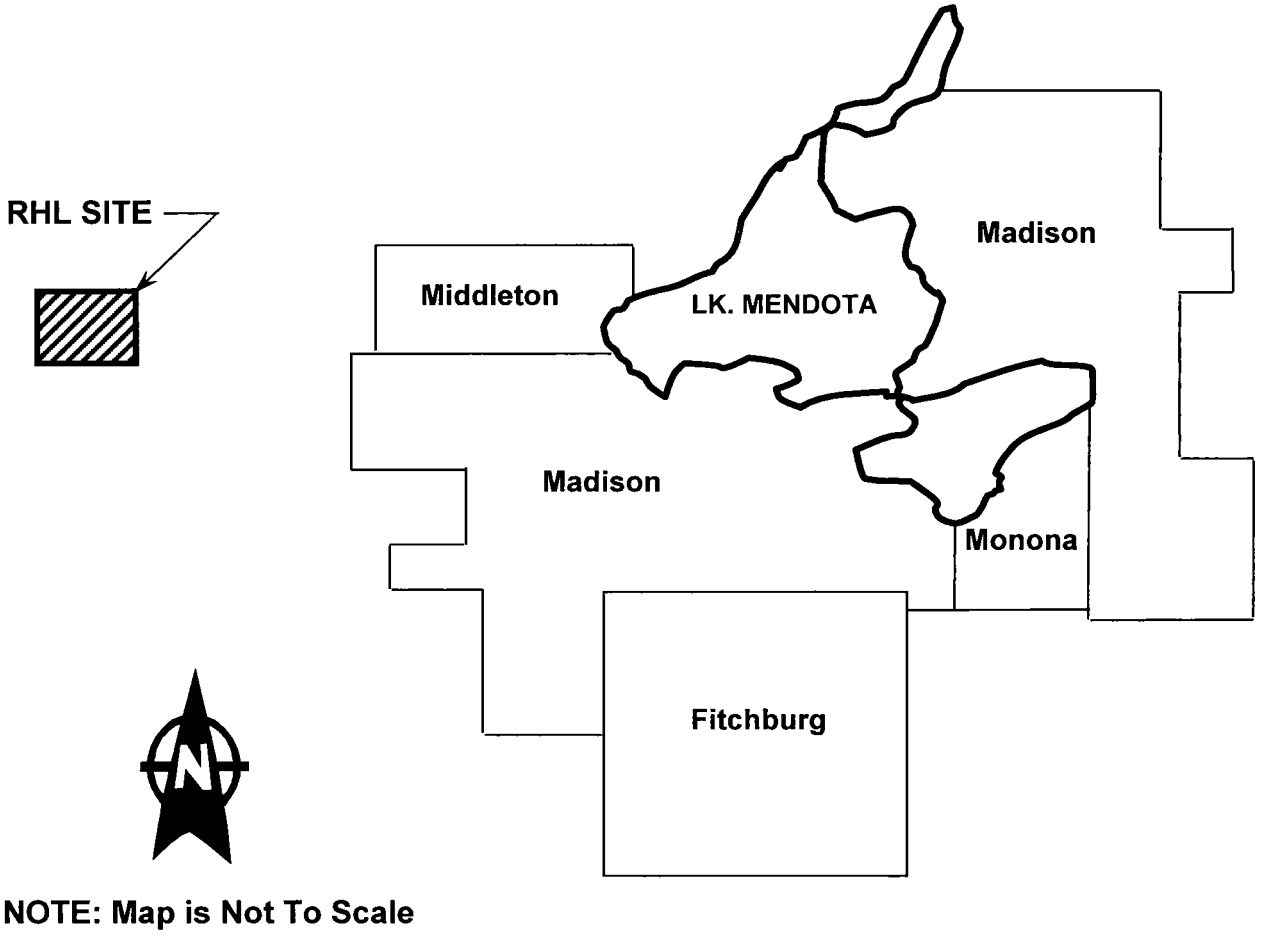


FIGURE 2: - Site Location Map (Local)

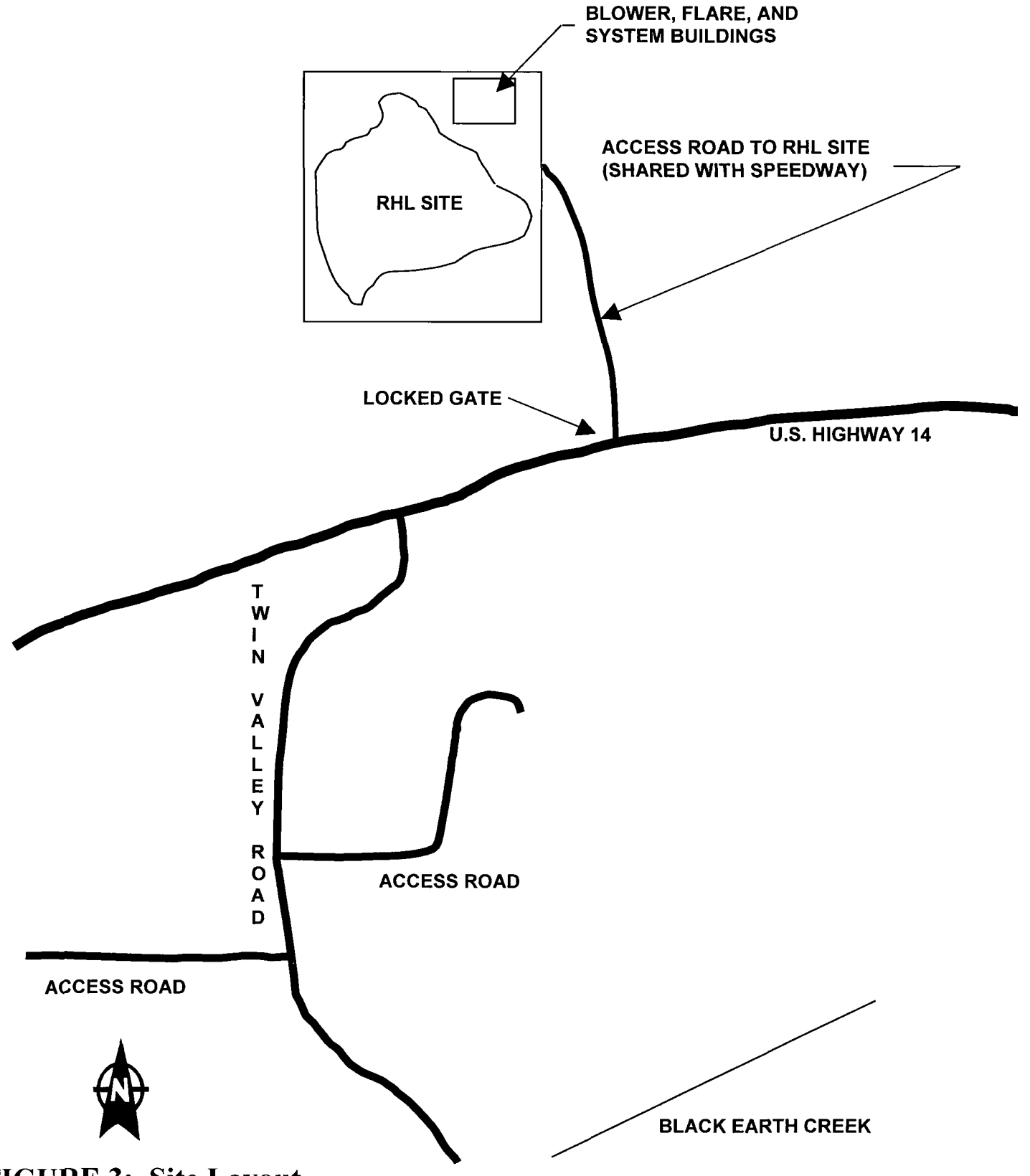


FIGURE 3: Site Layout
NOTE: NOT TO SCALE

NOTES:

1. P-29 is approx. 900 feet northwest of the site boundary. P-26 is approx. 150 ft. northwest of the site boundary.

2. P-34 is approx. 1000 ft. north of the site boundary. P-28 is approx. 100 ft. north of the site boundary.

3. P-20 is approx. 800 ft. east of the site boundary. P-23 is approx. 300 ft. east of the site boundary.

4. P-27 is approx. 200 ft. west of the site boundary. P-25 is approx. 400 ft. south of the site boundary. Noles and Stoppleworth wells are approx. 2200 ft. southwest of the site boundary.

5. P-40 is approx. 3500 ft. southwest of the site boundary. P-31 is approx. 3000 ft. southwest of the site boundary. P-22 is approx. 1500 ft. southwest of the site boundary.

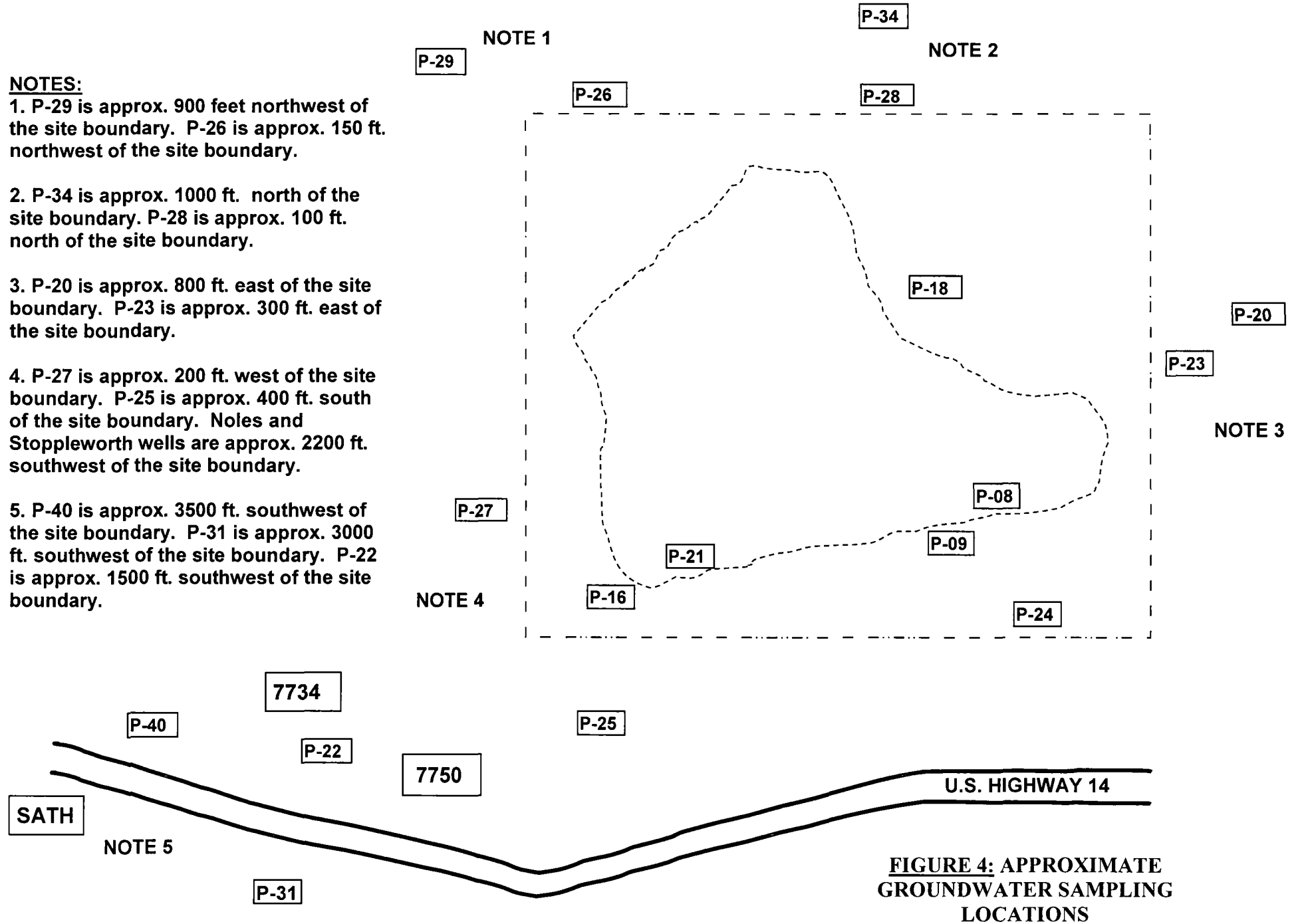


FIGURE 4: APPROXIMATE GROUNDWATER SAMPLING LOCATIONS
(Not To Scale)

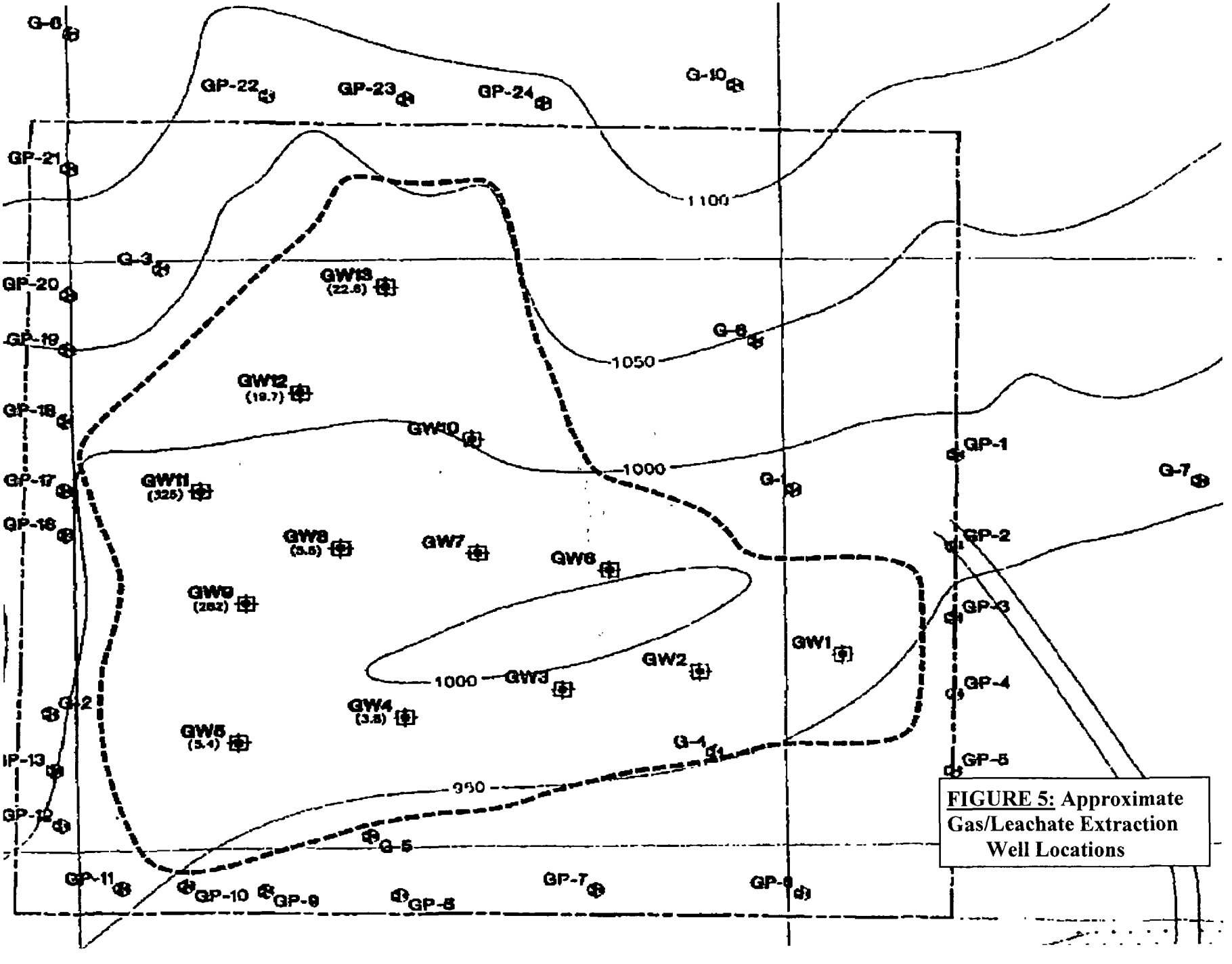


FIGURE 5: Approximate Gas/Leachate Extraction Well Locations

FIGURE 6: Approximate Site Plume Boundary Map

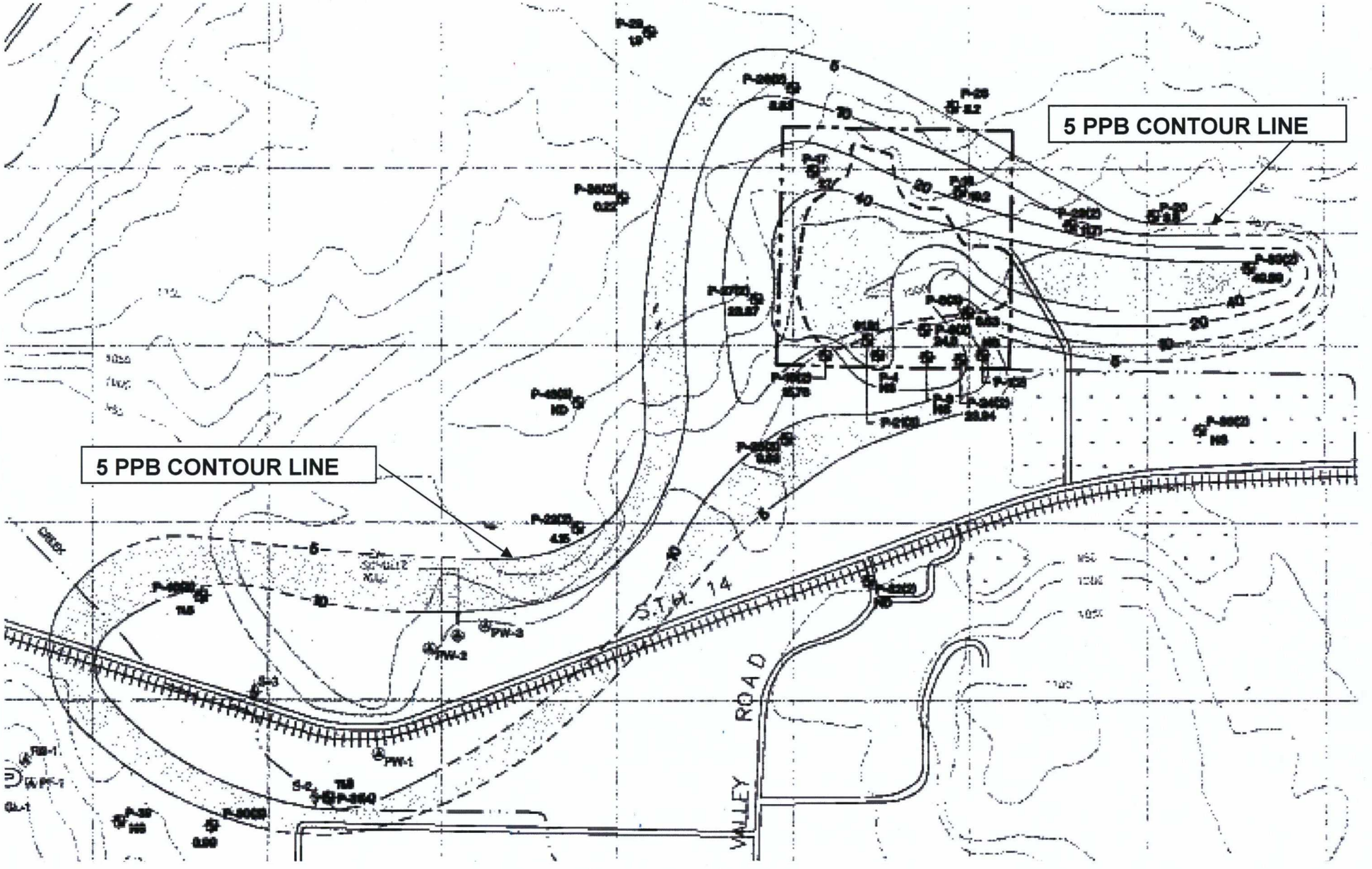
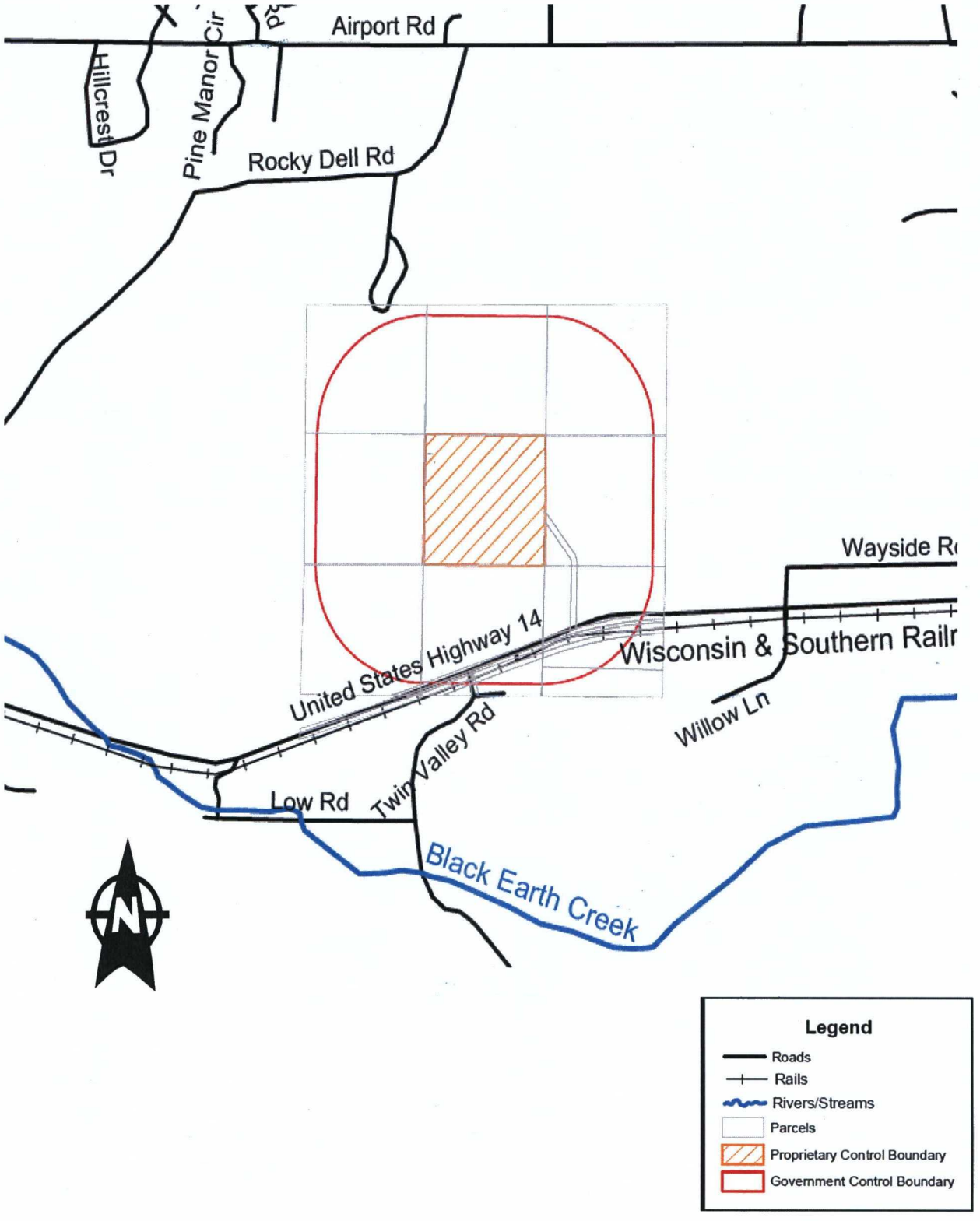


FIGURE 7: Approximate Institutional Control Area; Refuse Hideaway Landfill Superfund Site.
NOTE: Figure is not to scale.



EPA Begins Review
Of Refuse Hideaway Landfill Superfund Site
Middleton, Wisconsin

U.S. Environmental Agency is conducting a five-year review of the Refuse Hideaway Superfund site located on U.S. Highway 14, Middleton, Wis. The Superfund law requires regular checkups of sites that have been cleaned up – with waste managed on-site – to make sure the cleanup continues to protect people and the environment. This is the third review of the site.

EPA's cleanup, which was originally done by the Wisconsin Department of Natural Resources, included an upgrade to the existing landfill cap; operation and maintenance of the cap; gas and leachate collection systems; and extra point-of-entry water treatment systems for affected homes.

More information is available at the Middleton Public Library, 7425 Hubbard Ave. and at www.epa.gov/superfund/refuse-hide-away-landfill. The review should be completed by September.

The five-year-review is an opportunity for you to tell EPA about site conditions and any concerns you have. Contact:

Susan Pastor
Community Involvement Coordinator
312-353-1325
pastor.susan@epa.gov

John Fagiolo
Remedial Project Manager
312-886-0800
fagiolo.john@epa.gov

You may also call EPA toll-free at 800-621-8431, 8:30am to 4:30pm, weekdays.

FIGURE 8: Five-Year Review Advertisement.
Refuse Hideaway Landfill Superfund Site.
Third Five-Year Review

Table 5: Chronology of Refuse Hideaway Landfill Site Events

Event	Date
1974 to 1988	The RHL Site operated as a landfill, accepting a variety of commercial and industrial wastes, including barrels of glue and paint, barrels of ink and ink washes, spray paint booth by-products and paint stripper sludge, and spill residues containing VOCs.
December 6, 1985	A Notice of Violation is issued by WDNR to John DeBeck for recurring violations of solid waste disposal regulations.
May 2, 1988	WDNR issues Special Consent Order SOD-88-02A to John DeBeck relating to the closure and monitoring of the Refuse Hideaway Landfill (Lic. # 01953) The Special Consent Order specified the minimum requirements for closure of the landfill.
December 30, 1988	Special Consent Order SOD-88-02A is entered in court.
January 1989	John DeBeck declares bankruptcy
March 17, 1989	Dane County Circuit Court issues a Contempt Order to John DeBeck for failure to comply with the Special Consent Order.
September 1989	Using the State of Wisconsin Environmental Fund, WDNR hires a contractor to undertake investigation work at the Site with the eventual goal of controlling Site contamination.
November 1989	WDNR begins a series of public meetings to notify the community and discuss its investigation and cleanup work.
July 1990	Emergency landfill cap erosion control measures are implemented.
November 1990	Installation of wells for gas and leachate extraction begins.
March/April 1991	The State of Wisconsin issues Special Notice and Information Request Letters to Potentially Responsible Parties (PRPs)
August 1, 1991	Installation of the landfill gas/leachate collection and landfill gas flare systems is complete and begins operating.
September 3, 1991	After attempting to secure an agreement with the group of PRPs to undertake a Remedial Investigation/Feasibility Study (RI/FS) at RHL, WDNR nominates the Site for EPA's Superfund National Priorities List (NPL) of hazardous waste sites.
October 14, 1992	RHL Site was declared "final" on EPA's NPL.
February 17, 1993	EPA issues a General Notice Of Liability; CERCLA Section 122(a) Determination Letter to Site PRPs.
April 1993	A Cooperative Agreement was signed between the Agencies defining WDNR as lead agency for the RI/FS.
October 1993	WDNR secures a consultant and the RI/FS begins.
September 12, 1994	The RI is completed.
February 6, 1995	The FS is completed and WDNR requests public comment on potential remedy alternatives.
June 28, 1995	A ROD is issued that selects a remedy requiring: deed restrictions; perimeter signs; maintenance of the existing landfill cap; O&M of the existing gas/leachate collection system with flare; monitoring of groundwater wells and private homes; groundwater extraction with treatment and reinjection; maintenance of point-of-entry (POE) treatment units at two homes down-gradient of the landfill; and installation of new POE units as needed
April 8, 1997	An Administrative Order on Consent (AOC) is signed with PRPs for performance of the Remedial Design and O&M activities at the Site.

July 1, 1998	The Remedial Design was completed which demonstrated that groundwater contamination had decreased below 1995 ROD action levels. This permitted discontinuation of the groundwater extraction and treatment component of the selected remedy.
September 30, 1998	EPA completed an Explanation of Significant Differences (ESD) to document that (based on the 1998 groundwater data) it is not necessary to implement groundwater extraction and treatment.
September 30, 1998	EPA issues a Preliminary Closeout Report that documented the completion of construction activities consisting of soil cap upgrade, repair/maintenance of the existing gas/leachate collection system, and the installation and maintenance of POE treatment units at two homes.
May 25, 2000	EPA issues a Special Notice letter to Site PRPs to undertake the remaining remedial action work at the Site.
August 31, 2001	The Consent Decree (CD) for remedial action is entered in U S. District Court (Western District of Wisconsin) between U.S. EPA and the State of Wisconsin. The State, defined as the Settling Performing Party, has certain obligations under the CD that will be implemented under WDNR's management. Other PRPs' monetary settlements will be used by WDNR for the continued remediation at the Site and U.S. EPA retains some settlement monies as contingency.
September 1, 2001	As required by the CD, WDNR starts to develop documents specifying the manner in which the Settling Performing Party will perform the remedial action. These effectively serve as the Remedial Design.
September 19, 2002	EPA approves sampling and analysis documents, a health and safety plan, and an operation and maintenance plan, making this the effective date of the remedial action start.
September 18, 2007	The first Five-Year Review Report for the RHL Site is signed
January 3, 2012	The second five-year review process for the RHL Site is started.
April 17, 2012	The Site inspection for the second five-year review is completed.
June 22, 2012	EPA issues a second ESD that documents the decision to make the Wisconsin Groundwater Quality ESs the cleanup goals for the Site.
August 29, 2012	The second Five-Year Review Report for the RHL Site is signed.
October 16, 2016	The third five-year review process for the RHL Site is started.
May 23, 2017	The Site inspection for the third five-year review is performed.

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-08S [3]	Tetrachloroethylene [5]	1991	7 *	5
		1998	2.5	
		2006	1 3	
		2007		
		2008	0 83	
		2009	DNE [1]	
		2010	0 77	
		2011	0 69	
		2013	0.55	
		2014	DNE	
		2015	DNE	
		2016	1 2	
	Vinyl Chloride	1991	DNE	0.2
		2006	DNE	
		2007		
		2008	1 6 *	
		2009	DNE	
		2010	0.22 *	
		2011	0.22 *	
		2013	1 6 *	
		2014	2 8 *	
		2015	DNE	
		2016	0.28 *	
	Benzene	1998	DNE	5
		2006	DNE	
		2007		
		2008	DNE	
		2009	0 77	
		2010	DNE	
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Trichloroethylene	1988	DNE	5
		2006	DNE	
		2007		
		2008	DNE	
		2009	0.77	
		2010	0.68	
		2011	0 59	
		2013	DNE	
		2014	10 6 *	
		2015	DNE	
		2016	DNE	
	Tetrahydrofuran	2013	15 7	50
	cis -1,2-Dichloroethene	1998	DNE	5
		2006	DNE	
		2007		
		2008	DNE	
		2009	15 *	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES. ppb)
P-08S [3] (cont'd)	cis -1,2-Dichloroethene (cont'd)	2010	DNE	5
		2011	9 6 *	
		2013	DNE	
		2014	10.1 *	
		2015	DNE	
		2016	DNE	
P-08D [4]	Trichloroethylene	1988	45 *	5
		1998	1 6	
		2006	0 91	
		2007		
		2008	DNE	
		2009	DNE	
		2010	DNE	
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Tetrachloroethylene	1988	DNE	5
		1991	DNE	
		1998	DNE	
		2006	DNE	
		2008	0.68	
		2009	0 96	
		2010	DNE	
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
P-09S	Tetrachloroethylene	1988	70 *	5
		1991	16 *	
		1998	2.9	
		2006	0.93	
		2007		
		2008	0.81	
		2009	0 65	
		2010	0.62	
		2011	DNE	
		2013	0 9	
		2014	0 88	
		2015	0.71	
		2016	0.99	
P-09D	1,2- Dichloropropane	1998	2 8	5
		2006	1 7	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-09D (cont'd)	1,2- Dichloropropane (cont'd)	2007		5
		2008	2 0	
		2009	1 7	
		2010	1 2	
		2011	0 82	
		2013	1	
		2014	0 89	
		2015	DNE	
		2016	DNE	
	Benzene	1998	3 3	
		2006	1 4	
		2007		
		2008	2 9	
		2009	3 2	
		2010	2.4	5
		2011	1.0	
		2013	2 5	
		2014	2 5	
		2015	0 71	
		2016	0 81	
	Trichloroethylene	1988	36 *	
		2006	0 94	
		2007		
		2008	1 4	
		2009	0 97	
		2010	0 76	5
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Vinyl Chloride	1991	32 *	
		2006	0 9	
		2007		
		2008	0 73	
		2009	DNE	
		2010	0 27	0 2
		2011	DNE	
		2013	0 2	
		2014	0 25 *	
		2015	DNE	
		2016	0.4	
	Tetrahydrofuran	1998	DNE	50

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES. ppb)
P-09D (cont'd)	Tetrahydrofuran (cont'd.)	2006	DNE	50
		2008	56 *	
		2009	56 *	
		2011	DNE	
		2013	73 3 *	
		2014	80.8 *	
		2015	51 1 *	
		2016	55.5 *	
P-16S	Dichloromethane [6]	1988	1 0	
		2006	1.2	
		2007		
		2008	DNE	
		2009	DNE	
		2010	DNE	5
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
P-16D	1,2-Dichloropropane	1998	1.2	
		2006	0.78	
		2007		
		2008	0.77	
		2009	DNE	
		2010	DNE	5
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Benzene	1998	6 1 *	
		2006	2.3	
		2007		
		2008	2 6	
		2009	3 4	
		2010	1.5	5
		2011	0 70	
		2013	0 99	
		2014	1 7	
		2015	1.8	
		2016	2.7	
	Dichloromethane	1998	1 0	5
		2006	1.2	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-16D (cont'd)		2007		5
		2008	DNE	
		2009	DNE	
		2010	DNE	
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Trichloroethylene	1998	11 *	5
		2006	2 5	
		2007		
		2008	0 68	
		2009	0 74	
		2010	DNE	
		2011	DNE	
		2013	DNE	
		2014	0.57	
		2015	0 52	
		2016	DNE	
	Vinyl Chloride	1998	7 1 *	0.2
		2006	1 3 *	
		2007		
		2008	0.5 *	
		2009	DNE	
		2010	DNE	
		2011	0 23	
		2013	DNE	
		2014	0 53 *	
		2015	DNE	
		2016	DNE	
	Tetrahydrofuran	1998	DNE	50
		2006	DNE	
		2007		
		2008	89 *	
		2009	46 *	
		2010	DNE	
		2011	0.23	
		2013	77 9 *	
		2014	105 *	
		2015	80 4 *	
		2016	91.5 *	
P-17S	1,2-Dichloropropane	1998	DNE	5
		2006	DNE	
		2007		

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-17S (cont'd)		2008	1.2	5
		2009	1 2	
		2010	0 68	
		2011	0.56	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Benzene	1998	DNE	
		2006	DNE	
		2007		
		2008	DNE	
		2009	0 79	
		2010	DNE	5
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	cis -1,2-Dichloroethene	1998	DNE	
		2006	DNE	
		2007		
		2008	65	
		2009	81 *	
		2010	19	70
		2011	10	
		2013	DNE	
		2014	28 6	
		2015	16 6	
		2016	DNE	
	Tetrachloroethylene	1998	DNE	
		2006	DNE	
		2007		
		2008	5 7 *	
		2009	4.5	
		2010	4	5
		2011	4 2	
		2013	DNE	
		2014	3 8	
		2015	5 1	
		2016	2 8	
	Trichloroethylene	1998	DNE	
		2006	DNE	
		2007		
		2008	7 5 *	
		2009	6 7 *	5
		2010	3 5	
		2011	3.2	
		2013	DNE	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
	Trichloroethylene (cont'd)	2014	2 7	5
		2015	1 8	
		2016	0 53	
	Vinyl Chloride	1998	DNE	0 2
		2006	DNE	
		2007		
		2008	6 1 *	
		2009	6 6 *	
		2010	0 51 *	
		2011	DNE	
		2013	DNE	
		2014	1.5 *	
		2015	0 77	
		2016	DNE	
P-18S	Tetrachloroethylene	1998	11 *	5
		2006	7 8 *	
		2007		
		2008	12 *	
		2009	12 *	
		2010	5 3	
		2011	5.5 *	
		2013	6 8 *	
		2014	9 6 *	
		2015	11	
		2016	7 3	
	Trichloroethylene	1998	2.2	5
		2006	1 4	
		2007		
		2008	1 9	
		2009	1 8	
		2010	0 92	
		2011	0 84	
		2013	0 8	
		2014	1 3	
		2015	1 0	
		2016	0 63	
P-20SR [7]	Tetrachloroethylene	1998	3 7	5
		2006	2 6	
		2007		
		2008	1 5	
		2009	2 4	
		2010	2 1	
		2011	2 1	
		2013	1 8	
		2014	2 4	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-20SR [7] (cont'd)	Tetrachloroethylene	2015	2 7	5
		2016	2 8	
P-21D	1,2-Dichloropropane	1998	2.1	5
		2006	0.54	
		2007		
		2008	DNE	
		2009	DNE	
		2010	DNE	
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Benzene	1998	1 8	5
		2006	0 66	
		2007		
		2008	DNE	
		2009	1 2	
		2010	1.1	
		2011	DNE	
		2013	0.94	
		2014	0 71	
		2015	DNE	
		2016	0.73	
	cis 1,2-Dichloroethene	1998	120 *	70
		2006	27	
		2007		
		2008	12	
		2009	33	
		2010	10	
		2011	14	
		2013	7 5	
		2014	11 4	
		2015	DNE	
		2016	62 8	
	Dichloromethane	1988	3 7	5
		2006	1	
		2007		
		2008	DNE	
		2009	DNE	
		2010	DNE	
		2011	DNE	
		2013	DNE	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-21D (cont'd)	Dichloromethane (cont'd)	2014	DNE	5
		2015	DNE	
		2016	DNE	
	Vinyl Chloride	1998	16 *	0 2
		2006	3 1 *	
		2007		
		2008	4.1 *	
		2009	9.3 *	
		2010	3 1 *	
		2011	7.3 *	
		2013	3 *	
		2014	6 3 *	
		2015	DNE	
		2016	54 8	
	Tetrahydrofuran	1998	DNE	50
		2006	DNE	
		2007		
		2008	DNE	
		2009	52 *	
		2010	DNE	
		2011	DNE	
		2013	144 *	
		2014	120 *	
		2015	59 *	
		2016	51 3 *	
P-22S	Tetrachloroethylene	1998	2 9	5
		2006	0.68	
		2007		
		2008	DNE	
		2009	3 1	
		2010	1 9	
		2011	DNE	
		2013	DNE	
		2014	4.2	
		2015	3 0	
		2016	2 1	
	Trichloroethylene	2005	DNE	5
		2006	DNE	
		2007		
		2008	DNE	
		2009	1.2	
		2010	DNE	
		2011	DNE	
		2013	DNE	
		2014	1 0	
		2015	0 87	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES. ppb)
P-22S (cont'd.)	Trichloroethylene	2016	0.7	5
P-22E	Tetrachloroethylene	2005	1.31	5
		2006	3.9	
		2007		
		2008	6.2 **	
		2009		
		2010	1 2	
		2011	1 6	
		2013	DNE	
		2014	6 8 **	
		2015	8.5 **	
		2016	1.2	
	Trichloroethylene	2005	0 62	5
		2006	1 1	
		2007		
		2008	DNE	
		2009	0.74	
		2010	0.59	
		2011	0 84	
		2013	DNE	
		2014	1.5	
		2015	1 5	
		2016	DNE	
P-22D	Tetrachloroethylene	1998	6.4 **	5
		2005	2.4	
		2006	3.1	
		2007		
		2008	3 0	
		2009	DNE	
		2010	3.3	
		2011	1 6	
		2013	0.87	
		2014	1.9	
		2015	1 6	
		2016	2 0	
	Trichloroethylene	1998	1 8	5
		2005	0.65	
		2006	0.66	
		2007		
		2008	0 73	
		2009	0 66	
		2010	0 7	
		2011	DNE	
		2013	DNE	
		2014	DNE	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-22D (cont'd)	Trichloroethylene	2015	DNE	5
		2016	DNE	
P-23S	Tetrachloroethylene	1998	4 6	5
		2006	1 6	
		2007		
		2008	3 6	
		2009	5 6 **	
		2010	4 6	
		2011	3.4	
		2013	DNE	
		2014	1 3	
		2015	0 6	
		2016	2 0	
P-23D	Tetrachloroethylene	1988	2 3	5
		2006	1	
		2007		
		2008	0 9	
		2009		
		2010	0 68	
		2011	0 62	
		2013	0 71	
		2014	0 57	
		2015	DNE	
		2016	DNE	
P-24E	Vinyl Chloride	2004	4.1 *	0.2
		2006	5.7 *	
		2007		
		2008	2 1 *	
		2009	2.6 *	
		2010	1 1 *	
		2011	DNE	
		2013	2.2 *	
		2014	1.2 *	
		2015	DNE	
		2016	DNE	
P-24D	Vinyl Chloride	1998	2.2 *	0.2
		2006	3.2 *	
		2007		
		2008	1.4 *	
		2009	6 6 *	
		2010	4 8 *	
		2011	4 0 *	
		2013	6 1 *	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI
Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-24D (cont'd)	Vinyl Chloride (cont'd)	2014	9.4 *	0 2
		2015	8 9 *	
		2016	2 1	
P-25D	Tetrachloroethylene	1998	DNE	5
		2006	DNE	
		2007		
		2008	0 97	
		2009	DNE	
		2010	1.9	
		2011	1 7	
		2013	1 5	
		2014	1.1	
		2015	0 63	
		2016	DNE	
	Trichloroethylene	1998	DNE	5
		2006	DNE	
		2007		
		2008	1.5	
		2009	0 87	
		2010	DNE	
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Vinyl Chloride	1998	DNE	0.2
		2006	DNE	
		2007		
		2008	0.59 **	
		2009	DNE	
		2010	DNE	
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
P-26S	Tetrachloroethylene	1998	33 **	5
		2006	16 **	
		2007		
		2008	6 4 **	
		2009	15 **	
		2010	8 8	
		2011	15	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-26S (cont'd.)	Tetrachloroethylene (cont'd.)	2013	1.4	5
		2014	0 99	
		2015	0 78	
		2016	DNE	
	Trichloroethylene	1998	5.1 **	5
		2006	2.3	
		2007		
		2008	0 77	
		2009	2.2	
		2010	8 1 **	
		2011	2.2	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	0.88	
	Vinyl Chloride	1998	4 **	0 2
		2006	0 56 **	
		2007		
		2008	0.31 **	
		2009	0 6 **	
		2010		
		2011	0.27 **	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
P-26D	Tetrachloroethylene	1998	17	5
		2006	1.8	
		2007		
		2008	1.5	
		2009		
		2010	1 7	
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Vinyl Chloride	1998	DNE	0 2
		2006	DNE	
		2007		
		2008	0 44 **	
		2009	DNE	
		2010	DNE	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-26D	Vinyl Chloride (cont'd)	2011	DNE	0.2
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
P-27S	Tetrachloroethylene	1998	30 **	
		2006	10 **	
		2007		
		2008	6 6 **	
		2009	6.7 **	
		2010	12 **	5
		2011	5 0	
		2013	DNE	
		2014	4.0	
		2015	3 5	
		2016	3.2	
	Vinyl Chloride	1998	4 **	
		2006	0 56 **	
		2007		
		2008	DNE	
		2009	DNE	
		2010	DNE	0.2
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Trichloroethylene	1998	4 7	
		2006	1.7	
		2007		
		2008	1.0	
		2009	1 0	
		2010	1.2	5
		2011	0 64	
		2013	DNE	
		2014	0.52	
		2015	DNE	
		2016	DNE	
P-27D	Tetrachloroethylene	1998	54	
		2006	10	
		2007		5
		2008	33 **	
		2009	46 **	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-27D (cont'd.)	Tetrachloroethylene (cont'd.)	2010	26 **	5
		2011	23 **	
		2013	3.4	
		2014	19 **	
		2015	19.3 **	
		2016	11 9 **	
	Trichloroethylene	1998	8 4 **	
		2006	2.1	
		2007		
		2008	5 7 **	
		2009	8 7 **	5
		2010	4 7	
		2011	3 9	
		2013	0.77	
		2014	3 8	
		2015	2.8	
		2016	1.5	
P-28S	Tetrachloroethylene	1998	DNE	
		2006	DNE	
		2007		
		2008	33 **	
		2009	4.8	
		2010	1 4	5
		2011	1.5	
		2013	1 0	
		2014	1.4	
		2015	1.5	
		2016	0 76	
P-29S	Chloromethane	1994	0 6	
		2006	0.32	
		2007		
		2008	DNE	
		2009	DNE	
		2010	0 32	5
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Tetrachloroethylene	1998	0 9	
		2006	0.75	
		2007		5
		2008	1 6	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-29S (cont'd)	Tetrachloroethylene (cont'd.)	2009	DNE	5
		2010	1.1	
		2011	0 94	
		2013	DNE	
		2014	0.69	
		2015	DNE	
		2016	DNE	
P-31IA	Tetrachloroethylene	1998	13 **	
		2006	4 8	
		2007		
		2008	5 4 **	
		2009	5.9 **	
		2010	5 0	5
		2011	4 8	
		2013	3 9	
		2014	3 5	
		2015	4.0	
		2016	5.2 **	
	Trichloroethylene	1998	3 3	
		2006	1.4	
		2007		
		2008	1 8	
		2009	2 1	
		2010	1 7	5
		2011	1 6	
		2013	1	
		2014	1 1	
		2015	1.0	
		2016	1.3	
P-31IB	Tetrachloroethylene	1998	13	
		2006	5 3 **	
		2007		
		2008	4 6	
		2009	5.9 **	
		2010	4 7	5
		2011	4.2	
		2013	3 6	5
		2014	3 9	
		2015	3 3	
		2016	3.3	
	Trichloroethylene	1998	3 6	
		2006	1 6	5
		2007		

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
P-31IB (cont'd)	Trichloroethylene (cont'd.)	2008	1.7	5
		2009	2.0	
		2010	1 6	
		2011	1 4	
		2013	1 1	
		2014	1 2	
		2015	0 8	
		2016	0 87	
P-34S	Dichloromethane	1995	2	
		2006	1 9	
		2007		
		2008	DNE	
		2009	DNE	
		2010	DNE	5
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
P-40I	Tetrachloroethylene	1998	9.2	
		2006	4 6	
		2007		
		2008	6.3 **	
		2009	4 9	
		2010	4 5	5
		2011	5 1 **	
		2013	4 6	
		2014	5 1	
		2015	5.3	
		2016	4 6	
	Trichloroethylene	1998	2.5	
		2006	1 3	
		2007		
		2008	1.6	
		2009	1 3	
		2010	1 1	5
		2011	1.3	
		2013	1 1	
		2014	1.4	
		2015	1.1	
		2016	1.3	
7734 U S HWY 14 [8] (formerly Noles)	Dichloromethane	1996	0 14	5
		2006	4.1	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
7734 U.S 14 (cont'd.)	Dichloromethane (cont'd.)	2007		5
		2008	DNE	
		2009	DNE	
		2010	DNE	
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Tetrachloroethylene	1998	9.2 **	
		2006	4.6	
		2007		
		2008	6.3 **	
		2009	5.6 **	
		2010	DNE	5
		2011	DNE	
		2013	4.6	
		2014	DNE	
		2015	DNE	
		2016	2.5	
	Trichloroethylene	1998	DNE	
		2006	DNE	
		2007		
		2008	1.7	
		2009	2.2	
		2010	DNE	5
		2011	DNE	
		2013	1.5	
		2014	DNE	
		2015	DNE	
		2016	DNE	
SATHER	Dichloromethane	1996	0 14	
		2006	4.3	
		2007		
		2008	DNE	5
		2009	DNE	
		2010	DNE	
		2011	DNE	
		DISCONTINUED		
	Bromodichloromethane	2011	0 45	0 6
	Chloroform	2011	1 2	6
7750 U.S HWY. 14 [8]	Chloromethane	2004	DNE	5
		2006	DNE	

Table 6: Summary of Groundwater Data[1]: Refuse Hideaway Landfill Middleton, WI

Results marked with an asterisk (*) are on-site ES exceedances; double asterisk (**) are off-site ES exceedances.

Well Number	Contaminant [2]	Year	Concentration (ug/L or ppb)	Health Based Cleanup Standard (WI ES, ppb)
7750 U S. HWY. 14 [8] (cont'd.)	Chloromethane (cont'd.)	2007		5
		2008	DNE	
		2009	3 5	
		2010	DNE	
		2011	DNE	
		2013	DNE	
		2014	DNE	
		2015	DNE	
		2016	DNE	
	Tetrachloroethylene	2004	3 3	5
		2006	2.9	
		2007		
		2008	2 9	
		2009	3 5	
		2010	3.2	
		2011	3 1	
		2013	3 2	
		2014	3 4	
		2015	2 9	
		2016	2.4	
	Trichloroethylene	2004	0.85	5
		2006	0.63	
		2007		
		2008	0 63	
		2009	0 74	
		2010	0 68	
		2011	0.72	
		2013	1 5	
		2014	0 76	
		2015	0 67	
		2016	0.63	

TABLE 6 FOOTNOTES

[1] The summary of groundwater data is for contaminants that continue to be present at potentially unacceptable levels, shown in annual reports. DNE: "Did Not Exceed" the cleanup standard. Figure 4 shows the sampling locations.

[2] Contaminants listed are the only contaminants of concern shown in 2006 to remain at or near the Site. Data collected since 1998 has shown that other contaminants no longer pose any further threat. Approximately 70 contaminants are analyzed for twice a year at on- and off-site wells. Table 6 shows only those contaminants that are still present at the Site.

[3] Wells with S designations have screens at shallow depths.

[4] Wells with D designations have screens at deeper depths.

[5] Tetrachloroethylene is Perchloroethylene (PCE).

[6] Dichloromethane is Methylene Chloride.

[7] Wells with E, I, and R designations are monitoring wells that have been replaced since 1988.

[8] These wells are at residences that may have had Point of Entry Water Treatment Systems

Table 7: Summary of Cleanup Standards for the Refuse Hideaway Landfill Site [1]

COMPOUND	1995 Preventative Action Limit [2] (ppb)*	2012 Federal MCL[3] (ppb)	2012 Wisconsin Enforcement Std. [4] (ppb)
Benzene	0 5	5	5
Chloroform	0 6	70 [6]	6
1,2-Dichloroethane [5]	0.5	5	5
cis-1 ,2-Dichloroethene	7	70	5
1,2-Dichloropropane	0.5	5	5
Tetrachloroethene	0.5	5	5
Trichloroethene	0.5	5	5
Vinyl Chloride	0 02	2	0.2

TABLE 7 FOOTNOTES

* ppb = Parts per billion, or microgram of contaminant per Liter of water (ug/L).

[1] This Table updates Table 5 of the 1995 Record of Decision.

[2] There are no published generic PALs. PALs for contaminants are calculated on a site-specific basis and are generally multiples of standard deviations from background concentrations.

[3] Maximum Contaminant Limits as published at: "https://www.epa.gov/dwstandardsregulations"

[4] Enforcement Standard as published at: "http://dnr.wi.gov/topic/DrinkingWater/HealthAdvisoryLevels.html"

[5] This compound is no longer present anywhere on the Refuse Hideaway Landfill site.

[6] There is no MCL for Chloroform but there is a Maximum Contaminant Level Goal (MCLG) of 70 ppb.

Table 8
Summary of Landfill Leachate Production
Refuse Hideaway Landfill
Middleton, Wisconsin

Year	Gallons of Leachate Collected
2012	496,000
2013	393,916
2014	110,191
2015	103,919
2016	120,000 *
Total	1,104,026

Notes:

1. Volume of leachate produced is dependent on seasonal weather conditions and precipitation.

*2. Estimated volume based on 2014 and 2015 totals.

Table 9: Summary of Contaminants in Landfill Leachate
Refuse Hideaway Landfill; Middleton, Wisconsin

	PARAMETER											
	Cadmium	Total Chromium	Hexavalent Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	Cyanide
Permitted Levels =>	**250**	**10000**	**500**	**1500**	**5000**	**20**	**-**	**2000**	**300**	**3000**	**8000**	**100**
DATE												
2/21/2007	< 1.00	19.1	< 40	20.8	1.59	<0.07	-	50.4	51.8	6.30	< 10	12
6/6/2007	< 1.00	10.6	< 40	< 3.00	2.92	<0.07	-	413	10.2	6.77	17.2	7
9/4/2007	< 1.00	<8.00	< 40	307	2.53	<0.07	-	49.9	4.96	7.42	19.3	<5
1/16/2008	< 1.00	17.7	< 40	8.80	4.83	<0.07	-	62.2	473	7.30	42.7	11
3/31/2008	< 1.00	13.4	< 40	< 3.00	< 1.50	<0.07	-	38.1	< 3.00	< 1.00	< 10	6
7/1/2008	< 1.00	30.6	< 40	< 3.00	< 1.50	<0.07	-	64.8	< 3.00	1.13	10.1	19
9/17/2008	< 1.00	30.7	< 40	12.6	1.70	<0.07	-	82.9	5.87	1	54	34.7
1/6/2009	< 1.00	250	< 40	796	< 1.50	<0.07	-	70.6	< 3.00	< 1	00	59.1
4/7/2009	< 1.00	21.1	< 40	7	93	< 1.50	-	<0.07	56.6	< 300	< 1.0	17.4
6/30/2009	< 1.00	235	< 40	< 3 0	< 1.5	<0.07	-	69.6	< 3.00	< 1.00	< 10	14
9/28/2009	6.40	26	< 2.5	< 36	< 26	<0.07	-	77	< 90	2.6	25	< 17
1/20/2010	3.00	9.9	< 5.0	< 36	< 26	<0.07	-	48	< 90	9.8	17	< 51
3/31/2010	< 5	14	< 3.0	< 18	< 20	<0.07	-	41	< 44	3.7	20	< 51
6/29/2010	< 5	11	< 6.0	< 18	< 16	<0.07	-	36	56.0	3.7	9.2	< 8.1
9/30/2010	< 10	29	< 15	< 36	32	< 0.13	-	110	< 88	< 7.4	21	72
12/21/2010	< 10	29	< 15	< 36	< 32	< 0.65	-	76	< 88	230	26	5
3/30/2011	< 0.25	23	< 3.0	1 7	< 1.7	0.44	-	65	< 2.4	< 0.9	11	8.5
6/29/2011	< 0.36	21	5.2	4.4	< 2.0	< 0.05	-	57	< 2.5	< 0.7	10	7.5
9/24/2012	1.5	33	6.3	4.2	< 1.6	< 0.07	< 2.2	90	< 2.7	1.2	9.1	4
12/27/2012	< 0.54	27	73	9.4	5.7	0.08	6	79	2.8	1.1	36	3.3
3/26/2013	< 0.54	14	< 3.3	1.5	< 1.6	< 0.07	2.9	45	< 2.7	1 1	5.9	8.4

Table 9: Summary of Contaminants in Landfill Leachate
Refuse Hideaway Landfill; Middleton, Wisconsin

	Cadmium	Total Chromium	Hexavalent Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	Cyanide
Permitted Levels =>	**250**	**10000**	**500**	**1500**	**5000**	**20**		**2000**	**300**	**3000**	**8000**	**100**
DATE												
12/18/2013	1.6	6.3	< 3.8	4.4	5	< 0.06	< 2.1	29	< 4.6	< 0.57	31	3.8
3/24/2014	< 0.26	16	< 7.6	3.8	< 2.3	< 0.07	< 2.1	46	< 4.6	< 0.57	15	10
6/26/2013	1.2	10	< 3.8	4.1	8	< 0.06	< 2.1	28	5.2	< 0.64	35	2.5
9/24/2013	1.5	13	7.8	2.9	< 2.3	< 0.06	2.8	42	< 4.6	< 0.57	8.4	8
6/17/2014	0.56	8	< 3.8	5.5	< 2.3	< 0.07	5.8	23	10	< 0.57	31	4.8
9/23/2014	0.5	6.5	< 3.8	0	6.2	< 0.07	2.5	11	< 4.6	< 0.57	48	5.4
12/16/2014	0.34	6.5	< 3.8	4.2	< 2.3	< 0.07	2.2	28	< 4.6	1.1	16	9.7
3/12/2015	0	13	< 3.8	9.4	3.2	< 0.06	< 2.2	32	< 4.6	< 1.3	31	4
6/17/2015	1.8	9.1	< 3.8	6.7	3.1	< 0.06	< 2.2	22	< 4.6	< 1.3	16	2.7
9/28/2015	1.2	21	< 3.8	39	8	< 0.06	< 2.2	28	< 4.6	< 1.3	100	7.4
12/4/2015	1.2	4.9	< 2.5	3.2	< 2.5	< 0.07	< 2.2	15	< 4.6	< 1.3	11	4.2

Notes: Blank cell indicates parameter not analyzed.
All values are shown in ug/L = micrograms per liter, or parts per billion.

Table 10: Collection Efficiency of Landfill Gas Collection System
Refuse Hideaway Landfill; Middleton, Wisconsin

Gas Extraction Well	Avg % Methane at Well for Time Period	Dates Measured	Avg % Methane at Blower (Vacuum)	
GW1	52 81	7/23/2012		**Time Period: July 2012 to June 2013**
GW2	15 05	8/28/2012		
GW3	25 36	9/25/2012		
GW4	67 42	10/30/2012		
GW5	67.36	11/30/2012		
GW6	41 05	12/31/2012		
GW7	20 13	1/31/2013	31 20	
GW8	31 57	2/21/2013		
GW9	12 97	3/27/2013		
GW10	32 90	4/26/2013		Avg Approximate% Methane Delivered by System to Flare
GW11	13 39	5/31/2013		
GW12	24 47	6/11/2013		
GW13	36 13			
Avg% Methane at Wells →	33.89%	Avg % Methane at Blower →	31 20%	31 2 / 33 89 = 0 92 x 100% = 92 %
GW1	34.32	7/11/2013		**Time Period: July 2013 to June 2014**
GW2	9 23	8/28/2013		
GW3	21 03	9/23/2013		
GW4	69 71	10/25/2013		
GW5	61 66	11/26/2013		
GW6	35 42	12/23/2013		
GW7	17 55	1/30/2014	23 40	
GW8	31.32	2/28/2014		
GW9	37.31	3/28/2014		
GW10	25.28	4/25/2014		Avg Approximate% Methane Delivered by System to Flare
GW11	30 13	5/29/2014		
GW12	34 00	6/24/2014		
GW13	36 98			
Avg % Methane at Wells →	34 2%	Avg % Methane at Blower →	23 4%	23 4 / 34 2 = 0 68 x 100 % = 68 %
GW1	43 52	7/16/2014		**Time Period: July 2014 to June 2015**
GW2	30.53	8/26/2014		
GW3	20.81	9/26/2014		
GW4	36.82	10/22/2014		
GW5	31.39	11/25/2014		
GW6	50 73	12/29/2014		
GW7	48.33	1/30/2015	30 80	
GW8	50 08	2/24/2015		
GW9	47 50	3/13/2015		
GW10	30.00	4/30/2015		Avg Approximate% Methane Delivered by System to Flare
GW11	40 46	5/20/2015		
GW12	33.60	6/24/2015		
GW13	46.38	7/16/2015		
Avg % Methane at Wells →	39.2%	Avg % Methane at Blower →	30 8%	30 8 / 39 2 = 0 79 x 100 % = 79 %

TABLE 11: SITE INSPECTION CHECKLIST
Refuse Hideaway Landfill Superfund Site; Middleton WI
Third Five-Year Review

I. SITE INFORMATION	
Site name: REFUSE HIDEAWAY LANDFILL	**Date of inspection: MAY 23, 2017**
Location and Region: 7562 U.S. Highway 14. MIDDLETON, WI. U.S. EPA REGION 5	**EPA ID: WID980610604**
Agency, office, or company leading the five-year review: U.S. EPA REGION 5 (and WISCONSIN DEPT. OF NATURAL RESOURCES)	**Weather/temperature: PARTLY CLOUDY, 60 DEGREES F**

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other: **Long term groundwater monitoring; Landfill gas collection with a ground flare; Landfill leachate collection and transportation for off-site treatment.**

Attachments: ☐ Inspection team roster attached ☒ Site map attached **(Figure 3)**

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** No on-site manager necessary _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. a. **O&M staff:** **Jennifer Shelton** **Leggette Brashears Graham (LBG) Project Mgr.** **5/23/17**
   Name Title Date
   Interviewed ☐ at site ☐ at office ☒ by phone Phone no 608-310-7672

   Problems, suggestions:
   Individual was contacted by WDNR to confirm that all appropriate O&M and OSHA training and safety documents are readily available at the local LBG office in Madison, Wisconsin. WDNR consults with LBG at a minimum monthly.

   b. **O&M staff:** **Jennifer Shelton** **LBG Project Manager** **5/23/17**
   Name Title Date
   Interviewed ☐ at site ☐ at office ☒ by phone Phone no. 608-310-7672

   Problems, suggestions:
   Individual was contacted to confirm that she is still assigned to this Site for performance of O&M tasks.

   ☐ 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, etc.) Fill in all that apply.

Agency **WISCONSIN DEPT. OF NATURAL RESOURCES (WDNR)**

Contact	Tim Zeichert	Hydrogeologist	5/23/2017	(608) 266-5788
	Name	Title	Date	Phone no.

101 S. Webster St., P.O. Box 7921, Madison, WI 53707-7921
EMAIL: **Timothy.Zeichert@wisconsin.gov**

Problems, suggestions:
NOTE: Interviews were not conducted with any local regulatory authorities and response agencies. No comments were received by U.S. EPA as a result of the public notice, and no problems were reported to U.S. EPA or WDNR in the past 5 years.

☐ Report attached _____

4. **Other interviews** (optional)

Tim Zeichert, WDNR Project Manager. The WDNR project manager was present for the May 23, 2017 site inspection. U.S. EPA interviewed WDNR regarding guidance and current policies for conducting a five year review. In addition, U.S. EPA interviewed WDNR to determine if any problems or other issues for the RHL site were brought to either agency's attention over the past 5 years (no issues noted).

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

1. **O&M Documents**

O&M manual	☒ Readily available	☒ Up to date	☐ N/A
As-built drawings	☒Readily available	☒ Up to date	☐ N/A
Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks: **All of the above listed documents were present or were confirmed to be available during the site inspection in an updated form. These documents are located either on site (weather proof inside a site building), or at the WDNR's or contractor's office.**

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: **All of the above listed documents were present or confirmed to be available during the site inspection in an updated form. These documents are located either on site (weather proof inside a site building), or at the WDNR's or contractor's office.**

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

Remarks **All of the above listed documents were confirmed to be readily available at the office locations of the O&M and environmental sampling contractors.**

4.	**Permits and Service Agreements**			
	Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
	Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
	Waste disposal, POTW	☒ Readily available	☒ Up to date	☐ N/A
	Other permits_____	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: **POTW permit (# NTO-5.12) is the agreement for acceptance of landfill leachate by the Madison Metropolitan Sewerage District (MMSD) for treatment. This agreement was updated and revised in June 2014, is valid until 2019, and would be renewed at that time.**			
5.	**Gas Generation Records**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: **All of the above listed documents were confirmed to be available at the office locations of the O&M contractor (LBG). Gas generation records are submitted to WDNR monthly and summarized in an annual report. These records are permanently stored by WDNR. More frequent provision of gas generation information is available upon request.**			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: **There are no settlement monuments at the RHL Site.**			
7.	**Groundwater Monitoring Records**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: **All of the above listed documents were confirmed to be available at the office locations of any contractors performing the work at the Site. Groundwater sampling data are submitted to WDNR on a semi-annual basis. These records are permanently stored by WDNR. More frequent provision of this information is available upon request.**			
8.	**Leachate Extraction Records**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: **All of the above listed documents were confirmed to be available at the office locations of the the contractors performing the work at the Site. Leachate generation records are submitted to WDNR monthly and summarized in an annual report. These records are permanently stored by WDNR. More frequent provision of leachate information is available upon request.** **Leachate analysis documents are available at the office of the O&M contractor (LBG). Historical and recent leachate data is available in WDNR files. Copies are provided to WDNR each time leachate is analyzed for compliance with MMSD requirements, done at a minimum quarterly. More frequent provision of this information is available upon request.**			
9.	**Discharge Compliance Records**			
	☐ Air	☐ Readily available	☐ Up to date	☒ N/A
	☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: **There are no discharges from the RHL Site.**			
10.	**Daily Access/Security Logs**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks **Site access is restricted by the site's topography, specifically bluffs to the north and west, and the steep southern slope. The only site access is through the gate and access road maintained by Speedway Sand and Gravel, which is locked daily.**			

IV. O&M COSTS

1. **O&M Organization**

☒ State in-house ☒ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____

2. **O&M Cost Records**

☒ Readily available ☒ Up to date
☐ Funding mechanism/agreement in place ☐ Breakdown attached
☒ Original O&M cost estimate: **Page 38 of the 1995 ROD shows an annual cost of $100,000 for Alternative B, which is the closest description to the remedy that is currently operating.**

Total annual cost by year for review period if available

From: **2012** (Date) To: **2017** (Date); **Approx. $75,000-$100,000 annually, average** (Total cost) ☐ Breakdown attached

NOTE: **Average site annual costs are approximately $75,000 to $100,000. Average cost is cited here because site costs fluctuate depending on the degree of repair/upgrade to remedy components implemented throughout each year. This total reflects O&M and site sampling contracts awarded over the past 5 years and includes WDNR personnel and travel costs.**

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

Describe costs and reasons. **None.**

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

A. Fencing

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

Remarks: **There is neither damaged fencing nor damaged gate. Site access is restricted by the site's topography. Specifically, bluffs to the north and west and the steep southern slope make it nearly impossible to trespass the RHL site. The only site access is through the gate and access road maintained by Speedway Sand and Gravel, which is locked daily.**

B. Other Access Restrictions

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

Remarks: **Signage is posted at the locked access gate at U.S. Highway 14.**

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/A

Type of monitoring (*e.g* , self-reporting, drive by) **VISUAL OBSERVATIONS DURING O&M**
Frequency **MONTHLY, DURING OPERATION AND MAINTENANCE WORK**
Responsible party/agency **WDNR OR THEIR CONTRACTOR**

Agency **WISCONSIN DEPT. OF NATURAL RESOURCES (WDNR)**

Contact	Tim Zeichert	Hydrogeologist	5/23/2017	(608) 266-5788
	Name	Title	Date	Phone no.

EMAIL: **Timothy.Zeichert@wisconsin.gov**

Contact: LBG: **Jennifer Shelton** **Leggette Brashears Graham (LBG) Project Mgr.** **5/23/17**
Name Title Date
Phone no. **608-310-7672**

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/A
Other problems or suggestions: ☐ Report attached

NOTE: **Institutional Controls have been implemented in the form of Continuing Obligations. Since December 2013, WDNR has been imposing Continuing Obligations on the real estate that comprises the Site, ensuring that no trespassing occurs and that the land and underlying groundwater are not used in ways that are incompatible with the implemented Site remedial action. Site Continuing Obligations are consistent with requirements found in ch. NR 140 and the ch. NR 700 rule series, Wis. Adm. Code; the Hazardous Substance Spill Law, s. 292.12, Wis. Stats.**

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

Remarks: **Institutional Controls have been implemented by WDNR because the ownership of the site property can not be determined and remains unresolved. Continuing Obligations are consistent with requirements found in ch. NR 140 and the ch. NR 700 rule series, Wis. Adm. Code; the Hazardous Substance Spill Law, s. 292.12, Wis. Stats.**

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
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. **"Other Site Conditions" Section of this Form is being used to summarize remedy components that are not shown in the Site Inspection Checklist Template.**

2. **Electrical Enclosures and Panels; Ground Flare and Landfill Gas (Vacuum) Blower** (properly rated and functional)
☐ N/A ☒ Good condition ☐ Needs Maintenance
Remarks

3 **Tanks, Vaults, Storage Vessels; Leachate Holding Tank and Off-Loading Pad**
☐ N/A ☒ Good condition ☒ Proper containment ☐ Needs Maintenance
Remarks: **Concrete Leachate Off-Loading Pad is properly sloped and in good condition. Underground Leachate Holding Tank is in good condition.**

4. **Discharge Structure and Appurtenances**
☒ N/A ☐ Good condition ☐ Needs Maintenance
Remarks

5. **On-Site Buildings Containing Air Compressor and Landfill Gas (Vacuum) Blower**
☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair
☒ Chemicals and equipment properly stored

Remarks: **NOTE: No chemicals are stored on site. Equipment is stored in air compressor and blower (vacuum) unit shelters.**

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
Areal extent Depth
Remarks **Several low areas were filled, graded, and seeded in 2013.**

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
Lengths Widths Depths
Remarks

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
Areal extent Depth
Remarks **Several areas with slight erosion were filled, regraded, and seeded in 2013.**

4 **Holes** ☐ Location shown on site map ☒ Holes not evident
Areal extent Depth
Remarks

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

Remarks: **Saplings of potential deep rooting species are removed during mowing events. Mowing occurs twice per year.**

6. **Alternative Cover (armored rock, concrete, etc.)** ☒ N/A
Remarks

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
Areal extent Height
Remarks

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
Wet areas ☐ Location shown on site map Areal extent_____
Ponding ☐ Location shown on site map Areal extent_____
Seeps ☐ Location shown on site map Areal extent_____
Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____

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

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

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

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

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

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

Remarks: _____

D. Cover Penetrations ☒ Applicable ☐ N/A

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

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

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

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

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

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

1. **Gas Treatment Facilities**
☒ Flaring ☐ Thermal destruction ☐ Collection for reuse
☒ Good condition ☐ Needs Maintenance
Remarks_____

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

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

F. Cover Drainage Layer ☐ Applicable ☒ N/A

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

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

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

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

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

3 **Outlet Works** ☐ Functioning ☒ N/A
Remarks_____

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

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement_____ Vertical displacement_____
Rotational displacement_____
Remarks_____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks_____

I. Perimeter Ditches/Off-Site Discharge ☒ Applicable ☐ N/A

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

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

Remarks: **Vegetation in the surface run-off channel at the south of the site does not obstruct flow.**

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

4 **Discharge Structure** ☐ Functioning ☒ N/A
Remarks_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

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

2. **Performance Monitoring** Type of monitoring _____ ☐ Performance not monitored
Frequency_____ ☐ Evidence of breaching
Head differential_____
Remarks_____

IX. GROUNDWATER / SURFACE WATER REMEDIES ☐ Applicable ☒ N/A

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

1 **Pumps, Wellhead Plumbing. and Electrical**

☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ NA
Remarks: _____

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

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

B. Surface Water Collection Structures, Pumps. and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs Maintenance ☐ NA
Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance ☐ NA
Remarks: _____

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

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon adsorbers
☐ Filters_____
☐ Additive (*e.g* , chelation agent, flocculent)_____
☐ Others_____
☐ Good condition ☐ Needs Maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually_____
☐ Quantity of surface water treated annually_____
Remarks_____

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

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

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

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

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

D. Monitoring Data

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

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

E. Monitored Natural Attenuation

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

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy An example would be soil vapor extraction. **NONE.**

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy: Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedy at the RHL site is being implemented to achieve: prevention of direct contact with landfill contents, minimization of contaminants leaching into groundwater, prevention of migration of landfill gas, control of surface water run-off and erosion, and compliance with all identified Federal and State ARARs. For groundwater, the remedial action objectives (RAOs) are: attainment of Wisconsin NR 140 ESs for all groundwater affected at and beyond the landfill boundary, reduction of the potential for exposure to contaminants in groundwater; compliance with ARARs; and provision of potable water to residences with impacted private well water.

The implemented remedy does not yet achieve RAOs because long-term achievement of ESs within the site boundary has not yet been accomplished. The remedy is considered protective in the short term and is considered to be effective and functioning as designed. With continued maintenance and monitoring of the site landfill cap, landfill gas/leachate collection, and ground flare systems inside the security perimeter fence, the source area remedies should contain any soil contamination and ensure that no excess human health risks develop. Groundwater monitoring data was reviewed and the lateral extent of the plume of VOCs continues to remain stable. Total VOC concentrations toward the end of the plume continue to decrease, while certain VOC compounds remain at unacceptable levels within the site property. The overall extent and concentration distribution of VOCs has decreased since 2002. There is no evidence of exposure; there is no cracking, sliding, settlement of cap or other indicators of cap breaches; landfill gas and leachate are successfully being collected and adequately treated or disposed of; and residential water treatment systems are adequately maintained. In order for the remedy to remain protective in the long term, the remedy must achieve groundwater cleanup standards throughout the plume area. Ongoing extraction and attenuation of contaminants in groundwater is expected to meet the groundwater cleanup standards in the long-term, and continued operation of the remedy and monitoring of groundwater is necessary until cleanup standards are achieved.

The remedy selected by the 1995 ROD as modified by the 1998 and 2012 ESDs has been implemented and remains functional, operational and effective. As required by the 2001 Remedial Action Consent Decree, the State of Wisconsin is successfully implementing all other components of this remedy. Long-term maintenance of the site remedy components ensures containment of waste fill material, capture of landfill gas and leachate, destruction of landfill gas and organic contaminants that accompany it, and off-site treatment of the captured leachate. Site access and use is restricted by topography and a locked gate, and consideration of deed restrictions for the site property is underway.

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.

WDNR oversees an environmental contractor for remedy repair, upkeep, and O&M. There are weekly, monthly, quarterly, and annual activities that occur at the site. The landfill gas collection and destruction system must be operated and maintained because it removes significant amounts of VOCs from the waste fill that could otherwise be available for migration from the landfill, in addition to protecting adjacent properties and buildings from dangerous explosive gases. The leachate collection (for off-site treatment) system must be operated and maintained because it removes contaminants in leachate, making them unavailable for migration from the landfill and preventing further contamination of groundwater. The landfill cap must be maintained to prevent precipitation from infiltrating into the waste fill material to create leachate. Groundwater monitoring must be continued to document the reduction of contaminant concentrations and provide a warning to WDNR of increased concentrations in, or shifting of, the contaminant plume.

C. **Early Indicators of Potential Remedy Problems:** Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future

None.

D.	**Opportunities for Optimization.** Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.
	Although measures to improve cost effectiveness are routinely pursued by WDNR's O&M contractor, most of the remedy operational procedures have already been optimized. Groundwater monitoring at the site was streamlined from 1998 to 2001 and is the current sampling and analysis that occurs today. As the remedy has progressed, less landfill gas is being produced by the waste fill material. Data shows a decline in levels of contamination in groundwater, suggesting the remedy's effectiveness at an already optimized level.